

eman ta zabal zazu



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Logika eta Zientziaren Filosofia Saila

***The co-constitution of technobodies' sex-  
gendered materiality: multiple trans\*  
becomings***

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Kozuzendariak: Andoni Ibarra eta Elvira Burgos Díaz

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## **Esker onak**

Nire kozuzendariei, Andoni Ibarra eta Elvira Burgos Díaz, filosofia feministaren eta zientzia eta teknologiaren filosofiaren hibrido hau materializatzen laguntzeagatik. Zuen eskuzabaltasun, jardun on, argitasun, goxotasun eta irakaspen guztiengatik.

Pepini, maitasunaren, borrokaren eta onestasanaren aldarri eta iturri, nire bidea marrazten duen izarren hautsa izateagatik. Hegoak astintzean argitzen jarraitzen duen nire bihotzaren zatia.

Teresari, burnizko borondate, adibide amaigabe, langile nekaezin, feminismoa eta apaltasuna ardatz, bideak irekitzen dituen eta irakasten duen emakumea izateagatik.

Idoiari, bizitzaren zurrumbilo ero, gozo, latz, mingarri eta zoragarrian bidaide izateagatik.

Ana eta Cruzei, kulturaren balioa nire haragian txertatzeagatik.

Nire koadrilari, Haize, Ekhiñe, Ainhoa, Maider, Olatz, Hodeia eta Maiteri, zuen laguntasun, zaintza, sotengu, ulermen eta pazientziagatik. Hainbeste momentu zoragarriengatik. Bizitza oso bat elkarrekin igarotzeagatik.

Ainhoa, Irati, Xika eta Evari, nire tribua, bizitza kontatu zigutena baino askoz ere gehiago zela partekatzeagatik. Barre, negar eta erokeria guztiengatik. Dantzatutako eta bidaiatutako guztiarengatik. Inposatu zizkiguten mandatuak, feminitatea barne, gure erraien barrenetik desobeditzeagatik.

Xareri, nire kimiko eta iruzkingile politiko kuttunena, zure laguntasun bikainagatik.

Ana Saetari, zure laguntasun feministagatik eta ardo eta garagardo tartean igarotako tarte atseginengatik.

Yariri, songinkerian konplize, bizitzaren sigi-sagan adiskide eta indarraren eta heldutasunaren adibide izateagatik.

Izaskuni, zure disdira eta berotasunagatik, aire fresko gisa nire bizitzan agertzeagatik, koeratu gintuzten elementu horiez gutiez gain koeratzen gaituzten hainbeste elementu konpartitzeagatik.

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Brookei, partekatutako idatzi, bidai, elkarrizketa eta gogoetengatik, zure laguntasunagatik, mendebalde urrunean nire etxe izateagatik.

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Filosofia egiten duten emakume\*, trans\* eta feminista guztiei.

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# 1. Introduction

## **1.1. Transfeminist philosophy in the molecular becoming of technobiopolitics and sex-gendered identities**

These are viral times. The new pandemic of COVID-19 has threatened the hegemonic White life as well as the lives of those who have been threatened by said hegemonic white lives for some time now. For many, this crisis in the form of chemical molecular compounds manifests the structural crisis of our societies in neoliberal capitalism, the healthcare crisis, and consequently, the need to place life at the center of attention. The collapse of the public healthcare system which, albeit battered and privatized due to budget cuts in this case –and despite leaving out many bodies and demands– in certain places, has only exposed and accentuated the economic collapse and more profoundly, the ecological collapse.

We cannot deny the impact that large corporations have on our lives, our bodies, and a great multiplicity of earthly bodies; on social, systemic, and sex-gendered reproduction, namely, our identities and the management of illness and death. In this Dissertation, we<sup>1</sup> focus on the bio-techno-chemical-pharmaceutical-agrarian conglomerate, and especially on pharmaceutical companies because they are truly responsible for the micropolitical management of bodies. This micropolitics that Michel Foucault theorizes (1978 [1976], 1995 [1975]) and of which Donna Haraway (1991)<sup>2</sup> later speaks, now more than ever, acquires a clear molecular turn. Following Paul B. Preciado, Foucauldian biopolitics, that with Haraway we will reconceptualize as “technobiopolitics” (2003, pp. 9-11), becomes molecular (2008, p. 107). As Lorenzo Sandoval indicates in a recent article on the coronavirus, “beyond the disciplinary systems of control,

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<sup>1</sup> Although in English “I” is usually used in academic writing, in this Doctoral Dissertation we have chosen the plural “we.” The reason for this is based in that this Dissertation is shaped by the theorizations and thoughts of multiple authors. Therefore, it is to a great extent a collective effort, undertaking -and thinking with- condensed and reflected in the use of “we.”

<sup>2</sup> The text of “A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s” requires renewed relevance: “The diseases evoked by these clean machines are 'no more' than the minuscule coding changes of an antigen in the immune system” (1985, p. 71). The rapid testing the Ministry of Health has put into circulation in order to know whether a body is infected with coronavirus are antigen tests –the other two tests are reverse transcription polymerase chain reaction, (RT-PCR) and the antibody test. The micro becoming of politics and technology described by Haraway in her *Cyborg Manifesto* and in its current molecular becoming is even more useful and suggestive in these times of COVID-19.

corporations have understood that the battlefield is also molecular. After this pandemic, state and technological corporations will undoubtedly strengthen their control of our bodies” (2020).<sup>3</sup>

Yet the rabid and tragic current state of affairs offers us other concatenated examples that attest to the pertinence and relevance of this Dissertation. One of the triggering phenomena of the acceleration of climate change and its associated transformation and destruction is the increase in environmental toxicity. Xenoestrogens are one of many of the multispecies and multi material actors that comprise this masterpiece which is Earth, in which not all technobodies share the same degree of responsibility. From this situated awareness, also through philosophizing and naming, this Dissertation informs of the xenoestrogenicity in the environment. It analyzes its tentacularity and its ubiquity, its presence throughout geographies, species, bodies, and its various effects on these and on the environment. In addition to numerous hormonal products, among the multiple xenoestrogenic elements examined, dioxins and furans<sup>4</sup> are found as well as heavy metals such as lead, cadmium, selenium, chromium and cyanide. All of which are highly toxic chemical elements that were dumped into the atmosphere and surrounding rivers<sup>5</sup> in another recent collapse, the collapse of the Zaldibar landfill in the Basque Country.<sup>6</sup> Gas masks and masks in general appear as a recurring image and a symbol of our times. Confinement is reiterated as a safeguard against toxicity.<sup>7</sup>

We are also living in times of environmental xenoestrogenization. In the midst of this reality, one of the onto-epistemic innovations and tools that this Doctoral Dissertation offers is a notion of a multiply rooted technobody that points directly at xenoestrogens and more broadly at endocrine disruptors as highly relevant technological elements that participate in our constitution, in addition to hormones –as technoscientific devices and market products.

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<sup>3</sup> Translated from “más allá de los sistemas disciplinarios de control, las corporaciones han comprendido que el campo de batalla es también molecular. Después de esta pandemia las corporaciones estatales y tecnológicas reforzarán, con total seguridad, el control de nuestros cuerpos” (2020).

<sup>4</sup> Regarding the evolution of the levels of dioxins and furans in the air see the website of the Basque Department of Health “Situación calidad del aire y aguas de consumo en el entorno de Zaldibar” [situation of air and water quality consumption of the area of Zaldibar] (2020). This is the only official publication available at the moment. I would like to thank Begoña Jiménez Luque, researcher at the General Organic Chemical Institute (Instituto de Química Orgánica General [IQOG]) of the Spanish National Research Council (Consejo Superior de Investigaciones Científicas [CSIC]), who took said measurements, for her availability and the information shared.

<sup>5</sup> See Basque Water Agency (Agencia Vasca del Agua) (2020).

<sup>6</sup> Two workers from the landfill, Joaquín Beltrán and Alberto Soraluze, died in the collapse. Their bodies still have not been found.

<sup>7</sup> The preventative measures advised by the Basque Country Government concerning the high level of contamination included not ventilating houses, nor practicing sport outdoors in the areas of Eibar, Ermua, and Zaldibar. The Public University of the Basque Country (Universidad Pública del País Vasco/Euskal Herriko Unibertsitatea) advised pregnant and breast-feeding mothers not to attend their center in Eibar. The council of Zaldibar requested that the residents of the neighborhood of Eitzaga not drink tap water. In addition, a league soccer match from La Liga was cancelled. The resonance between the measures taken in the midst of the collapse of Zaldibar and the current crisis of coronavirus is evident.



“Technobody” casts light on the present with its allusion to our constitutive toxicity and our role as generators of toxicity. In the words of Eduardo Rodríguez-Farré, professor of the Biomedical Research Institute of Barcelona (Instituto de Investigaciones Biomédicas de Barcelona) and member of the European Union Scientific Committee on Emerging and Newly Identified Health Risks, who warned of the risks of the increase of dioxins in the Zaldibar area: “It is not a question of alarming, we all have dioxins in our organism” (Gara, 2020).<sup>8</sup> We become technobodies in our multiply relational, albeit unequally toxic,<sup>9</sup> xenoestrogenic and hormonal constitution.

However, as good apprentices to our intellectual predecessor, the cyborg, technobodies observe environmental xenoestrogenicity and the estrogenization of the environment as an ironic possibility of understanding and criticism that traces lines of subversiveness, transformation, and deconstruction of heteropatriarchal logic that operates also philosophically. Following Haraway, it is no use departing from non-existent purity. Knowing we are xenoestrogenically-hormonally constituted in our interweaving with a multiplicity of earthly technocorporealities is the starting point. Through the use of “technobody,” this Dissertation contributes to the analysis and awareness of our co-constitution and the environment.

Through the re-elaboration of the concept of “Capitalocene” (Moore, 2013, 2017, 2018; Malm & Hornborg, 2014; Haraway, 2016a, 2016b), this Dissertation situates technobodies in what we have called the “neoliberal Capitalocene” and makes its small contribution in the characterization and formulation of climate change, beyond anthropocentric determinisms, as a problem with a great capitalogenic feature requiring reflection on the modes of relation and co-constitution of bodies and the environment, principally through various technologies. This contribution is made through two elements. On the one hand, it adds xenoestrogenic toxicity, hormones, and endocrine disruptors to the list of agents that shape this earthly multispecies and multimaterial creation that is capitalism. On the other hand, it shows the nexus between the current levels of toxicity and the economic management that crosses our modes of relation, as various experts and groups indicate regarding the disaster of the landfill site of Zaldibar to which we previously alluded.

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<sup>8</sup> According to the data from the CSIC, transmitted by the Basque Government, the initial detected levels far surpassed the habitual levels of dioxins and furans, which provoked a healthcare emergency. As Rodríguez-Farré indicated, despite the reduction in the levels of toxicity after the fires and disappearance of the state of alert, xenoestrogens had already been deposited in the environment of the area and they will continue to accumulate in the food chain to form part of human technobodies, mainly via dietary intake, but also via inhalation (Naiz, 2020a). Translated from “No es cuestión de alarmar, todos llevamos dioxinas en el organismo” (Naiz, 2020a).

<sup>9</sup> Differences and inequalities of species, class, race or ethnicity, sex-gender, etc. are important when exposing this toxicity. Not all technobodies are exposed to the same levels of toxicity.

This acquires particular importance in relation to the hormonal co-constitution of human, but not only human, animal technobodies and their sex-genders, given that a historical analysis of the technoscientific processes of the creation of hormonal devices, which cannot be understood as disconnected from the manufacturing processes and sales of pharmacological hormonal products, reveals certain interests that operate in the production of our technocorporealities-subjectivities. In this way, this Dissertation is another contribution to the opening of the “hormonal black box” (Preciado, 2008);<sup>10</sup> it is an analytical contribution that exposes and examines the fundamental role of pharmacological, hormonal, xenoestrogenic, and toxic elements that co-constitute our sex-gendered identities, our and more-than-our technobodies and the environment; it is a critical contribution that stimulates and empowers our conscience and agency in the processes of the constitution of our bodies and subjectivities, and the environment.

To account for this relevance and importance of hormonal devices and products in the co-constitution of the materiality of the sex-gender of technobodies, which implies sex-gendered identity, this Dissertation coins the expression “The Age of Hormones,” an era which follows the Age of Gonads (Dreger, 1998) and enables us to designate the historic period in which the gonads, a principal and defining constitutive element of sex-gender –albeit not the only– give way to hormones. Sex-gendering arrives at such a profound level that each molecule of testosterone is synonymous with masculinity and each molecule of estrogen synonymous of femininity. We are witnessing the molecularization of sex-gendered identities in the times of the molecular becoming of technobiopolitics.

Yet this sex-gendering of hormones, its dimorphism, and hierarchization is the fruit of a contingent historic process. Through the analysis of this process, the revealing of its contingency, as well as through the exploration of alternatives to the characterization and understanding of hormones, this Dissertation contributes to the philosophical, scientific, and historical tradition of problematizing “sex hormones.”

Why is this relevant? What purpose is there in showing and challenging the current sex-gendered feature of hormones, devices to which we have lent so much freedom? Because, paradoxically, from their very ambivalent nature, they fulfill the purpose of naturalizing and normalizing sex-gender. On the one hand, hormones have brought with them the attainment of great independence and freedom for many women\*, trans\*, and nonbinary trans\*, separating reproduction from sexuality and offering great possibilities for the self-determination of identity

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<sup>10</sup> Translated from “la caja negra hormonal” (Preciado, 2008).

and body modification. The possibilities to gestate and reproduce for bodies that previously could not have also materialized. However, at the same time, they have also served to pathologize, problematize, and capitalize many vital and identity processes of multiple bodies, causing pain, illness, and even death. These molecular devices that are dreadfully employed by contemporary pharmacologized medicine beyond their use of emancipation, transgression, and multiplication of possibilities, play a key role within the sex-gender regimen as elements of fixation, classification, hierarchization, pathologization, and undervaluing of bodies and identities.

This naturalizing, essentializing, normalizing, and even pathologizing function of hormones is reaffirmed by neuroscientific discourse that sustains the innate nature of sex-gendered identities that remain hormonally hard-wired and fixed for life in the brain of the unborn, following Aristotelian logic of the masculine as presence and the feminine as absence. Through their “hormogenic” determination of cerebral sex-gendered dimorphism, these scientific accounts point at the innate and immutable “nature” of distinct abilities and behavior that can be summarized as greater physical aggressiveness in men and their brain programmed for systematization, and the female brain programmed for empathy (Baron-Cohen, 2005; Swaab, 2007; Auyeung & Baron-Cohen, 2008; Jones et al. 2011). In addition to this, they conceptualize trans\* identities as pathological through the notions of “gender dysphoria,” “gender problems,” or “gender identity disorder” based on an alleged “mistake” or “alteration” of “normal” development due to the reversal of the size of certain brain areas, their quantity of neurons, and/or the incoherence between genital and cerebral “sexing,” all of which are provoked by “alterations,” “disturbances,” or “anomalies” in the hormone levels of the uterus (Zhou, Hofman, Gooren & Swaab, 1995; Kruijver et al., 2000; Chung, De Vries & Swaab, 2002; Swaab, 2007).

Analyzing and challenging these biological determinist narratives in this hybrid of philosophy of science and technology and feminist philosophy which is this Dissertation acquires a triple relevance from my position as philosopher, feminist, and as a body conceptualized and socialized as a woman, which becomes a vital task. Haraway reminds us that it is *only* possible to generate knowledge, rather, responsible knowledge from someplace (1991, p. 193). It is not possible to philosophize from no place. If something characterizes philosophy it is the critical gaze, the questioning of the naturalized, sedimented, and taken for granted. Consequently, the critical and analytical philosophical outlook that provokes and guides this research is inevitably raised from this triple positioning. From this view, the critical analysis of essentialist, determinist, and pathologizing discourses of neurobiology appears as a philosophical undertaking of first degree. In this sense, this Dissertation is a contribution to the analysis and

questioning of certain neuroscientific discourses, not only from a methodological and design perspective, but also because of the unjustified inferences and conclusions that they present and their conceptual mixture and confusion and gender bias, that is, their questionable scientific quality and more importantly, their worrying consequences on the social level. As Haraway indicates:

[f]eminists have stakes in a successor science project that offers a more adequate, richer, better account of a world, in order to live in it well and in critical, reflexive relation to our own as well as others' practices of domination and the unequal parts of privilege and oppression that make up all positions. In traditional philosophical categories, the issue is ethics and politics perhaps more than epistemology. (1991, p. 183)

Denaturalizing sex-gender is not only an epistemically and philosophically relevant undertaking, but it also has great social transcendence. Beyond epistemic aspects, contributing to the ethical-political problematization of these neuroscientific accounts, among which dangerous consequences can be found in the legitimization on a biological basis of the inequality of rights and opportunities for corporealities-subjectivities, of the sex division of work, and even the exclusion, undervaluing, and violence of some bodies against others, acquires greater importance, if possible, in this historic moment of the reduction of rights and liberties worldwide. It is a time when the presidents of countries such as the United States, Brazil, Russia, or the United Kingdom are openly misogynistic, homophobic, and transphobic; it is a time when the ultra-right is rising in many countries of the world, among whose proclamations and proposals of change include the negation of sexual violence, derogation or modification of laws of gender violence, or the fervent fight against affective-sexual education. It is a time when there is a high rate of violence against women\*, trans\* and nonbinary\* and an exponential increase of sexist murders in various places on the planet.<sup>11</sup> It is a time when those who identify as trans\*

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<sup>11</sup> Countless studies attest to this fact. We have selected a few significant ones, both global and from specific territories, whether for their stark reality, or relation to this Dissertation. According to the data from Emakunde (the Basque Institute for Women), 4,244 women\* were assaulted by men in the Basque Autonomous Community in 2018, as recorded by the ertzaintza (police force of the Basque Country), which is 224 women more than in 2017 (2019, p. 28). The consult center for women, Argitan, in Barakaldo, Basque Country attended to 66 women\* in 2019 who had suffered sexual aggression or abuse, which is 74% more than the year before (Naiz, 2020b). The map created by *Berria* cites the figure of women\* murdered in Euskal Herria (Basque Country) from 2003 until present at 105 (2020). According to *Feminicidio.net*, in the Spanish State 99 women\* were murdered in 2019 and 98 in 2018 (2020a). From 2010 until 2019, 1,119 women\* were murdered in the Spanish State (*Feminicidio.net*, 2020b). In Mexico, 2,833 women\* were murdered between January and September of 2019 according the figures from Executive Secretariat of the Public Security National System (Secretariado Ejecutivo del Sistema Nacional de Seguridad Pública [SESNSP]) (Animal Político, 2019) and 3,142 women\* between January and October of 2019 according to Gómez (2019), based on a map of femicide created by María Salguero –which we cannot access because of it being out of service during the quarantine. Concerning 2020, in

suffer a high degree of discrimination, precarization, and social exclusion.<sup>12</sup> It is a time when care is highly feminized, invisibilized, devalued, and subjected to precarization, implying vast economic and power asymmetries (Federici, 2012; Pazos Morán, 2018; Pérez Orozco, 2014).

In the midst of this stark reality that shows appalling figures and a deep and violently unequal makeup, problematizing essentialism appears as a relevant undertaking from the view of the third eye, that is, from a feminist view as well as within feminism. The question of the subject of feminism has emerged with renewed strength in the last years. Who has or does not have the right or legitimacy to speak in the name of feminism and from feminism? Behind certain behaviors and exclusive acts that have to do with the idea of intersectionality as Sam Fernández states (2018), which also deals with the matter of trans\*, a variety of factors are hidden, on the political scale, the fear and anger that can be provoked by the loss of power, representation, and visibility, and on the epistemological level, biological essentialism and determinism.

The idea that the same biotechnologies, pharmacological technologies, and hormones, in particular, constitute our bodies, those of women\* in particular, and even the supposedly pure natural essential cis femininity –often heterosexual– that some privilege, is something that we share and that brings us closer. It takes away privileges awarded on the basis of this presumed idea of the essential and natural “woman.” Moreover, historically cis women\* have been the ones who have most treated themselves with hormones (Oudshoorn, 1994; Watkins, 2007;

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Mexico 8,640 women\* have been murdered (Castillo, 2020). The website of INCITE! shows various cases of police and state violence in the United States against trans\*, nonbinary\*, Native, Black, Latin, Asian, and Arabic women\* (2020). Trans Murder Monitoring reports 3,314 murders of people who identify as trans\* in 74 countries of the world from 2008 to 2019 (Transgender Europe, 2019). 61% of them were sex workers. I would like to thank Aura Sabina for the information shared.

<sup>12</sup> According to a study by the European Union Agency for Fundamental Rights (FRA), 54% of trans\* Europeans surveyed had suffered from discrimination, harassment, or violence in the previous year (2014, p. 3). 29% of trans\* students had been discriminated against at school by teachers, 37% while searching for employment, and 27% in the workplace (2014, p. 4). In the study, “Transexualidad en España. Análisis de la realidad social y factores psicosociales asociados,” (Transsexuality in Spain. Analysis of social reality and associated psychosocial factors) 33,3% of the trans\* surveyed earn less than 600 euros a month and 15% less than 300 euros (Domínguez Fuentes, García Leiva & Hombrados Mendieta, 2012, p. 31). Likewise, 35,3% of those surveyed were unemployed, 48,2% had worked in prostitution and 55,9% had experienced workplace conflict for having made their condition public (Domínguez Fuentes, García Leiva & Hombrados Mendieta, 2012, p. 31). According to the Mexican National Survey on Discrimination 2017 (Encuesta Nacional sobre Discriminación 2017), 36% of Mexicans would not rent a room to someone who identified as trans\* (National Council to Prevent Discrimination [Consejo Nacional para Prevenir la Discriminación], 2018). Robles et al. report that 76% of trans\* participants in their study, conducted in Mexico City, had suffered some type of discrimination, and 63% some type of violence during the course of their studies (2016, p. 856). In the study conducted by Baruch, Infante, and Saloma based on a survey from 2012, 66% of trans\* bodies had suffered bullying in Mexico (2016, p. 20). Coinciding with the data from the Spanish State, more than 40% trans\* bodies considered in the report from the Mexican Public Health Institute (Instituto de Salud Pública) are sex workers (Gutiérrez, Franco, Sansores & Shiba-Matsumoto, 2012, p. 2). For data concerning the discrimination of trans\* in the United States, see U.S. Transgender Survey (National Center for Transgender Equality, 2016).

Preciado, 2008; Ostertag, 2016). Paraphrasing Beauvoir, “one is not born, but rather becomes, a woman” (Beauvoir, 1956 [1949], p. 273) hormonally as well.

On the other hand, as we have indicated, some scientific discourses affirm cerebral sexual dimorphism and justify the innate and biological nature of the distinct abilities, preferences, and behavior of men and women\*. These are the same scientific discourses that conceptualize trans\* identities as pathological, as a problem, disorder, or inversion. That is to say, the discourses that conceptualize trans\*, cis, bisexual, pansexual, lesbian, heterosexual, and nonbinary trans\* women\* as inferior subjects are the *same*.

Inspired by the words of Haraway and interpellated by our own genealogical history, this research also revises her postulates and conclusions in light of epistemic considerations – what have we learned? – or in an ethical-political sense –do we want to reproduce the same exclusions, hierarchizations, and dominations to which we have been subjected? In this sense, when falling into relationality, multiplicity, and the becoming of sex-gendered corporealities-subjectivities, this Dissertation also supports a multiple and anti-transphobic feminism. One of the ideas that sprouts from these pages that is also a contribution to feminist thought and praxis is the relevance of these relations: they are relations that we must change. As an alternative to the basis of the political subject in biology, it may be that a more efficient, desirable, and fruitful way is to analyze the oppressions that constitute us or the modes, practices, discourses, and specific and shared technologies of constitution, domination, and exclusion. In other words, we should generate action, as Judith Butler (1990, pp. 1-6) proposes, not from the identification of supposed biological essences, but from the constitutions and oppressions that from their specificity and interweaving unite us, which redound to the shaping of provisional, open, multiple, and changing political subjects in becoming.

## **1.2. Objectives and hypothesis. The conditions of possibility of the materiality of technobodies’ sex-gender**

The principal objective of this Dissertation is to understand the main processes, elements, and technologies that operate in the co-constitution and significance of the materiality of the sex-gender of technobodies in the neoliberal era, focusing on trans\* bodies, creating new opportunities for multiplicity. As we can observe, the main aim with an epistemic feature presents an onto-political dimension as well. In other words, we could read that an objective of onto-political nature underlies this main objective of an epistemological nature.

This study departs from an apparently simple question in its formulation, but highly complex in its approach: What is sex? What and how is what we call “sex” constituted in its materiality? This question is formulated by Butler in *Gender Trouble*:

And what is sex anyway? Is it natural, anatomical, chromosomal, or hormonal, and how is a feminist critic to assess the scientific discourses which purport to establish such facts for us? Does sex have a history? Does each sex have a different history, or histories? Is there a history of how the duality of sex was established, a genealogy that might expose the binary oppositions as a variable construction? Are there ostensibly natural facts of sex discursively produced by various scientific discourses in the service of other political and social interests? If the immutable character of sex is contested, perhaps this construct called “sex” is as culturally constructed as gender; indeed, perhaps it was always already gender, with the consequence that the distinction between sex and gender turns out to be no distinction at all. (1990, pp. 6-7)

As observed, one of the immediate questions to emerge when questioning sex is its relation with gender. Butler has already wonderfully formulated the problem of sex-gender in her questioning of sex. This Butlerian formulation of the matter of sex-gender will function as a Gordian knot. We will unweave and reweave the multiple strands of this knot in this introduction as well as throughout this Dissertation. From the consideration of the very ontological status shared by “sex” and “gender,” Butler denounces the logic of inversion in which gender was invented first and later sex, as natural to legitimize gender on the basis of the naturalness of sex. According to Butler, through its sedimentation in time, culture has made its creations appear natural (1999, pp. 139, 178).

Both for Butler and Thomas Laqueur, sex is a social and cultural construction, which is a result of or is determined by the concept of gender –although for a great part of the time period analyzed by Laqueur, the concept of “gender” with all of its semiotic-material condensing and implications would not have emerged yet–: “Two incommensurable sexes were, and are, as much the products of culture as was, and is, the one sex model... Sex... replaced what we might call gender as a primary foundational category. Indeed, the framework in which the natural and the social could be clearly distinguished came into being” (1990, pp. 153-154). Laqueur traces a genealogy of sex from Ancient Greece to the decades of 1920 and 1930, a moment in which a new conceptualization of sex-gender emerged that pivots around a new technoscientific artifact: hormones. This historic tracing maps the “creation” rather than the “discovery” of sex as a biological entity, and the subsequent emergence in the eighteenth and nineteenth centuries of a new logic, sexual dimorphism, a process which he does not characterize as immediate nor

homogenous, nor as a complete erasure of the previous logic. He explains the causes are rooted beyond new science, in the political arena, specifically in the necessity of re-legitimizing the hierarchy of gender:

I have no interest in denying the reality of sex or of sexual dimorphism as an evolutionary process. But I want to show on the bases of historical evidence that almost everything one wants to *say* about sex –however sex is understood –already has in it a claim for gender. Sex, in both the one-sex or the two-sex worlds, is situational; it is explicable only within the context of battles over gender and power. (1990, p. 11)

In his analysis of the establishment of the logic of sexual dimorphism, Laqueur reveals the establishment and dichotomic configuration of the dimensions of the natural and the cultural. However, he indicates that “some of the so-called sex differences in biological and sociological research turn out to be gender differences after all, and the distinction between nature and culture collapses as the former falls into the latter” (1990, p. 13). Questioning sex/gender, nature/culture dichotomies among other pairs that are traditionally articulated as dichotomic and their relational and co-constitutive conceptualization is reiterated throughout the work of Anne Fausto-Sterling (2000, 2003, 2005, 2012a, 2012b, 2019) and Haraway (1985, 1991, 2003, 2015, 2016a, 2016b), among others, and broadened to other differences such as race by authors such as Laurel C. Schneider (2012) or Amade M’charek (2010).

For Butler, sex and gender are performative, producing that which they intend to describe, and therefore need reiteration. As a result, they appear as effects, not of the action of a subject, but of the cultural norms previous to the action of this subject (1990, pp. 24-25). Haraway also highlights the nature of effect of differences between gender and race, among others (2003, pp. 6-7). The theory of gender performativity rejects that sexual difference originates from natural or biological differences. Butler indicates that the cultural gender norms are what prescribe the coherence, stability, and the truth of gender identity, “they produce the masculine and feminine in opposition and designate heterosexuality as desire” (Burgos Díaz, 2012, p. 96).<sup>13</sup> Therefore, gender identity is not descriptive but normative. However, the performative nature of gender implies its instability and vulnerability because it needs repetition and never comes to be concluded. Therefore, it can be configured in other ways and can, and should, be disputed and multiplied.

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<sup>13</sup> Translated from “producen lo masculino y femenino en oposición y designan la heterosexualidad del deseo” (Burgos Díaz, 2012, p. 96).



With respect to the *materiality* of sex, for Butler, gender performativity is intertwined with the materiality of the body and in this interweaving, the category of “sex” inevitably emerges: “the regulatory norms of “sex” work in a performative fashion to constitute the materiality of bodies and, more specifically, to materialize the body’s sex, to materialize sexual difference in the service of the consolidation of the heterosexual imperative” (1993a, p. 2).<sup>14</sup> Thus, the norms that embody sex are also the ones that regulate the process of materialization and make the body intelligible and apt as human, or exclude it and convert it into something abject (1993a, pp. 3, 8). This process of materialization is possible only as a result of the continuous and obligatory repetition of norms. Therefore, materiality is an effect of power dynamics (1993a, pp. 2, 3, 8). There is no matter, body, or sex before discourse, yet this does not imply the erasure of the material. Butler describes the relation between language and materiality as interdependent and characterized by mutual excess, which implies the difficulty of establishing the limits between materiality and discourse:

Language and materiality are fully embedded in each other, chiasmic in their interdependence but never fully collapsed into one another, i.e., reduced to one another, and yet neither fully ever exceeds the other. Always already implicated in each other, always already exceeding one another, language and materiality are never fully identical nor fully different. (1993a, p. 69)

The influence, relevance, and acceptance of the theory of gender performativity in contemporary feminist thought is undeniable. Nevertheless, it has received a number of criticisms that we could condense into one issue: its difficulty to account for the *materiality* of sex-gender. These criticisms could be traced in two directions, on the one hand those which point to *technological* aspects of constitution or shaping of sex-gender; on the other, those which point to *biological* materiality, although there may be proposals that join both aspects.

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<sup>14</sup> Other authors like Elizabeth Grosz (2008) (1999) or Rossi Braidotti (1994, 2002) maintain and defend the existence of sexual difference, beyond the heteronormative framework. In *Metamorphoses*, the references to Butler and the dialogue and debate of her various postulates and approaches are constant (Braidotti, 2002). Butler responds to this criticism from Braidotti in *Undoing Gender* (2004, pp. 192-203). The excessive importance awarded to the linguistic and the matter of sexual difference are part of Braidottian criticism. Without delving into this criticism or the response, it is relevant not in the defense of sexual difference, which is absent in this Dissertation, but because of the close relation that it presents with one of the main theses that we formulate in this Dissertation, recovering the multidimensionality and complexity that Butler acknowledges in reference to the question of gender, sexuality and sexual difference: “I want to suggest that the debates concerning the theoretical priority of sexual difference to gender, of gender to sexuality, of sexuality to gender, are all crosscut by another kind of problem, a problem that sexual differences poses, namely, the permanent difficulty of determining where the biological, the psychic, the discursive, the social begin and end.” (2004, p. 185).

Preciado, who ascribes to the Butlerian framework of performativity states that “gender is not simply performative (that is, an effect of the linguistic-discursive cultural practices),” but that “it is found in the materiality of bodies” (2002, p. 25),<sup>15</sup> which implies forms of *technological* incorporation. In this sense,

Although performative analyses of gender was and continues to be quite fruitful, both regarding the production of political strategies of self-nomination... as well as giving effective results for the understanding of identity in its discursive proliferation (especially textual and linguistic) it falls short when attempting to explain the modification of the structure of life that operates in our post-Money-ist societies.

The performative analysis of identity closes the cycle of the reduction of identity to the effect of discourse which ignores the specific incorporation technologies that function within the different performative inscriptions of identity. The concept of the performance of gender, and more so the concept of performative identity, do not allow for biotechnological processes that make determined performances “pass” as natural and others not taken into account. Gender is not only a performative effect; it is above all a process of prosthetic incorporation. (2009, p. 31)<sup>16</sup>

This relevance of the technological in relation to sex-gender takes a double form for Preciado. On the one side, it falls on the nature of political-social technology of sex-gender and sexuality themselves (2002, pp. 21, 22). It also speaks of “technogender” in this sense and of gender as an operating program (2008, p. 81, 88). On the other, it emphasizes the role of surgical, pharmacological, hormonal, and chemical technologies as well as biotechnologies and digital and communication technologies in the production and management of sex-gender (2008, 2009). Delving into this technological importance, he conducts an analysis of the “pharmacopornographic” modes and technologies of production and management of the sex-gendered identities of “technobodies” (Preciado, 2008, pp. 117-158; 2013), in which a brief political genealogy of hormones and certain hormonal products is framed, based on the archaeology previously carried out by Nelly Oudshoorn (1994).

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<sup>15</sup> Translated from: “[e]l género no es simplemente performativo (es decir, un efecto de las prácticas culturales lingüístico-discursivas)”, sino que “no se da sino en la materialidad de los cuerpos” (2002, p. 25).

<sup>16</sup> Translated from: “si bien el análisis performativo del género fue y sigue siendo muy fructífero, tanto a lo que concierne a la producción de estrategias políticas de autonominación (...) [a]sí como da resultados eficaces para la comprensión de la identidad en su proliferación discursiva (sobre todo textual y lingüística) tropieza cuando se trata de explicar la modificación de la estructura de la vida que opera en nuestras sociedades posmoneyistas. El análisis performativo de la identidad cierra un ciclo de reducción de la identidad a un efecto del discurso que ignora las tecnologías de incorporación específicas que funcionan en las diferentes inscripciones performativas de la identidad. El concepto de performance de género, y más aún el de identidad performativa, no permite tomar en cuenta los procesos biotecnológicos que hacen que determinadas performances “pasen” por naturales y otras, en cambio, no. El género no es sólo un efecto performativo; es sobre todo un proceso de incorporación prostético” (2009, p. 31).

The role of technologies in the shaping of sex-gender, specifically in the appearance of the idea of psychological sex, which later stems to the appearance of the concept of “gender,” is also emphasized by Geertje Mak. Her study of intersexuality from the nineteenth century, especially in the context of Germany and France, informs of the emergence and intervention of distinct sexual logics: the logic of sex as social inscription, the logic of sex as representation of the body, and the logic of sex as representation of the inner self. According to Mak, although some of these logics have historically overlapped and have operated simultaneously, the step toward 1900 from the logic of representation of the body to the logic of sex as the inner self, which acquired greater and greater transcendence to complete their deployment through the condensing of the notion of gender –according to Alice Domurat Dreger, in 1915, in the article “Hermaphroditism” by William Blair-Bell (1998, p. 166); according to Mak (2012, p. 158), Preciado (2008, p. 81; 2009, pp. 21-22)<sup>17</sup> and Bernice L. Hausman (1995, pp. viii, 7, 72-73), led to John Money and John and Joan Hampson in the decade of 1950<sup>18</sup>– it would not have been possible without the role that new technologies played. According to Mak, the supply and demand of surgery increased considerably after 1900 because of, among other reasons, the laparotomies and biopsies available to doctors.<sup>19</sup> These diagnostic techniques and surgical operations made possible the irreversible modification of the subjectivity-materiality sexed by the bodies, thus implicating vital decisions about the future of legal and social sex (Mak, 2012, p. 171).<sup>20</sup> These new techniques and technologies, in addition to appearing as effects, transformed

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<sup>17</sup> Preciado specifies that the notion is used for the first time by Money in 1947 in his Doctoral Dissertation and later developed together with Anke Ehrhardt and the Hampson siblings (2008, p. 81; 2009, pp. 21-22).

<sup>18</sup> Although Mak agrees with Hausman on the relevance of new technologies and medical practices in the appearance of this new idea of the sexed inner self, Mak critically elaborates on Hausman’s hypothesis that the separation between body and gender identity took place in 1950. Mak postulates that this excision began around 1900, although she situates its culmination in the mid-twentieth century (2012, pp. 10, 159, 182).

<sup>19</sup> This is a point of discrepancy between Mak and Dreger, given that the latter affirms that biopsies did not begin to be conducted in France and Great Britain until 1910, and laparotomies were not available as a regular diagnostic method of sex in France until 1920 (Dreger, 1998, pp. 93, 149). Nevertheless, it is important to note that surgical operations do not appear out of thin air. Herniotomies have been conducted since the end of the nineteenth century (Mak, 2012, pp. 258-259). According to Reis, the surgeries offered toward the end of the nineteenth century generally included opening the vaginal occlusion, surgically removing the testicles, and excising the clitoris; in the case of hypospadias, the straightening of the penis and extension of the urethra through the penis (Reis, 2009, p. 71). Nevertheless, Reis notes that the danger of inflammation, infection, and even bleeding to death involved in surgeries such as the opening of the vagina.

<sup>20</sup> Until then, according to Mak, hermaphrodites were subjected to ecclesiastic and legal civil authority, which in certain cases requested medical consult (2012, pp. 36-40). Now, the management will be directly medical. Importantly, the strategy, especially in contexts and moments in which the logic of sex as inscription dominated, and also in part of the period in which the logic of sex as representation of the body operated, hermaphrodites lived in secret, although their situation may have been known in small communities (2012, p. 24). When they were discovered and obligated to live as another sex assigned at birth, they often abandoned the community (2012, pp. 57, 65). Now, the social uprooting and abandoning of past life will not be necessary: bodies will be technologically operated and modified. Intersexuality will continue to be erased as in previous times and in the Age of Gonads because of the imperative of the two sexes with one single sex per body, but now this will occur technologically.

and shaped sexed materialities and subjectivities in ways that had been unknown until that moment. To accomplish this, the role of anesthesia was fundamental in overcoming the resistance, shame, and pain of patients which led to the suspension of subjectivity, awarding increased power to doctors (Dreger, 1998, pp. 91-92; Mak, 2012, pp. 6, 148-151).

Mak and Dreger coincide in pointing at the criteria of the end of gonads, that is the end of what Dreger called “The Age of Gonads,” a period between 1870-1915, especially in Great Britain and France, in which the only and true sex of the body was mainly established by the gonads, which came to be favored by new technologies, but Mak disagrees with Dreger regarding the exact moment in which this occurred. For Dreger, this took place in 1915 through the open questioning of the criteria of the gonads by Blair-Bell, who, in the previously mentioned text, “Hermaphroditism,” together with the employment of the notion of gender highlighted the importance of hormonal secretions in the shaping of sex characteristics (1915, pp. 289-290).<sup>21</sup> However, Mak agrees with the fact that this questioning, and the new sexual logic to which it led began after 1900 (2012, pp. 157, 159). Reis, who analyzes the context in the United States, states that this is still employed by some doctors despite the growing and progressive questioning of the gonadal criteria in the decades spanning from 1920 to 1940, and the loss of the importance of the gonads due to the renewed importance given to the genitals, psychological sex and hormones (2009, pp. 98-109).

Mak and Reis point at a historic Gordian knot. According to Mak, also based in the analysis of Stefan Hirschauer (1993), the logics of sex as representation of the body and representation of the inner self that appear in distinct historic moments come to occur simultaneously, often entering in conflict not only in a specific historic moment, but also in trans\* bodies (Mak, 2012, p. 13). In both cases, sex as a representation of the self or psychological sex, which leads to gender identity, will acquire greater epistemic relevance and authority than sex as representation of the body or sex that we could call “tangible.” For Mak, this conflict between tangible sex and gender identity, which currently occurs simultaneously in trans\* corporealities-subjectivities, is the fruit of a historic process, which is resolved by the pre-eminence of gender identity:

As the modern Western world has grown accustomed to the phenomenon of transsexualism and – certainly in Western Europe – has institutionalized the physical, social and legal transformation of

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<sup>21</sup> Blair-Bell does not yet speak of “hormonal secretions,” but of “internal secretions,” which later would be called “hormones” (2015, p. 290). Together with internal secretions, “endocritic organs” or “internal secretory organs” are mentioned (1915, p. 289).

men into women, or women into men, the idea of sex being fundamentally anchored in the self has become a quite dominant rationale. The sex of self, then, ultimately legitimizes the infringement of the other rationales, of sex as a representation of the body and sex as someone's inscription in society. (2012, p. 157)

Together with the challenging of the dichotomism of Mak's analysis, it is important to note that the idea of sex as inner self, which would become gender or in gender identity, is not something exclusively nor specifically linked to trans\* corporealities-subjectivities, but something that co-constitutes all corporealities-subjectivities. What makes this idea –despite its essentialism that is often associated or intrinsic– particularly interesting, useful, and fruitful in the case of trans\* corporealities-subjectivities is that it allows for the destabilizing of the coherence of gender and for the questioning of the sex-gender assigned at birth, which is reclaimed by –and associated with– various trans\* collectives. Moreover, paradoxically, despite this essentialism, the idea of psychological sex, together with the distinction between tangible physical sex and psychological sex that it brings with it, is what made possible the emergence of trans\* corporealities-subjectivities in the west.

Reis focuses on heteronormativity that guides gonadal processes of sex reassignment<sup>22</sup> and points at the intersection between hermaphroditism and homosexuality and the likeness they present concerning the current conceptualization of many trans\* technocorporealities-subjectivities. In 1890 homosexuality intersected with hermaphroditism: the so-called genital “ambiguity” could imply homosexuality, and it could even be understood that homosexuality was a type of mental or cerebral hermaphroditism (Reis, 2009, pp. 57, 63). According to Reis – before Mak– the description from various doctors of cases of hermaphroditism –in this case the doctor C.W. Allen– is similar to many current descriptions of trans\* identities (*transgender identity*):

Angell was “honestly convinced that nature had intended him for a female.” As the historian Joanne Meyerowitz has pointed out, early sexologists considered cross-gender identification to be a category of “inversion”; it wasn't until the mid-twentieth century that “transsexualism,” the term for sex change through hormones and surgery, was coined. (2009, p. 65)

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<sup>22</sup> Regarding the heteronormativity that guided the processes of the scientific-medical management of hermaphroditism, and the problems that they often caused concerning the criteria of the gonads, see Dreger (1998, pp. 110-138).

Reis again notes that this same theory of “psychological hermaphroditism” or “mental hermaphroditism” in reference to men who feel they are women\* or that were “destined” to be such is currently postulated by some transsexuals: “Comparing themselves to intersexed people, they argue that their condition is hidden in the brain, but biological nonetheless” (2009, p. 184, note n° 33).

The importance of hormones in the constitution and definition of sex is also noted by Oudshoorn in her piece *Beyond the Natural Body: An Archeology of Sex Hormones* (1994). In it, the author conducts an archaeology of the so-called “sex hormones” and analyzes how scientific facts that shape and constitute the bodies of women\* were created in laboratories as well as converted into market products. Oudshoorn continues the analysis from the point at which Laqueur left it:

Given this dominant status of the hormonally constructed concept of the body, I took up the challenge of uncovering the roots of the hormone story to see whether the image of “the hormonal woman” is only a current notion, or whether it had emerged already during the early years of sex endocrinology, as this area of biomedical sciences came to be known. *Beyond the Natural Body* takes up the course of history where Thomas Laqueur left it in *Making Sex*: the roaring 1920s and 1930s. In these decades, sex endocrinologists established the basic concepts and techniques that have served as cornerstones in structuring our knowledge of hormones to this day. (1994, p. 9)

The transcendence of hormonal products in the constitution of femininity has been repeatedly highlighted (Seaman, 2003; Watkins, 2007). In *Sex, Science and Self. A Social History of Estrogen, Testosterone, and Identity*, Bob Ostertag extends this hormonal constitution of sex-gendered identities, the idea that hormones constitute the essence of gender, beyond the identities of trans\* or LGTB, to human identity in general:

The point is not that we should declare sex hormones to be “good” or “bad”. The point is that they are at the center of the story not outside of it. Because the biggest story here... is not the story of particular kinds of chemicals or people, be they L, G, B or T. It is the nexus between technology and what has come to be called human identity. (2016, p. 7)

This feature of the technological construction of corporealities-subjectivities, not only that of trans\*, is also emphasized by Preciado, extending the concept of “technobody” to contemporary technocorporealities in general, which are characterized, among others by a “pharmacopornographic” hormonal constitution, especially after WWII.

In line with what has been presented until now, the principal hypothesis formulated in this Dissertation is that hormones are some of the main technological elements that operate in the co-constitution of sex-gendered *materiality* of technobodies –which implies their subjectivity– in the neoliberal era, not only in the case of trans\* technocorporealities, but also in technobodies in general, which allows for the questioning of sex-gender as something given, natural, fixed, stable, and makes possible the deconstruction and reconstruction of this materiality in a more fluid and changing way.

However, accounting for the materiality of the sex-gender of technobodies, as we indicated previously, requires the informing of other elements that have a biological nature, in addition to discursive and technological elements. In this sense, in line with the deployment of the Butlerian question formulated at the beginning of this section, the main objective specified in this Dissertation consists of delving into the processes of construction and meaning of the materiality of sex in the context of the relation between “gender” and “sex,” aiding in strengthening the questioning of the normative framework that imposes the coherence between gender, sex, and sexuality and delves into the creation of new opportunities for multiplicity.

Once again taking up the question of the criticisms or contributions to the Butlerian framework of gender performativity, the second line of criticism stems from new materialisms or the “material turn.” Stacy Alaimo and Susan Hekman, in the anthology of *Material feminisms* state that the tendency to focalize on discourse at the expense of the material has been evident in what they call “feminist versions of postmodernism.” In this sense they affirm that

Judith Butler, perhaps the most notable feminist postmodern, is frequently criticized for her “loss” of the material, specifically the materiality of the body. The feminist debate over her *Gender Trouble* (1990) and *Bodies That Matter* (1993) is evidence, in the eyes of many feminists, that postmodern feminism has retreated from the material. (Alaimo & Hekman, 2008, p. 3)

According to the authors, this retiring from the material, this not taking the material seriously has had serious consequences for feminist theory and praxis, including, among others, the appropriation of the material by hegemonic discourses from the racist and heteronormative regimen. Despite the vast amount of feminist publications in the last decades regarding the body and the undeniable contribution of the discursive critique and the studies of feminist politics, Alaimo and Hekman note that this and its materiality have been conceptualized as effects of discourse. Therefore, instead of speaking about the body, they have ended up speaking about discourse on the body (2008, p. 3). In the face of this, the authors reclaim the necessity of speaking of the body, materiality, and “nature” from their feature as active agents that are far

from the dualisms of nature/culture, human/nature, or body/environment. In this sense, they emphasize work of Haraway as it speaks of the “discursive-material” and of “material-semiotic actresses” from its mutual interweaving.<sup>23</sup>

For Alaimo and Hekman, when it comes to inhabitants of more-than-human worlds, thinking of corporeal materiality implies thinking openly about the environment, in dialogue with the lines opened by environmental feminisms, ecofeminisms, corporeal feminisms, and feminist studies of science. This requires considering the materiality of more-than-human worlds. “Nature” has consequences for human and nonhuman worlds. The authors reclaim the necessity of reconceptualizing “nature” from the relationality of the material, the discursive, the human, the more-than-human, the corporeal, and the technological (2008, p. 5). Nevertheless, according to Alaimo and Hekman, this more productive account of the dynamics, agency, and semiotic strength of bodies and “natures” should be given based on the lessons learned from the *linguistic turn*, not abandoning them (2008, p. 6).

From the interaction of culture, history, discourse, biology, technology, and the environment, the materialist feminism that Alaimo and Hekman propose thinks through the co-constitutive materiality of human corporeality and nonhuman nature (2008, pp. 7, 9). Distanced from an environmentalist view based on *wilderness* they propose thinking of the trafficking of toxins as a phenomenon that implicates scientific, economic, political, and ethical fields in an interrelated way. The analysis reveals the disproportionate toxic burden placed on indigenous bodies and the bodies of lower classes and bodies of color:

The same material... particular toxin such as mercury or dioxin, may affect the workers who produce it, the neighborhood in which it is produced, the domesticated and wild animals that ingest it, and the humans who ingest the animals who have ingested it. (Alaimo & Hekman, 2008, p. 9)

Leaving behind the idea of nature as a blank slate, as well as racism, sexism, and homophobia, the authors postulate that acknowledging the active and significant feature of nature from a multiple grounding implies creating histories that interlace historically situated human bodies, other organisms, and technological devices, namely, the human and the nonhuman, the organic and the inorganic (Alaimo & Hekman, 2008, p. 11-12).

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<sup>23</sup> In addition to Haraway, other distinguished authors who participate in this anthology are Grosz, “Darwin and Feminism: Preliminary Investigations for a Possible Alliance” (2008 [1999], pp. 23-51), Karen Barad, “Posthumanist Performativity: Toward an Understanding of How Matter comes to Matter” (2008 [2003], pp. 120-154), or Vicki Kirby, “Natural Conver(s)ations: or What if Culture was Nature all along?” (2008, pp. 214-236), among others. In the introduction, Alaimo and Hekman name other authors absent from the anthology, such as Braidotti, Luce Irigaray or Gloria Anzaldúa among others, with whom nevertheless, according to Alaimo and Hekman, this piece should be read in dialogue (2008, p. 10).



Although we could problematize certain aspects or issues, these critical contributions are not interpreted in this Dissertation as criticisms that weaken, delegitimize, or invalidate the Butlerian theory of gender performativity. Quite to the contrary, they are relevant points of view that complement and enrich it significantly and necessarily. In the words of Preciado: “it should not be interpreted as breaking away from the Butlerian framework of analysis, but as a contribution to what Butler herself calls for” (2009, p. 31),<sup>24</sup> in her zeal for accounting for the processes of the materialization of the body and of sex-gender. This way, following the approaches of Anne Fausto-Sterling (2000, 2003, 2019), Haraway (1991, 2003, 2016b), M’charek (2010), and Schneider (2012), the first specific hypothesis that we will deploy throughout the four chapters of this Dissertation, with particular importance in the second and fourth chapters, is that the relation between sex and gender intertwined with other differences such as race, class, ability, sexuality, etc. is of mutual constitution or co-constitution in which technological-organic-discursive-material elements participate. That is, sex-gender is an effect of technological-organic-discursive-material relations. Given that in feminist literature the matter of sex-gender appears linked to the debate regarding technobodies (Hawthorne, 2001; Braidotti, 2002; Pitts, 2003; Balsamo, 2005; Croissant, 2006; Preciado, 2008), and from the analysis of the interweaving of the human and the nonhuman, the organic and inorganic, the biological, the discursive, and the technological (Alaimo & Hekman, 2008; Alaimo, 2008; Fausto-Sterling, 2000, 2003; Haraway, 1991, 2003, 2016a, 2016b), our hypothesis is that the sex-gender of animal technobodies and, specifically, human technobodies is an effect of technological-organic-discursive-material relations of co-constitution in a changing process that is open to the environment.

Here, co-constitution acquires a double meaning. On one hand it alludes to the Harawayan and Butlerian idea that nothing is constituted alone; we are in relation, becoming with, making with; our becomings are constitutively interrelated (Butler, 2005, 2009; Haraway, 2003, 2016a, 2016b). On the other, it acquires the sense with which Judy Wajcman (2004, 2007) and Haraway (1985, 1991, 2016a) characterize the relation between technology and gender. That is, the conception of gender shapes technology while technology constitutes and reproduces the conception of gender, as we will mention in the second chapter and manifest and analyze in depth in the third chapter.

Given the previously mentioned importance of technological elements intertwined with other organic-discursive-material elements in the sex-gendered co-constitution, the second

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<sup>24</sup> Translated from: “no debe interpretarse como una ruptura con el marco de análisis butleriano, sino como un aporte a lo que la propia Butler llama” (2009, p. 31).

specific objective of this Dissertation consists of departing from the relational cyborg onto-epistemology, delving into the understanding of the meaning of our co-constitution as technobodies as far as sex-gender is concerned, analyzing and describing the principal technologies that intervene in this sex-gendered co-constitution. From a multiform mapping shaped by multiple technological elements, our second hypothesis is that we are technobodies inasmuch as our sex-genders are xenoestrogenically and hormonally co-constituted in a changing process open to the environment. Hormones and xenoestrogens, which implicate and exceed each other, are some of the main technological devices –but not the only– that operate in the co-constitution of human animal technobodies, animal technobodies in general, and the environment as a whole in the current historical moment.

The third specific objective consists of exploring in-depth the processes of co-constitution and significance of the materiality of the sex-gender of technobodies, especially emphasizing the category of trans\*, aiding in strengthening the questioning of the normative framework that imposes a coherence between gender, sex, and sexuality, and delving into the creation of new opportunities for multiplicity. Related to this objective, we formulate different hypotheses. Along the line of the principal hypothesis in this Dissertation, our third specific hypothesis is that Dreger’s Age of Gonads, around the decades of 1920 and 1930, gave way to what this Dissertation calls “The Age of Hormones” so that from approximately 1940 or 1950 we can state with clarity that sex-gender acquired a new hormonal conceptualization and pivoted around a fundamental concept: “sex hormones.” Our fourth specific hypothesis is that the sex-gendered nature of “sex hormones” can and should be disputed in favor of an account in which *steroid* hormones are conceptualized as another element among a multiplicity of technological-organic-discursive-material elements that participate in the co-constitution of sex-genders, as well as in another barrage of technocorporeal processes and functions in a changing process that is open to the environment.

Given the toxic xenoestrogenic feature of hormones in their co-constitution of the environment and nonhuman animal technobodies, our fifth specific hypothesis is that beyond the binary heteropatriarchal anthropomorphizing view, which places excessive emphasis on the sex-gendered effects of xenoestrogens to the detriment of their multiple and significant effects on the health of technobodies, toxicity forms part of their very sex-gendering process, in a changing, and multiple process open to the environment. The excessive emphasis on sex-gender brings to light the fear and vulnerability of hegemonic masculinity.

With respect to the processes of co-constitution and meaning of the materiality of the sex-gender of trans\* human technobodies, we deploy a two-fold hypothesis, which encompasses

elements of a discursive and biological feature. Likewise, our sixth specific hypothesis consists of the category of “trans\*” making reference to a subjective-corporeal multiplicity that is historically situated. The seventh specific hypothesis is that multiplicity is reduced and conceptualized as pathological, abnormal, and problematic by the neuroscientific discourses of “Brain Sex Theory,” which explain transsexuality as a result of the hormonal prenatal influence in the formation and development of the brain, remaining fixed for life.

The fourth specific objective of this Dissertation consists of delving into the principal characteristics and tendencies of neoliberal capitalism in relation to the sex-gendered paradigm, placing special emphasis on the role that technology plays. Our eighth specific hypothesis is that in the neoliberal Capitalocene, not only are the management, production, and constitution of sex-gendered identities becoming molecular, but also technobiopolitics as a whole: the agro-chemical-bio-techno-pharmaco-military fabric acquires a toxic and molecular shape and infiltrates all forms of production in its tentacularity, from seeds to microprocessors.

The fifth and final specific objective attempts to delve into the perspectives that characterize the sex-gender of technobodies as process, becoming, and effect of relational practices and interactions with a special focus on trans\* technobodies. This allows for the analysis of multiple configurations in which the sex-gender coherence is subverted. Our ninth hypothesis is that sex-gendered identities and other elements such as bones, cognitive abilities, or “preferences,” which are employed by determinist biological discourses to establish the former as natural, innate, and prenatally and hormonally fixed, thus legitimizing the binary heteronormative sex-gender paradigm, are the result of the interaction of multiple technological-organic-discursive-material elements in a changing process that is open to the environment, in which they emerge as contextual, multiple, and in becoming. Sex-gender, sex-gendered identities, and among them, corporealities-subjectivities that are encompassed in the term “trans\*,” are *dynamic processes in becoming, open to the environment* in whose co-constitution participates in a multiplicity of technological-organic-discursive-material elements or dimensions. An especially interesting formulation in this sense, because of its alternative feature and explanatory power, is that of Fausto-Sterling, who intertwines gender performativity with dynamic systems of development, and rests them in its co-constitutive and procedural bosom along with biological, socio-cultural, technological, and discursive elements, from the role of hormones, to the dyadic exchange between newborns and caregivers, to categorical-identity acquisition, to the social context and environment that surrounds them. This implies that if we inhabit a society with a broader and more multiple sex-gender paradigm, multiplicity would be manifested to a greater and broader degree.

### 1.3. Structure of the Dissertation

The first specific objective, namely delving into the processes of construction and significance of the materiality of sex in the context of the relation between “gender” and “sex,” aiding in strengthening the challenging of the normative framework that imposes a coherence between gender, sex, and sexuality, as well as in delving into the creation of new opportunities for multiplicity is deployed throughout this Dissertation, with special importance in the second and fourth chapters. In addition to what is presented in the previous section, in the second chapter, a brief genealogy of gender, sex as a biological entity and sexual dimorphism is traced. The three logics of sex conceptualized by Mak will be presented and the dichotomy between sex and gender established by Money and the Hampsons will be analyzed. Likewise, the approaches that postulate a relation of co-constitution between sex and gender will be examined.<sup>25</sup>

Given the double meaning that “co-constitution” acquires in this Dissertation, following the co-constitutive approach of Wajcman and Haraway that is set out in the second chapter, in the third chapter we will analyze what are, which characteristics they have, and what effects generate hormonal and xenoestrogenic chemical agents –sex-gendered and others– in human animal technocorporealities, exploited animal technocorporealities, and animal technobodies that inhabit multiple ecosystems, as well as in the environment in general. That is, we examine how these chemical agents constitute these technobodies and the environment. Likewise, we will examine what hormonal and xenoestrogenic products contain them, the human practices through which they are created, the uses awarded, and the industrial conglomerate of which they form part. That is, we analyze how the very toxicity that we have generated constitutes us at the same time.

This co-constitutive sense will return in the analysis of the creation of hormonal devices in laboratories on the part of scientists, inextricably linked to being converted into market products, and how these hormonal products and devices constitute human –and not only human– technobodies and their sex-genders.

As we indicated, sex-gender is intertwined with other differences such as race, sexuality, ability, etc.; however, how each one of these specific interweavings operates should be analyzed in its own particular context. In this sense, despite the main question guiding this dissertation having to do with sex-gender in particular, diverse interweavings will be present and will be an object of analysis. Therefore, the interweaving of sex-gender and race or ethnicity will

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<sup>25</sup> The use in this Dissertation of “technocorporealities-subjectivities” also responds to this co-constitutive view.

appear in the second chapter in various approaches such as those of the Combahee River Collective, Alicia Garza, Anne Balsamo, or Susan Hawthorne; in the analysis of aesthetic surgical operations, in the case of the athlete, Caster Semenya, or in the exposure to toxicity of the workers of microchips in South Korea and Taiwan. In the third chapter, this is also present through the exploration of the birth of gynecology and its multiple operations performed on Black slaves, and in the revealing of the eugenic and racist origins of the contraceptive pill tested on women\* in the Caribbean. In the fourth chapter, this interweaving will also take the shape of the bone formation of children in ultraorthodox Jewish communities, children in China, and women\* in rural areas of China.

The interweaving of sex-gender and sexuality will be present in the second chapter through the analysis of approaches from authors such as Victoria Pitts, Jennifer Croissant, or Preciado; or through the examination of testicle transplants and hormones as a “cure” for homosexuality, as well as through the analysis of Jack Halberstam and Jon Mooallem on our heteronormative projections at other animal technocorporealities in the third chapter. The interweaving of sex-gender and ability will also be mentioned in the second chapter through the feminism of functional diversity of Soledad Arnau Ripollés.

On the other hand, the multidimensionality implied in the sex-gender co-constitution is grouped into four categories that operate intertwined. In this sense, although in the second and third chapters, technological elements such as hormones and xenoestrogenic chemicals will be analyzed –not only as products of human practices, but also from their nature as agents that generate effects– and in the third chapter and, specifically, in the fourth, biological-organic elements in both cases the analyses will be accompanied by the examination of the rest of the elements that are both discursive –identity categories, scientific discourses, etc. – and material – geography, earthly materiality, latitude, etc.

Finally, the interchangeable use in Basque of “sexu-generiko” and “sexu-generizatu” to refer to the relative of sex-gender throughout this Dissertation –although, in English for linguistic reasons this is not possible– accomplishes a double task. On the one hand it functions as a strategy and linguistic tool of unveiling, which shows that this sex-gendering is not something innate, its own, natural, essential, given, an attribute, or characteristic that simply presents the body itself, but there is a wide variety of actions that produce it in a relational way. On the other hand, it shows that there is something that emanates from the body, that the body puts in, although we cannot access it directly, but discursively.

Departing from a relational cyborg onto-epistemology, the second specific objective consists of delving into the understanding of the meaning of our co-constitution as technobodies,

to what sex-gender refers, and analyzing and describing the principal technologies that intervene in this sex-gender co-constitution. To accomplish this, in the second chapter we will execute a genealogy of the concept “technobody” through its use by different authors, taking the threads from each of the conceptual elaborations that are relevant and interesting to plot the shaping of the concept of technobody that we propose in this Dissertation. We will add toxic xenoestrogenic chemicals to these threads that have not been linked to the concept until now, which will endow it with greater explanatory power and robustness while allowing for the extension of a relational ontology that embraces differences and multiplicity.

In this development of conceptual elucidation, we will analyze differences and similarities that the concept presents with respect to another conceptual triad, “cyberbody,” “cyborg,” and “posthuman body,” likewise tracing the origins and evolution of such concepts. Finally, we will argue in favor of the suitability of “technobody” to account for the co-constitution of the sex-gender of animal bodies –placing special emphasis on human animal technobodies– and the constitution of bodies that exceed animality in their opening to the environment in this historic moment.

The third objective, delving into the processes of co-constitution and the significance of the sex-gendered materiality of technobodies, placing special emphasis on the trans\* category, aiding to strengthen the questioning of a normative framework that imposes a coherence between gender, sex, and sexuality and delving into the creation of new opportunities for multiplicity is deployed in the third and fourth chapters. To accomplish this, in the third chapter, we will plot a genealogy of hormones both as technoscientific devices and market products in which the sex-gendering process is evidenced, fruit of the collaboration of scientists, medical stratum, and pharmaceutical companies through which “sex hormones” were conceptualized as opposing, and dimorphic, reproducing heteronormative logic and masculine supremacy. Likewise, other accounts are analyzed that conceptualize “sex hormones” as steroids, which participate in a multiplicity of processes and corporeal functions. In this sense, four arguments are presented that problematize and dispute their sex-gendered nature and their conception as the chemical essence of gender. Additionally, the hormonal black box is opened, that is, the interests condensed in hormones as products of an ambivalent nature will be traced and examined, with special emphasis on pharmaceutical corporations, as well as on the uses on the part of trans\*, trans\* nonbinary, and women\* technocorporealities. As part of this “unblackboxing,” we will analyze the processes of pathologizing, capitalization, resignification, transformation, and identity-corporeal self-determination through which their uses are legitimized, as well as the effects they

generate in different corporealities, both in those that consume them and the technobodies from which they are extracted.

Together with this genealogy, in the third chapter, a thorough analysis will be conducted of the presence of xenoestrogenic hormones and, more broadly speaking, xenoestrogens in multiple animal technocorporealities of various eco-systems and geographies. Moreover, there will be an archaeology of scientific discourses that study their effects on these corporealities. Specifically, the emphasis granted to the effects that have to do with sex-gender such as imposex, feminization, transsex, hermaphroditism, or the loss of reproductive abilities to the detriment of the multiple effects of xenoestrogens on the health of technobodies will be critically analyzed. Likewise, the discourses that conceptualize toxicity as part of technobodies' multiple dynamic sex-gendered process that is opened to the environment, and the changes mentioned as a sign of resilience and adaptive capacity will be considered.

As we indicated, this third objective is also deployed in the fourth chapter. In it, the joint form of the distinct dimensions and elements that participate in the technological-organic-discursive-material co-constitution of trans\* technobodies will be jointly analyzed. After extensively analyzing technological elements like hormones and xenoestrogens in the third chapter, surgical operations together with hormones and discursive elements such as identity categories will be considered in the fourth chapter. To accomplish this, a genealogy of "trans\*" will be mapped from the emergence of the category "transsexual" in the medical context to the appearance of political categories of self-determination that point toward multiplicity. With respect to the interweaving of the biological and discursive dimension, four articles that belong to the body of neuroscientific literature known as "Brain Sex Theory," will be critically analyzed. These articles conceptualize transsexuality as a problem, anomaly, disorder, result of alterations in prenatal hormone levels that determine cerebral sex-gender programming, that produce inconsistencies between cerebral and genital sexing and prenatal stages, and/or produce neuron reversals and/or brain structures. These discourses will be problematized from a methodological point of view, as well as because of their gender bias and unjustified inferences and conclusions. Moreover, we will look into discourses from associations and culture manifestations that assume and reproduce these accounts. Classic theories of gender stability will be put into dialogue with the narrative of "girls with penises, boys with vulvas" will be discussed. Finally, other views that conceptualize trans\* as a social and historic construction, which is dependent on the sex-gender conception will be presented, which advocate for the broadening of imaginaries and the desirability of all bodies.

The fourth specific objective, delving into the characteristics and principal tendencies of neoliberal capitalism in relation with the sex-gender paradigm, with special emphasis on the role that technology plays will be deployed in the third chapter. With this aim, the historic tracing of Anthropocene and the discourses that employ and defend this notion will be analyzed as well as its historic, ecological, geological, and andro-anthropocentric implications and presuppositions. To accomplish this, the criticism of the Anthropocene account will be analyzed through the discourse proposed in the “Capitalocene” narrative and the principal postulates of the latter will be presented. From here, the role of xenoestrogenic toxicity in the co-constitution of what we have called, according to these proposals, “neoliberal Capitalocene” will be analyzed. Together with this we will delve into the proposals of Haraway (2003) and Preciado (2008) of technobiopolitics as a characteristic form –albeit not the only– of current politics and, following Preciado (2008), into the molecular becoming of the production and management of sex-gendered identities and the tentacular forms of production, management, and constitution of technobiopolitics in the neoliberal Capitalocene will be analyzed in depth.

Finally, the fifth specific objective consists of delving into the perspectives that characterize the sex-gender of technobodies as a process, becoming, and effect of relational practices and interactions, with special focus on trans\* technobodies. With this aim, on the basis of three elements of biological-technological-discursive nature, a historic analogy between women\* and trans\* will be explained from their mutual involvement and interweaving. The discourses that postulate sex-gender as an effect of technological-organic-discursive-material interactions will be analyzed as well as the ones that postulate it as a norm of reaction and as a process, in which context is of great importance. Specifically, from the view of the dynamic systems theory of development, bone formation, color preference, cognitive abilities, and sex-gendered identity formation will be examined. These accounts that affirm that the former arise as the result of sociocultural and biological interactions in becoming, in which the context or environment from gender norms to geographical location have great importance will be compared with biological determinist narratives that, from a sex-gendered dimorphic view, characterize all these elements as natural, innate, and biologically predetermined. The interactionist accounts based on the dynamic systems theory of development and on norms of reaction, which stress the relevance of context from a process point of view, will be postulated as an alternative to biological determinist discourse of neuroscience.

Finally, from a view that interweaves gender performativity and the dynamic systems theory of development, the incorporation of gender norms and the formation and development of sex-gendered identities from birth will be analyzed, emphasizing on nonbinary, multiple, trans\*



identities through the dyadic exchange of caregiver-infant, the influence of a broader social context, the acquisition of linguistic identity categories and the interweaving of social influence, hormones and neural connections.

## 2. Technobodies that matter.

### The constitutive relevance of the technological in techno-organic-discursive-corporeal materiality

“Pain would remind him that he doesn’t just *have* a body, but that he *is* his body and that it is on this material fact of existence that affect... is grounded”.

V. Sobchack, *Carnal Thoughts: Embodiment and Moving Image Culture*, 2004, p. 178”

“[T]he man . . . of whom the condition is wonderfully *corporal*”.<sup>26</sup>

M. de Montaigne, *Les Essais III*, VIII De l’art de conferer, 1595, p. 101

“It matters which stories tell stories, which concepts think concepts. Mathematically, visually, and narratively, it matters which figures figure figures”.

D. Haraway, *Staying with the Trouble. Making Kin in the Chthulucene*, 2016, p. 101

### **2.1. Introduction**

We are facing times of great anxiety. This study is the result of such anxiety that, though nothing new, is most likely more pronounced than ever. This concern toward what is occurring and what we sense, we smell, we imagine, we feel, we predict, we anticipate is yet to come: It is something of an unknown magnitude, yet its mere image creates a crippling sensation of unease. It has manifested itself in a profound sense of despair and confusion provoked by the slew of historic events on a global scale that are on the verge of an irreversible turning point. It is

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<sup>26</sup> Original text : “[L]’homme... duquel la condition est merveilleusement *corporelle*.”

an anguish that trembles through our skin as it lies in wait with an almost unbearable nature. It presents itself in the overpowering, yet simple question Haraway formulates in relation to the changes we are witnessing: “when do changes in degree become changes in kind” (2015, p. 159). This thesis arises from the subsequent necessity to name the unknown in order to somehow gain a small handle on which to support the weight of our terrified and troubled consciences

The quantity of concepts preceded by prefixes in the past years has created a generous sampling of the results of said anxiety and the urgency to name that which accompanies it. At this point, I feel the need to specify the superficiality of such considerations and to apologize for the lack of sensitivity they may derive given that there are much more pressing “*desessities*”<sup>27</sup> and relevant efforts than this proclamation in the tumultuous times of this planet’s empire or planetary imperialism, which is swaying even further toward the right, and the equally overwhelming responses of the Earth.<sup>28</sup> In the words of Christian Parenti (2017, p. 49), we are witnessing times of “catastrophic convergence: militarism, neoliberalism and climate change,” or of a “Climate Change LLC” (Buxton and Haywes, 2017)<sup>29</sup>; the threshold of the probability of “The Sixth Mass or Great Extinction” (Wake and Vredenburg, 2008; Kolbert, 2014; Ceballos et al., 2015) appears frighteningly closer.

However, awarding such time and space to this fear and urgency to name, also emanates, albeit not exclusively, from my position of partiality situated in the inescapable truth of dwelling in an occidental white body with privileges of race and class, among others.

As previously mentioned, this proposal falls within the modern western tradition of prefixing. It is an endeavor to bear the outcome of a specific historic moment whilst knowing of one’s limits, limitations, and the partiality of one’s views, yet both open and willing to be challenged. Yet, at the same time, the steadfast determination of said accurate and brilliant endeavor harbors this dance of prefixing, death, transmutation and subversiveness. After all, naming is also a political act of resistance and subversion, of survival, transformation and creation.

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<sup>27</sup> As Amaia Pérez Orozco explains (2014, p. 26), this term has been created by women\* from Central America, in the context of Public Education and the Participative Action Research, to express and defend their needs or necessities (*necesidades*) without separating this from their desires (*deseos*), and likewise fight for them as with the needs of their husbands and/or others, thus coining the word *desessities* (*desesidades*) (2014, p.26).

<sup>28</sup> From August to October 2017 in the United States (a place chosen due to my stay there during this period) and the Caribbean, there were record breaking floods in Texas, later hurricane Harvey, hurricane Irma in Florida, and the devastating hurricane María in Puerto Rico, leaving 2,975 dead and massive destruction (CNN, 2018) along with thousands of forest fires in California. In 2018, record-breaking forest fires reached the highest peak in the last two decades (*tiempo.com*, 2018), destroying 737,803 hectares in California alone (National Interagency Fire Centre, 2018). That of Camp Fire claimed 88 lives (Fuller, 2018).

<sup>29</sup> Although previous publications in English used the title: “The Secure and the Dispossessed – How the military and corporations are seeking to shape a climate-changed world,” in this English translation we chose to translate the Spanish title literally as “Climate Change LLC” for clarity, strength and visibility of this concept.

Thus, this recognizably politically involved endeavor to name is in favor of the creation of a strong and competent transfeminist anticapitalistic materialism capable of generating alliances and subversiveness.

The relation between sex and gender, and sexuality (and race, class, ability, nationality, ethnicity, age, religion, etc.)<sup>30</sup> is one of the most important issues facing contemporary feminist philosophy. Part of the recent literature is evidence that this issue is indissociably linked to the debate concerning technobodies (Hawthorne, 2001; Braidotti, 2002; Pitts, 2003; Croissant, 2006; Preciado, 2008). Both issues reside in a wider domain: the body. This has been, and continues to be, one of the fundamental axes of recent feminist thought; within its construction, as we have indicated, lie the differences and inequalities of sex-gender, race, economics, ability, sexuality etc., and the interweaving of all of these play a leading role.

Nevertheless, corporeality exceeds “the human,” as trans-corporeal feminisms accurately postulate. Stacy Alaimo (2008, p. 237) indicates that despite the enormous feminist production surrounding the body, few are the texts that link this with the environment (although in the last ten years these works have increased). Moreover, to fill this void, she proposes the concept of “trans-corporeality,” in which the theories of the body and the theories of the environment meet and intertwine generatively and productively to make reference to “the time-space where human corporeality, in all its material fleshiness is inseparable from “nature” or “environment”” (Alaimo, 2008, p. 238); where we find ourselves happily and ontologically intertwined and affectively politically twinned with “techno-corporeality.”

Alaimo invites us to think of human corporeality as trans-corporeality in which human materiality is always “intermeshed” with the environment. This Alaimian thinking “across the bodies” equips us with awareness concerning the advocacy of the environment and of the “more-

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<sup>30</sup> Alicia Garza (2017), in her energetic and inspiring contribution at the University of California - Berkeley, recalls that after 43 years we have yet to take seriously “the interweaving of the systems of oppression” enunciated by Combahee River Collective (1979) which were later termed “intersectionality.” The differences in race class, sex-gender, sexuality ability, age, etc., can be separated on an analytical level, but they cannot be dissociably analyzed with respect to oppression. For a critical account of the interweaving of categories of race, sex-gender, and class from a feminist Black American perspective, see Davis (1983). For a poetic critique from a feminist Black American lesbian view of the interweaving of race, class, sex, and age, see Lorde (1984). See Moraga and Anzaldúa (1983), for a critical perspective of American black women\*. The fight of Kurdish women\* from Rojava, Syria against patriarchy, imperialism, the Islamic State, and in favor of their freedom and of the Kurdish community is a good example of the simultaneousness and inseparability of systems of oppression, which act differently in each territory and body. This is also the case of the various feminists of Abya Yala, although some of them would not call themselves feminists such as the indigenous Mexican Zapatistas (Zapatistas), the Bolivian Aymara communities, the Mapuches of Wallmapu, and the Xinkas of Guatemala among others (Gargallo Celentani, 2014), as well as the “radical feminists of color working to end violence against women, gender, non-conforming and trans people of color,” “INCITE”! (2019). For a feminist critique of functional diversity see Arnau Ripollés (2005). Regarding the multiple oppressions of Afghan women\* see Fernandes (2017), Khan (2001), and Stabile and Kumar (2005). For an Islamic feminist perspective, see Mir-Hosseini (2011). These are only some examples of an endless list.

than-human” given that it provides an account of the actions of chemical agents, ecosystems, nonhuman creatures, and various other material actors.

However, even beyond western proposals and much before them, worldviews of Abya Yala gave an account of the indivisibility of bodies and territories. As maya k’iche Guatemalan feminist Lolita Chávez notes, an attack on territory is also an attack on the body: “To defend the territory-body is to defend the territory-earth, and to defend the territory-earth is also to defend bodies themselves. We are in the web of life defending water, mountains, and this is life for humanity” (EHko Emakumeen Mundu Martxa, 2017).<sup>31</sup> The subversiveness of this worldview lies in a myriad of dichotomy shatterings as well as in the relationship of responsibility, care, and the becoming-as-part-of-everything that it generates and establishes. The recent fight of the Sioux of Standing Rock against the Dakota Access Pipeline also emanates from the assumption of the interweaving of territories-earth-territories-body/territories-body-territories-earth.

Following this idea, Alaimo states that “only by directly engaging with matter itself can feminism do” (2008, p. 241). We will parenthesize this “directly” though, and in its place propose the Butlerian “discursively mediated” together with the Harawayan “ouroborosly”<sup>32</sup> among other possibilities. Likewise, this is another transfeminist attempt to account for corporeal sex-gender<sup>33</sup> or sex-gendered materiality from its inextricable technological-organic-discursive-material relationality.

Returning to what is analytically defined as “human,” we depart from the basis that within sex and gender and the previously mentioned differences, there is a relation of co-constitution (Fausto-Sterling, 2000, pp. 23-28; 2003, p. 131; Schneider, 2012, p. 127), in which human-techno-animal and material differences participate on the whole (Haraway, 1991, p. 200; 2003, p. 7; 2016a, p. 104). From this co-constitutive relationality of the organic, the discursive, the technological and the rest of the material, we pose the question regarding the constitution of technobodies, which are mainly human, although not exclusively so –given the mutual structure and interdependence of semiotic materiality and/or various corporealities–, placing the spotlight

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<sup>31</sup> Original text: “Defender el territorio-cuerpo, es defender el territorio-tierra, y defender el territorio-tierra es defender también los cuerpos. Estamos en la red de la vida defendiendo el agua, las montañas y eso es vida para la humanidad”.

<sup>32</sup> From “ouroboros” (from the Greek “ουροβόρος”), a symbol originating in Ancient Egypt, which is also present in classic Greek culture, and in Occidental Christian Europe from the Medieval Ages to modern times, through alchemist iconography. The image consists of a serpent or dragon devouring its tail while it shapes a circle with its body, representing temporality or cyclical continuity, cycles or eternal looping. See Roob (2016, pp. 342-49), for graphic alchemist representations; Bernardes (2019), for an exhibition of contemporary art based on the concept of ouroboros.

<sup>33</sup> In this translation we have chosen to maintain sex-gender in noun positions and sex-gendered in adjective positions as translations of *sexo-genérico* for reasons of clarity to actively include both concepts of sex and gender.

on the technological elements of such co-constitution in order to focus on the very matter that lends its name to this thesis: its sex-gendered co-constitution.

“Technobody” is a broad and more complex concept to be explained and defined considering its use varies depending on the author. In this genealogical branch of conceptual elucidation, we will define technobody as a means of that which it is not as well as what we understand it is, disputing synonymies while creating semantic alliances. In this way, in the second section, we will call into question the synonymy of technobody and cyberbody from the idea of *techno-organic* fusion as the fundamental constitution of the *materiality* of technobodies.

In the third section beginning from the importance of differences and the Harawayan thought of «“both/and,” “yes/and,” “no/but,” “no/and”,» we will argue in favor of a partial analogy between “technobody” and its indisputable precursor, the “cyborg” of Donna Haraway. In order to do so we will trace its historic origins and analyze the evolution of “cyborg” and “technobody.” When delving into the tentacular complexity of this analogy, we will observe that, in spite of their similarities, both concepts present differences, which in our opinion, do not make it completely possible to use said concepts as equivalents. If Haraway emphasizes one aspect, and if feminism has shown us something, it is precisely that differences, from their interdependence and interweaving, matter, and so much so.

Throughout this genealogy of “technobody,” together with various authors we will map relevant elements shaping the co-constitution of the materiality of technobodies, –particularly but not exclusively– of humans in their sex-gendered multiplicity highlighting hormonal and xenoestrogenic elements, which are synthetic estrogenic chemical compounds derived in part from hormonal products from technologies of representation and other biotechnologies and pharmacological technologies. This will offer a broad and multiply rooted base that will legitimize the pertinence, adequacy, and use of the concept “technobody,” which transgresses human corporeality and animality, thus broadening the rest of the subject, breaking dichotomies and interweaving differences.

Therefore, it is not so much an exhaustive and detailed list of mainly technological elements which shape the materiality –specifically sex-gendered– of technobodies; a task belonging to the efforts of taxonomic norms of the style of *Psychopathia Sexualis* and its classification of practices, desires, and identities (Krafft-Ebing, 1892 [1886]), but the observation and signaling of the main technological elements that share corporealities that are historically situated in this neoliberal *Capitalocene* (Malm & Hornborg, 2014; Haraway, 2015, 2016a, 2016b; Moore, 2013, 2017, 2018) that make it possible to justify discussing technobodies,.

Finally, in the fourth section we will analyze the comparison of “technobody” and “posthuman” while presenting similarities as well as differences. We will display diverse meanings of “posthuman,” which from the critique of the modern notion of the human are being deployed toward animality as challenging anthropocentrism, including androcentrism as well as the technological, which is relevant in the shaping of new (post) human materiality. We challenge the concept of “posthuman (body)” as unable to achieve its purported overcoming of anthropocentrism. In this sense, we will argue that “technobody” appears as a more adequate option to account for our situation within material rationality as well as to educate and inform of the relevance of this technological element, not only in the co-constitution of human technocorporealities, but also in animal technocorporealities and the environment in general, and especially, but not exclusively, human animal sex gendered co-constitution in the current historical context.

## **2.2. Technobody vs. cyberbody: *The techno-organic fusion by means of endo-constitution of the materiality of technobodies.***

One of the authors who employ the term “technobody” is Rosi Braidotti in *Metamorphoses. Towards a Materialist Theory of Becoming* (2002). Braidotti conceptualizes the technobody in various fields (literature and science fiction cinema, related to electronic communication technology, and information, and to a lesser extent, with prosthetic technology and biotechnology), extracting certain cursory conclusions which are somewhat confusing.

As many feminist authors who analyze technology-body in the midst of excessive optimism and apocalyptic nostalgia relations (Haraway, 1991, 1997; Balsamo, 1995; Livingston & Halberstam, 1995; Hayles, 1999) within technological determinism, democracy, and complete freedom, as well as authors who are opposed to the idealistic (patriarchal?) dreams of the flight of the body and transcendental consciousness, Braidotti emphasizes the carnal and material nature of the body in its technological connections. However, Braidotti affirms the immateriality of information technology and communication, which we will later bring into question and expand: “Electronic machines are, from this angle, quite emblematic, as they are immaterial: plastic boxes and metal wires that convey information” (2002, p. 222). Despite the fact that plastic boxes or metal cables invalidate the author’s very statement concerning supposed immateriality, to say nothing of the material conditions of production, this assertion is striking

for an author who ascribes to the mainstream thought of “enfleshed or embodied materialism” (2002, p. 5).

Braidotti describes the becoming of our relation with electronic technology: “Cyber-entities and techno-organisms proliferate in the age of artificial intelligence... The scalation of the interface between the human and the electronic machine is... from juxtaposition to superimposition until finally technology supersedes the human” (2002, p.223). This same position defines our relationship with technology as symbiotic interdependence; “[a] rather complex kind of relationship has emerged in the cyber universe which we inhabit: one in which the link between the flesh and the machine is symbiotic and therefore can best be described as a bond of mutual dependence” (2002, p.223). This relation of mutual dependence is simultaneously and eminently prosthetic because it occurs when the body is immersed in a set or network of practices of prosthetic extensions mediated by technology.

Thus, when speaking of technology inasmuch as an internal corporeal constituent or technobody as a technologically co-constituted body from its interior, Braidotti does so thinking of implants or prosthetics such as pacemakers, hearing aids, iron lungs, incubators, etc. Despite the relevance of these technological elements and relational forms, one of the practices and main scopes of techno-corporeal constitution is ignored: what sex-gender references in particular. What constitutes our bodies as technobodies is not the fact that they are connected to a technological network, prosthetically attached, or present in technological implants, but that technology constitutes its materiality, carnality, in the most literal sense, in the sense of fusion. Braidotti seems to forget or ignore that biotechnology and agricultural pharmacological technology is ingested by our bodies and transforms the body to exist indissolubly from these on the molecular level,<sup>34</sup> as occurs with a vast quantity of technologically produced chemical substances such as medicines, genetically modified organisms, pesticides, and hormonal products, with the latter being quintessential molecular devices of subjectification.

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<sup>34</sup> The author speaks of “the molecular” on various occasions, however, none of these uses are related to the molecular or techno-molecular configuration of the body. When she speaks of “molecular biology” (2002, pp. 4, 8, 63, 134, 136, 228), or the “molecular scale,” as in the previous example, she does not specify this: “It is important to resist the uncritical reproduction of Sameness on molecular, global or planetary scale” (2002, pp. 13-14). Regarding the rest, she repeatedly refers to “becoming-molecular” from Gilles Deleuze and Felix Guattari “A kind of order or apparent progression can be established for the segments of becoming in which we find ourselves; becoming-woman, becoming-child, becoming-animal, -vegetable, or -mineral; becoming-molecular of all kinds, becoming-particles” (1987, p. 272). This “molecular” has a very different meaning from that of “molecular” in the hormonal techno-corporeal constitution that we explore here: it provides an account of the reticular, of interconnectivity “[a] view of the subject as a flux of successive becomings by positing the notion of a ‘minority’” (Braidotti, 2002, p. 70). The molecular or nomadic is a process of “becoming” (2002, p. 80). It is related to emotional intensity, with a thought of affirmation, of action – as opposed to reaction – and happiness. The molecular –the becoming, nomadic subjectivity and power is opposed to the molar, identity, the permanent, being and *potestas [power]* (2002, p.84). Apart from the molecular, Braidotti also mentions Prozac on one occasion (2002, p. 110), and hormones on another (2002, p.230).



Braidotti highlights the figure of Haraway's cyborg in part to underline the pertinence of some of its aspects and partly to question it. With the aim of this questioning, she establishes a synonymy between "cyborg" and "technobody" from which she presents the exclusion of the feminine from the technological:

The trend towards a blurring if not a downright erasure of sexual difference, due to the impact of cyborgs or technobodies, is also evident in the tendency of mainstream postmodern philosophies to efface the feminine by making it express the anxieties and fears of the hystericized male subject-in-crisis. (2002, p. 232)

Consequently, the author states that technobodies are only masculine or trans\*,<sup>35</sup> thus, attempting to assume or include by means of this second category the hybridization of Haraway's cyborg. As the utopian and critical figure that it is, the cyborg involves hybrid blending as well as the dismantling of the modern dichotomy of man-woman. However, for Haraway, this is not translated into the practical elimination of differences of race, class, sex-gender, sexuality, ability, etc. neither in the moment in which she wrote the *Manifest* nor later. As she herself indicates in the interview "When We Have Never Been Human, What is To Be Done?" in 2006 in reference to the concept of "post-gender," the critical task of categories does not imply that these disappear nor does reality automatically change.

Braidotti underscores her claim of the exclusion of the feminine from the technological and its entry into the natural realm:

Technology in postmodern culture is no longer feminized, as it was in modernity, but rather neutralized as a figure of mixity, hybridity, interconnectedness, in-between states such as trans-sexuality. If the machine is prosthetic and transgender and the maternal are mechanized, the female body has nowhere to go. I would say that it is in free fall outside classical sexual difference, into a sort of undifferentiated becoming-other. (2002, pp. 232-233)<sup>36</sup>

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<sup>35</sup> She employs the words "trans-sexual" and "transgender," but given the awareness and acceptance and diffusion that this has had in over fifteen years, the term "trans\*" has been translated both as an agglutinating or umbrella term.

<sup>36</sup> Braidotti speaks of the "female technobody" situating it, according to her, in finalized modernity and takes the female android Hadaly, main character of the novel from 1886 *The Future Eve*, by Augusto Villiers de l'Isle Adam as an example (1998) (2002, pp. 220-221). She concludes that the blending of human-technology embodied in the female technobody shows the paradox of how technology undermines the possibility of female subjectivity, while at the same time it personifies it: Hadaly is highly sexualized while being asexual; she is incarnate, yet ideal. Braidotti comes to state that "Hadaly is a bodyless body" (2002, p. 220). Apart from the fact that there can be various types of corporeality and that corporeality does not necessarily imply organicity, the figure of the robot or female android of the late postindustrial societies that the author conceptualizes as technobody does not fit within our definition of technobody precisely because of this lack of organicity (2002, p. 259). This in no way implies that this is an invalid conceptualization of "technobody"; it is simply different from

On one hand, if the maternal is mechanized or technologized, the female and/or women\* or a large part of what is considered as such and/or a great number of them are not excluded from technology as Braidotti suggests when she states that “the female body doesn’t have anywhere to go” because technology is not feminized and the maternal is mechanized. Apart from the hormonal cocktail that shapes their bodies, gestation is a process that lasts nine months. Even when insemination has taken place in vitro, in many cases, women\* gestate for nine months after the fertilized egg was introduced. In other cases, the egg is fertilized in situ, albeit technologically, within the body conceptualized as female. In both cases there are eggs and technorganic sperm, with organicity gestated by women\* or other gestating bodies. On the other hand, through the technologization or mechanization of maternity, “the female body is constructed as the site of the natural, of *bios* and *zoe*, hence also of procreation... the... discourse of high-tech postmodernity leaves the female subject where it was before modernity, namely assimilated to nature, identified with reproduction” (2002, p. 233).<sup>37</sup> Though in a certain sense this would lead “to push women\* back to a form of techno-primitivism that is regressive at best, profoundly reactionary at worst” (2002, p. 233). Because of the reinforcement of the mandate that the maternity that accompanies these new modes and technological tools, what occurs is a techno-reformulation of gender roles. In other words, it would be a (re)affirmation of sexual difference, not an erasure. The question would then be, how these technologies strengthen or do not strengthen the reduction of the female aspect in the reproduction-reduction and identification that existed before the appearance of said technologies, as opposed to their eviction from sexual difference.

What Braidotti forgets is that beyond collective imaginaries, literature, cinema, and science fiction, we are speaking about technobodies as well as technologically constituted corporealities here and now; female bodies are just as, or more, technologically constituted as those of “men.” It is not a coincidence that in this moment the testosterone market has become the new “road to el Dorado,” one of the important niche markets for which multinational pharmaceutical and biotechnology companies are competing, linked to the appearance

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what is laid out in this Doctoral Thesis, which emanates from the current relevance of biotechnologies, in particular hormonal technologies in the constitution of corporeal materiality, and more specifically, sex-gender. On the other hand, the Braidottian meaning of “technobody” as android could be contrasted with the “techno-organism” to which she herself makes reference (2002, p.233). In this sense, it would be interesting to have a greater conceptual clarification from Braidotti.

<sup>37</sup> This statement is reiterated throughout the text: “One of my arguments so far has been that the social imaginary around technobodies is tempted by a fantasy of flight from the body. This reduces the women to the site of reinscription of the natural, mostly in its material/maternal format. With the technological artifact situated in a trans-sexual space, and femininity associated, yet again, with the natural, the main sexualized body is male and it is around masculinity that the contested discussions about virtual identities are focused” (2002, p. 247).

(invention?) of testosterone deficit syndrome (TDS), an apparent illness with a cure lying in the ingestion of testosterone. This is perhaps because in the immense quantity of bodies considered as female, there is hardly a centimeter of skin to commercialize, a vital process in creating capital: hormonal replacement therapies (HRT) for menopause and other uses, the contraceptive pill or other contraceptive hormonal methods, hormonal therapies for pregnancy, hormonal treatments to stimulate fertility, etc.

The example of assisted reproduction technology, which encompasses what is known as “surrogacy”<sup>38</sup> and women\* with –but not limited to– diverse sexual orientations (lesbian, heterosexual, bisexual, pansexual, asexual), diverse corporeal morphologies, and multiple chromosomal and hormonal combinations, in which various treatments and hormonal therapies are intertwined in the same body dismantles the idea of the exclusion of the technological from the feminine or the feminine from the technological based in “the maternal being mechanized.”<sup>39</sup> Quite to the contrary, our interpretation is that it provides an account of the technologization of the feminine. If instead, we spoke of female bodies not inhabiting or inhabiting certain technological fields to a lesser extent such as the automobile, aerospace, information or communication sectors, we could subscribe to Braidotti in the lower representation of women\*. Yet, we would no longer be speaking of technobodies, at least not with the definition that we have provided here.

Hormonal ingestion is produced by all groups of sex-gender, the immense multiplicity subsumed in the terms “women\*,” “men,” “non-binary trans\*,” “genderqueer,” or “non gender.”<sup>40</sup> A large percentage of western –and not only western– technocorporealities treat themselves with hormones in an exercise that will supposedly imply the affirmation of “their” identity-corporeality –which can be multiple and dynamic– or their transgression and transformation. What we would like to express is that the technologization of many of the trans\* corporealities-subjectivities does not entail the disappearance of the corporealities-subjectivities

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<sup>38</sup> Hormones drive the process of both in the synchronization phase and in subsequent hormonal therapy, in which a variety of hormones which include contraceptive pills, leuprolide (Lupron®, Synarel® or others) is used so as to synchronize the menstrual cycles of a pregnant woman and the future mother, along with other phases of the process in which the former ingests estrogen so as to stimulate the endometrium (lining of the uterus) and its growth, and the future mother takes FSH (follicle stimulating hormone) in order to stimulate the production of eggs (San Diego Fertility Centre, 2019).

<sup>39</sup> On the other hand, precisely due to this technologization of the body, reproduction is no longer an exclusively female territory. Pregnant bodies such as those of Thomas Beattie or Trystan Reese show that it can also take place in males and/or trans\* males.

<sup>40</sup> This is a contingent division and classification, an equally valid possibility among others.

of female bodies in general, as Braidotti suggests,<sup>41</sup> but the co-existence of greater multiplicity. Quite to the contrary of assuming a disassociation with certain hormonal devices in females or males, it accentuates this identification. Now, more than ever, femininity is equated to estrogen and progesterone, and masculinity to testosterone, reinforcing sexual difference, while other uses venture in the opposite direction, diluting, multiplying, transforming, and broadening sexual difference. From here, Braidotti understands trans\* bodies as the prototype of the cyborg: “Prosthetically enhanced, self-consciously artificial, the trans-sexual body is the prototype of the cyborg in that it signifies the symbiosis between the organic, the biochemical, the technological and the surgical” (2002, p. 57).

In general, the author specifies two points of contention or conceptual discrepancies with respect to Haraway’s cyborg. As we have seen, one of them is the matter of the existence of sexual difference. Braidotti insists that sexuality and sexual difference continue to be far too structurally embedded in subjectivity to be so readily disposable despite the metaphysical weight they may carry. In this sense, Braidotti states that “[i]t seems to me that Haraway’s cyborg is unresolved not only on the issue of unconscious desires, fantasies and identifications, but also, on a more basic level, as to whether the cyborg is sexed at all” (2002, p. 243).<sup>42</sup> The second aspect is related with posthuman agency: “I believe that an alternative definition of the subject is necessary, even desirable, and consequently I cannot share in Haraway’s preference for post-human agency” (2002, p. 243). As we will see at the end of the chapter, Braidotti’s opinions have changed considerably.

Concerning Braidotti’s previously established synonymy between “cyborg” and “technobody,” the problem is that if people who are trans\* are the prototype of cyborg and “technobody” encompasses not only human animality, but other types of animality, both concepts would not be synonymous in themselves. However, “technobody” would be a concept with broader semantic amplitude which includes cyborgs as human-technological assemblages: “oncomouse and other experimental animals and insects (such as the fruit-fly); dogs and other genetically recombined ‘pets’ are the fodder for the bio-tech laboratories which construct

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<sup>41</sup> Braidotti is a stolid defender of sexual difference and the desirability of its existence. She comes to state that “[o]n closer scrutiny, however, I would argue that there is ample room for concern. As is often the case with promises of trans-sexual ‘open-ness’, in fact, the evacuation of the feminine is not far off” (2002, p. 259).

<sup>42</sup> Though it is true that Haraway proposes the cyborg as a subject of feminism and states that we are all cyborgs, from the CEO of the Central Intelligence Agency in the United States to feminists, she speaks of a utopian horizon without genders: “We require regeneration, not rebirth, and the possibilities for our reconstitution include the utopian dream of the hope for a monstrous world without gender” (1991, p. 181). Nevertheless, as we have already indicated, regarding the notion of gender for example, Haraway states that the critical work with categories does not mean its automatic disappearance. This would not clarify if Haraway’s utopian horizon is a world without genders and, if it is, to what extent.

contemporary *techno-bodies*. Multiple four legged clones, or silicon-pumped Dollys crowd our social horizon” (Braidotti, 2002, p. 138, emphasis added). Moreover, this is something that Braidotti neither explains nor clarifies. In this sense, she claims: “the discussion of Haraway’s cyborgs alongside Deleuze’s rhizomes, I will suggest that it is crucial to invent conceptual schemes which allow us to think the unity and the interdependence of the human, the bodily and of its historical ‘others’... to dislocate the foundations of the humanistic world-view” (2002, p. 214). From here, it could be deduced that the meaning of cyborg is restricted to human animality despite its interdependence and connection to other entities that emerge, whereas “technobody” encompasses another type of technologically constituted animality.<sup>43</sup> The following example reaffirms this interpretation:

Consequently, cyberspace and the ‘cyborg’ subjectivity it offers are no longer the stuff of which science fiction is made. On the contrary, the blurring of the boundaries between humans and machines is socially enacted at all levels: from medicine, to telecommunication, finance and modern warfare, cyber-relations define our social framework. What I want to emphasize, however, is that the cyborg as an embodied and socially embedded human subject that is structurally inter-connected to technological elements or *apparati*, is not a unitary subject position. (Braidotti, 2002, p. 17)

Another “knot” lacking conceptual clarity is found in the technobody-cyborg-posthuman triad. At the beginning of the section “Technobodies in the social-cyber space,” in which cyborgs, posthuman bodies, and technobodies are mentioned, Braidotti states: “[a]ll cyborgs, the majority as well as the minoritarian ones, inhabit a posthuman body, that is to say an artificially reconstructed body (Balsamo, 1993)” (Braidotti, 2002, p. 244). This “posthuman” clarification of “artificially reconstructed body” would lead to an interpretation in which the “posthuman body” and “technobody” are synonymous or broader categories that include cyborgs. However, another passage states: “Thus, I want to argue that the hyper-reality of the *cyborg* or *posthuman* predicament does not wipe out politics or the need for political resistance: it just makes it more necessary than ever to work towards a radical redefinition of political action” (2002, p. 245, emphasis added). Should we then understand that “cyborg” is synonymous of “posthuman”? If cyborgs both as minorities as well as majorities inhabit a posthuman body, it is not clear which one Braidotti references with her statement: “I cannot share in Haraway’s

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<sup>43</sup> Although both authors, as we will see, understand “trans/trans\*” as a technology of species involved and intertwined with nonhuman animality through hormonal technologies, among other elements, Braidotti does not offer any indication of theoretical deployment in this direction.

preference for post-human agency” (2002, p. 243). What differentiates them, if both concepts do not make reference to the human? Again, it remains unclear as to both the meaning of the categories that Braidotti employs as well as the relation between them.

Finally, regarding cyberspace, as we indicated, Braidotti mentions cybersubject and cyber-entities: “Cyber-entities and techno-organisms proliferate in the age of artificial intelligence” (2002, p. 223). It could be understood that cybersubjects and cyber-entities also lie within the concept of technobody because together with the motivational nature of transhumanist dreams of freeing the body with digital and information technologies, she states that “far from abolishing or replacing the body, the new technologies strengthen the corporeal structure of both humans and machines” (2002, p. 244). However, it is not so clear what cybersubjects and cyber-entities mean for Braidotti:

It would be a mistake, however, to think that the cyber-imaginary of techno-bodies is merely a symptom of fear, or cultural trend, a literary or utopian figuration lacking substantial social, economic and political implications. I rather think that the cyber-imaginary is powerfully active throughout the social fabric and in all the modes of representation prompted by our culture at present. (2002, p. 222)

The problem continues to be the lack of conceptual clarity, given that we do not know exactly what the author references with “cybersubject” and “cyber-entity.” The cyber subjects and cyber-entities could be understood as cyberbodies, in other words, virtual bodies or bodies that inhabit cyberspace such as the characters of videogames, cartoon porn, or Youtubers. In this sense, in the case of modern robots or androids –which she terms “technobodies”– it remains unclear whether cyborgs are also technobodies or not for Braidotti. Statements of the sort of “[b]ecoming-cyborgs may be virtual, but it is nonetheless socially enacted, materially grounded –embodied and embedded, to the end, enfleshed” (2002, p. 240) or, “[t]he model of the body... points to the co- presence of different elements... The human organism is neither wholly human, nor just an organism... [T]oday’s body is immersed in a set of technologically-mediated practices of prosthetic extension” (2002, pp. 226-227) indicate this may not be so.

Be that as it may, the use of “technobody” exhibited in this Doctoral Thesis will clarify that the cyberbody is understood either as a virtual body that *exclusively* inhabits cyberspace, whose materiality is *exclusively* contained in virtual space –given that the corporeal materiality of technobodies surpasses the merely technological– or understood as subjectivity of a technorganic body that inhabits cyberspace, namely, in the sense of identity, image, personal and

biographical information, etc., in other words, a body whose subjectivity inhabits cyberspace despite having its corporeal materiality situated simultaneously outside this virtual space.<sup>44</sup> The corporeality-subjectivity of this second type of cyberbody would occupy two spaces simultaneously, so to speak. Our notion of technobody can be differentiated from both ideas of cyberbody in two fundamental aspects: 1) Technologies aimed at biotechnologies, pharmacological technologies, and hormonal artifacts. 2) The mode of technological-corporeal relation, or the mode of technological-organic-discursive-material co-constitution is internal or endogenous in the sense that in addition to the simultaneous prosthetic relations, there is also ingestion, inhalation, or absorption, which imply a literal interiorization and are the material of the same device or technological element and its subsequent fusion on the molecular level.

Summarizing, Braidotti blends social imaginaries, virtual realities, inhabited corporealities, spheres of knowledge –which are mutually constituted– and interrelated elements that are not the same. In our judgment, what-who are technobodies, how are they shaped, and through which types of elements and relations require more accurate, stringent, and clear descriptions and elucidations. The author seems to focus on technology as a social imaginary (in which cinema and literature play a leading role) as a corporeal extension (in which information and communication systems are key), and as a place to be inhabited by bodies conceptualized as female (the technological world in general including technological disciplines), without analytically observing the way in which these are inhabited, colonized, and technologically

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<sup>44</sup> The concept of technoperson elaborated by Javier Echeverría and Lola Sánchez Almendros could include certain relevant aspects of the notion of “cyberbody” that we reference here. The authors define technopersons as persons (physical or legal) whose identity, relations, functions, and interactions are technologically shaped by information technology systems in particular. Technopersons are superimposed on physical and legal persons and technologically implemented, though the persons continue existing as technopersons (2020, pp. 94-95). Therefore, each physical or legal person can have various technopersons or electronic masks and digital identities –some ephemeral, others lasting. These technopersons are created both by the users, and, to a greater extent the “lords of the air” –a play on feudal lords– those who control the *clouds*, the military, private enterprises (Facebook, Google, Amazon, Microsoft, etc.), or organizations like the European Union, namely, giant factories of information and technopersons. Echeverría and S. Almendros distinguish three types of technopersons: 1) Human beings that depend on technologies to live, whether it be for work, like technoscientists, or as part of daily life. 2) Technological devices or tools like robots and other modalities of software that simulate and enhance mental functions and the mental capacities of human beings (Echeverría & S. Almendros, 2020, pp. 79-80). 3) Literary cinematic characters of cartoons or videogames that serve as imaginary icons for the two types of previously mentioned technopersons for example, *Matrix*, *Blade Runner*, Lara Croft or the Netflix series titled *Black Mirror*, but also *animals and intelligent monsters*, which are characteristic of videogames, science fiction, and technopolitical figures (*influencers, youtubers*, etc.) (2020, p. 81). A relevant element of a technoperson is its often-collective nature (2020, p. 82). Echeverría and S. Almendros also dedicate a short section in the book to “technobody” and “cyborg” (2020, pp. 234-248). I would like to thank Echeverría for his generosity in sharing the manuscript with me and exchanging impressions on the concepts of “technoperson” and “technobody”.

shaped.<sup>45</sup> In so doing, she ignores the leading role of biotechnology in sex-gendered material constitution, which affects technobodies in general, including of course, the feminine, which draws attention to an author who states “I want to think through the body, not in a flight away from it” (2002, p. 5). The role of biotechnology and pharmaco-food technology is varied. In spite of having a larger and larger space for hybridization and sex-sexuality-gender multiplicity, the difference has been and is continuing to be reconceptualized and resituated in “the techno” by “pharmopornographic capitalism” (Preciado, 2008). We are witnessing a broadening in which different directions, trends, and desires play their role, albeit strongly driven toward the readjustment of duality.

A year before Braidotti, Susan Hawthorne also seems to use “technobody” as synonymous of or making reference to cyber bodies in her article “Wild Bodies/Technobodies” of 2001, although her use is not exclusively reduced to such, as it includes biotechnologies. For Hawthorne, technocorporealities mean disconnection, virtuality, disembodiment, and homogeneity; that is to say, they lack identity or subjectivity. In spite of the pertinence of several of her criticisms, her proposals and answers are often onto-political-epistemologically insufficient and missing the mark. Like Braidotti, what Hawthorne seems to avoid is that technology is not only incorporated, but also transformed into materiality and corporeal carnality in organic-technological corporeality by means of ingestion and techno-corporeal fusion, which exceeds mere virtuality.

Hawthorne characterizes technobodies as “bodiless bodies,” and highlights biotechnologies, as well as information and communication technologies as causes of such, that is, as disembodied technologies: “The forces that have brought this bodiless body into being are the combined forces of information technology, biotechnology and globalization” (2001, p. 55). Thus, she reaches a common general conclusion for all, in a type of theoretical mish-mashed hodgepodge “a la Braidotti.” Nevertheless, the thought and the complexity that living in the “belly of the monster” entails require us to dig deeper.

Even while inhabiting the virtual-material space by connecting ourselves to a computer or vice versa, *our* corporealities do not cease to be technologically co-constituted by means of representation technologies such as the Internet and mass media communication, or agro technologies, pharmacological technologies, and biotechnologies such as hormones and the xenoestrogen that we inhaled, ingested, or absorbed when breathing, feeding ourselves,

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<sup>45</sup> As we have not tired from mentioning throughout this Doctoral Thesis, all these technological elements and techno-corporeal relations are equally valid as constituents of the concept of technobody. Nevertheless, they are not the relevant elements which direct our conceptual elaboration. As we will see, we have other objectives.



perfuming ourselves, shaping our corporealities-identities to maintain sexual relations, and in an infinite range of practices. In other words, technological-corporeal relation is multiple –through fusion, coupling, connection, ingestion, prosthetic through assembly, reticular through incorporation, material embodiment, alliance, subjectivation, etc.– and it occurs simultaneously: while we are connected to it, we ingest technology that becomes corporeal materiality in a relational technological-organic-discursive-material network:

Theorists such as Donna Haraway (1991) have proposed liberation through the cyborg; Sandy Stone (1995) suggests that prosthetic experience will get you there; and others are suggesting an increasing disconnection from the body through experiences in cyber- and virtual worlds.

But women\*already experienced disconnection of the self through rape, abuse and economic exploitation. (Hawthorne, 2001, p. 55)

Our qualm consists of the absence of a place to escape; technology is within us, making up both our skin and our materiality. Far from a determinist position, we defend the advocacy and the possibility of other generating practices, but never from a “clean” position of purity, but entangled in networks of power and capital. Disconnection is not possible either given that our bodies are technologically co-constituted. In this sense, inhabiting cyberspace does not solely and/or necessarily imply disconnection; it implies being assembled and connected to technological artifactuality, inserted in and multi-connected to a technological-material-organic-discursive network.

Moreover, in spite of being a space in which it is possible to inhabit and to temporarily simulate other corporealities-subjectivities –which can be understood as disembodied and bodiless<sup>46</sup>– cyberspace does not necessarily cease to be a material dimension which is marked and co-constituted by gender, race, class, ability, etc., from its design and manufacturing to its use, politics, and the neoliberal deregulation that regulates and manages it. As the passage of time has demonstrated, what Hawthorne attributes to technocorporeality, an absolutely homogenized body devoid of identity, that is, “a body that has lost all identifying markers, that is, markers that might link it to a particular time, locale, culture or even individual” (2002, p. 55) cannot be assumed here.

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<sup>46</sup> This can be understood as bodiless inasmuch as corporeality can acquire greater importance and awareness, whether technological or exclusively technological. As we previously indicated, it is possible to speak of cyberbodies as “virtual bodies”. In this sense, creating a new identity and virtual image, for example, would emphasize virtual technocorporeality as a detriment to technological-organic-discursive-material technocorporeality, whose new identity or cybersubject inhabits virtual space. It is in this sense, for example, in which it could be interpreted as disembodied.

To state that bodies, or technocorporealities in general, have lost “all identifying markers” is not only hyperbole, but also a fallacy. As previously stated, technobodies continue to be marked by differences and inequalities derived from the interweaving of oppression systems, among others, race, class, sex-gender-sexuality, ability, age, language, religious and cultural context, ethnicity, nationality, and geographic location, altitude, latitude, climate, etc. There may be a certain homogenization of some identities and differences derived from mass production and capitalist consumer culture, in relation to fashion and various differences as Fredric Jameson (1998, pp. 59-60, 65-68) affirms, and concerning the queer as stated by Preciado (2015a). However, together with the capacity of capitalism to convert even movements of subversiveness and transformation into a commercial commodity, there is the growing tendency, amplified by globalization, to turn differences in race, sex-gender, sexuality, etc. into inequalities that are even deeper, widening the chasm of social hierarchy (Alexander & Mohanty, 1995, xv-xviii; Harrison, pp. 474-475, 2006; Enloe, pp. 496-497, 2006). Technobodies are historically situated and therefore, historically marked like any other effect of the relations of co-constitution within organic-technological-discursive- material differences.

Hawthorne seems to mix phagocytosis, production, and commercialization of identities and/or differences with their disappearance (2001, p. 56). The former implies the loss of their subversive and transforming force not their evaporation. On the one hand, there is *dispossession*, and, on the other, *dis-embodiment*. In this sense, she states: “The ideal globalized technobody is so lacking in content that it can be rented out, leased, downloaded, stolen, and sold” (Hawthorne, 2001, p. 56). However grave and abominable the territorial dispossession on the part of great multinational corporations or the dispossession of the bodies of children and women\* (sale, rape, unavoidable abuses of all nature, marriages, etc.), this does not cause disembodiment. The harmful and reprehensible fact that our bodies are managed and governed by others, that our corporealities belong to others and not to ourselves, does not mean that we are disembodied entities, or subjectivities without bodies or that our bodies have literally been erased. Oppression, colonization, making invisible, expropriation and exploitation of bodies, the negation of self-determination, as well as corporeal and identity sovereignty do not imply nor can be compared to the absence of corporeality itself, to inhabit “bodiless bodies,” as if we were disembodied subjectivities, beings, or spirits –pure or not–. The hyperbolic affirmation of our disembodiment and dematerialization poses great danger, which weighs against what Hawthorne seems to want to defend.

On the other hand, in view of the affirmation of a co-constitutional relation among technology, sex-gender, and capital, or this and the racist, heteropatriarchal, capitalist, ableist

system, the problem is not technology in itself, but the disinterest and capitalist heteropatriarchal aims from which it emanates and it reproduces –in addition to the possibility of reappropriation and meaning shift of subversive and transforming uses. The fact that technobodies are equated with profit and yet another marketable object at the service of sexed-gendered, ableist, racial domination is not so much owing to being technologically constituted, but that they are produced and designed in a capitalist, racist, ableist and heteropatriarchal system.

This apparently involuntary idealism –clearly, in her very words– subjacent to the postulates of Hawthorne contrasts with the critique of the idealism of some transhumanist technophiles like Hans Moravec (1988)<sup>47</sup> who perpetuate the comparison of the “techno” to “that interminable search for immortality that is reflected in under many religions centered on the disembodied male god” (Hawthorne, 2001, p. 57). In this case, the problem resides in that by wanting to criticize the search and the exaltation of the disembodiment of a part of science and technology and certain philosophical views, she reduces technological matter and our relation to said view, attributing the bodiless trait or quality to the generality of technological elements and techno-corporeal relationalities, thus ignoring the existence of other artifacts and uses of the technological, therefore reproducing the very disembodied view that it strives to criticize.

Hawthorne also criticizes the conceptualization of identities as permeable and fluid: “[I]ndividuals [are] asked to surrender their identities. These identities of class, sex, ethnicity, ability, age, sexual orientation, and so on –hard fought for over the past four decades and more– have suddenly become fluid and permeable” (2001, p.55). In spite of the tough and intense fight that is hidden behind the achievement of the recognition of certain identities, we understand the fluidity of these as something positive from a relational perspective of transformation according to which sexuality and sexed and gendered corporealities-identities ebb and flow in continuous change, although this change is not necessarily equal for everybody –which is a perspective that has also taken time to construct.<sup>48</sup> The forcefulness of this statement and opposition to identities apparently presenting themselves as fluid and permeable –as if the fact that identities were

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<sup>47</sup> Moravec expresses his desire to rescue to the mind from the limitations of the mortal body: “It is easy to imagine human thought freed from bondage to a mortal body... But it is not necessary to adopt a mystical or religious stance to accept the possibility. Computers provide a model for even the most ardent mechanist, what we can reasonably call a computer's thought process—can be halted in midstep and transferred, as program and data read out of the machine's memory, into a physically different computer.... Imagine that a human mind might be freed from its brain in some analogous (if much more technically challenging) way” (1988, p. 4).

<sup>48</sup> Moreover, bearing in mind the exclusion and the pain derived from naturalized identity concepts that conceptualize identity as essential, innate, immutable, rigid, static etc., which was challenged and criticized by various feminist positions for this very reason, the debate continues surrounding categories like “women\*,” who women\* are or not, and those who exercise the authority to decide such, for example, the anti-trans\*protest on behalf of certain TERFS (Trans\* Exclusionary Radical Feminists) who invaded the London Pride Parade in 2018 (Dommu, 2018).

perceived as fluid and dynamic excluded the possibility of being conceptualized as identities—can be understood from the fear and the unease of the possibility that something that has cost so much can be snatched away. Authors like Bonnie Morris (personal communication, December 7, 2017) facing the rise of trans\* from a lesbian position, also criticize the fluidity and permeability of sexual identities. However, almost twenty years after the text in which Hawthorne saw the light, we can state that none of the identities nor categories that the author names have disappeared. Admittedly, some of them may have lost strength in favor of others, but, at least for the moment, not a single one has disappeared.

Without detracting from sex-sexuality-gender identities,<sup>49</sup> as they satisfy the necessity of identifying ourselves in order to be interpreted by others—at least, until now in this social organization based on gender constructions that traverse all—recognizing them as something personal and politically valuable—some time ago it was said that “the personal is political”, one of the most iconic feminist phrases—, identities are battle weapons or political places, not nineteenth century fossils arranged on display to be observed, cleaned once in a while and admired. They are constituted as relational, and this relationality is historically and socially situated. They depend on the fight, interest, necessity, desire, and *desessities*.

On the other hand, in reference to techno scientific projects such as the Human Genome Project, the author states that “[a]fter they’ve had their go, we won’t any longer be black, or lesbian, or poor (unless they design us that way), or disabled, or even aging, or possibly even female” (2001, p. 56). As prenatal or pre-implantation genetic diagnosis show, genetic selection is an event which is mainly used to detect cases of functional diversity such as Down syndrome, Edwards-syndrome, or Patau syndrome, which could be expanded and broadened in the near future. That said, the elimination of women\* is an old practice, occurring ages before the appearance of this type of technique or technology.<sup>50</sup> In addition to its forcefulness, there are

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<sup>49</sup> The expression “sex-sexual-gender” includes the categories “sex,” “gender,” and “sexuality.”

<sup>50</sup> Despite the possible criticism concerning the article, according to Amartya Sen (1990), over 100 million women\* mainly from the continent of Asia have disappeared, 50 million in China alone. In India, infanticide and the abortion of fetuses considered female have been and continue to be not uncommon practices in addition to the advertisements of clinics calling for abortion upon giving birth to girls. This is so much so that ultrasounds with a selective abortive aim are called “SD”, the acronym for “Sex Detection”, as well as the “Solution to Dowry” (Campos Mansilla, 2010, p. 202). The law of 1994, Law of Pre-conception and Pre-natal Diagnostic Techniques (Ley de Técnicas de Diagnóstico de Pre-Concepción y Prenatal), and its continuation in 2003 prohibits revealing the sex of the baby before birth as well as the employment of prenatal diagnostic techniques with objectives deviating from the detection of anomalies or genetic illness or chromosomes to reduce female infanticide (Villela Cortés & Linares Salgado, 2012, p. 36; Biblioteca del Congreso Nacional de Chile, 2013). However, in spite of the law from 1961, which prohibited dowry, currently the rate of deaths due to dowry is increasing (Fundación Vicente Ferrer, 2019). In China, feminicide of girls has been documented since the third century A.C. As the legalist Han Fei Tzū recounts, “[w]hen a boy is born, the father and mother congratulate each other, but if a girl is born, they put it to death” (Creel, 1953, p. 149). Therefore, although there is a relation

other aspects that challenge author's statement. In the United States, for example, the trend seems to be the blurring of features through racial mixing and multiracial identity. The Census Bureau began to compile detailed information on people who identify as multi-racial in 2000 when checking more than one race<sup>51</sup> in the field of ethnic origin was permitted for the first time. A total of 6.8 million people marked the multiple race option. Ten years later, in 2010, this number increased by 32 per cent. The Census Bureau of the United States predicts that by the year 2060, non-Hispanic whites will not be a majority in the United States (Funderburg, 2013). Recent nomenclatures such as "Blackanese," "Filatino," "Chicanese," "Blaxican," and "Korgentinian" describe this patchwork well.<sup>52</sup> On the other hand, regarding the identity category of "lesbian," behind Hawthorne's statement –despite highlighting the possibility of design and technological modification– an essentialist conception of identity is hidden from which lesbian emerges, for example. As we have presented, this research questions and highlights said conception.

This article of everything or nothing, black or white, right or wrong, albeit on occasion apocalyptically tinged, critically gnashes the simplicity of the argument and the lack of depth of the concept, as Hawthorne clearly establishes a synonymy between "technobody" and "cyberbody":

The technobody has been romanticized by some cyber culture theorists, including the much quoted Donna Haraway, who claimed in her *Cyborg Manifesto* that "the machine is us" (1991, 181), without seriously considering how such a claim might begin to be manifested within less than a decade. The postmodern body of cyber culture ranges from the "meat" and "wetware" metaphors to glimmering virtual surfaces without weight or mass. And, I could add, without heart. (2001, p. 56)

As an example of these "virtual surfaces without weight or mass," the author cites Kyoko Date, the Japanese virtual adolescent girlfriend who debuted in 1996; Webbie Tokay, the first virtual model born in 2003; and Lara Croft. However, the technocorporeality that writes these lines does so, along with other actions, thanks to her heart, which continues to beat.

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of co-constitution between technology and gender, the problem itself is not technology, but economic and sex-gender concepts.

<sup>51</sup> Despite the fact that a large part of the scientific community has rejected the existence of race as a biological entity, society as a whole continues to be constructed by means of the category of race, generating grave inequalities, discrimination, oppression, exploitation, and violence. See Sussman (2014a, 2014b).

<sup>52</sup> For Funderburg, this mix and these new proliferating hybrid categories that account for lateral and genealogical intertwined multiplicities are an opportunity for all: "If we can't slot people into familiar categories, perhaps we'll be forced to reconsider existing definitions of race and identity, presumptions about who is us and who is them. Perhaps we'll all end up less parsimonious about who we feel connected to as we increasingly come across people like Seda, whose faces seem to speak that resounding line from Walt Whitman's 'Song of Myself': 'I am large, I contain multitudes'" (Funderburg, 2013).

Technobodies, as we have indicated, are technologically-organically-discursively-materially co-constituted corporealities, of which neither Webbie, nor Lara –until incarnated on the big screen, first by Angelina Jolie, and later by Alicia Vikander, in which case could be a representation of technobody more-than-technobody–, nor Kyoko would be included in our definition of “technobody.”

In reference to the cyborg and Haraway’s phrase, “the machine is us,” which we will later explore in depth, Hawthorne does not seem to completely understand the meaning, breadth, and carnal, corporeal, material, and especially political possibilities for empowerment that the cyborg offers. This is not romanticism, but a critical analysis of reality. Haraway does not celebrate nor praise our cyborg corporeality, but assumes it as a starting point of action, both at the service of imperialist heteropatriarchal capitalist powers because technology, she states, is a tool of domination, and feminist and socialist action to which she invites us. Should one truly strive to change something, to create other realities, it serves little to no purpose to start from a non-existent place, from corporealities we do not inhabit.

Haraway does not propose disconnection. Quite the contrary, her proposal is a responsible one, implicated in materialist and socialist feminism. What she proposes is the surpassing of an essentialist concept of differences in sex-gender, sexuality, race etc., which does a great disservice to the liberation of women\*, non-binary trans\*, racialized peoples, diverse functional bodies, and oppressed corporealities-subjectivities in general.

Hawthorne highlights the immaterial nature of information and communication technologies, and/or virtual reality: “Do we really want to create personalized “export processing” zones whether in the *immaterial* or material world?” (2001, p. 61, emphasis added). As we previously noted, together with Haraway,<sup>53</sup> we challenge and question the existence of immaterial worlds in opposition to Michael Hardt and Antonio Negri (2000).<sup>54</sup> Likewise, we

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<sup>53</sup> I would like to thank César Alcázar for conversations held in this sense, for his critique of the concept of “immaterial capitalism,” and his materialistic perspective on information and communication technologies in a capitalist context.

<sup>54</sup> The references to “immaterial work” and “immaterial production” and other types of immateriality are constant in Hardt and Negri (2000): “the recent transformations of productive labor and its tendency to become increasingly immaterial” (2000, p. 29); “We will elaborate on the three primary aspects of immaterial labor in the contemporary economy: the communicative labor of industrial production that has newly become linked in informational networks, the interactive labor of symbolic analysis and problem solving, and the labor of the production and manipulation of affects” (2000, p. 30). Hardt explains in the following way what he understands as immaterial production: “Our hypothesis is based on the fact that today we are experiencing a period of transition from the hegemony of industrial production to the hegemony of immaterial production, that is to say, the production of goods with content that is immaterial, intellectual, of images, ideas, affection, information, codes etc., which qualify this dominant form of production nowadays.

There are many jobs... that participate in this immaterial production. To give an example: nurses perform a material job, but also perform a job of affection because they create social relationships. The same occurs in computing, in services, and in education; in all these fields, there is a part of the product of these activities which

postulate the materiality of the world, capitalism, and its products and modes of production, including information and communication technologies and the virtual world. There is neither an immaterial world nor immaterial technology. Perhaps there are spaces, products, modes of production, and intangible goods, however they are not immaterial.<sup>55</sup>

Regarding the technobody, understood as a form of cyberbody –a virtual body that exclusively inhabits cyberspace, which is also a body attached, connected, and assembled to information and communication technologies and therefore bodiless, as the author concedes–, as well as a “bodiless and dispossessed body by biotechnology” –and capitalist globalization–, Hawthorne opposes the “wild body”: “I propose a different way of conceptualizing the body, using the idea of the “wild body” as a site of resistance to the homogenizing forces of global capital and global culture” (2001, p. 54). She defines it in the following way:

not interfered by man -I mean man. Wild types are the vital resource for continuing generational health in any population, be it plant, microbial, or human. The wild element is that element in a culture that keeps the culture healthy by challenging assumptions, power blocks, and institutions. Most radical politic forces play this kind of role in moving the culture forward, although their visions are rarely realized. (2001, p. 62)

The adjective “wild” comes from the Old English word “wilde,” which means “in the natural state, uncultivated, untamed, undomesticated, uncontrolled” (Harper, 2019). In turn, this is rooted in the Proto-Germanic “wildia” (source also of Old Saxon “wildi”, Old Norse “villr”, Old Frisian “wilde”, Dutch “wild”, Old High German “wildi”, German “wild”, Gothic “wilþeis” “wild,” German Wild (n.) “game”) (Harper, 2019).

“Wild”, as an adjective can mean: 1) (of an animal or plant) Living or growing in the natural environment; not domesticated or cultivated; 2) (of a place or region) Uninhabited, uncultivated, or inhospitable; 3) Lacking discipline or restraint; 4) Not based on sound reasoning or probability; 5) (of a playing card) Deemed to have any value, suit, color, or other property in a game at the discretion of the player holding it.

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is immaterial” (2007, pp. 92-93). An interesting exercise in this sense would be to ask the women\* who work in the sector of care if their work effort, energy, and affection implied, and the products of all this –rather, the effects, because, as Pérez Orozco (2017) indicates, we do not produce anything new, we only transform what exists– as a whole, are material or not. Nevertheless, in a conference at the University of California-Berkeley, Hardt (2017) stated that the terms “immaterial capitalism” and “immaterial production” did not seem appropriate, although, perhaps for lack of a better term, he continues to employ them.

<sup>55</sup> For a use and development of “intangible capitalism” see A.R.A (2007). Regarding the concept of “intangible goods” see Ramís (2014). About “intangible economy” see Regnasco (2000).

Reclaiming the wild body as a place of resistance in the presence of the homogenizing forces of capitalism is good. This also proves to be interesting as it is an element shared by microbes, plants, animals etc., which shatters dichotomies and hierarchies and appears as a commons, or a common and shared space. However, the problem lies in: 1) How we understand the wild body in relation to purity and essentialization-naturalization. 2) Whether we understand that this is the only possible path of resistance; as opposed to, technocorporeality inasmuch constituted by means of information and communication technologies as biotechnologically shaped. Quite the opposite, technobodies are also places of resistance to bodily corporealities.

In the three examples the author offers of wild body, the indigenous peoples who resist the Human Genome Diversity Project,<sup>56</sup> the radical feminists of 1980 who opposed reproductive technologies, and the women\* of the Performing Older Women's Circus of Melbourne, there is no "pure, natural, essential" body that has not been touched by Man (in addition to the literal sense). This remains true if we focus the spotlight on the hormones that we ingest, as well as those which we inhale; it would be difficult to think that there would not be radical feminists opposed to certain reproduction technologies who did not take the pill or other hormonal contraceptive measures, nor women\* who had not been under hormone replacement therapy in the medical-scientific age of invented-created menopause, in the case of the women\* of Melbourne. Yet, as we noted, there would be many other elements such as the immense variety and quantity of medicines from which antibiotics stand out, or a massive quantity of technologically modified foodstuffs, from transgenic to colorings and preservatives, among others, that make these corporealities technologically co-constituted bodies in addition to bodies that resist. From this biotechnological co-constitution these bodies demand other types of policies and practices that bear in mind these differences.

Hawthorne points at an outlook of sustainability, in which the diversity of cultures and the biodiversity are relevant elements:

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<sup>56</sup> Admittedly, indigenous groups are found among the greatest examples of resistance and struggle. It is worth highlighting the network "Mesoamerica initiative of Women Defenders of Human Rights (Iniciativa Mesoamericana de Mujeres Defensoras de Derechos Humanos). From 2012 to 2016, 3,886 of these women\* who fight against femicide, defending territory, bodies, and movements, were assaulted and 53 murdered (IM-Defensoras, 2019). Together with the previously mentioned fight of the Sioux of Standing Rock against the Dakota Access Pipeline or that of the Ohlone tribes in the San Francisco Bay area, the example of the indigenous Dayaks of Borneo stands out, among other tribes from Indonesia and Malaysia, who fought against the destruction generated by large enterprises such as the BEST Group and its palm oil plantations or logging business such as Novelpac of the jungle and their means of life. This vicious attack has caused thousands of orangutan and human deaths. See, The Gecko Project and Mongabay (2018); Inguanzo Ortiz (2016, pp. 227-228). Also see Aliansi Masyarakat Adat Nusantara- AMAN (2020), an organization of 17 million individuals from 2,359 indigenous communities across Indonesia, in which the Dayaks can be found.



Diversity of cultures and biodiversity in the natural world are the sustainable elements. Immortality, homogenization, reductionist biotechnologies and the rush for profit... represent short-term, unsustainable futures. What we need is a vision of ourselves that enhances collective diversity, takes account of our contexts and our environments. (Hawthorne, 2001, p.65)

Hawthorne's defense of the need to create a vision that that exalts collective diversity and the environment assumes our entanglement with power, our technologically co-constituted corporeality, and our inhabiting a globalized capitalist world without reclaiming nor departing from ideal-unreal places of chastity and cleanliness; shattering and overcoming dichotomous views of nature/culture-technology; and likewise accepting xenoestrogenicity and environmental toxicity. Haraway reminds us that there is neither purity nor innocence in the belly of the monster, and that assuming and embracing hybridization, or semiotic-materiality – “autocorrection,” or the important nuance that this accomplishes (2016a, p. 104)– and the constitutive relationality of our corporealities is not contradictory nor exclusive to defending indigenous corporealities, territories, and fights. It is the starting point to be able to create resistance strategies, practices, and collective subversive transforming subjectivities, lifestyles, and other relations that make possible and foster the plurality of planetary material, life with dignity, or well-being, and contribute to continuity and –finite and limited– terrestrial regeneration (Haraway, 2016a; Puig de la Bellacasa, 2017; Pérez Orozco, 2014, 2017). Concurring with Hawthorne and Fredric Jameson (1998, pp. 59-60, 65-68) in that one of the features of the capitalism globalizer is homogenization and standardization, and in the face of the *desesity* of fighting for differences and the local, and it is not an exaggeration to remember that the idea of nature as a place purity and cleanliness, as an indomitable and wild *locus* opposed to culture, technology, etc. is a creation of the –cis, heterosexual, bourgeois– White Man. There is no return to Eden: perhaps, because it never existed.

Therefore, it is not only that wild bodies appear or can appear as technocorporealities, as reflected in the previously analyzed examples, but this dichotomy turns Hawthorne's approach into a politically weaker and less effective one because it has shown to be of little use generating a solid strategy in the face of global heteropatriarchal imperialist ableist capitalism which, in our opinion, resounds with the alliance of the multiplicity of technobodies that inhabit different places and categories to varying degrees, measures and frequencies.

Therefore, despite the fact that Hawthorne accurately highlights the molecular level – “[n]ow its colonialism in a molecular level” (2001 p. 63)– technology, pharmacology, and biotechnology –despite not using the word “hormone”–, and offers various pertinent examples,

the sampling of indigenous cell lines by pharmaceutical companies; think of the so-called women\*health products for menstruation, fertility, and menopause invented over the half past century; think of the designer babies, the trade in organs and bodies that is growing year by year; think of the genetically modified organisms you are ingesting through food or absorbing through tampons. (2001 p. 63)

to our mind, she makes an ontological and political error. It is the result of a dichotomous thought of good-bad, pure-contaminated, natural-technological of excluding a great mass of technobodies from the conceptualization of “wild bodies,” which is a politically subversive conceptualization, as well as “bodies in revolt against these homogenizing forces” (Hawthorne, 2001, p. 63). It is ontological if we bear in mind, among other matters, the xenoestrogenicity of the environment and the environment as a whole (aquifers, rivers, seas, oceans, plants, animals, rocks, microbes etc.). It is political, because the different technocorporealities are necessary allies in this joint struggle.

### **2.3. Cyborg and technobody the importance of the differences in the thought of «“both/and”, “yes/and”, “no/but”, “no/and”»**

Another semantic comparison ready to be analyzed is between “technobody” and “cyborg.” Sandra Valdetaro (2010) and Braidotti (2002) are two authors who use these concepts as equivalents. However, despite the figure of a cyborg undoubtedly being a precursor to the concept of technobody and of the relational onto-political-epistemology of which both give an account and are the result, as well as the historic moment at which they are aimed, allow for the establishment of a partial synonymy. Here, we will defend that the differences presented suffice in order to conceive them as concepts that tell us of material-semiotic things or objects that are not entirely distinct nor identical. That is to say, despite various uses and possible meanings, we do not postulate interchangeability between Haraway’s cyborg and the concept of technobody with the meaning that we articulate and shape here.

### 2.3.1. The Space “Man-Machine”. *In the beginning there were drugs...*

The term “cyborg” is an acronym of “cybernetic organism.” It was coined in 1960 by the doctors of Rockland State Hospital in Orangeburg, New York, Manfred E. Clynes and Nathan S. Kline to speak of the *man-machine*<sup>57</sup> in space voyages. It is interesting to observe that from the beginning, both pharmacological technologies –the work of Kline was a great contribution to the psychiatric conversion in psychopharmacology– and information technologies –the creation of a CAT computer (Computer of Average Transients) in 1960 for the research of electrical activity in the brain in relation to sounds and colors, and the later creation in 1996 of a computer software program for classical music, called Superconductor– were some of Clyne’s many known scientific achievements - which led to the creation of the idea of “cyborg.”

The concept appears for the first time May 22, 1960 in an article from *The New York Times* called “Spaceman is seen as man-machine.” As set out in said article, “a cyborg is essentially a man-machine system in which the control mechanisms of the human portion are modified externally by drugs or regulatory devices so that he being can live in an environment different from the normal one.”

This new image of the “spaceman” –we say “man” because this is how it is introduced in the article, which, in our opinion, helps to visualize the changes that are the result of this feminist fight– results from a change in perspective in space medicine, which consists of adapting the human being to the environment, rather than transporting earth-like conditions with it. The prescription proposed to combat this is a combination of drugs and cybernetics: “We were asked to present a paper on drugs for space flight... and this naturally led to a question of how they would be administered... and this led us to applications of cybernetics to the problem” (The

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<sup>57</sup> Despite the term being previously non-existent, the idea of cyborg as a hybrid creature as a kind of “man-machine” or “woman-machine” did exist. Already in 1839, Edgar Allan Poe described a man with a prosthetic limb in his satirical account “The man that was used up: A Tale of the Late Bugaboo and Kickapoo Campaign.” Among other “man-machines” there would be the “clockwork man” the main character of the novel from 1923 *The Clockwork Man* by Edwin Vincent Odle (2013). In it, the author narrates that advanced humanoids living millions of years from our civilization implant clockwork devices in our heads. At the expense of part of our independence, these devices allow us to move through time and space, however this mechanism can function incorrectly. This is what happens to the clockwork man who accidentally appears in the middle of a game of cricket in an English village. Edmond Hamilton (1928) in his story *The Comet Doom*, also speaks of hybrid creatures, of immortal brains wrapped in metallic casings that plan to bounce Earth from its orbit to theirs in order to conquer it. In July of 1931, *Amazing Stories* published *The Jameson Satellite* by Neil Roland Jones (2008), in which the protagonist, the professor Jameson, survives the destruction of the human race thanks to repairing of his brain. We find another example in the novel of *No Woman Born* by the prolific science fiction writer Catherine Lucille Moore (1975), which was published in the issue of December 1944 of *Astounding Science Fiction*. Deirdre, the main character, is a beautiful and successful singer and dancer who dies in a fire in the theatre. Her whole body is burnt except her brain. Upon the request of Harris, her manager, Matzer, a robotics specialist reconstructs her with gold metal.

New York Times, 1960). Drugs, technology, and biotechnology appear as one of the central axes of the cyborg from the very beginning.

In the news article from *The New York Times* we also find a prophetic declaration from Clynes, who states that “the concept of the cyborg might become a valuable tool of research into mental and other diseases” (The New York Times, 1960). The doctor is correct in his prediction, but in addition to psychiatry and the medical field, it is in the feminist analysis of technoscience, in feminist onto-political-epistemology from the hand of the well-known Donna Haraway, where the concept spreads its wings and becomes a key figure, through a sort of an ironic historical time warp, which later extends to many other fields.

The very week that the article was published, Clynes and Kline made their new focus of space medicine known in the *Psychophysiological Aspects of Space Flight Symposium*, from the Air Force School of Aviation Medicine in San Antonio, Texas. The article “Cyborgs and Space,” published in the journal *Astronautics* in September of 1960 sets out said briefing in the title, “Drugs, Space and Cybernetics.” In it, Manfred and Nathan present what this “cyborg being” would entail in more detail. What they propose are “artifact-organism systems which would extend man’s unconscious,” for which “self-regulatory controls are one possibility” (Clynes & Kline, 1960, p. 26).

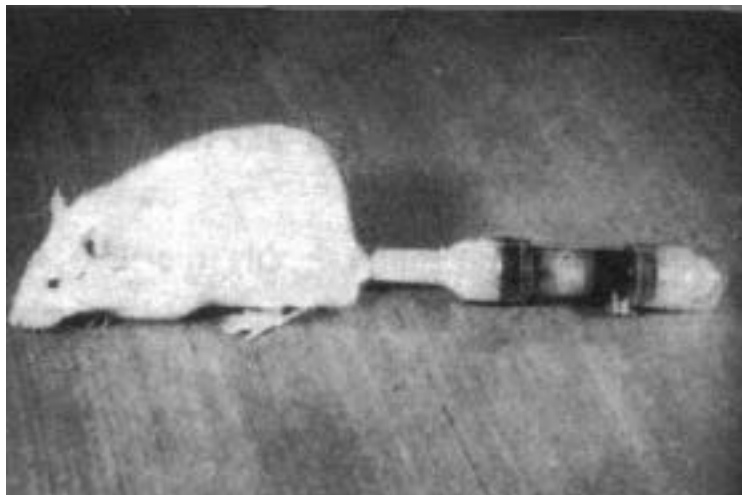
This addresses the question of knowing “some of the devices necessary for creating self-regulating man-machine systems” (Clynes & Kline, 1960, p. 27). They also formulate the term “cyborg” to bear in mind this “exogenously extended organizational complex functioning as an integrated homeostatic system unconsciously” (Clynes & Kline, 1960, p. 27). The cyborg incorporates exogenous elements that extend the function of auto-regulating control of the organism, with the purpose of adapting it to new environments. The purpose of the cyborg and its homeostatic systems is to liberate “man” to perform all sorts of tasks such as thinking, feeling, observing, or creating, without having to be dependent or a slave to the machine; these robotic-like tasks of adaption to the environment are undertaken by the organizational system automatically and unconsciously.

Among the devices that aided thinking of the construction of cyborgs, there is the osmotic pressure pump capsule developed by S. Rose and J. F. Nelson (1955),<sup>58</sup> that injected chemical substances or drugs into the organism. This was created to respond to the still unresolved problem of gradual continued injection of certain drugs and medicines. In this sense,

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<sup>58</sup> Despite the fact that Clynes and Kline only name Rose (1960, pp. 27, 74), both pharmacists in the article referenced developed the osmotic pressure injector. Regarding the osmotic pump of Rose and Nelson, see Nikam Kareparamban, Jadhav and Kadam (2012); or Keraliya, Patel, Patel, Keraliya, Soni, Patel and Patel (2012); Hernández and Melgoza (2014); Mathur and Mishra (2016).

the Australian pharmacologists note that many of the errors in the conclusions of experiments stem precisely from the lack of an adequate method of administration: “This is particularly so when an attempt is made to estimate the replacement dose of a hormone after the removal of the gland. To approach physiological conditions, continuous injection of the hormone is necessary” (1955, p. 145). Therefore, they invented a device capable of continuously administering fluid, “drugs, hormones, etc.” at relatively constant rhythm (1955, p. 145).<sup>59</sup> As can be observed, hormones have been present from the beginning in Rose and Nelson’s long-term injector.



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The osmotic pressure pump was accompanied by sensors or controls to adjust the quantity and type of drug in different environments in the case of the human cyborg of Clynes and Kline. This device had previously been used in rabbits and rats like the Heparin injector in human beings. In fact, the article of Clynes and Kline features the photograph above in which the osmotic pump is being used to inject a rat. The caption of the photo included “one of the first Cyborgs” (1960, p. 27). The irony is not lost in that in this incipient attempt to improve “man,” the first and only cyborg whose photograph Clynes and Kline could show was that of the osmotic rat. That is, the rat was a cyborg before man. Another example of animal-

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<sup>59</sup> The device consisted of three chambers: one for the drug, another for excess salt and a third for water. It featured a latex diaphragm that separated salt and drug chambers, as well as a semipermeable chamber that separated the chambers of water and salt. The difference in osmotic pressure between these two chambers moved the water from the water chamber to the salt chamber through a membrane. The volume of the salt chamber increased, forming a flow of water distending the latex diaphragm and releasing the drug to the exterior of the device.

biotechnological fusion is of monkeys administered a combination of aminoethyl isothiuronium and cysteine to increase the resistance to radiation, an experiment that the Air Force School of Aviation Medicine conducted, as stated in the article (Clynes & Kline, 1960, p. 74). As Haraway (1991) indicates twenty-five years later, the breaking down of barriers between humans-animals-machines is already in the same origin of cyborg and its possibility.

Within the features of this cyborg in space we find breathing with a lung connected to a solar powered battery, lethal radiation rate detectors, inducement to hibernation by means of pharmaceuticals, and pharmaceuticals to maintain mental activity during hibernation as well. As the article in the *New York Times* sets out: “He would not have to eat or breathe. Those functions and many others would be taken care of by automatically by *drugs* and battery powered devices, some of which will be literally built into his body” (1960, emphasis added). Cyborg on drugs. Of drugs and cybernetics. The authors state, “we are now working on a new preparation which may greatly enhance hypnotizability, so that pharmacological and hypnotic approaches may be symbiotically combined” (Clynes & Kline, 1960, p. 28). The title of the paper by Clynes and Kline for the *Psychophysiological Aspects of Space Flight Symposium* crystallizes the pharmacological technology as central to the construction of this “man-machine.”

Moreover, of the sixteen psycho-physiological problems or issues detailed in the doctors’ article (wakefulness, radiation effects, metabolic problems and hypothermic controls, enzyme systems, vestibular function, cardiovascular control, muscular maintenance, perceptual problems, gravitation, variations in external temperature, magnetic fields, sensory invariance and action deprivation, psychosis, and limbo), fourteen propose solutions by means of ingesting drugs. Furthermore, the use of drugs as a repairer of problems did not play a leading role. In the subsection, “Other problems,” they add “[t]here obviously exists an equally large number of medical problems amenable to pharmacological influence which have not been discussed here for lack of space. Among these are such conditions as nausea, vertigo, motion sickness, erotic requirements, vibration tolerance, etc.” (Clynes & Kline, 1960, p. 76).

Despite the fact that in Haraway’s development of the cyborg figure she fixates on information and communication technologies as well as biotechnology in her constitution, she does not specifically attribute the latter to pharmacological technology, to say nothing of drugs. There is great resonance in the original idea of the cyborg of Clynes and Kline and the concept of technobody developed by Preciado (2008) with respect to the centrality of drugs in the

constitution of corporeal materiality, even greater than between the former and the Harawayan cyborg.<sup>60</sup>

However, in the origins of the concept of cyborg, we also encounter a clear line toward transhumanism very much in spite of Haraway's. She explicitly distances herself from posthumanism and directly and strongly criticizes the former (2006, p. 140), or perhaps, does so precisely as a test to find to which extent the cyborg inhabits and emerges from the belly of the monster. As can be observed in the *The New York Times* article, the transhumanist seed is present from the very beginning in the "man-machine" of Clynes and Kline: "So equipped, the space man would belong to a breed of literally *super-human beings* that the scientists who conceived the call them "cyborgs"" (1960, emphasis added). We also find the article of Clynes and Kline from 1960 on the website, "Transhumanity. Enhanced Intelligence, Awareness, Strength, Durability and Longevity" (2016), which is a transhumanist page as its very name indicates. Evidently, it is the phrase that begins the article that situates it there: "Space travel challenges mankind not only technologically but also spiritually, in that it invites man to take an active part in his own biological evolution" (Clynes & Kline, 1960, p. 26). The phrase that ends it judiciously declares: "Solving the many technological problems involved in manned space flight by adapting man to his environment... will not only mark a significant step forward in man's scientific progress, but may... provide a new and larger dimension for man's spirit as well". (Clynes & Kline, 1960, p.76)

### 2.3.2 The feminist cyborg. *Material semiotic knots*

As we have previously mentioned, within feminist literature the term "cyborg" is used for the first time by Haraway in her *Cyborg Manifesto*, "*A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s*," published in the *Socialist Review* of Berkeley in 1985,<sup>61</sup> and mainly revealed in her work of *Simians, Cyborgs, and Women: The Reinvention of Nature* in 1991.

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<sup>60</sup> Among the drugs administered by the "Cyborg technique" there would be the following: phenoziathines, "epinephrine, reserpine, digitalis, amphetamine, etc." (Clynes & Kline, 1960, p. 75).

<sup>61</sup> Nevertheless, we find the following note in the Acknowledgements (1985, p. 101), as well as in Haraway (1991, p. 243): "An earlier version of the paper on genetic engineering appeared as 'Lieber Kyborg als Gattin: Für eine sozialistisch-feministische Unterwanderung der Gentechnologie', *Argument-Sonderband* 105, eds. Bernd-Peter Lange and Anna Marie Stuby, Berlin, 1984, pp 66-84; the cyborg manifesto grew from 'New Machines, New Bodies, New Communities: Political Dilemmas of a Cyborg Feminist', *The Scholar and the Feminist X: The Question of Technology*, Conference, Barnard College, April 1983."

In the introduction of *Manifestly Haraway*, Cary Wolfe remarks, “in the thirty-plus years I’ve been reading critical and cultural theory, I don’t think there’s ever been a phenomenon like ‘The Cyborg Manifesto’” (Haraway, 2016b, p. vii). This phrase serves to show the transcendence of this text and its indisputable figure: the cyborg. This is one of the papers that mark a turning point: after having read it, one does not remain the same; one acquires a new conscience. It “cyborg-yzes,” given that one is already a cyborg, and, as we will argue later more specifically and particularly, a technobody. This text that broadens minds and is materialized in hearts cyborgyzes us; we were *already* cyborgs because, as Wolfe states, it is a text that emerges from and reflects a specific historical moment:

“The Cyborg Manifesto” is also very much a product of its moment, and this is as it should be, since cyborgs (as she reminds us many times in the text) have no truck with time - lessness or immortality. Reading it again today, it’s a sort of time capsule or cultural brain smear from the era of Star Wars (both the Hollywood film franchise and the Reagan-era missile defense system) blasphemously reinterpreted by a committed socialist-feminist. (Haraway, 2016b, ix)

As a result, *Companion Species Manifesto: Dogs, People and Significant Otherness* saw the light in 2003. For Haraway, with the new world context and the checkmate position which neoliberal politics were and continue to be placing on the planet, now more than ever, emphasis of life is required: the vital component of the relation of co-constitution and nature-culture-technology, which she would later include through the figure of the “companion species,” or, dogs. However, this does not mean a break from the previous manifest nor the obsolescence of the figure of the cyborg. The coherence and continuity between both words and figures remain apparent in the author’s statements. Examples of this are the description of cyborgs as the “junior siblings in the much bigger, queer family of companion species, in which reproductive biotechnopolicies are generally a surprise” (2003, p. 11) and the response Wolfe offers when suggesting: “I felt that when you wrote the “Companion Species Manifesto,” one of the reasons you moved away from the figure of the cyborg...,” to which she responds: “they’re in the same litter...” (2016b, p. 254). This response is reiterated in *Staying with The Trouble: Making kin in the Chthulucene* (2016a, p. 105): “cyborgs are critters in a queer litter.” Later we will unravel the composition of this Harawayan *litter*.

The cyborg continues to exist, as we will later see. Though chance plays its part, it is no coincidence that in her last essay, *Staying with the Trouble*, she resuscitates the cyborg. It is in these changing and tumultuous times of global resurgences to the right, of “catastrophic convergence: militarism, neoliberalism and climate change” (Parenti, 2017, p. 49), or of



“Climate change LLC” (Buxton & Haywes, 2017), in which neoliberal capitalism is sharpened and bares its teeth at the pinnacle of global ecological collapse, its reality is visible, and the cyborg heart, stronger than ever, seems to beat.

This requires the simultaneous conjuring of the biopolitics that resound in *Companion Species Manifesto*, which reclaim the spotlight on the vital component of the human-machine-animal co-constitution, with the technocriticism of “Michael Foucault's biopolitics, [which] is a flaccid premonition of cyborg politics” (Haraway, 1991, p. 150)<sup>62</sup>; but not of a dialectic nature of “both, but,” “yes/and,” “no/but,” “no/and” (2016b, p. 212), giving way to materialistic technobiopolitics or biotechnopolitics already invoked in the *Cyborg Manifesto*, which now explicitly speaks of multispecies alliances and technological-organic-discursive-material compost facing the necessity of “staying with the trouble.” Cyborgs continue to be relevant and valuable with the aim of creating lateral twinnings and making politics and compost, in a queer way “Make Kin, Not Babies!” (2015, p. 161).

Returning to approximately thirty years ago, as Haraway (2016b, p. 202) herself remarks, the *Cyborg Manifesto* is borne from the invitation of the *Socialist Review West Coast Collective* to trace the possibilities of political subversiveness and to consider the meaning of being Marxist feminist or socialist feminist in the early 1980s in the era of Reagan, at a time in which the promises of political change of the 1960s had been left behind. The petition “to prepare a paper, as delegate for the socialist Review, to a meeting in (then) Yugoslavia of the New Left and post–New Left, of the Eastern European and Euro- and American parties” arises (2016b, p. 202).

The *Manifesto* stems from Sputnik and the space race in the middle of the cold war, and the militarization and imperialism that was known before she had worked at the University of Santa Cruz, in Hawaii, and later at Johns Hopkins:

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<sup>62</sup> Haraway states that our dominations do not work well through medicalization and normalization, but by creating networks, designing new communications, managing stress, and, as we will later introduce, lead to Preciado (2008), producing, destroying, mutating, becoming chronic, optimizing subjectivities and materialities through biotechnologies or pharmacological technologies, and technochemicals on the molecular level. For Haraway, the works of Foucault *The Birth of the Clinic* (2003) (1963), *The History of Sexuality* (1978) (1976), and *Discipline and Punish, The Birth of the Prison* (1995) (1975) provide an account of a means of power in the moment of its implosion. “The discourse of biopolitics gives way to technobabble, the language of the spliced substantive; no noun is left whole by the multinationals. These are their names listed from one issue of *Science*: Tech-Knowledge, Genentech, Allergen, Hybritech, Compupro, Genen-cor, Syntex, Allelix, Agrigenetics Corp., Syntro, Codon, Repligen MicroAngelo from Scion Corp., Percom Data, Inter Systems, Cyborg Corp., Statcom Corp., Intertec” (1991, p. 245). Approximately half of these companies –the majority of them still in existence nowadays– are dedicated to information technology or electronics, and the other half to biotechnology and pharmacological technology.

The Applied Physics Laboratory at Hopkins and the Pacific Strategic Command in Hawaii made me see the military industrial complex as it is embodied, embedded, in elite research apparatuses and in real places ... I was personally shaped by ... these complex formations of capitalism, militarism, imperialism, and more. (Haraway, 2016b, p.203)

As Haraway herself narrates, the origins of her work are reassembled while learning from the history of science in Baltimore where, apart from meeting her husband, she worked with Nancy Hartsock and experienced being part of a group of Marxist feminists. The *Manifesto* also sups from a particular moment of feminism of color in the United States and strives to be responsible in the face of the prevailing racism. Finally, it emanates from the process of the consolidation of information and communication technologies as means of power and control:

Lived particularly in the forms power took in information-saturated culture, information science-saturated culture and politics, in Command Control Communication Intelligence (C3I). C3I was central to the McNamara plan in the Vietnam War—the particular cybernetic rationalization of war, much of which was run from Hawaii, during the very period of indigenous Hawaiian sovereignty movements, struggles for feminism and reproductive and sexual freedom, and land and labour struggle movements, both Hawaiian and not. (Haraway, 2016b, p. 205)

The “Cyborg” is deeply, intricately, and tentacularly rooted in a multiplicity of origins. It is a metaphor that, apart from criticizing the domination of technology, indicates its role in the blurring of limits and the transgression of borders between humans-animals-machines and in the dissolution of modern dichotomies nature/culture, man/woman, sex/gender, I/others, mind/body, among others. It also offers possibilities of empowerment for various oppressed corporealities-subjectivities.

Haraway brilliantly succeeds in expanding and converting matters that had gone inadvertently unnoticed and had been conceived as the logical succession of events into criticized and subversive matters. This is the case in the limits between *science fiction*, *scientific fact*, *speculative fabulation*, and *speculative feminism* (SF) (1991, p. 201)<sup>63</sup> as well as the dissolution of limits between humans-animals-machines. As we have shown, the idea of the

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<sup>63</sup> In *Staying with the Trouble*, Haraway makes SF more complex, adding a new meaning: *string figures*, which makes reference to complex thought that unravels, (un)weaves, (un)twines old patterns of practices, discourses, and events to generate new events (2016a, p. 3). This figure simultaneously implies a new triad: on one side, undoing the threads already sewn in thick events and practices in search of crucial patterns and knots, “In that sense, SF is a method of tracing, of following a thread in the dark, in a dangerous true tale of adventure, where who lives and who dies and how might become clearer for the cultivating of multispecies justice” (2016a, p. 3), on the other, the patterns and knots themselves. Finally, she implicates bequeathing and receiving, doing and undoing, gathering the strands and throwing them away. *String figures* is practice and process; a necessary figure for the possibility of future desirable groups and desired for global multi-species materiality.

man-machine previously existed in science fiction before Clynes and Kline transformed the concept of cyborg on the part of scientific discourse and Haraway in feminist metaphor. Likewise, as we have presented, the transgression of borders between human animals, nonhuman animals, and technology was a technoscientific event materialized in the osmotic pressure pump of Rose and Nelson, employed in rats and rabbits and thought of by Clynes and Kline for its use in humans before being raised as a subversive onto-political-epistemic question.

The notion of technobody follows this line, in this sense, coinciding with the meaning of “cyborg” just as the concept “technobody” is thrust into a world in which the breaking of barriers on a theoretical and practical level has already been accomplished. Technobodies have inherited the world of the cyborgs, their transgressions, and their teaching. We have been fed from the bosom of the cyborg bodies of our intellectual mothers and of those who gave us birth. Therefore, we know that the bond has tightened, that fusion is infusion solidified from xenoestrogenic hormonal microartifacts because all of us are technologically configured by means of ingesting synthetic hormones and inhaling their aromas.

### **2.3.3 Origins and the evolution of the concept of technobody**

At this point it is necessary to review a brief genealogy of the concept of “technobody” and indicate the main source that feeds our interpretation. The first trace of the term “technobody” is found in an article from 1991; by the critical and cultural theorist and cinema feminist, Vivian Sobchack, titled “Baudrillard’s Obscenity.” Throughout said article, Sobchack makes reference to the body thought of as an object and never lived as a subject of Jean Baudrillard (1991),<sup>64</sup> in relation to the reading and interpretation of the work *Crash* of James Graham Ballard. In this novel by Ballard from 1973, the protagonists sexually arouse themselves participating in car accidents. For Sobchack, Baudrillard makes an “obscene” and “pornographic” interpretation of said piece and, from a demoralized and demoralizing view, detaches corporealities from their carnality, subjectivity, and pain:

Baudrillard is so into *thinking* the techno-body as without organs and full of orifices, so erotically seduced by the (very male?) confusions of sex and death that look to apparent resolution by

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<sup>64</sup> Baudrillard writes two essays in the same journal, *Science Fiction Studies*, and the same number as Sobchack: “Science Fiction and Postmodernism.” A large part of the articles in the journal are a response to the essays of Baudrillard, among them, the author. Sobchack also discusses “Ballard’s *Crash*” (Baudrillard, 1991, pp. 313-320).

“riddling” the imagined body with technologically-conducted holes, that he reads Ballard’s *Crash* obscenely - that is, off to the side. (1991, p. 327)

According to Sobchack, *Crash* revolves around “the human body abstracted, objectified and literalized as techno-body,” which Ballard, from the view of Sobchack, does not value. However, in the opinion of the author, Baudrillard shows a lack of morality and fascination “with scars, orifices, desires and violent sexuality” (1991, p. 238), from an experience after a surgical operation of cancer in the thigh,<sup>65</sup> he wishes for a car accident or two to remind him that he is a body, a body that feels pain, a place, according to Sobchack, from which the moral view arises. She ends by stating “if we don’t keep this subjective kind of bodily sense in mind as we negotiate our techno culture, then we ... like Baudrillard will objectify ourselves to death” (1991, p. 239).

### **2.3.3.1 Balsamian technobody: *Gendered and racially marked discursive-material technocorporeal multiplicity***

The concept of “techno-bodies” that Anne Balsamo proposes in her text “Forms of Technological Embodiment: Reading the Body in Contemporary Culture” from 1995 is much closer to the notion of technobody that we maintain in this piece.<sup>66</sup> However, we will also indicate the distances and differences in respect to the main elements that provide, account for, and constitute technocorporeality.

The author begins her article stemming from the Harawayan cyborg, “the technological-human” (1995, p. 215), a figure which encompasses biological-technological fusion, union, combination, or incorporation, or a combination of all or some of them, as Balsamo establishes with the term “merger” –said term carries various meanings–. In the author’s words, nearing the end of the 1980s, this idea infiltrated western imagination, so much so that the cyborg has become a familiar fixture in the subject of postmodernity. Balsamo’s essay encompasses: “the contemporary cultural conjuncture in which the body and technology are co-joined in a literal sense, where machines assume organic functions and the body is materially redesigned through the use of new technologies of corporeality” (1995, p. 215). To do so, the author analyzes

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<sup>65</sup> As she herself mentions, after three operations on cancer in her thigh, her left leg is amputated in the summer of 1993 (2010, p.51).

<sup>66</sup> After this article, *Technologies of the Gendered Body: Reading Cyborg Women* (Balsamo, 1996), was published which sets out the ideas and main concepts of the article.

distinct modes in which bodies are being remodeled or remade by means of the application of these new technologies of corporality.

The technological-biological relation, this *merger* of what constitutes the cyborg involves a reconceptualization of the human body as a boundary concept belonging to two systems of meaning, which, for Balsamo, were previously conceptualized as simultaneously incompatible “organic/natural” and “technological/cultural.” This new character delineating the body implies an ideological slackening between these two systems of meaning that compete to see which will succeed in dominating the meanings and definitions:

The construction of a boundary between nature and culture serves several ideological purposes; most notably, it guarantees a proper order of things and establishes a hierarchical relationship between culture and nature. At a basic level, this socially constructed hierarchy functions to reassure a technologically over stimulated imagination that culture/man will prevail in his encounters with nature. The role of the body in this boundary setting process is significant because it becomes the place where the anxieties about the ‘proper order of things’ erupt and are eventually ideologically managed. (Balsamo, 1995, p. 216)

More than juxtaposition in which each plot longs for its widening, or the existence of elements like the body that acquire a limiting feature and occupy a common area –part of which previously belonged to one of the spheres or sides of the dichotomy, and the other to the other– the idea condensed in the Harawayan cyborg is that there is hardly anything (or nothing) pure and that almost all (or all) is co-constituted in a relational way by elements of a diverse nature; the multiple material semiotic knots emerge as effects of these relations. Balsamo herself, as we will later present, affirms the mutual determination of the material and the discursive (1995, pp. 219-220).

Haraway, apart from noting the enormous and varied potential of cyborgs, and the informatics of domination, also emphasizes their capacity to transform reality. From here, we agree with Balsamo that “new biotechnologies are promoted and rationalized as life-enhancing and even life saving,” but “[o]ften obscure are the disciplining and surveillant consequences of new body technologies -in short, the bio-politics of technological formations” (1995, p. 216). Given that technology also emanates from both capitalist and imperialist heteropatriarchal social structure, it is designed and employed for ends that often generate, reproduce, and intensify precariousness, domination, exploitation, chronification, and death,<sup>67</sup> which leads us to present

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<sup>67</sup> Military technology has caused hundreds of millions of deaths and displacements in the world –110 million deaths in the twentieth century according to Peña Huertas (2006, p. 74) and Fisas (2011). Western countries have

the idea that “techno-bodies are healthy, enhanced and fully functional” (Balsamo, 1995, p. 216). Technobodies provide an account of a constitutive relational feature that share corporealities in neoliberal capitalism, and in this multiplicity in terms of healthiness and life, there is a little bit of everything.

As we noted, Balsamo states that the body can never be constructed as a purely discursive entity nor purely material when considering the “dual ‘natures’ of the body in terms of its ‘structural integrity’ to use Evelyn Fox Keller’s (1992) term” (1995, p. 219). For Balsamo, this means that the material and the discursive are mutually determined (1995, pp. 219-220), which we could characterize as a co-constituted view. From here we establish that the material qualities of the body are “culturally determined and discursively managed; qualities that are tied to its physiology and to the cultural contexts within which it makes sense such as its gender and race identity” (1995, p. 220).

In the literary extract that transports us to Preciado’s (2008) technobody, the author upholds that “[i]n our hyper mediated techno-culture, body awareness is amplified so that we can technologically witness, if not yet manage, the molecular functioning of bodily processes” (1995, p. 216). Among the elements to control through this technological surveillance, Balsamo enumerates “sugar, caffeine, salt, fat, cholesterol, nicotine, alcohol, steroids,<sup>68</sup> sunlight, narcotics” (1995, p. 216), directly referencing drugs, pharmaceuticals, and hormones in particular.

However, likely because of the yet unclear techno-pharmaco-hormonal corporeal constitution, she mentions technologies as tools or means to redesign the body, awarding them a role of surveillance, observation, and medical follow-up, but ignoring their role in the internal molecular constitution of their own corporeal materiality. As we mentioned in respect to the Braidottian and Hawthornean technological attachment to a computer, though our bodies are

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collaborated in the genocide in the Democratic Republic of Congo where 80 per cent of the world’s coltan reserves are concentrated. Coltan is a mineral employed in the manufacturing of the latest generation of mobile devices (Blay, 2016) and weapons like those used in Syria and Yemen. In the second Congolese war alone, called the Coltan War (1998-2007), 5.4 million people were murdered according to the NGO International Rescue Committee (Deiros, 2016). The creation of hormonal technology such as Prempro® or Premarin® generates a deplorable situation for mares as they are continuously and interminably impregnated. The hormones in said articles are extracted from their urine (Haraway, 2016a, pp. 110-115). Among the numerous precarious global situations is that of the workers and in the maquila industry (Cravey, 1998, p.71) or the workers in the industry of microprocessors given that the manufacturing of such correlates to higher instances of cancer, deformities and infertility (Kim, Kim & Peak, 2014; Infobae, 2017). Richard Roberts, the Nobel Prize winner in Medicine in 1993, indicated the lack of interest of pharmaceutical companies in the commercialization of medicines that cure many of the illnesses currently considered chronic because “curing was not as profitable as chronicity” (Redbioética-UNESCO, 2016). The list goes on and on.

<sup>68</sup> Steroids return (Balsamo, 1995, p. 217).

technologically monitored, they are also technologically co-constituted in their corporeal materiality.

In spite of pioneers like Rachel Carson speaking extensively of the devastating and noxious effects of pesticides –xenoestrogenic technological products with disrupting endocrine effects, thus, operating on the molecular level<sup>69</sup>– in the decade of the 1960s, the relevance of these elements as techno-molecular constituents of human corporeal materiality seem to still pass by unnoticed for those who analyze technologies and their role in sex-gendered corporeal configuration. This is also the case for Balsamo. In fact, that we know of, there has not been, any proposal that relates the concept of technobody with xenoestrogenicity.<sup>70</sup> The relevance of xenoestrogen as a constituent of the materiality of which technobodies consist is not limited to animal bodies, but extends throughout the environment including other animals, soil, plants, bacteria, fungi, rivers, oceans, and the atmosphere. The visualization, identification, and conceptualization of certain technological elements and technocorporeal relationalities still seem to be incipient in 1995. The breadth and frequency of technobodies were still to be increased exponentially.

Consequently, despite setting out diverse relationalities and various forms of technological-corporeal embodiment and constitution, from which a fairly accurate analysis can be deduced, as we will see, the conceptual elucidation that Balsamo conducts seems to indicate an incipient sojourn from the concept of technobody, in relation to one of the central tenets of technocorporeal *materiality* which implicates and links human corporealities with a great multiplicity of other technocorporealities. Thus, albeit still lukewarm and not completely accurate, the Balsamian protoconcept of technobody or “prototechnobody” points toward molecular management, which is not yet possible as the author suggests, but real by means of an infinite number of pharmaceutical and biotechnological products of varying degree such as the previously mentioned xenoestrogenic pesticides, antibiotics, antidepressants, sex-gendered hormonal products, or genetically modified organisms.

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<sup>69</sup> Nevertheless, Carlson does not speak of ‘endocrine disruptors’ because of the later appearance of this terminology. The phrase “endocrine disruptor” was used for the first time in a conference celebrated on July 28 and 29 in 1991 in Wingspread, Racine, Wisconsin, where the “Wingspread Consensus Statement” emerged. Various scientists from diverse disciplines gathered, Theodora Emily (Theo) Colborn and John Peterson (Pete) Myers, among others, who were worried about the seriousness of certain chemical substances introduced into the environment by human beings that had the capacity to alter the human and nonhuman animal endocrine system (Colborn, Dumanoski & Myers, 1997, pp. 259-260).

<sup>70</sup> This is largely due to the recent and increased research in this century started in the decades of 1960 and 1970, and with it, the knowledge, though still insufficient, concerning the workings and the effects of xenoestrogenic elements and products.

According to the author, the technological devices undertaking molecular control of technobodies function through a “set of visualization techniques that contribute to the fragmentation of the body into organs, fluids, and ‘bodily states’, which in turn promote a self-conscious self-surveillance whereby the body becomes an object of intense vigilance and control” (1995, p. 216).<sup>71</sup> The processes of molecular organization of the body have not only given rise to fragmentation, their control, and surveillance, as Balsamo states, but also, as Preciado emphasizes, its production, namely, its varied constitution on different levels. Thus, these processes increasingly surpass the symbolic to form part of the construction of corporeal materiality, of carnality and sex-gendered molecularity, and of the same concepts of the sexual regime. As we will see, while Balsamo does note the constructs of certain identities through these imaging technologies, the corporeal-identity constitution that these technologies undertake transpire to even more profound levels. Therefore, it does not seem that Balsamo is contemplating fusion, which implies indissolubility, inseparability, and indistinguishability of fused elements, at least at determined levels and through determined devices, as a relational mode within her forms of *technological embodiment* nor in her idea of technobody. Nevertheless, the meaning of fusion as “merge” is possible in both the conceptualization of the Harawayan cyborg, and in the notion of technobody, both being instances in which the technological and biological combine.

The idea of molecular fusion as a technological-corporeal relational mode, or as an endogenous constituent of the cyborg does not explicitly appear in Haraway’s *Cyborg Manifesto*. When the author speaks of the miniaturization of technology “on the molecular scale”, the example of the silicon chip is given (1991, p. 153). She also mentions nuclear energy and “the miniscule changes in the code of an antigen in the immune system”; but the matter of techno-corporeal fusion on the molecular level by means of ingestion is not developed in the constitution of cyborgs (1991, p.154). When Haraway uses the term “fusion,” she states the following: “my cyborg myth is about transgressed boundaries, potent fusions and dangerous possibilities which progressive people might explore as one part of needed political work” (Haraway, 1991, p. 154).<sup>72</sup> As Haraway indicates, this statement is derived from two premises:

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<sup>71</sup> Among these devices, Balsamo mentions “electronic scales, home pregnancy kits, diabetes tests, blood pressure machines and fat calipers” (1995, p. 216).

<sup>72</sup> In relation to the “necessary political work,” and the union of cyborgs of varying degree and different positions, the author defends a coalitional policy, but indicates that “*fusion* is a bad strategy of positioning” (Haraway, 1991, p. 192, emphasis added). This is due to fusion erasing and overriding differences in this case. Coalition, however, implies the agglutination and union of differences to fight for common objectives or purposes while these are recognized and in mind. This way, in this area, fusion is reduced and coalition is strengthened.



1) The still profound dualist constitution –mind/body, animal/machine, idealism/materialism, etc.– that is socialist and feminist in social practices, symbolic formulations, and technoscientific artifacts. 2) The urgent need for people to unite to resist domination.

Therefore, the idea of fusion, which Balsamo references, is what Haraway highlights as a constituent of the cyborg: the technological-biological machine-animal fusion, namely, the surpassing of dichotomies and of certain barriers. It does not seem that Balsamo is speaking of techno-corporeal fusion on the molecular level. Rather, she would be speaking of a multiplicity of modes of biological-technological relation which have an effect on the human body and which comprise combination, assemblage, cohabitation, (re)design, prosthetic relation, juxtaposition, connection, or mutual determination, among others.

Returning to the idea of fragmentation, the author states that these technological devices of visualization lead to a fragmentation of the body into parts such as urine, fingerprints, and blood, which serve to conduct intense surveillance and control of the self, and construct cultural identities like “infected with HIV,” “coke-addict mother,” or “user [of drugs].” In this sense, a series of relevant and interesting questions are conducted:

When the human body is fractured into organs, fluids and scorned material, what happens to gender identity? When the body is fractured into functional parts and *molecular* codes, where is *gender* located? What is the relationship between physiological sex markers and gender identity? (1995, p.216, emphasis added)

The dominant response that this research aims to challenge is that gender identity or sex-gender is in molecular codes and structures or in molecules themselves, be these hormonal molecules inside the human body or in boxes that contain their synthetic replica, molecules of deoxyribonucleic acid (DNA), that together with ribonucleic acid (RNA) and specific enzymes and proteins make up chromosomes<sup>73</sup> or neurotransmitters of brain areas such as the central subdivision of the bed nucleus of the stria terminalis (BSTc). Today, true gender identity is no longer found in the gonads –although it is there as well, as Dreger indicates in relation to the period she calls “Age of Gonads” (1870-1915)– but in hormones, in their molecular chemical structure.<sup>74</sup> In the third chapter we will analyze this question in depth. In response to the

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<sup>73</sup> Each chromosome of our cells is formed by a molecule of DNA associated with RNA and proteins. I would like to thank Xare for clarifications on chemistry matters.

<sup>74</sup> Although chromosomes are decisive elements in current scientific accounts regarding the determining of sex in human technobodies; namely, at the time of sex-gendering a body, we could say that the hormones have the last word, because many bodies hormonally or surgically modify the sex-gender they were assigned at birth. Moreover, of the many examples of trans\* corporealities-subjectivities, as we will specify, the world of sport

questions from Balsamo, we can state that gender identity is currently fragmented up to the molecular level, as in the case of “sex hormones” the quantity each of the two types of molecular hormonal compounds that produces –or should produce– a technobody, or each individual molecule itself.

The so-called “sex hormones” are divided into two types: female hormones (progesterone, pregnenolone, estradiol, estriol, estrone, etc.) and male hormones (dihydrotestosterone, testosterone, androsterone, etc.), which leaves the very sex gender of the hormones to be discovered: each molecule of testosterone becomes synonymous of masculinity and each molecule of estrogen synonymous of femininity. Likewise, it is commonly accepted that all bodies produce the two types of hormones, but it is considered that the bodies conceptualized as masculine contain higher levels of male hormones than those conceptualized as women\*. In contrast, it is considered that female bodies contain higher levels of female hormones than males.<sup>75</sup> That is, in order to decide if a body is male or female, it is necessary to take into account, among other variables, the quantity of hormones perceived as male or female that are produced, although this also has its various exceptions.<sup>76</sup> In the last example, the question revolves around masculine hormones, testosterone, in particular.<sup>77</sup>

In relation to Balsamo’s last question of what the relation between physiological sex markers and gender identity is, the answer we offer in this Doctoral Thesis is that the relation between what has traditionally come to mean “sex” is understood as biological and “gender is

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offers a good sampling of this. Hormones have become highly relevant elements –although not sole elements– in our sex-gender concept.

<sup>75</sup> According to a cohort study from Travison et al. published in *The Journal of Clinical Endocrinology & Metabolism* from the American Endocrine Society, “[t]he harmonized normal range for testosterone in a non-obese population of European and American [white] Men, 19-39 years, is 264-916 ng/dL” (2017, p. 1161). On the website of the Endocrine Society where the findings from the study are shown, it is stated that “[t]estosterone is the main sex hormone in men, though women have testosterone as well in smaller amounts” (2017). Regarding testosterone and bodies conceptualized as female, despite the variability, the 5th and 95th percentiles estimated by Braunstein, Reitz, Buch, Schnell and Caulfield for a woman of 30 years are 15–46 ng/dL (520–1595 pmol/L) (2011, p. 2924). For a study on the levels of androgens in German women\* between 20 and 80 years old see Haring et al. (2008). On the different levels of testosterone in the blood of men and women\* see Preciado (2008, p. 148). With respect to estradiol, a hormone that is considered female, Stanczyk Clarke discuss the following approximate levels of estradiol in serum: 20–300 pg/mL in adolescent girls; <40 pg/mL in adolescent boys; 30–800 pg/mL during the menstrual cycle; >20.000 pg/mL during pregnancy; <20 pg/mL in “postmenopausal women”; 40 pg/mL in men; 20-100 pg/mL in “postmenopausal women” in estrogen therapy; and >10.000 pg/mL in women\* in ovarian stimulation treatment (2014, p. 57). The idea of the rigid sexual and hormonal dimorphism and the pathologizing of certain hormonal levels considered as abnormal will also be challenged in the third chapter.

<sup>76</sup> For example, in the case of “androgen insensitivity syndrome” it is not the quantity of androgen that the body produces, but that it does not “read” it.

<sup>77</sup> In general, Aristotelian logic of the masculine presence and the feminine absence operates condensed in testosterone as the reigning hormone. This is clear, as we can see in the fourth chapter, in determinist biological accounts concerning the prenatal development of genitals and the sex gendered brain of the fetus. In this sense, there are limits in testosterone levels for bodies of women\* while low quantities of testosterone are pathologized in men. On the contrary, a female hormone given such onto-political-epistemic authority has not been observed.

conceptualized as social and cultural, is of mutual agreement. In this sense we differ with Balsamo in her conceptualization of gender, as well as of the body as a “boundary concept ... at once related to physiological sexual characteristics of the human body (the natural order of the body) and to the cultural context within which that body ‘makes sense’” (1995, p. 216). The relation of co-constitution between nature-culture, sex-gender (Fausto-Sterling, 2000, 2003, 2019<sup>78</sup>; Haraway, 1991, 2003)<sup>79</sup> implies that the division is not as clear as Balsamo seems to suggest between sex as belonging to nature, and gender belonging to culture despite its historical construction in this sense. Both dimensions are juxtaposed or joined forming gender or gender identity.

Just as Laqueur indicates, in relation to the invention of sex in the eighteenth and nineteenth centuries (1990), or sex as a biological entity, which led to the shifting from a monosexual model to a sexual dimorphism model,<sup>80</sup> Butler also decried the cultural logic of inversion of first gender being invented, and later sex as natural to legitimize gender on the basis of the naturality of sex, with both sex and gender holding cultural constructions (1990, pp. 6-7). That is to say, what sex is, where sex is, what elements shape sex, how these elements are related, how many sexes there are and the relation between them is something that came to be determined by the concept of gender and its gender norms, though norms can be transgressed. Sex is assigned to corporeal morphology through gender norms. Therefore, sex is not natural nor does it exclusively belong to the biological, organic, or material realm. “Sex” is a category in itself which contains gender. In this way, this “natural order of the body” in which Balsamo situates the “physiological characteristics of the human body” is culturally interpreted, constructed, or co-constituted. The means of the body acquiring meaning is not simply cultural either. It is above all material, technologically-organically-discursively material. As we will see

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<sup>78</sup> In the article “Gender/Sex, Sexual Orientation, and Identity Are in the Body: How Did They Get There?” (2019), Fausto-Sterling employs “gender-sex,” which could be interpreted as marking the reversal of cultural logic that Butler manifests through the interweaving of sex-gender. Although in this Doctoral Thesis we have leaned toward “sex-gender” or “sex-gendered” to visualize the nature of relational construction, procedural of sex-gender, and the workings of the prevailing logic, nominal and conceptual multiplicity is always welcome and enriching.

<sup>79</sup> Schneider adds the category of race to this co-constitution: “It is this co-constitutive quality of sex, race and gender that I am interested in, primarily because of the support each construction gives in the modern West to white supremacy’s tenacity. To make the claim that sex, gender and race all constitute each other (suggesting, for example, that whiteness itself has a gender) supposes an unseemly or even grotesque conflation of natures... brings into question the natural status of all three categories, implying that they could be otherwise” (2012, p. 125). For Schneider, “the co-constitutive qualities of race, sex, and gender are such that each becomes nonsensical apart from the others” (2012, p. 128). In addition to race, a multiplicity of categories such as ability, class, age, nationality, religion, geographical location etc. participate in this co-constitution. How the distinct categories and oppressions operate in each intermeshing is something to be analyzed in each individual body or context.

<sup>80</sup> Although this did not mean the total disappearance of the unisexual model according to Laqueur (1990, pp. 21, 154).

in the following chapters, a wide range of environmental and conceptual factors and elements influence the shaping of sex-gender.

Likewise, gender needs a material, biological, organic dimension to be incorporated, carried out, materialized, assumed, experienced, and inserted. When this materiality is modified, gender is often modified as well. The incorporation of gender ends when it literally turns into corporeal materiality. As Fausto-Sterling indicates, interweaving the theory of gender performativity of Butlerian gender with the development systems theory (DST) and changing the causality of anatomy-function to function-anatomy, the body or corporeal materiality also evolves and develops to comply with functions that are assigned by gender norms (2003, pp. 125-126).

However, we cannot state that sex and gender are the same either. On the one hand, the concepts cannot be completely dissociated from the meanings from which they were conceived, or the semantic dimensions that they have come to acquire in history. For example, sex was conceived as a natural and a biological entity (Laqueur, 1990), that served to inscribe and designate social position in a body (Mak, 2012) and led to having a technological dimension at the end of the nineteenth century through surgical reconstruction and, later a hormonal dimension in the body in the cases of intersexuality (Dreger, 1998; Reis, 2009; Mak, 2012). The psychological dimension is added to this technological dimension: sex begins to be rationalized as a representation of an inner self, which will result in the idea of gender: first from Blair-Bell and later from Money and the Hampsons (Dreger, 1998, p. 166; Mak, 2012, pp. 10-11, 13).

“Gender” as a concept that shifted its meaning from the linguistic-grammatical field to the field of sexology-psychology and later extended to the feminist field appears in the context of Blair-Bell’s medical/scientific dealing of intersexuality as a means of condensing the idea of sex as psychologically and directly linked to the incipient hormonal relevance in sexual configuration (1915). Later Money and the Hampsons laid out the surgical-hormonal practices of sex reassignment that were to come and the criteria to employ, offering a new theoretical corpus in which gender, as well as behavior –established throughout childhood– would designate psychological sex and would present a clear technological dimension: genital reconstructability would be key at the time of assigning gender, which implies the necessity of adequate genital morphology (Money, 1955; Money, Hampson & Hampson, 1955, 1957). The recent inauguration of the sex-gender dichotomy is taken on and reproduced by authors like Ann Oakley (1985 [1972], pp. 158, 164, 189) and Michèle Barrett (1980, p. 213) and their condemning of the oppression of women\*, extending the idea of sex as natural and gender as a social cultural construction. Furthermore, returning to the reasons that impede the establishing of

a complete synonymy of sex and gender, the fact that they are not exactly the same favors the strategies of questioning the coherence of gender and allowing them to be articulated by other means, multiplying the possibilities for their materialization, as we observed in many cases of trans\* and others.

With this, what we want to manifest is the multidimensionality that both concepts present –without forgetting that both are cultural constructions– and the multiplicity of their materialization and activation in varying contexts through distinct practices, discourses, relations, and technologies.<sup>81</sup> All this comes to be gathered together in the sex-gender arena. In this sense, Butler and Haraway coincide in the nature of the effect of gender. For Butler, gender and sex function performatively, that is, they produce that which they intend to describe; they appear as effects, not from the action of the subject, but from previous cultural norms (1990, pp. 24-25). For Haraway, the subjects, objects, types, races, species, genders etc. are products of their relations (2003, p. 7). Following these lines, in this thesis, we will propose that sex-gender is the effect of relations of technological-organic-discursive-material co-constitution, together in this multidimensionality in the four intertwined categories. Within sex-gender there is a relation of co-constitution in which technological-organic-discursive-material elements participate while appearing as an effect of these relations. Therefore, the body is not something that is in the middle of, or a sort of limit between, these two distinct spheres. The Harawayan nuance between hybridization and semiotic-material knot or object acquires all of its transcendence here.

This interrelated multidimensionality is irreducible and of great importance. The idea of co-constitution between nature-culture, sex-gender, and semiotic-material elements of a varying degree imply an onto-political-epistemologically useful position offering a brilliant way out when facing the dead-end alley of the debates between “everything is culture” and “everything is biology.” To our mind, this opening that presents the view of mutual constitution is valid because it includes and embraces multiplicity, all subjective-technocorporeal multiplicity, accounting for it without hierarchy, oppression, or exclusion. Perhaps it is for this very reason that it can appear as a generator of understanding, well-being, justice and liberty.

In this sense, although it is true that “[t]he widespread technological refashioning of the ‘natural’ human body suggests that gender too would be ripe for reconstruction” (1995, p. 216), it would not be the remodeling or reconstruction of a “natural” body with or without quotation marks as Balsamo claims, but the reconstruction of a body already previously constructed because sex-gender and race function as production technologies and subjectivity-corporeality

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<sup>81</sup> Regarding multiple ontology see Mol (2002).

control while being constituted by a great quantity of technological elements. That is, it deals with the reconstruction of a body that is far from being natural; it is technologically-organically-discursively-materially co-constituted.

Thus, this idea of fracturing and fragmentation to which sex-gender refers is nothing new. If we retreat to the nineteenth century, to the era Dreger called “Age of Gonads,” these were the predominant defining elements of male and female, those that determined if someone was woman or man, which likewise implied the fragmentation of the body. Similarly, since the end of the eighteenth century and turn of the nineteenth century, stemming from the invention of sex as a biological category and political-scientific construction of sexual difference, of two heteronormative and dichotomously opposite, and anatomically and physiologically distinct sex-genders, as Laqueur shows us (1990), the human body has remained fragmented in distinct organs, parts, and sexual fluids –some of which were described centuries before. Perhaps, the novelty resides in the completeness of fragmentation and its increasingly greater invisibility: from the hormonal, molecular, chemical level, to the identification of the female with estrogen and progesterone and masculinity with androgens.

For Balsamo, one of the most forceful and stoic defenses in the safeguard of the boundary of gender is given in the context of sports, where “the gendered boundary between male and female is one border that remains heavily guarded despite new technological ways to rewrite” (1995, p. 217). For example, she cites the case of athletes whose strong athletic bodies are too unconventional for gender norms and are neutralized in the media through allusions to their sexualization. Moreover, the bodies of women\* who threaten the order of gender and question the supposed natural physical inferiority are subjected to genetic endocrinological and physiological tests with the aim of demonstrating that they are *true* women, going so far as to prohibit their competing, like in the case of the athletes María José Martínez Patiño, Mokgadi Caster Semenya, or Edinanci Fernandes da Silva, among others.

Beginning in the decade of 1960 these tests have acquired various structures over the years from “tests of femininity” such as the one to which María Patiño was subjected by the International Olympic Committee (IOC) (Fausto-Sterling, 2000, pp.1-5),<sup>82</sup> to the recent

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<sup>82</sup> María Patiño, the best Spanish hurdler in her day, has a congenital condition known as androgen insensitivity syndrome (AIS) meaning that despite having a Y chromosome and testosterone producing testicles, her cells do not recognize the hormone and she did not develop masculine traits, but she did develop an external feminine physiology (without having ovaries or a uterus). In 1988, on the way to the Olympic Games, she forgot the obligatory certificate that stated she was a woman. After undergoing the impertinent test of scraping the inside of her cheek, she faced the result that supposedly, she was not a woman and was prohibited from competing and stripped of her awards and her license to compete. But she did not give up; together with Alison Carlson, ex-tennis player and biologist of the University of Stanford, they would confront the IOC. See Varona (2015). As Arribas sets out, “during the fight against a discrimination that was on the verge of destroying a life, she became

publication by the International Association of Athletics Federations (IAAF) regarding hyperandrogenism which prohibits women\* with “higher than normal” levels of testosterone to run distances of 400, 800, 1,500, a mile and hurdling (2018, pp. A-3, A-4, A-9). This regulation affects Caster Semenya, a three-time world champion of the 800-meter race and double gold Olympian who usually competes from 400 to 1,500 meters. The only possibility that the International Federation gives for athletes with levels of testosterone considered to be “too” high for the norms of gender to be able to compete is to take medication. This implies that an athlete should take medication continuously for six months with a hormonal contraceptive treatment if there are more than five nanomoles of testosterone in the blood (Bellón, 2018). Nevertheless, the Supreme Federal Tribunal of Switzerland has suspended the regulation of the IAAF; as a result, at the moment, Semenya can continue to compete without having to take medication (El País, 2019).

The case of Edinanci Silva, a judo athlete who participated in four Olympic Games and won two golds in the Pan-American Games in Rio de Janeiro 2007, bronze in the Worlds in Paris in 1997 and Osaka in 2003, and was champion of the World Super cup in 2007, is even more unfair and shocking. To be able to obtain the certificate of femininity from the IOC and participate in the Olympic Games in Atlanta in 1996, she was subjected to various surgical operations, “surgery to excise intra-abdominal testicles (a procedure that is known as bilateral orchiectomy) and to reconstruct the clitoris (clitoridectomy)” (Lins França, 2009, p. 43), and hormone treatments (García Dauder, 2015).

In a traditionally masculine area like sports, one of the quintessential battlefields for the conception of gender, physical excellence of women\*, the similarity to masculine marks and standards, or even overpassing of these marks<sup>83</sup> are viewed as attacks because the bodies of women\* that are “too masculine” should be prohibited and erased, or otherwise technologically modified. As García Dauder points out, in relation to Caster Semenya, and completely applicable to any female athlete whose body is under question by the rigid norm of sexual difference:

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a doctor in Sport Sciences, conducted research at the University of California, Los Angeles (UCLA), worked as a professor at the Universidad de Vigo, and published her story in *The Lancet* to become an advisor for the International Olympic Committee in terms of gender and also to defend Indian athlete Dutee Chand, who succeeded in repealing a new barrier, the norm of hyperandrogenism or overproduction of testosterone” (2015). Dutee Chand is currently competing.

<sup>83</sup> The film of 2017, *Battle of the Sexes*, tells the true story of the tennis match in 1973 where Billie Jean King, one of the best tennis players in history, in addition to being an activist for the rights of women\*, faced Bobby Riggs, number one in the world in the 1940s. This challenge was the first to demonstrate the supposed superiority of men. However, Billie Jean King won the match with great ease.

The fear that awoke Caster Semenya was not the competitive advantage, but a fear of a body of a hyper muscled woman who did not ask for apologies, thanks to the hormones that were naturally generated in her organism, but most of all thanks to effort and hard training. Until the markers and “masculinity” of women\* athletes are jointly celebrated, in the sense of strength, musculature, ambition, and indifference toward aesthetics benefitting athletic achievement, in the same way the races of Usain Bolt were celebrated, barriers for women\* will continue to exist in the sports world and will be continued to be watching the boundaries of sex. (2015)<sup>84</sup>

Nevertheless, together with the strong trend toward maintenance and reinforcement of sexual dimorphism and a sex-gendered dichotomous and heteronormative regime, both in spite of and through technology, we can observe another trend toward the multiplicity of sex-sexual-gendered corporealities-subjectivities, a multiplicity that has been increasing in the last decades.

Balsamo also associates technobodies with multiplicity and racial and gender differences. From a feminist perspective, her objective is to create a taxonomy of the distinct forms in which technobodies are constructed as effects of diverse techniques and technologies. To do so, she uses the Foucauldian technique of cultural speech analysis in which they are articulated, conceptualized, and produced. The author departs from the assumption of the body not as a natural object, but as production, which is a simultaneously cultural, social, and historic product and process. Regarding the product, the body is the material embodiment of ethnic, gender, and racial identities, “as well as a staged performance of personal identity, of beauty, of health (among other things)” (1995, p. 217). Concerning the process, it is the manner of knowing and marking the world, while knowing oneself and marking oneself.

For Balsamo, the forms through which technobodies are shaped as well as technobodies themselves are varied:

In contrast to those who would argue that there is a dominant - singular - form of the postmodern techno-body, I argue that when starting with the assumption that bodies are always gendered and marked by race it becomes clear that there are multiple forms of technological embodiment that must be attended to in order to make sense of the status of body in contemporary culture. (1995, p. 218)

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<sup>84</sup> Original text: “el temor que despierta Caster Semenya no es su ventaja competitiva, sino el miedo a un cuerpo de mujer hipermusculado, que no pide disculpas, gracias a las hormonas que naturalmente genera su organismo, pero sobre todo gracias al esfuerzo y al entrenamiento duro. Hasta que no se celebren conjuntamente las marcas y la “masculinidad” de las mujeres deportistas, en el sentido de fuerza, musculatura, ambición e indiferencia hacia la estética en beneficio del logro deportivo, de la misma forma en que se celebran las carreras de Usain Bolt, seguirán existiendo barreras para las mujeres en el mundo deportivo y se seguirán vigilando las fronteras del sexo”.



Thus, it goes hand-in-hand with the cyberpunk novel *Synners* by Pat Cadigan (1991), which “explicitly discusses an often-repressed dimension of the information age: the material identity of the techno-body” (Balsamo, p. 220), and its four main characters, describing four types or versions of incarnation or postmodern embodiment: *the laboring body, the marked body, the repressed body and the disappearing body*.<sup>85</sup>

Despite finding themselves in cyberspace, the four characters of the novel are marked by race and gender as well as socialized by means of connection to technology. Throughout the article we see a reiterated emphasis on bio-corporeality, embodiment, and in the sex-gendered, racial, ableist etc., configuration of technobodies. It emphasizes the idea that technologies are embodied *in* bodies, even when these are connected or attached to information and communication technologies when navigating and/or inhabiting cyberspace:

The key insight to emerge from the novel is that the denatured techno-body remains a material entity. Although it may be culturally coded and semiotically marked, it is never merely discursive. This is to say that even as *Synners* discursively represents different forms of technological embodiment, it also reasserts the critical importance of the materiality of bodies in any analyzes of the information age. (1995, p. 223)

According to Balsamo, Cadigan also characterizes the use of technology depending on gender differently, namely, that it determines the type of relation with technologies: bodies named and socialized as feminine are codified as bodies-in-connection, while male bodies are bodies-in-isolation. Thus, while feminine cyberpunk bodies look to “log in” or connect with others by means of their sociality, male bodies wish to overcome material barriers individually, exposing their individualism.

Balsamo again deploys another version of the taxonomic matrix of the types of technological embodiment, expanding beyond that shaped by the four people of *Synners*, and analyzes the racialization and gendering of technobodies. Thus, through the repressed body, the author aims to provide an account of a body that has been subjected to glittering promises of virtual reality of a universe free of bio-corporeality. As Hawthorne did, it denounces the restructuring and redevelopment of the narratives of immortality and ancestral transcendence created principally by Man through the technological ideal of overcoming the material corporeal barriers and their social meanings. As Balsamo points out, “we are promised whatever body we

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<sup>85</sup> The characters represent the four corners of a matrix of identity constructed in and around cyberspace which are, left to right and top to bottom: Sam (the laboring body), Gina (the marked body), Gabe (the repressed body), and Visual Mark (the disappearing body).

want, which doesn't say anything about the body that I already have, and the economy of meanings I already embody" (1995, p. 229). This supposed corporeal liberation does not imply "that people will exercise 'the freedom to be' any other kind of body than the one they already enjoy or desire" (1995, p. 229). The author once again highlights corporeal materiality, which disappears representationally, even in connection with the virtual reality of cyberspace through distinct technological devices. She concludes that the creation and use of the coding language, cyberspace, and virtual reality continue to be affected by and reproduce markers, and inequalities that are sex-gendered, ethnic, ableist, etc.

In reference to the marked body, Balsamo highlights the fashion industry and aesthetic surgery as technologies and means of production of identities that are leased and bought. Within the former, racialized bodies of women, especially Black women\*, are objectified and eroticized through fetishization. Cultural appropriation of primitive ethnicities on the part of mainly white, western readers implies the hierarchical construction of identity in which the black body is conceptualized as "other" and the white body as normal and good. In the author's words:

[T]he black bodies of supermodels are used as billboards for designer messages about the fetishization of black identity as the cultural sign of the ethnic primitive. Just as they are admitted to the elite club of well-paid supermodels, black models are coopted to a cultural myth of racial subordination. (1995, p. 225)

In addition to imaging technologies, to which Balsamo seems to give considerable importance, aesthetic surgery implies often drastic and dramatic transformation of the body. According to the author, this type of surgery offers provocative material for the debate concerning the *cultural* construction of the gendered body because, on one side, women\* are mainly the preferred subject of this discourse, and on the other, aesthetic surgeries are mainly performed by men. However, it is not solely the debate concerning cultural construction, given that "the physical female body is technologically dissected, stretched, carved and reconstructed" (1995, p. 226) following the tyrannical heteronormative ideal of beauty.

According to data published by the International Society of Aesthetic Plastic Surgery (ISAPS) (2019a), in 2016, 10,417,370 surgical operations were performed in the world, as well as 8548,594 injectable operations and 2,545,922 facial rejuvenation operations, equaling a total of 13,209,539 non-surgical operations, totaling a figure of 23,626,909 of global aesthetic procedures in 2016. The data from 2017 that ISAPS offer are very similar. 10,766,848 surgical operations were performed in the world, 8,572,196 injectable operations and 2,051,984 facial

rejuvenation operations, equaling a total of 12,623,694 operations that did not involve surgery. The number of aesthetic operations on the global scale was 23,390,542 in 2017 (ISAPS 2019b).<sup>86</sup>

In these same statistics collected in 2016, 87.5% of non-surgical aesthetic operations, as well as 84.6% of the surgical operations and 86.2% of general aesthetic operations were performed on women\*. In 2017, the data is similar. 85.6% of human technobodies were subjected to aesthetic surgical operations. 87.1% who underwent non-surgical aesthetic operations, as well as 86.4% of those who underwent general aesthetic operations were women\*. The high percentages show that the weight of the aesthetic or beauty canon mainly affects those who are conceptualized as women\*. According to the data of Statista (2019a), in 2017, the countries in which more aesthetic and cosmetic operations were performed were the United States of America (18.4%), Brazil (10.4%), and Japan (7.2%), followed by Mexico (4.4%), and Italy (4.1%). The data from ISAPS in 2017 confirm that of Statista: in the United States of America 4,310,180 surgical and non-surgical aesthetic operations were performed, comprising 18.4% of the global aesthetic operations. Brazil follows with 2,427,535 (10.4%); Japan, 1,678,610 (7.2%); Mexico, 1,036,618 (4.4%); Italy, 952,830 (4.1%); Germany, 704,880 (3%); Colombia 516,930, (2.2%); and in eighth place, Thailand with 128,398 aesthetic operations (0.5%).

From the data provided by ISAPS we can conclude that in South Korea,<sup>87</sup> one in every 500 people underwent rhinoplasty surgery, and one in every 600 a fat grafting. In Brazil and Colombia, a liposuction is performed on one in every 950 people. One of the most widespread surgical operations is breast augmentation: in the United States one in every 1000 women; in Brazil, one in every 1,100; in Colombia one in every 1,200; more than one in every 1,600 in France, and more than one in every 1,700 in Germany. In Colombia, one in every 2,300 people underwent buttocks augmentations, with over one in every 4,000 people in Brazil and with more than one in every 5,000 in Mexico.

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<sup>86</sup> The data from 2017, in contrast with 2016, are based on a survey conducted by 1,329 plastic surgeons. As the report indicates, the final figures have been projected, and are based on the estimated number of certified plastic surgeons who perform their work in each country, 43,500 in total according to the data from all of the National Societies together with the survey shown.

<sup>87</sup> In this country, the concern of image and physical appearance has led to aesthetic surgery fever. The subway stations in Seoul are littered with giant posters of “before and afters” and the advertising of these centers. According to statistics published in the local newspaper *Chosun Ilbo*, Korea has the highest rate in the world; one in every five Korean women has undergone some type of aesthetic operation (Miró Martí, 2012; Vidal Lyi, 2015). The South Korean Ministry of Health and Well-Being stated 122,000 people visited the country in 2011 to undergo some type of medical treatment, representing state profit of some 180 billion *wones* (Miró Martí, 2012). According to the South Korean tourism office, the medical tourism sector, mostly aesthetic, generated 393 million euros in 2012 calculates that the roughly million people who visit the country in 2020 to undergo aesthetic treatment will generate around 2.800 million euros (Vidal Lyi, 2015).

The tyrannical ideal of feminine beauty in particular arrives at its peak in the television program broadcast in the United States of America, *Botched*, broadcast by the Spanish state on Be Mad TV as “*Chapuzas estéticas*”, in which a couple of doctors “solve” and “fix” errors, extreme plastic surgeries gone wrong, and technological wreckage performed by other doctors on human bodies. Female technobodies appear such as Susan “Busty Heart,” who crushes cans and even smashes watermelons with her enormous and multiply operated breasts –with which she has earned a fortune (Baskin, Ross, Stewart & Herwick, 2018a). Less humorous is the case of Allegra, with breasts of 4,600 cubic centimeters, whose health is at risk (Baskin et al., 2018b).<sup>88</sup>

According to the data from Statista (2019b), the market value of aesthetic surgery on the global scale was 9,050 million euros in 2016, with a predicted growth to 12,580 million for 2020. Its market value in the European Union has experienced a steady increase throughout the past years with a figure of approximately 2,200 million dollars according to the data of 2016 (Statista, 2019b).

In addition to economic, ethical, and health considerations, Eulalia Pérez Sedeño (2014, p. 127) indicates that aesthetic surgery “reinforces the intense interest in body image and culturally prescribes to beauty standards, especially in women”<sup>89</sup> in addition to contributing to a culture of youth that stigmatizes and punishes age (2014, p. 127). These standards of beauty are racially and ethnically marked by what aesthetic surgery “maintains and confirms as specific (Anglo-Saxon Caucasian or Northern European) cultural standards of beauty and denigrates the appearance of ethnic groups that stray from this norm” (2014, p. 127).<sup>90</sup> This is precisely what is observed in the case of South Korea, where the obsession with, or tradition of body modification, seem to date back to prehistory –museums like that of Busan display remains of Neolithic skulls showing rudimentary procedures that were used to style the head and sharpen the chin. The aesthetic canon that is copied in surgical operations is western (round eyes, sharp chin) (Miró Martí 2012)<sup>91</sup>; probably due to the importance granted to success, a determined concept of

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<sup>88</sup> Buttocks implants floating within the buttocks or of implausible sizes, lips inflated with silicone on the verge of explosion, triple and quadruple rhinoplasties on the same nose, completely deformed swollen faces and poisonings or possible fatal consequences due to chemical compounds and surgeries, are the bread and butter of these televising programs.

<sup>89</sup> Original text: “[r]efuerza el interés intenso por la imagen corporal y prescribe culturalmente normas de belleza, especialmente entre las mujeres”, además de contribuir a una cultura de la juventud que estigmatiza y penaliza la edad”

<sup>90</sup> Original text: “mantiene y confirma normas culturalmente específicas de belleza (caucásica anglosajona o norteamericana) y denigra la apariencia de grupos étnicos que se desvían de esta norma”

<sup>91</sup> Miró Martí presents that “the pursuit of a westernized aesthetic canon allows for the finding of better jobs, more easily finding a partner, and being better accepted into social circles: this same appearance that is upheld as a standard of physical beauty is the indispensable passport to success in work and personal relationships” (2012).

success, and influence, control, and imperialism of the United States of America, among other reasons.<sup>92</sup>

Delving into this line, Pérez Sedeño sets out the increase of the surgeries labeled as “ethnic” or “racial” in the Spanish State (2014, p. 127). Hundreds of migrants from Latin America, especially Peruvians, Bolivians, Ecuadorians have resorted to aesthetic surgery centers to modify the nose labeled as “Incan” in order to “westernize” their look (Pisani, 2008).

The data presented until now demonstrate the important role of surgical and non-surgical aesthetic operations in the shaping of the materiality of technobodies, in relation to categories such as sex-gender, race, or ethnicity. However, we cannot gather together all of the strands of the technocorporeal weave nor thoroughly scour the infinite number of points that comprise this reticular mapping. In addition to time and space finitude, aesthetic technologies affect human technocorporealities, whereas hormonal or xenoestrogenic techno-corporeal fusion on the molecular level is a relational constitutive trait of human animal technocorporealities, among others, as well as a defining characteristic of the environment which technocorporealities inhabit, and of the age, or historic moment, with specific forms of power and power relations. Nevertheless, given this relevance, it is necessary to sketch some lines in relation to these technological aesthetic-plastic procedures focused chiefly on the co-constitution of human technocorporealities.

Returning to the Balsamian types of technological-corporeal embodiment, the author conceptualizes the laboring body as a multiplicity of laboring female bodies, in which, of course, reproducing bodies can be found that habitually perform many other tasks in addition to reproduction. Much has been said from feminist theorizing regarding these two matters, although they are not so closely linked to technobodies.<sup>93</sup> For Balsamo, despite often being made invisible, these bodies are implicated at the core of reproduction of many technological creations, including the “natural” family (1995, p. 227).

According to the author, the maternal body is likely the most obvious form of the laboring body. This body is increasingly treated as a *technological body*, as an object for

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<sup>92</sup> South Korea is technically a sort of colony of the United States, given that its army is still under the control of said country. This is due to a security resolution from the UN approved in 1950, which authorized UN military action against the North and designated the United States as the main authority in the operation; it is a role of control to which the United States still clings (Chang Soon, 2017).

<sup>93</sup> Regarding caring for more than human worlds, see Puig de la Bellacasa (2017). For a critical Marxist analysis of unpaid female work and invisibilized social reproduction and care performed by women\* as a consequence of legitimizing and sustaining the capitalist heteropatriarchy, see Federici (2012, 2018). For a feminist economist critique on the current economic model based on the gender gap in the workplace and remunerated work, invisibilizing all precarious and feminized work, and an invitation to the collective debate regarding how to organize ourselves to sustain life that deserves being lived, see Pérez Orozco (2016).

technological manipulation at the service of human reproduction. According to Balsamo, reproductive technologies appear as surveillance tools. The imaging technologies that can be found are sonograms and laparoscopies among others. They have contributed to conceptualizing the fetus as a subject of rights. They likewise oppose and place their rights above those of the pregnant woman, which, in the lot of technological deconstruction, come to be made completely invisible and reduced to a mere receptacle or warehouse.<sup>94</sup> The conceptualization of the female techno-body as a fetal container gives rise to discourse concerning reproductive technologies, it is again highlighted in relation to the disappearing body (1995, p. 230).

Along with this, Balsamo denounces the material conditions of the production of high-tech devices, like the silicon chip, bought in bulk by consumers in the United States. These devices are inexpensive to produce and assemble, because of the cheap labor of technocorporealities in Southeast Asia. Often, women\* are preferred as workers in the electronics and microelectronics industries for their supposedly greater natural patience, sharp eyes, and agile fingers. The author also highlights the greater invisibilization of the work performed by women, the increased occurrence of excessive disciplinary actions, workplace insecurity, violence and discrimination (the glass ceiling and the wage gap, among many others), the beliefs of the inferiority of women, socialization of service roles, and the pressure to be mothers and to procreate, thus leaving remunerated work for that of care the household.

For Balsamo, of all types of technological embodiment, from the disappearing body, corporeal engineering, tissue engineering to microelectronics, are what most steadfastly promise the erasure of the marks of the systems of differentiation of race and gender. Prostheses and implants of all nature, sinews, ligaments, electronic retinas, bionic joints of wrists, elbows, and hearts, etc. are transformed pieces of the technobodies. The pieces replace body parts, but not even whole-body replacements, as in the case of most of robots or military machines, are exempt from codification of gender. Nevertheless, the author makes note of the reassurance that this replacement offers for the unease concerning immortality and control over life and death (1995, p. 231).

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<sup>94</sup> María Jesús Santesmases also discusses the disappearing body of pregnant women by means of imaging and rendering technologies (2018). The author explains that as the ultrasound develops, the image of the fetus begins to move. The ultrasound displays movement belonging to a culture of cytogenetics that returns the importance of bodies: the fetus is displayed and exhibited. The ultrasound images and karyotype of the fetus generate a new ontology, according to which the unborn and the mother function as two separate beings: the former is ontologically superior and renders the body of the mother invisible. Santesmases provides an account of how gender conception prevails in early medical genetics, which is centered on healthy descendants through the analysis of images of karyotypes and fetuses between the decades of 1960 and 1970, produced by human cytogenetics, the ultrasound and the famous photographs of Lennar Nilsson. See, Santesmases (2017).

The relation between material bodies and the also-material information collected from databases from the decade of 1990 challenged what corporealities-subjectivities count, how and for what; who creates the data, and for what, and who has access to it. Framed against this background, Balsamo, like Hawthorne, critically shows the examples of the Human Genome Project and the Human Genome Diversity Project both the debate in which the two are surrounded and the abundant and justified criticisms presented concerning the privacy of data; the use of data for lucrative, eugenic, and racist purposes by multinational companies, and public and private institutions of varying nature; the nondemocratic, and the lack of direct and equally distributed access to information; etc. (1995, pp. 231-233).

Opposing the claim of a single dominant uniform cultural logic, and commensurate with one of the main ideas that guides this investigation, Balsamo repeatedly emphasizes the importance of multiplicity to provide an account of the multiple forms in which corporealities are technologically produced and implicated as well as the very multiplicity of technobodies. She also mentions the diversity of political forces that determine the reality of material bodies.

From here, she claims to be against an essentialist, ahistorical, and static conception of the body as well as racial and gendered differences. Nevertheless, she asserts that “gender and race identity of the material body structures the way that body is subsequently *culturally reproduced* and *technologically disciplined*” (1995, p. 233, emphasis added). We must not forget that sex-gender, race, ability, etc. are also technologies, not only of control, but also of production of subjectivity-corporeality. That is to say, race and gender identity are also technologically produced, not only culturally and technologically reproduced and disciplined. There is no original. Gender and race are performative.

Another fundamental thesis Balsamo defends time and time again against the bodiless and disembodied dreams of transhumanist theories, perpetrated largely by white men of upper middle class, is that bodies and, of course, technobodies are noticeable or constituted by a multiplicity of differences such as sex-gender, race, ability, etc. In spite of the praiseworthiness and present necessity of insisting on bio-techno-corporeality and the racial, sex-gender-able co-constitution of bodies, the author seems to postulate or to assume an excessive naturalization of said differences.

This leads her to the establishment of principles such as “[w]hat becomes obvious through the study of the new reproductive technologies that enable the visualization of the fetus in the womb, there is no blank page of gender identity... we are born always already inscribed” (Balsamo, 1995 p. 233). There is no blank page, but the matter is not automatically or directly given, or ready to be interpreted. Matter is mediated, shaped, and constituted. The subjective-

corporeal marks or inscriptions vary depending on the identity categories available in a specific society, in a historically determined moment, the regimes of power and truth from which they emerge, the technological configuration of that society, etc. That is to say, the way of organizing, classifying, articulating, interpreting, placing meaning, giving sense, conceptualizing, configuring, shaping, constituting, making intelligible, passable as human is not pre-established nor discursively occurring a priori, beforehand, naturally as matter itself before becoming techno-cultural. Contrary to what Balsamo claims, sexual-sex-gender identity “knowledge” cannot even be revealed at the moment of birth, nor in prenatal fetal stages.

For Balsamo, in this design, the configuration and reconstruction of technobodies marked by race, sex-gender, ethnicity, ability etc. are objectified by means of dualist gender codes, both in their fragmented parts and in their entirety. In this sense,

despite the technological possibilities of body reconstruction, in the discourses of biotechnology the female body is persistently coded as the cultural sign of the ‘natural’, the ‘sexual’ and the ‘reproductive’, so that the ‘womb’, for example, continues to signify female gender in a way that reinforces an essentialist identity for the female body as a ‘maternal body’. (1995, p. 234)

As Balsamo correctly indicates, the social mandate of maternity is assumed, replicated, and reinforced by the discourses of biotechnology, in addition, offering new possibilities in the direction of the identification of female bodies or those of women\* with pregnant bodies, including unmarried, lesbian women\*, etc. who some time ago would not have conceived, let alone given birth. Nevertheless, along with this reinforced and extended tendency of equating the female with maternity, biotechnologies make the question of maternity and its sex-gender relation more complex, extending it to non-binary trans\*, trans\* males, and/or males as we previously noted with the examples of Thomas Beatie and Trystan Reese, or Evan Hempel and Henry Steinn. The examples are on the rise. Therefore, despite reproduction continuing to be a matter eminently feminine or associated with femininity, its technologization has generated possibilities for oppression-commodification-survival –as is the case of a highly complex issue, wombs for rent,<sup>95</sup> on which the discussion remains open, and, from a critical feminist

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<sup>95</sup> The subject of the womb for rent, surrogate pregnancies, pregnancy by means of substitution, or surrogate parenthood is as much a relevant question as a complex one. For a defense of the regulation of surrogacy in Argentina, a proposed law, together with an examination of international regulations see Lamm (2013). For a defense of the regulation of surrogacy, with the argument of avoiding of violations of human rights, also see Lamm (2016). For an analysis from feminist positioning on wombs for rent as a new clause in sexual contract, see Nuño Gómez (2016). For a feminist analysis of the diverse elements that shape the complex board of wombs for rent, see Momoitio (2017). *Pikara* gathers several articles on this topic from different feminist views. For a philosophical analysis about the wombs for rent that compares Plato’s thinking and current events, see González



perspective, also requires details and deep debate— as well as possibilities for the gestation and reproduction for other corporealities-subjectivities, like cis, lesbians, trans\* heterosexual women, non-binary trans\*, trans\* heterosexual men, trans\* homosexual men, etc.

On the other hand, biotechnologies, hormonal and pharmacological technologies, and surgical technologies have made possible and multiplied the existence of bodies of women\* without a uterus, something that has happened for centuries without these types of technological interventions. Along with this, as we present in the following chapter, male bodies, have begun to be sexualized by means of pharmacological products like Viagra® or different testosterone compounds to treat the recent testosterone deficit syndrome, thus enabling a trajectory to be traced of sexualized male body, albeit briefer and much shallower.

Balsamo proposes the concept *technologies of gendered bodies*, attuned to *technologies of gender* from Teresa de Lauretis (1987) and the notion of *technogender* from Preciado (2008, p. 81) to provide an account of the power relations manifested between technology and bodies, organized by the sex-gender system. Here, she indicates that gender is as much a determining cultural condition as a social consequence of technological deployment. In other words, aligning herself with Haraway (1985, 1991) and Judy Wajcman (2004, 2007),<sup>96</sup> she poses a view of co-constitution between technology and gender, from which she concludes that “contemporary discourses of technology rely on a logic of binary gender identity as an underlying organizational framework to structure the possibilities of technological engagement, and ultimately to limit the revisionary potential of such technologies” (Balsamo, 1995, p. 234).

Nevertheless, as Butler states (1993b, pp. 314, 318)<sup>97</sup> with respect to gender and Haraway (1991, p. 181)<sup>98</sup> with respect to technologies, and as we have also noted in this chapter,

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Suárez (2015). For criticism on the discourses of autonomy in surrogate motherhood from the economy of vital properties and a decolonial perspective of power, see Heredia (2018).

<sup>96</sup> The co-constitutive view of Wajcman’s technology-gender relation is constructed from sexual dualism, whereas Haraway’s is not; therefore, the perspective of Balsamo would be closer to the former in this sense.

<sup>97</sup> In this sense, Butler asserts: “Although this failure of naturalized heterosexuality may constitute a source of pathos for heterosexuality itself... it can become an occasion for a *subversive* and proliferating parody of gender norms in which the very claim to originality and to the real is shown to be the effect of a certain kind of naturalized gender mime” (1993b, p. 314, emphasis added). Later this idea is explained in depth and it is postulated that “[a]lthough compulsory heterosexuality often presumes that there is first a sex that is expressed through a gender and then through a sexuality, it may now be necessary fully to invert that operation of thought... It may be that the very categories of sex, of sexual identity, of gender are produced or maintained in the *effects* of this compulsory performance ... How then to expose the causal lines as retrospectively and performatively produced fabrications, and to engage gender itself as an inevitable fabrication, to fabricate gender in terms which reveal every claim to the origin, the inner, the true, and the real, as nothing other than the effects of *drag*, whose subversive possibilities ought to be played and replayed to make the “sex” of gender into a site of insistent political play?” (Butler, 1993b, p. 318).

<sup>98</sup> For Haraway, “[i]t is not just that science and technology are possible means of great human satisfaction, as well as a matrix of complex dominations. Cyborg imagery can suggest a way out of the maze of dualisms in which we have explained our bodies and our tools to ourselves” (1991, p. 181).

technologies offer opportunities for empowerment and meaning shift. Thus, together with the strong and often dominant trend in refocusing bodies to the sex-gender binary, now by means of technology, we also encounter a multiplicity of possibilities for the embodiment of other subversive and transforming corporealities-subjectivities.

In spite of having a direct impact on the multiplicity of technocorporealities and their differences of sex-gender, race etc., as well as on relational co-constituency, the Balsamian conceptualization of technobody would differ from ours in two clear aspects. On the one hand, this multiplicity does not seem to consider a multiplicity of sex-gender or sexuality. On the other hand, although it is directed at possible –albeit future– molecular management, it does not consider techno-drug-hormonal-corporeal fusion nor xenoestrogenic techno-corporeal fusion on the molecular level as one of the main types of technological-organic-discursive-material co-constitution of technobodies in its broadening.

### 2.3.3.2 Technobody art: *Technologies of design and body modification*

Influenced by the social theories of cultural studies, post-structuralism, and feminism, Victoria L. Pitts in *In the Flesh. Cultural The Politics of Body Modification* (2003),<sup>99</sup> conducts a critical analysis of radical artistic practices of body modification including, among others, scarifications, piercings, tattoos, silicone implants, sub dermal metallic implants, orifice dilations, circus performances, *techno/leather/latex* SM, body suspensions using titanium hooks, etc., that are prolific in a host of stores and/or alternative, artistic spaces, festivals, musicals, books, magazines, websites and exhibitions, that are becoming more and more fashionable in the United States and Europe since 1990.

As the author describes, women\* have undergone these body transformations, generating different (often opposing) reactions within feminism (2003, p. 5). On one side, there are some who highlight the subversive potential of these practices, especially for women\*, because of the pressure to which their bodies are subjected due to the heteropatriarchal ideal of female beauty; whereas for others, they align this trend with other social actors as practices that denigrate the body, even conceptualized as pathological.

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<sup>99</sup> Years before Pitts, and a few years after Balsamo, in 1997, Veronica Hollinger, feminist and publishing author of the magazine *Science Fiction Studies* as of 1991, uses the concept “technobody” in a criticism of 3 pieces – *Escape Velocity: Cyberculture at the End of the Century*, of Mark Dery; *Technologies of the Gendered Body: Reading Cyborg Women*, by Anne Balsamo, and *Electronic Eros: Bodies and Desire in the Postindustrial Age*, by Claudia Springer– published in said magazine under the title “The Technobody and its Discontents.”

For Pitts, these radical body modifications interweaving sexual oppression, fights, and conflict surrounding beauty, pleasure, cultural nostalgia, high technology, and body policing are social and politically interesting and significant to a varying degree:

I do not subscribe to the relativist view that all body modifications are homogenously significant... Neither am I joining in the optimism of celebrating the “cyborg” that characterizes some segments of postmodern theory, although I consider the political promises of technology for progressive cultural politics as laid out by feminist scholars of technoscience like Donna Haraway. Rather, I am interested in exploring how body technologies are multiply significant, and how both the manner and the political context in which they are used impacts upon their social meanings. (2003, p. 18)

Although some of the practices mentioned, like tattoos and piercings have become fashionable and had been approved by the media and multinational businesses at the end of the 1990s, the practices and technologies of body modification also offer possibilities for personal, cultural, and political expression using the body as well as for the expression of sexuality, sex-gender, and even ethnic identity. In this sense, Pitts also emphasizes the queer potential that these practices of body modification offer to corporealities-subjectivities identifying as lesbian, trans\*, gay, SM, etc., rejecting mainstream culture and generating subversive sexual attitudes and rituals that often foster stigmatized identities. Along these lines, cyberpunk culture takes the idea defended by body modifiers to the limit, in which individuals are creators of their identities by means of technological body alteration. Cyberpunk distorts the body, though the reappropriation of knowledge and tools of electronic, medical, informatic, surgical, etc. nature, to explore it, to alter it and to reconstruct it (2003, p. 154).

According to Pitts, the art of body modification incorporates, imitates, and reproduces indigenous tribal and primitive elements such as early Hindu, African, native American, Polynesian, etc., producing modern western primitivism that is constituted by a feeling of nostalgia and solidarity towards these cultures. In spite of this, consciously or not, it reflects, social and political spaces that bodies occupy within wider power relations (2003, p. 124). Thus, while modern primitive thought often develops subversive political perspectives, they are criticized for cultural appropriation of indigenous rites of passage, given that from mainstream culture and a hegemonic and privileged standpoint, who and what is primitive, and what and who are, designate and indicate what and who are not.<sup>100</sup> Their romantic ideas of the spiritual and “natural” primitive ways of life are also problematic (Pitts, 2003, p. 124).

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<sup>100</sup> The author argues that the majority of body modifiers reject deep ethnocentric western tradition and construct nostalgic views of indigenous cultures as more authentic, natural, and communal, alternatively, also due in part,

Pitts is especially critical of the pathologizing views that conceptualize body modifications that do not belong to hegemonic culture nor fall within social norms as pathological, self-harming, mental illness and therefore, socially unacceptable. This pathologizing of artistic body modifications affects racialized bodies and sexualities and nonhegemonic sex-gender to a much greater degree.

The word “techno-body” appears for the first time in the conclusions of Pitt’s work, “Reading the Postmodern Techno-Body” (2003, p. 185), in which the author reviews the article of Balsamo (1995). Among the technological body practices that cause technobodies to acquire increased visibility, Pitts enumerates “medicine, gene therapy, transsexual surgery, in vitro fertilization, cloning, cosmetic surgery, pharmacological interventions, and so on” (2003, p. 185). These along with the aforementioned information and communication technologies increase mobility, movement, and the crossing of borders of bodies and identities, something which is also manifested in art and alternative or street fashion, as well as in haute couture and mainstream fashion. According to Pitts, all unrelentingly drive us to having to face the cultural and technological character of our bodies (2003, p. 185).

Gathering the tenets of Balsamo, Pitts states that technology is often displayed as a resource to release or free the body of what is assumed as natural limitations, or, in contrast, as the emancipation of cultural limits, so that the body is theoretically dissociated from its constitution of race, sex, and sexuality even becoming a process of disembodiment in itself (2003, p. 186). Nevertheless, Pitts ascribes to the feminist political view that challenges the technobody as being purely discursive and, even “purely natural.” Following Balsamo, this co-constitution of material and cultural elements implies that bodies are marked by race, sex-gender, sexuality, etc., and immersed in power relations (Pitts, 2003, p. 186). Both technological practices and technologically modified bodies or those formed by such practices, emerge from and reproduce power relations. These power relations are numerous, multiple, and heterogenous as are technologized bodies marked by race, sexuality, sex-gender (Pitts, 2003, pp. 186-187).

For Pitts, bodies are territories for technological innovation, politics, and the exchange or traffic of goods; they are spaces disputed by social movements, medical systems, and industries pertaining to culture, cosmetics, fashion, etc. In these battlefields that are bodies, a great variety of social norms and are subverted and challenged by the *body art movement* and its

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to the discomfort generated by certain technological advances, environmental collapse, and cultural homogenization. However, when reappropriated from the primitive representations of indigenous bodies historically exposed in circuses and spectacles, “they preserve the historically imagined exceptionality and anomaly of indigenous bodies and cultures while promoting new notions of identity for postmodern subjects” (Pitts, 2003, p. 124).

technological and artistic practices of body modification. For example, “neo-tribal body art not only appears to represent political affinity with indigenous cultures, but also poses ethnicity as an elective identity for largely white, urban body-subjects” (Pitts, 2003, p. 189). The docility and beauty imposed on femininity by gender norms are also subverted through the use of these deviated or perverted corporeal practices. As Pitts adds, “body modification is also perverse in its exploration of sexuality. The affective pleasures of body modification breach the ways sexuality is ordered in heteronormative culture (2003, p. 189).

Nevertheless, the author indicates that the radicalness of body modifiers is limited by social forces, often the same as those that these artistic-technological practices are against or seek to oppose: “including patriarchy, Western ethnocentrism, symbolic imperialism, pathologizing, and consumerism” (2003, p. 189). Thus, the great majority of body modification practices fall within consumerist Capitalism. Moreover, the use of primitive aspects, as previously indicated, together with their character of an ironic tactic and being symbolically powerful, gives rise to problematic effects contrary to the intentions of body modifiers, because the primitive remains an image of colonialism: “nostalgic and characterized as natural, uncivilized, sexualized, and wholly Other” (2003, p. 190). Pitts makes it clear that “[b]odies and technologies are not ever fully authored by individual subjects, but are always experienced and understood through the historical forces that shape them” (2003, p. 190).

A critical perspective of body projects indicates that our bodies and identities are continuously shaped and reshaped through different levels of technological access, speed, and visibility in a highly stratified transnational social world. Those who have access to the practices and technologies of body modification that appear linked to techno-representation, thus showing the unnatural nature of the body, obtain a certain degree of individual freedom in the design of their identity and body, surpassing various material and symbolic limits. Nevertheless, as Pitts states, it also implies the reduction in the opportunities for the self-narratives of others. Some bodies are more vulnerable to underrepresentation such as those of women\* and people of color (2003, pp. 190-191). The main idea for the author is that the design and shaping of the body, including the practices that are said to express self-narratives, are eminently social and political processes rather than of individual choice which then combat and reaffirm privilege (2003, p. 192).

Nevertheless, even in its nature of affirmation, on par with the response to and the appropriation of privilege, technobodies and the artistic practices of body modification create interruptions, subversiveness, reappropriation, and transformations. The *reclaiming projects*, for example, are rituals that unite women\* and mark a collective position in gendered relations of

domination and oppression, socializing and grouping something that could be silenced as an individual (Pitts, 2003, p. 193).<sup>101</sup> It is for this reason, the author notes that

[w]hen women engage in anomalous body projects, meanings can be produced outside of what is functional, efficient, or otherwise fruitful for the social order. The circulation of norms can be, at least temporarily, interrupted, so that the ordinary relations of power over women's bodies, including those governing beauty, consumption, health and mental health, are challenged. The minute, partial, marginal "inner" histories of women's bodies can be made visible and inserted into the flow of information, such that the dominant ideologies are forced to confront their subjugated knowledge. (2003, p. 194)

The modern primitivism projects appear to Pitts as masculinist or, in Balsamian terms, less recognizing of connectivity despite on occasions coinciding with reclaiming projects. Modern primitivism emphasizes global connection of bodies, a meeting place between cultures, and the convergence of historical human roots in tribal societies. Nevertheless, this is an ideal connection which does not reflect global socioeconomic policy, in which significant inequalities prevail, and western white bodies socialized as masculine have a greater access to technology, generate cultural meaning, and participate more extensively and directly in their self-expression and the definition of the groups which they strive to emulate. In its refusal to recognize relational identity politics and the production of meaning, "modern primitivism embraces a 'body-in-isolation'" (2003, p. 195). Like Cyberpunk, modern primitivism is a trope for modern liberalism: we can be whom we want, regardless of our social and personal history.

Facing this, the acknowledgement of our history and bonded futures is necessary for any democratic attempt to share social, technological, and cultural resources and to use body technologies to multiply the possibilities of our existence, instead of being even more culturally, economically, and politically stratified (Pitts, 2003, p. 195). For Pitts, an example of this acknowledgement is generated in the anti-globalization movement when consumerist bodies of shoe brands like Nike or clothes like Gap are linked to exploited laboring bodies of women\*, children and men.

According to Pitts, the body-as-a-project, flexibility, and choice attributed to the western body are part of stratified, consumerist, and capitalist ideology. Flexible bodies are bodies of privilege that partly produce their own identities by means of consumption, under contract. However, these modified, gendered, and technologically, artistically, and racially designed technobodies can invest or annul their naturalization and queer ontologies: "[a]nd so,

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<sup>101</sup> The reclaiming projects consist of piercings on nipples or the labia of the vaginas of women\* who have suffered oppression and sexist violence and/or have been sexually assaulted (Pitts, 2003, p. 11).

such bodies —such cyborgs and monsters, in Donna Haraway’s terms— remain in some ways rebellious, unfixed, unclosed to possibilities that might be contained within and without them” (2003, p. 197). By creating cracks in the foundations of the functions, objectives, and authorship of technologies, these body modification technologies not only queer the bodies, but also the technologies themselves with respect to their uses and objectives. In this way, techno-artistically modified technobodies frequent power relations, while answering and challenging them: “Such bodies are disruptive not because they are wholly unintelligible, but because they remain partly unintelligible while also speaking the common language of consumption, flexibility, and technological invention/intervention” (Pitts, 2003, p. 197).

### **2.3.3.3. The new sexual technobody: *The pharmacological constitution of sex-gender-sexuality of technobodies***

“The Sexual New Technobody: Viagra in the Hyperreal World” (2006) by Jennifer L. Croissant<sup>102</sup> is a text centered on the biotechnological and pharmaceutical industry —more specifically on Viagra® (sildenafil) and other drugs that treat sexual function problems— and in its advertising representation in the media, which are the two verification devices —market and media— Preciado (2013) specifies in her conceptualization of technobody. This article, similar to the one of Sobchack, uses theorizations and concepts from Baudrillard.

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<sup>102</sup> Another two texts focused on Viagra® are “Fixing broken masculinity: Viagra as a technology for the production of gender and sexuality” (Loe, 2001) and “Cyborg masculinity in the Viagra era” (Potts, 2005). Potts coincides with Croissant in many aspects. Nevertheless, she differs when asserting Viagra® is linked to the concept of cyborg instead of technobody, which she calls “Viagraborgs” or “*Viagra cyborg*, the recent creations of sexuopharmacology” (2005, p. 3). Following Loe, Potts indicates that, except those associated with the field of psychopharmacology, the use of drugs as an element to consider for the conceptual development of cyborg has been long coming (2005, p. 4). This incipient character that had already appeared in the cyborg of Clynès and Kline is another indicator of the distinctions, albeit not fundamental, between the figure of cyborg and the concept of technobody, as is the case with pharmacological technologies and biotechnologies that constitute technobodies specifically, the sex-gender of a good number of them which extend beyond that of Viagra® —and its sisters Levitra® (vardenafil), Cialis® (tadalafil), Uprima® (apomorphine chloralhydrate), etc.—: they are hormonal, estrogenic, and xenoestrogenic. Potts accurately notes the deficiency in the conceptual development of cyborgs and linking sexuopharmaceuticals to such: “Some academic interest has been generated toward the human cyborg produced through psychopharmacology (whose purpose is to think and behave better) but little is known about the experiences of those created through sexuopharmacology” (2005, p. 6). Nevertheless, what Potts calls “sexuopharmacology” and its extension through the previously mentioned elements appear to be more directly related to technocorporealities than cyborgs, as we later argue. Drugs as co-constituents of cyborgs also are contemplated by Gray, Mentor, and Figueroa-Sarriera: “anyone with an artificial organ, limb, or supplement (like a pacemaker), anyone reprogrammed to resist disease (immunized) or drugged to think/behavior/feel better (psychopharmacology) is technically a cyborg” (1995, p. 2). However, they do not consider the use and/or ingestion of other types of drugs, like those related to sex-gender constitution, or the multiple xenoestrogenic elements.

Croissant hits the nail on the head when continually employing notions of pharmaceuticals or drugs, in addition to the mainly masculine and heterosexual sex-gender-sexuality constitution in this case, and when highlighting the techno-corporeal constitution of chemical-molecular fusion as one of the significant relational modes of the constitution of the technocorporealities; though the words “fusion” and “molecular” are not explicitly mentioned, the term “chemical” is. In addition to Viagra®,<sup>103</sup> the author includes hormonal drugs like steroids, medicines for the thyroid and growth hormones.

As Croissant indicates in the analyses of Baudrillard (1994), the simulacra are the copy for which there is no original or “real” referent that previously exists for the production and dissemination of the representation.<sup>104</sup> The simulacra differ from the simulation, as a mirror differs from reality, or as a distortion of this, whereas the latter implies a referent. For the author, the notion of simulacra is a useful tool to critically think of saturated mass media phenomena like Viagra® or other lifestyle drugs “because it provides the means for critiquing the normalizing practices centered in commercialized cultural constructions” (2006, p. 334).

In the case of Viagra®, its critical likeness as an example of simulacra allows for the questioning of the concept of “normal sexual activity,” assumed by doctors who prescribe it, patients who consume it, and the advertising that sells it. This occurs in spite of the difficulties and limits that the concept of simulacra can imply to articulate a position that argues that one state or situation is better or more desirable than another. Nevertheless, according to the author, this suggests that what is absent or denied by the simulacra can be the most important resource of analysis, which calls the attention to what is not mentioned, which is unmentionable, or that which appears as a given or evident.

According to Croissant, Viagra® participates in a hyperreal sexual landscape, soaked in nostalgia, and generated and venerated from a mythical original sexuality: “The s(t)imulation of sex is a reproduction of an ‘original’ sex imagined to be the sex of early adulthood: erections available on demand, when bodies and relationships were young” (2006, p. 335.). In order for this form of sexuality to be effective and/or function as simulacra, it must be considered so important and desirable that it generates a necessity simulated with medicated bodies, healthy or

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<sup>103</sup> Croissant (2006, p. 340) also speaks of pornography, an industry that along with the pharmaceutical industry comprises what Preciado (2008, 2013, 2015) calls a “regime or pharmacopornographic Capitalism,” linked to what develops her concept of technobody. This comes closer to the notions of technobody of both authors. Nevertheless, pornography is a scope that is outside our investigation, as well as of our development of the very concept of technobody.

<sup>104</sup> This idea of the simulacra as copies without an original is reminiscent of the Butlerian notion of gender as performative, gender and heterosexuality as copies without the original, as copies of the copy (Butler, 1999, p. 41). Only that for Butler, in no case are there copies that sustain the original. Moreover, Butler equips this idea in a positive light that is affirmative and subversive. I thank Elvira Burgos for the nuances added to this echoing.



not, which is precisely what Pfizer accomplished: conceptualizing erectile dysfunction as a health problem. Thus, in addition to treating the chest pain or angina for which it was invented, Viagra® was immediately expanded to men who, far from having some medically demonstrable health problem, could improve their sexual performance. The advertisements for Viagra® are directed at adult men of a certain age who present signs of erectile dysfunction; but these same advertisements also often question their partners or companions, with the message of an assumed increase in the pleasure of both.<sup>105</sup>

According to Croissant, the use of sexual drugs escapes the limits imposed by advertising namely, non-binary trans\*, androgynous, transvestite, trans\* women, trans\* men, trans\* lesbian, cis lesbian, cis gay, trans\* gay, trans\* heterosexual, pansexual women\*, bisexual, unmarried people, families or affective-sexual groups of more than two members, and the categories and interweaving that we want to add also participate or can participate in Viagra® culture. Nevertheless, according to the author, despite these pharmaceutical products allowing for the creative appropriation of performance or act, they do so, still, idolizing, idealizing, and reinforcing the erect phallus and its use in heterosexual practices.

In 2015 Addyi®, christened by diverse media outlets as “the female Viagra,” surfaced to deal with the apparent biological disorder of premenopausal women\* that theoretically affects one in ten women\* (SexHealthMatters. Sexual Society Medicine of North America, 2019),<sup>106</sup> called “hypoactive sexual desire disorder” (HSDD). Nevertheless, as the National Women's Health Network warns, this product is surrounded by a host of problems (2019a). Moreover, it was tested on a small group of premenopausal, heterosexual, very healthy non-smoking women\*, more than 85% of whom were white. Moreover, it has been observed that it causes central nervous system depression and can produce sudden and prolonged loss of consciousness. It is not recommended with alcohol consumption, and its use mixed with hormonal contraceptives can be problematic. Moreover, it was prohibited by the Food and Drug Administration in the United States in 2010 and 2013 because it did not consistently perform better than the placebo. In this sense, it indicates that only 10-12% of the women\* who participated in the actual clinical tests of

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<sup>105</sup> In 2014, as part of its marketing strategy in the midst of sales losses, and because of the impending expiration of its patent and the appearance of generic versions, Viagra® released the first advertisement starring a woman and directed at women\*.

<sup>106</sup> This percentage is questionable, considering that on the very website of Addyi® it is explicitly stated that HSDD “can” have a biological base, but does not come to claim this (Sprout Pharmaceuticals, 2019). In addition to this, the fact that at some time in their lives, 40% of women\* have had low sexual desire (SexHealthMatters. Sexual Medicine Society of North America, 2019) is something completely understandable and nothing exceptional, considering that sexual desire is something that varies and fluctuates in life depending on a great many factors.

Addyi® benefitted from it. Finally, although it is commonly known as the “female Viagra,” the National Women’s Health Network emphasizes that the two drugs are very different: Addyi® works by changing cerebral chemistry to increase sexual desire in premenopausal women, but it does not facilitate an orgasm; it does not entail an increase in sexual pleasure for them or for their companions (2019a). Viagra® mainly “helps” men who, having sexual desire, want to have sex, but display physiological difficulties. Viagra® is taken before practicing sex, to increase the blood flow towards the penis. Addyi® must be taken every day during an indeterminate period of time so that it is minimally effective.

Pfizer, on its part, has a product called Lovegra, which is like Viagra® but directed at female bodies.<sup>107</sup> The pill is equal in shape, size, and design, but pink in color. Its main active ingredient is also the same: Sildenafil. It is aimed at menopausal women\* of all ages and, like Viagra®, stimulates blood flow in certain parts of the body like the genitals and increases the activity in the mucous glands that stimulate vaginal secretion. Nevertheless, in addition to its success in the increase in the attainment of an orgasm, it is also advertised as a booster for sexual desire, “resolving” the loss of the libido or hypoactive sexual dysfunction.

Returning to the text of Croissant, she disputes the possible interpretation of sexual experience mediated by Viagra® as a first-degree simulation, or one which does not aim to be more than a reflection of reality (Baudrillard, 1994, p. 6) because the drug allows consumers to relive sexuality experienced in youth. The author argues that if such were the case, there would be no necessity for Levitra® or Cialis®, which are drugs supposedly advertised to repair the errors of Viagra, specifically, the uncontrollable *timing* of erections. But its “sisters” are also simulacra because they compensate for presumed “genetic errors” that have to do with length, resistance, vigor, or the very act itself. However, as Croissant notes, sexual performance is unpredictable at any age and depends on matters like age, emotional state, drug and/or alcohol consumption, and other relational elements that are masked or hidden by pharmaceuticals (2006, p. 336). The penis does not operate according to some certain standard of *phallus*; therefore, sexual drugs are a type of simulation of third-order or simulacra that mask the absence of this reality.

The relation of Croissant’s postulates and the idea of Butlerian gender performativity can be observed when she states that “[i]n a media-saturated world there... cannot be ‘real’ prediscursive referents or subjects. The saturation inhibits alternative understandings or constructions of bodies and events, and the terms by which the world might be understood are

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<sup>107</sup> In fact, on the packaging of the product is reads: “Female Viagra®, 100mg, Lovegra”.

pre-given” (Croissant, 2006, p. 336). Marketing advertisements of pharmaceutical sex products reference a normal unmedicated sex experience, which is imaginary and iconic mostly because it assumes uniformity where there is diversity. The narratives of sexual experience are reminiscent of a younger past that is remembered as ideal so that “[i]t is as this hyperreal (Baudrillard, 1994: 336) that I argue that Viagra and other sexual pharmaceuticals are most critically understood” (2006, p. 336).

In other words, Viagra® can only appear in a cultural landscape when the conditions for its existence as simulacra are pre-set. These are previously shaped by a group of consumers of a determined age, general social acceptance of a medicated experience as a definition of health, normalcy, the construction of discourse of disorder, and an intense saturation of mass media (Croissant, 2006, p. 337). The discovery of the effects of the drug precedes the discursive, rhetorical, and scientific production of erectile dysfunction as a disorder that requires medicalization to obtain the “normalization” of sexual operations.

The other dimensions of the hyperreal are desire for control and idolatry of simulation; imitation reached its peak and after, the reality always will be inferior. As Croissant notes, the promise of Viagra®, Levitra®, and Cialis®, among other drugs, is the improvement of sexual performance: “And so, ‘Longer, Harder, Stronger’ is not just a mantra for shot-putters, it reifies a phallic and priapic model of masculine sexuality, as if that were the solely important aspect of the heterosexual dynamic” (2006, p. 337). In this sense, almost all men are potential buyers of Viagra®.<sup>108</sup> Moreover, as author states, it also is possible that medicated sexual experience is preferred to the insufficiencies or deficiencies of non-pharmaceutically mediated sex.

Another sample of heteronormativity and of the coitocentric model implied in and promoted by Viagra® advertising is that the only sex for women\*, or at least, the best and most pleasant, is one of vaginal penetration. As Croissant postulates, both the commercials that reduce sexual satisfaction to the male orgasm, and those that assert that what is at risk with the use of Viagra® is the attainment of female sexual pleasure, placing these sexual drugs in the dimension of the hyperreal.

In the world of pharmaceutically mediated sexuality saturated by mass media, the technologized, techno-pharmacologically “improved” bodies appear as perfectly natural, more natural than the “natural” ones, that “nature” offers entering the dimension of the hypernatural.

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<sup>108</sup> The same occurs with the purchase of testosterone products, as a result of the supposed testosterone deficit syndrome (TDS) –which we will later cover, because it is not a “normal” nor “healthy” level of testosterone, but varies with age and from body-to-body. Consequently, almost all men are suitable candidates for the syndrome. In addition, as Ostertag points out, testosterone level, whatever it may be, is not a problem in itself, unless it is accompanied by another type of symptom (2016, p. 92).

Technology is transformed, not only in means, but also in ends, as a sort of collapse between means and ends. Croissant asks: “What are the ends of sexual interaction, of which Viagra might provide a means?” (2006, p. 338). Long and erect Penises? The necessity of technological assistance that works as a form of control appears as a product of nature.

In addition to our perceptions, according to the author, the advertising of sexual drugs like Viagra® also direct the articulations and interpretations of those perceptions. Moreover, Croissant also highlights the encapsulation of sexual relations in a blue or yellowish orange pill as the embodiment of one of the forms of capitalist mediation:

Sexual activity has always been part of the relations of production and exchange, whatever the specific market forms of the time. Thus sexual pharmaceuticals reflect one, but not the only, expression of new forms of capitalist mediation into sexual intimacy. For things to be exchanged they must first of all be ‘things’ of an alienable sort, and the sexual pharmaceuticals bound sexual encounters in such a way as to encapsulate them into ‘little blue pills.’ (2006, pp. 340-341)

This capacity of present-day capitalism to turn issues related to sex-gender identity or sex-gender-sexuality into marketable goods or substances, tangible objects, or a transaction not only of mediation, but of production of corporealities-subjectivities, is covered by Preciado (2008, 2013, 2015a) in depth, as we later see.

Independently of what the possible problems that hide behind erectile dysfunction or sexual dissatisfaction may be, ignoring this importance, sexual drugs promise both a new identity and the perfection of sex. According to the advertising of these legal drugs, not only will sexual perfection be obtained through their consumption, but also a sensation of confidence, sexual attraction, and charm in public: “one is more confident at work or esteemed by peers, because an erection is guaranteed” (Croissant, 2006, p. 341). The author provides a comparison with other drugs like the antidepressants Prozac, Paxil or Zoloft drugs –again bordering the concept of technobody from Preciado (2008)– that reify the biological causes of these complications and ignore the social ones. This is a good indicator of the type of capitalism of which Croissant speaks, which Preciado (2008) conceptualizes as “pharmacopornographic,” as we later develop.

Thus, we inhabit a type of capitalist society, in which one of the many paradigmatic metaphors are the pill or tablet. The drug in pill, tablet, or capsule form is the all-powerful technological solution to an infinite number of social, personal and political problems. Among the plethora of examples of the pill as one of the of the metaphors of our moment in time is the expression “in small pills,” synonymous of “in small sizes or portions,” which we find in

countless places, like in the heading of *El Diario Vasco* “Zikloia 2016, theatre in small pills”<sup>109</sup> (Goñi, 2016, emphasis added), or passing from the theatrical to the cinematographic, “digital pills” from the Olatu Talka festival (Irigoien, 2013). With this same idea of “small dose,” the notion employed to designate a multitude of tasks from singing aloud for two minutes, to practicing sex, a good hug, a nap, as noted in the news article of *El País* “Turbopleasures, small pills of happiness that can change your life”<sup>110</sup> (Garrido, 2014, emphasis added). Another example from an economic context is offered by the webpage of Economists Without Borders<sup>111</sup>: “In February we launch small pills”<sup>112</sup> (2018). On a website of political groups, like the one of Sare de Gernika-Lumo, we find “sentipen-pildora txikiak” (small sentimental pills), in relation to the audio-visual project Aterabidetik (2019).

In our western societies, topics such as erectile dysfunction and depression are treated as individual problems instead of public matters with social causes: “So rather than fighting economic exploitation, poor working conditions, exposure to toxic chemicals, social anomie, bad diets (both a personal responsibility and a social product...), physical and emotional exhaustion, the treatment of sexual and mental health is... pills” (Croissant, 2006, p. 342). In the absence of sexual vigor, youthful desire, and the throbbing erection, sex drugs offer a hyperreal sex act despite age, lack of exercise, stress, deteriorating health, workload, and all of the other possible causes of the reduction or worsening of abilities and sexual interest, which do not have to be conceptualized as problematic.

Another looming criticism of manufacturing sexual pharmaceutical product is the premise of standardization of the corporealities-subjectivities from which they depart (Croissant, 2006, p. 341). The same treatment is prescribed irrespective of desires, strengths, abilities, physical and mental states, and other elements of the general context of each corporality-subjectivity. This adds further importance to remembering to read the fine print: “after four hours of an unresolved erection or continuing priapism, seek medical help; do not take if using certain cardiovascular medicines, and so on” (2006, p. 341). This way, together with the negation of mortality to which we previously alluded through the imperative constant of vigor, sexual desire, and youth, the author indicates that the hyperreal sexuality produced by pharmaceuticals is “a denial of the diversity of sexual expression, especially over the life course of an individual but also a denial of other markers of difference (race/ethnicity, class, gender, sexuality), and an elision of the means and ends of sexual interaction” (2006, p. 342).

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<sup>109</sup> Original text: “Zikloia 2016, el teatro en pequeñas píldoras”

<sup>110</sup> Original text: “Turboplaceres, pequeñas píldoras de felicidad que pueden cambiar tu vida”

<sup>111</sup> Original text: Economistas Sin Fronteras

<sup>112</sup> Original text: “En febrero emprendemos con pequeñas píldoras”

#### **2.2.3.4. Technocorporealities: Xenoestrogenic-hormonal daughters of our carnal and intellectual cyborg mothers**

After this brief genealogy of the concept of technobody, the cyborg is once again a figure that encapsulates science fiction and reality, functioning simultaneously as a utopia and embodiment. In the words of Haraway herself: “It is oppositional, utopian, and completely without innocence” (1991, p. 151). As a utopia it remains loyal to socialism, non-essential feminism, materialism, and we will add, ecologism. It is a figure that challenges us, a call to our collective responsibility of what we are and will be, of a better world that is more habitable and friendly, but always from the belly of the monster, from the entanglement with power where no position is pure or innocent, but rather all of the views and positions are situated and they are partial and embodied.

As it shapes what reality entails, we are also cyborgs. All of us are cyborgs, from the Secretary of State of the CNI, to radical self-governing feminists: “By the late twentieth century... [Haraway states] we are all... theorized and fabricated hybrids of machine and organism; in short, we are cyborgs. The cyborg is our ontology; it gives us our politics” (1991, p. 150). She claims that communication technology and biotechnology are the major players in our constitution and in our cyborg transformation: “Communications technologies and biotechnologies are the crucial tools recrafting our bodies” (1991, p. 164). She highlights the miniaturization of technology and consequently, the miniaturization of power, giving the silicon chip as an example, which Preciado (2008, 2009, 2013) developed. Designed on the molecular scale, “modern machines are quintessentially microelectronic devices: they are everywhere and they are invisible” (Haraway, 1991, p. 153). Miniaturization changes our experience of technology and it passes by unnoticed.

It is interesting that although Haraway speaks of biotechnologies and communication technologies as the main types of technology in relation to cyborgs, despite focusing more on the latter in terms of microprocessors or chips –which are a paradigmatic example of the transformation of technology and its ubiquity, as we have seen– the chemical composition of these goes unnoticed by the author. Physicists design microchips, but their production is eminently chemical. In the basic sense, chemicals and light are combined to be photographically printed on a silicon circuit board. As in the photolithography process and in others, a large quantity of chemicals is used (Yoon, 2012, p. 462). Not only are these chemical products highly

toxic,<sup>113</sup> but they contain, among other components, ethylene glycol ethers (EGE),<sup>114</sup> in other words, electronic technology, information technology, chemistry, and toxicity have been co-constituted from the very beginning and continue as such in the form of silicon chips.

Returning to the concept of “technobody,” the main reason for its use here is eminently epistemological as the intention and the main objective are to develop academic investigation. In this sense, it does not directly point toward the creation of possible worlds, nor science fiction, but part of the necessity to name, to explain, and to delve into “what there is.” However, we know that these concepts also house possibilities for embodiment, subversion, and creation. It

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<sup>113</sup> Gordon E. Moore, chemist and founder of the company Intel, the leading manufacturer of circuit boards in the world and one of the big names in the creation of the modern chip in 1960, worked alongside physicist Jay T. Last on the process of printing. In an interview conducted with both David C. Brock and Christophe Lécuyer, Last states “we were putting into industrial production a lot of really nasty chemicals at the time” (2006, p. 80). But both explain that, then, supposedly, there was no knowledge of these matters (2006, pp. 80-81). However, according to Simpson, the studies indicating the danger of photo resistant ingredients, photosensitive material used in diverse processes of electronic chip manufacturing, date back to the 1930s (2017). We do not doubt this information, but we have not been able to find a single scientific study, nor legal document to attest this. Among a host of reasons, lack of time for a more exhaustive search can be included.

<sup>114</sup> These toxins pass through rubber gloves. Cutaneous absorption presents exposure rates between 500 and 800 times higher than levels considered safe. EGE’s were classified as “Category 1 Toxins” in the United States and “Extremely Dangerous Substances” in the European Economic Community. Pastides, Calabrese, Hosmer and Harris demonstrated that workers who manufacture circuit boards in Digital Equipment Corporation suffered twice the number of miscarriages than the average (1988). They found that these women\* were exposed to mutagens, carcinogens and toxins. Hired by the Semiconductor Industry Association (SIA), formed by the International Business Machines Corporation, Intel Corporation, and another twelve companies from the United States, the University of California-Davis conducted a second study of 14 companies of the SIA, 42 plants and 50,000 workers “Semiconductor Health Study.” IBM opted to hire Johns Hopkins University to study their plants, insinuating that they were not as toxic. The studies confirmed and even surpassed the results of Pastides et al. (1988): “They reported elevated risks for spontaneous abortion (SAB) among workers in fabrication processes, especially masking and photolithography. More specifically, ethylene glycol ether (EGE) and fluoride-containing compounds were noted to be associated with the excess risk” (Kim et al., 2014, p. 97). As a result, and after reports to IBM from workers of cancers, neonatal deformations, EGE’s were supposedly removed from the manufacturing of chips. However, Kim et al. found 41 studies from 1988 to 2011 that speak of the noxious effects of microprocessors (2014, pp. 107-112). This shows that despite the impossibility of knowing real figures –because of the high rate of turnover and the fact that many workers undertake multiple tasks– over 290,000 Taiwanese and South Korean workers are exposed to these in addition to “[a] variety of chemicals including organic solvents, acids, and metals... heavily used”, that are carcinogenic, reproductive toxins, and/or neurotoxins (2014, p. 95). The South Korean government conducted a study in 2008 as a result of the complaints lodged by workers on semiconductors of Samsung Electronics because of the number of cases of cancer (Kim et al., pp. 96, 99). The rate of non-Hodgkin's lymphoma (NHL) in women\* and thyroid cancer in men was significantly elevated (Lee, Kim, Park & Kang, 2011, pp. 139, 145; Kim et al., 2014, p. 99). In its analysis of the 41 studies, Kim et al., conclude that despite the limitations, “we could observe elevated risks for some types of cancer across studies –NHL, leukemia, brain tumor, and breast cancer” (2014, p. 101). Kim, Kim, and Lim found the data from the research of Pastides regarding miscarriages and menstrual abnormalities in the workers in the microelectronics industry replicated in Korea (2015, p. 8). Although EGE’s had supposedly been retired, in 1995 Samsung and SK Hynix signed million-dollar multiannual contracts for the sale of memory chips with IBM (Simpson, 2017). That is, they produce them in Korea –where they continue using products that contain EGE’s– and IBM and Intel buy them in the United States. Samsung and SK Hynix (both Korean) produce 75% of the memory chips worldwide. Kim et al. report the lack of knowledge, due to the great power of these multimillion dollar companies and their lack of transparency; they do not reveal chemical ingredients used. Consequently, many of them can be extremely harmful, while making it impossible to know to what a worker is exposed, to which we must add precariousness of this (2014, p. 106). On the other hand, products substituted for EGE, like propylene glycol to ether, are also harmful (2014, p. 105).

could not be any other way in the case of “technobody,” which displays, a utopian dimension,<sup>115</sup> because it is enunciated, constructed, and interpreted from a queer, feminist, anticapitalistic, and ecologist positioning, and towards a horizon of possible and still desirable futures for a multiplicity of planetary material corporealities.

As we stated in the introduction, naming and the place from which naming occurs also imply political leanings. Given that we support a relational onto-political-epistemology in which absolute, rigid, or definitive limits between epistemology, politics, and ontology cannot be drawn because they are indissolubly bound and mutually constituted –though they may be analytically separated– epistemic aspects also have onto-political consequences. They are likewise borne of an onto-political vision. Thus, the underlying objective, is to generate possibilities for multiplicity, so that all human corporealities are *livable and desirable with dignity*, which implies, without doubt, a transfeminist, materialistic, anticapitalistic, and ecological position. But “technobody” is not a call for our collective responsibility in the construction of a better world. This text is not a political appeal.

Therefore, “technobody” provides a practical account of our co-constitution and technological-corporeal fusion in particular, here and now. We are technobodies inasmuch as we are technologically constituted, co-constituted by technological-organic-discursive-material elements. “Technobody” refers to our sex-gendered constitution and directly points to hormones as one of the main elements or technologies that operate within this co-constitution. Nevertheless, as we will argue, this sex-gendered hormonal constitution is not only a relational human characteristic, but a number of nonhuman animal corporealities can also be observed. Moreover, in addition to the sex-gendered constitution, xenoestrogenicity constitutes part of earthly material corporealities and the environment in general.

This concept of technocorporeality is based to a great extent on the definition Preciado (2008) offers. Preciado, departing from the conceptualization of Haraway’s cyborg, indicates that the body of the twenty-first century is inhabited by hormonal, chemical, and molecular technologies that become part of the body, materiality, subjectivity, sex-gender-sexuality, until becoming indissoluble from them, thus making it necessary to speak of “technobody”: “This body is a multi-connected techno living organization that incorporates technology. Neither organism, nor machine: technobody” (2008, p. 39).<sup>116</sup> Bodies and sex-genders are produced through a “set of photographic, biotechnological, pharmacological, cinematographic, or

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<sup>115</sup> I would like to thank Jon Umerez for enabling me to see that technobody also presents, although in another sense this utopian dimension.

<sup>116</sup> Original text: “Este cuerpo es una entidad tecnoviva multiconectada que incorpora tecnología. Ni organismo, ni máquina: tecnocuerpo”.



cybernetic techniques that performatively constitute the materiality of the sexes” (2008. p. 86).<sup>117</sup> His conceptualization of “technobody” is particularly adequate because in addition to technologies of representation, it highlights biotechnology in particular, pharmaceuticals, and specifically hormones as principal agents of their sex-gendered co-constitution (Preciado, 2008, 2009). Nevertheless, gender and race are also production technologies of subjectivity-corporeality. Preciado emphasizes this through the notion of technogender (2008, p. 81). Gender is a “meaningful machine” that condenses intervals of time and social domination relations; it is a map of power norms that regulates, produces, and governs corporeal materiality.

Preciado notes that although it emerged before this, in the middle of the cold war a new ontological-sexual distinction between “bio-men-women” arose, those who conserve assigned gender at birth and “techno or trans\* men-women,” “who will call upon hormonal, surgical and/or legal technologies to modify that said assignment” (2008, p. 85).<sup>118</sup> Obviously, this distinction is not dichotomous and presents much more complexity because, as we have just indicated, sex-gender, among others, is also a production technology of subjectivity-corporeality; in this sense, we are all technobodies. Yet we are importantly technocorporealities; it is here where the notion of technobody that we build in this Doctoral Thesis comes into play because the immense majority of western –and not only western– bodies ingest a multiplicity of technological artifacts of subjectivity-corporeality production of varying degree. On the other hand, another element that complicates Preciado’s classification is the greater multiplicity of subjective-corporeal options; in other words, there are androgynous or trans\*bodies that do not identify with “man” nor with “woman.” In fact, Preciado himself states “I will use this nomenclature [trans] from now on, knowing that both statutes of gender, bio,<sup>119</sup> and trans, are technically produced” (2008, p.85).<sup>120</sup>

In addition to this, through the account of Preciado’s experimentation with Testogel® – a testosterone product applied in form of a gel– and his evolution of his subjective-corporeal transformation (2008, pp. 47-54, 101-107, 159-172), the junkie-addiction,<sup>121</sup> and the hacking<sup>122</sup>

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<sup>117</sup> Original text: “conjunto de técnicas fotográficas, biotecnológicas, farmacológicas, cinematográficas o cibernéticas que constituyen performativamente la materialidad de los sexos”.

<sup>118</sup> Original text: “hombres-mujeres tecno o trans”, “que apelarán a tecnologías hormonales, quirúrgicas y/o legales para modificar esa asignación”.

<sup>119</sup> If we substitute “bio” for “cis” the classification would make more sense. As Preciado himself indicates, the status of bio is generally also techno, therefore both types are bio-techno-corporealities, although not, perhaps, to the same degree or in the same way.

<sup>120</sup> Original text: “utilizaré a partir de ahora esta nomenclatura [trans], sabiendo que ambos estatutos de género, bio y trans, son técnicamente producidos”.

<sup>121</sup> Original text: *yonkismo*

<sup>122</sup> Original text: *hackerismo*

of the heteronormative sex-gendered regime, the technobody is directly linked to the trans\* corporealities subjectivities (2008, 173).<sup>123</sup>

The author traces the genealogy of hormones, based largely on the archaeology of the sexual hormones that Nelly Oudshoorn (1994) (2008, pp. 117-155) accurately maps of the hormonal market and the modes of reproduction of subjectivity-corporeality which he calls “pharmacopornographic Capitalism.”

Preciado’s technobody is also a toxic body, which is shaped and constituted by a number of substances like “oxytocin, serotonin, codeine, cortisone, estrogen, Omeprazole, etc.” (2008 p. 89).<sup>124</sup> In this interweaving of human technobody with toxicity, Preciado comes to thresh out or to dissect the psychotropic origin of criticism of researchers and theoreticians like Sigmund Freud or Walter Benjamin (2008, pp. 248-255). The concept also points toward environmental toxicity such as nuclear toxicity, but without mentioning, much less developing, xenoestrogenic toxicity (Preciado, 2008, p. 65).

Likewise, as we recently observed, another one of the differences and/or specificities that allow for the distinction between the figures of cyborg and technobody are that the former mainly highlights information and communication technologies, and biotechnologies, whereas the technobody in the conceptualization that we develop here directly specifies hormones –which have xenoestrogenic effects on the environment– and xenoestrogen. Haraway brilliantly, albeit lukewarmly highlights our corporeal “reconstruction” by means of biotechnology and technology on a molecular level, without specifically mentioning hormones or xenoestrogen. However, technobodies not only confidently affirm our reconstruction, but our and not only our xenoestrogenic-hormonal corporeal co-constitution, as we will see and we have already asserted.

“Technobody” also provides an account of how, a specific how, albeit one that is not unique, of the techno-xeno-hormonal-corporeal, molecular chemical fusion, as a means of transforming technocorporeality, in which hormonal the sex-gendered co-constitution is central, to the case of the human technocorporealities, although not exclusively so.

What both concepts also share is a critical dimension. “Cyborg” is a theoretical tool of criticism, from criticism of heteropatriarchal, imperialistic, racist, capitalist etc. power to the

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<sup>123</sup> Other texts that also relate technobody to trans\* are the work of the master’s thesis “I, Technobody. A study of the way a sexual toy can contribute to the understanding of the body as a merge of artificial and natural” (van Etten, 2014, pp. 25, 32); the undergraduate thesis “Transgender Traces: Techno-Bodies Through Time” (Wong, 2015).

<sup>124</sup> Barbiturates (2008, p. 29), Prozac® (fluoxetine), Secobarbital, cocaine, methadone, morphine, ketamine, cannabis, alcohol, tobacco (2008, p. 30), DHEA or growth hormone, anabolic steroids, sildenafil, Ritalin® (2008, p. 31). The list would be endless. Original text: “la oxitocina, la serotonina, la codeína, la cortisona, el estrógeno, el Omeprazol, etc.”.

dualist view, essentialist view, the use of nature as a resource for humans, mainly of Man. On the other hand, “technobody” indicates the central role of hormones –synthetic or not– in our sex-gendered constitution. The shaping of our subjectivity and our body transformation pass through the ingestion, consumption, or purchase of this quintessential molecular device of production of subjectivity-corporeality on a massive scale. This act is not accidental; it responds to specific interests and the convergence of a wide variety of factors. The notion of technobody allows for the identification of this main element –which is not the sole element– of our sex-gendered co-constitution, in addition to tracking and demonstrating the interests that promote it. In this sense, it also challenges the sex-gendering of hormones because it leads to an essentialization and naturalization of sex-gender. This criticism is also produced surrounding the toxicity of the environment that we produce in our multiple relations and the immense quantity of toxic xenoestrogenic products that we employ. Regarding its effects, “technobody” reflects its necessity and possibilities for change. In both cases, these unveilings and revelations contribute to this awakening to favor our free and active participation in our relational co-constitution more completely. Being aware of our technocorporeality equips us with agency.

“Technobody” is a concept that questions the centrality and excessive weight of certain technological and biological elements in our sex-gendered co-constitution and the construction of our sex-gendered identities, becoming, like the cyborg, a critique of dominant heteropatriarchal, capitalist, racist, ableist, speciesist, and earth-centrist institutions (The Laboratory Planet, 2016, p. 24).<sup>125</sup>

Another matter that has varied in around 30 years of difference between the two notions is the generalization, globalization, and restoration of corporeal technological co-constitution.<sup>126</sup> We could state that our technobodies have heightened awareness of our techno-material semiotic state. Not only has awareness increased, but the ordinariness and the frequency of our technocorporeality have as well. If we compared how many people “were cyborg” thirty years ago, and how many are now constituted as technobodies, with regard to communication and information technologies, mainly, biotechnology in general, and hormones and xenoestrogenicity

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<sup>125</sup> With respect to biocentrism, although “technobody” aims not to articulate the relation between living – nonliving dichotomically as we will present in the following section, various arguments encourage embracing the knot of this distinction.

<sup>126</sup> The references that we take here are Haraway’s concept of cyborg coined in 1985, but dating back to 1960, and our conceptualization of technobody, developed between 2015 and 2019, mainly based on Preciado (2008), but enriched and extended by means of the work of other authors –like Hayward (2014), and Ah-King and Hayward (2014) – along with individual theorizations. In spite of the use of “technobody” prior to these dates, as we have shown in this genealogy, it is not until *Testo Junkie* that the concept acquires the robustness, density, complexity, and directionality as far as the fundamental elements and modes of co-constitution of corporal materiality that is of interest to us here.

in particular, the difference would be significant. Therefore, it is a question of mode, as well as quantity: the bodies in the neoliberal Capitalocene are technobodies.

Therefore, both the cyborg and the technobody present a utopian dimension that criticize and give an account of our hybrid intertwined and entangled relational constitution: of the not “fundamental, ontological separation in our formal knowledge of machine and organism, of technical and organic” (Haraway, 1991, p. 178). As Haraway indicates “[t]he machine is us, our processes, an aspect of our embodiment... We are responsible for boundaries; we are they” (1991, p. 180). Nevertheless, “technobody” directly and specifically points to hormones –both synthetic and nonsynthetic– and xenoestrogenicity as main technologies and elements that operate in our sex-gendered co-constitution, in the sex-gendered co-constitution of a great number of nonhuman animal technocorporealities, and in the environment in general.

To complicate the subject slightly, as we noted in the beginning of this section, Haraway’s cyborg reappears in 2016 in her work *Staying with the Trouble*. The author reconceptualizes the figure, drawing nearer to “technobody,” but still allowing for its differentiation from such. Thus, she states:

Cyborgs are kin, whelped in the litter of post-World War II information technologies and globalized digital bodies, politics, and cultures of human and not human sorts. Cyborgs are not... machine-organism hybrids. In fact, they are not hybrids at all. They are, rather, imploded entities, dense material semiotic “things” - articulated string figures of ontologically heterogeneous, historically situated, materially rich, virally proliferating relatings of particular sorts, not all the time everywhere, but here, there, and in between, with consequences. (2016a, p. 104)

The technologies that are mentioned in this quote in relation to the cyborg and its corporeal makeup are information technologies and the bodies are “globalized digital bodies.” However, the author does not make any express mention to biotechnologies, pharmacological technologies, drugs, hormones, endocrine disruptors, or to the molecular chemical constitution, among others, at the time of providing an account or definition of the cyborgian constitution.

Nevertheless, this update to the thirty-year-old cyborg is closer to our concept of “technobody” because in spite of not capturing hormones in the definition, it casts the spotlight on said hormones, and in particular, estrogenic products DES,<sup>127</sup> and Premarin®,<sup>128</sup> in a chapter

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<sup>127</sup> DES or Diethylstilbestrol is a synthetic non-steroid hormone synthesized for the first time in 1938, which was prescribed to millions of pregnant western women\* between 1940 and 1971, supposedly to avoid the risk of abortions or pregnancy complications. After demonstrating that it was carcinogenic, it was prohibited first for women\*, and later for cattle. See, DES-Action (2019).

titled “Awash in Urine: DES and Premarin in Multispecies Response-ability.” The first of both hormonal products was prescribed for pregnant women\*; the second, obtained from mares and prescribed first for women\* with the scientifically-medically codified menopause; later for trans\*, and also for dogs.

Haraway continues with the elucidation of her cyborg reloaded:

Particular sorts of historically situated machines signaled by the words *information* and *system* play their part in cyborg living and dying. Particular sorts of historically situated organisms, signaled by the idioms of labour systems, energetics, and communication, play their part. Finally, particular sorts of historically situated human beings, becoming-with the practices and artifacts of technoscience, play their part. (2016b, p. 104)

As we observed in this quote, the words “information” and “system” associated with “machines,” the term “communication” associated with organisms, and human becoming go hand in hand with the technoscientific practices and devices that have much to do with hormones labeled as “sex” hormones, as well as technoscientific creations or devices (Oudshoorn, 1994, pp. 10, 64). In this sense, the *hormonal* or *endocrine system* is also defined as a *communication system*, in that communication and integration of information take place by means of *chemical* stimuli. In this system, adjacent cells communicate via surface *molecules* and specialized bonds, while the communication between distant cells is conducted through the secretion of chemical messengers: *hormones*, which are transported through the blood and activate target cells by interacting with specific receptors.

Despite this, the Harawayan thought of «“both/and,”“yes/and,”“no/but,”“no/and”» (2016a, p. 212) allows for the distinction of the cyborg in “Awash in Urine” and the concept of technocorporeality in this text. Another distinguishing factor is that the cyborg would be “one more” in the queer litter which Haraway says: “Irreducible to cyborgs, the litter interests me, the particular kin and kind nursed on the fluid and solid effluvia of terra in the late twentieth and early twenty-first centuries” (2016a, p. 105) As Haraway herself describes, this litter is composed of women\*, dogs, and mares in this case:

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<sup>128</sup> Premarin® was released in 1939 by the pharmaceutical company Ayerst and was prescribed to women\* with menopause for sixty years. After hundreds of studies, mainly through the Women's Health Initiative in 2002, it was demonstrated that, not only does it not prevent cardiovascular disease, but that it is related to heart attacks, blood clots, stroke and breast cancer. In spite of the great decline in its prescription, it continues to be prescribed to different technocorporealities, among them, menopausal women\* with hot flashes. See the page of Pfizer on PREMARIN® (2019).

Made up of an aging Californian dog, pregnant mares of the Western Canadian prairies, human women who came to be known as DES daughters, lots of menopausal U.S. women, and assorted other players in the story of “synthetic” and “natural” estrogens, the litter for this chapter is decanted from bodies awash in a particular pungent fluid-urine. (2016a, p. 105)

However, for us, all of these estrogenically and xenoestrogenically connected and co-constituted mares, humans, and dogs, could be read as technocorporealities despite their differences, differences that matter. It is therefore here, among other matters, where we focus the co-constitution of sex-gendered *human*.

The cyborgization of human corporeality, contrasts with canine corporeality, this distinction between humans and canines, inasmuch as the former viewed as cyborgs, but not the latter, becomes clearly manifested in the passage in which Haraway places the cyborg in the front lines and the dog, companion species in a large queer family, both of which are necessary to make *compost* and *kin*:

Each diner exposed to high risks of familial heart failure, eating dangerous and notorious estrogens in later life, seems, finally, what here, in this table, conjugates... the cyborg author and the dog of her heart. *Cum panis*, companion species, females of two species (along with their microbiomes with species in the zillions) at table together, in different decades, slurping drafts of dubious estrogens. (2016a, p. 115)<sup>129</sup>

Haraway, through Cayenne (her dog), warns of the centrality of hormones as corporeal constituents that intermesh and weave different bodies, breaking down barriers and borders once again. By aiming to account for this current and important technological element of our-and-more-than-our corporeality as a material semiotic knot, she now returns with the cyborg *reloaded*, which had really never left. It is as if she had realized that there are important processes and technologies in our constitution and corporeal transformation for which the 1985 cyborg did not account. Perhaps it was because this was not the objective, because it was overlooked, or still too difficult to notice its transcendence, given that its ubiquity and centrality have increased with time to the point of almost, or rather completely, pervading it.

Admittedly, from the responsibility of companion species, she confirms our intuitions by casting light on mares in particular:

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<sup>129</sup> For Haraway, one of the matters that significantly differentiates cyborgs, dogs, and mares is that cyborgs are responsible for the harmful consequences from this hormonal chaos.

Somehow, a feminist science studies scholar and lifelong animal lover, my menopausal self failed to know much about pregnant mares and their disposable foals.

Did I forget, never know, not look – or just not care? What kind of conjunctivitis was that? Social movements for animal flourishing had noticed those horses and made a very effective fuss about it, and these movements were full of feminist women\*and men. Why not me too? Was it only after it turned out that HRT probably harmed the heart rather than guarded it that the horses came into my ken. I don't remember. Marx understood all about how privileged positions block knowledge of the conditions of one's privilege. (2016a, p. 111)<sup>130</sup>

Another distinction between the cyborg and technobody is techno-corporeal fusion, which is chemical fusion on the molecular level. In her first cyborg, Haraway mentions the word “fusion” several times, as we have shown in the footnotes; yet it is not related to the type of fusion between hormonal or xenoestrogenic artifacts and bodies on the molecular level, but to a fusion which occurs between nature-culture, animals-humans- machines, etc., as a means of overcoming dichotomous and dualist thought, without expanding upon or specifying it on the molecular level.

Finally, for us, the element that makes dogs, mares, humans, mollusks, fish, crops, atmosphere, rivers, soils, among others yield or be shaped by technocorporealities, namely, the relational technological element, among many others, that the environment shares in general in the age of ecological toxicity in which we live, is xenoestrogenicity. Neither the former nor this later Harawayan cyborg contemplate estrogenic effects –endocrine disruptors for a large number of animal technobodies and relationally constituted for the rest of the material corporealities– derived from myriad artifacts and technological products.

Perhaps thirty years were necessary because now is when hormones and xenoestrogens have deployed their power much more clearly. It is more difficult to warn of the invisibility of hormonal, xenoestrogenic, chemical, molecular materiality than that of electronic ostentation given that it is diluted, melted, and evaporated within bodies and the environment. The forcefulness of its effects is resounding. Molecularization is a silent process. It is like a virus. It is when the infection has reproduced exponentially and concatenated that it asserts its presence

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<sup>130</sup> Note that as Haraway, herself explains in “Awash in Urine,” the vital process called “menopause” begins at the end of the 1980s. The *Cyborg Manifesto* was published for the first time in 1985 and later in *Simians, Cyborgs, and Women: The Reinvention of Nature*, which, if it had been merely a temporal matter, could have been included in the biotechnological hormonal constitution of the cyborg, which is directly aimed at wiping out the barriers between humans-animals-machines central to this piece. However, despite the fact that in *Cyborg Manifesto* the author postulates technology becoming micro, a miniaturization and invisibilization of a chemical and molecular magnitude and degree pass her by unnoticed. Moreover, it seems that her greatest concern does not reside in ignoring this fact, but in oppression, and animal abuse of mares and their foals in this case, that the production of technological devices brings forth.

ever more clearly. With toxicity it is the same. The sparkle, glamour, and shine of the space race and cybernetic worlds give way to hormonal and xenoestrogenic mutations. Later, silicon chips drift through rivers of acidity. As in all processes, decades of hormones and xenoestrogens have been necessary in order for their effects to reach an even greater and broader degree of effect in the sex-gender paradigm, the environment, and bodies.

Cyborgs gave rise to technobodies. The thought of «“both/and, yes/and, no/but, and no/and”» implies that the differences between both concepts indicated up to this point do not allow for the establishing of a synonymy between them: technocorporealities are now more artifactual-hormonal-synthetic-toxic than ever, more so than cyborgs ever were. However, they do make a partial comparison possible because they co-exist in the same family as the old cyborgs, DES-hormone cyborgs, the daughters of these, and the younger hyper multi-xenoestrogenic-hormoned technocorporealities.

In this sense, cyborgs continue to have validity in these times of the paradigm reshaping of imperial neoliberal military security through climate change –the new business of world capitalist hegemony: “My slogan from the 1980s, ‘Cyborgs for Earthly Survival’, still resonates, in a cacophony of sound and fury emanating from a very big litter” (Haraway, 2016a, p. 114). Continuing with the problem is also resisting and transforming this toxic-hormonal tangled mess, embracing xenoestrogenic mutations while unweaving old hormonal-chemical patterns to intertwine the bodies and the environment differently.

To conclude, there are some technological artifacts which are axial to current corporeal co-constitution, specifically human sex-gender, which saw the light in the same era as certain constitutive technologies of cyborgs, but its centrality and ubiquity passed by unnoticed, for reasons we have suggested or others. Some technologies and modes of relational co-constitution legitimize speaking of technobodies: “I trace a tangle and add a few threads that first seemed whimsical but turned out to be essential to the fabric” (2016a, p. 116). These threads that went unnoticed, remained hidden, or were ignored, which are decisive in understanding the sex-gendered co-constitution of human technocorporealities, the co-constitution of vegetal nonhuman animal technobodies, and the toxic global environmental constitution, are the traces of hormones and others comprised of xenoestrogen. Haraway concludes “The differences matter” (2016a, p. 116). For this reason, we speak of technobodies in this paper and not of cyborgs.



#### **2.4. *Posthuman\* too human\**. The technological in the technological-organic-discursive-material co-constitution of technobodies<sup>131</sup>**

If Humans live in History and the Earthbound take up their task within the Anthropocene, too many Posthumans (and posthumanists, another gathering altogether) seem to have emigrated to the Anthropocene for my taste. Perhaps, my human and non-human people are the dreadful Chthonic ones who snake within the tissues of Terrapolis.

D. Haraway, *Staying with the Trouble*, 2016, p. 50

The fourth comparison or synonymy that we will challenge on this path to conceptual elucidation is that constructed between “technobody” and “posthuman” or “posthuman body.” “Posthuman” and “posthumanism” are academically trending terms which are tremendously fecund and productive as they have generated the emergence of new disciplines of knowledge that intertwine and propagate at great speed. With a great contagious power, both notions incite extensive and profound reflections concerning our and more-than-our conceptualization, condition, and becoming.

The posthuman is deployed in various modes. On one hand, it emerges from the quest for a common denominator after “Man,” which denounces the constitutive exclusions of the human. On the other hand, from the idea of the nature-culture continuum, it aims to overcome the anthropocentrism that has characterized the human notion leading to modern western humanist thought. Together with recovering materiality, corporeality, and animality overlooked by the modern subject, it also influences the relevant nature of technology in our and more-than-our constitution.

Our critique of the concepts of “posthuman body” and posthuman” in particular are principally based in the difficulty that both notions present in order to achieve the intended overcoming of their inherent anthropocentrism and consider the new position of the human within material relationality. In this sense, as Haraway indicates, “posthuman” seems far too restrictive while resulting too apprehensible for transhumanist views imbibed by their thirst for *divinity*; they pursue technological improvement of the human species, exacerbating human

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<sup>131</sup> I would like to thank Elvira Burgos especially for her accurate feedback in this section and her generosity as well as her sharp critical view that teaches to contemplating the idea of multiplicity.

exceptionalism. We will argue that “technobody” overcomes these restrictions more satisfactorily, making the work of accounting for the technological-organic-discursive-material co-constitution of human animals, nonhuman animals, plant-life, waterways, atmosphere, the environment in general not as anthropocentric in this current moment of the neoliberal Capitalocene. “Technobody” blurs various dichotomies while highlighting differences but shortening distances and verticality, likewise reducing the level of human superiority. This is the first of two main reasons which lead us to lean toward the employment of “technobody” in this Doctoral Thesis.

The second is related with the importance of the technological element in the shaping of the posthuman and the technocorporeality, namely, its role in our and more-than-our constitution, and in the overcoming of the modern notion of the human. In this sense, we will present that “technobody” more clearly, sharply, and explicitly gathers, raises awareness, and informs of one of –but not the only– relevant constitutive technological modes and elements. Not only does the technobody do so for the technocorporealities that are differently sex-gendered humans or humans sex-gendered differently, but also sex gendered animality in general, as well as environmental becoming, in its toxicity<sup>132</sup>; in other words, “technobody” more clearly, sharply, and explicitly gathers, raises awareness, and informs of the becoming-with of our corporeality and of a multiplicity of planetary corporealities in this current historic moment. In the face of futurism and exceptionalism exacerbated by the fantasies of techno-*superhumans*, “technobody” is not directed at the improvement of the human species, nor does it point toward what is yet to come, or a posterior state of our becoming-with, but it accounts for one of the relevant technological elements of our and more-than-our relation hormonal and xenoestrogenic co-constitution, which is often sex-gendered in the here and now.<sup>133</sup>

The objective of this section, far from proposing a sole exclusive term, further still, from establishing the imperative of having to ascribe to such –which would go against the idea of multiplicity that guides this research– is to indicate the problem surrounding “posthuman” and “posthuman body”, and the differences between “technobody” and “posthuman (body)”, to defend the choice of “technobody” in relation to the objectives and previously indicated tasks.

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<sup>132</sup> Toxicity is a matter of degree that depends on the scale and position from which it is measured and defined. The environment is not toxic in itself, but it can be toxic for human beings at a certain level of concentration of a series of elements that generate specific circumstances. Speaking of the toxicity of planet Earth for the universe, for example is senseless. Moreover, the environment has always been toxic in the sense that many toxic elements already existed, although in lower concentrations; as Pérez Orozco indicates (2017) in her denouncing of the capitalist production fallacy, toxic elements that did not exist as such in “nature,” rather than something completely new are the result of the transformation of previously existing elements.

<sup>133</sup> I would like to thank Sergio Urueña and Ainhoa Fernández for the conversations on ontology and for their collaboration when thinking of the different posthuman dimensions.

### 2.4.1. The posthuman as a critique of the modern idea of *human*

Moreover, one could put [*mettre*] the subject in its subjectivity on stage, *submit* [*soumettre*] it to the stage as the idiot ... as great, erect, autonomous as *submissive*, etc.<sup>134</sup>

J. Derrida, "Eating well" or the calculation of the subject" (2005) (1989)

"Posthuman" undertakes a critical review of occidental humanism and the modern subject and stresses the matter of a determined concept of "the human" because of the exclusions it produces and it has constituted, among others. Part of the critique of this notion of "the human" alludes to the historicity and temporality of the human. As Marta Segarra emphasizes, in addition to being post of something, what comes later is the generative power of "posthuman" just as it is employed by Cary Wolfe (2010), for example. According to Segarra, Wolfe

understands it in the Foucauldian sense ("man" is a modern invention as F. says in *L'archéologie du savoir*), that is, as a warning sign of the fact that "the man", "the human" is not an essential, immanent, ahistorical category, but that it obeys a history and, therefore enters in a temporality, which is not necessarily teleological, as Derrida warns in relation to "the subject" in "*Il faut bien manger ou le calcul du sujet*." (personal communication, 15 October 2017b)<sup>135</sup>

Wolfe (2010, xii) traces the origins of posthumanism to Foucault, to *Les mots et les choses. Une archéologie des sciences humaines*, and states that this provocatively ends his archaeology arguing that the concept of "man" as "luminous consciousness" is a relatively recent invention, which has reached its limits of usefulness (1966, p. 398). However, in the idea of the human as a measure of all things, Wolfe distances himself from the posthuman.<sup>136</sup> Likewise,

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<sup>134</sup> Original text: "D'ailleurs, on pourrait mettre en scène le sujet, *soumettre* en scène le sujet dans sa subjectivité comme *l'idiot même*... : aussi grand, érigé, autonome que *soumis*, etc."

<sup>135</sup> Original text: "lo entiende en el sentido foucaultiano (el "hombre" es una invención moderna, como dice F. en *L'archéologie du savoir*), es decir, como un signo de atención al hecho de que "el hombre", "lo humano" no es una categoría esencial, immanente y ahistórica sino que obedece a una historia y, por lo tanto, entra en una temporalidad, que no tiene por qué ser teleológica, tal como advierte Derrida en relación con "el sujeto" en "*Il faut bien manger ou le calcul du sujet*".

<sup>136</sup> Wolfe emphasizes and takes the distinction that Foucault makes between Enlightenment and humanism as a starting point in the sense that from Enlightenment itself there was the critical permanent work of reason while humanism does not make a critical review of its own dogmas, the "anthropological universals" (Wolfe, 2010, xvi). Humanism, according to Foucault, is a diverse group of topics that have appeared in distinct historic

speaking of *posthumanism*, not of “posthuman”, namely of a “substantive being called posthuman” to which an –ism is applied (Pollock, 2011, p. 235), and less still of “posthuman bodies”: “posthumanism in my sense isn’t posthuman at all—in the sense of being “after” our embodiment has been transcended—but is only *posthumanist*... it opposes the fantasies of disembodiment and autonomy, inherited from humanism itself, that Hayles rightly criticizes” (Wolfe, 2010, xv). Insisting on this idea, Wolfe specifies his notion of “posthumanism”: “it is not posthuman or antihuman but rather simply *posthumanist*” (2010, pp. 120). In fact, apart from the passages in which the notion of “posthuman” from Hayles (1999) is mentioned, the term “posthuman” is not employed again in this piece.

The posthumanism of Wolfe reclaims human animality, something reviled and rejected by the modern subject; therefore, his sense of posthumanism “is the *opposite* of transhumanism, and in this light, transhumanism should be seen as an *intensification* of humanism” (Wolfe, 2010, xv). In this sense, according to Wolfe, posthumanism would simultaneously come before and after humanism because “posthumanism names a historical moment in which the decentering of the human by its imbrication in technical, medical, informatic, and economic networks is increasingly impossible to ignore” (Wolfe, 2010, xv). In this way, in current posthumanist thought and the convergence of other genealogies can be traced to the Macy conferences (1946-1953) (2010, xv). These conferences were significant because they inspired the cybernetics systems theory of various authors. For the author, the importance of this genealogical branch resides in that the information systems theory “converged on a new theoretical model for biological, mechanical, and communication processes that removed the human and *Homo sapiens* from any particularly privileged position in relation to matters of meaning, information, and cognition” (2010, xii). In this model, the human brain is conceptualized as an information processing system which implies the loss of the extraordinary nature of human subjectivity, of conscience, rather than its difference or ontological superiority. Wolfe understands the human being not as an individual, but as an autopoietic system<sup>137</sup> within

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moments in western societies as a critique of other topics, but not subjected to the criticism of their own postulates, that is to say, “certain conceptions of *man* borrowed from religion, science, or politics” (Foucault, 1984, p. 44, emphasis added). In this sense, Foucault warns of a tension between Enlightenment and humanism. For Wolfe, “the point is not to reject humanism *tout court*—indeed, there are many values and aspirations to admire in humanism—but rather to show how those aspirations are undercut by the philosophical and ethical frameworks used to conceptualize them” (2010, xvi).

<sup>137</sup> Haraway, however, criticizes the autopoietic conceptualization of our and more-than-our nature: “So if the ‘Cyborg Manifesto’ is looking at the couplings of cybernetic systems and organisms, the ‘Companion Species Manifesto’ is saying, ‘Wait a minute, the entity that we are is the outcome of a symbiogenetic doing.’ We are sympoietic systems; we become-with, relentlessly. There is no becoming, here is only becoming-with’ (2016a, p. 221). This criticism of autopoiesis previously appears in Haraway (2006, p. 141): “nothing self-organizes –it’s relationality all the way down and self-organization repeats the trouble of systems theories.” The author

another system that experiences this system in the environment, from the “openness from closure” (2010, xxi, xxiv, pp. 15, 117, 118), a principle that is repeated like a mantra throughout the piece (Pollock, 2011, p. 236).

Applying the systems theory to animal studies means observing multiple animal corporealities in a relational system or network, which deontologizes binary oppositions between animals-humans, and nature-culture. Wolfe defends that in order to overcome humanism – intensified through the technoredefinition of posthuman and transhumanism– which is anthropocentric by definition, subjectivity must be conceptualized in such a way that it does not privilege the human and can be extended to the rest of animality. It does not merely suggest the what of including animals in a liberal pluralist humanist framework, but the how, destabilizing and radically challenging this very framework (2010, 99). However, only by truly destabilizing speciesism can we be posthumanists.

With this conceptualization of posthumanism, as opposed to posthumanist humanism and humanist posthumanism, it follows that “to fully comprehend... that the human occupies a new place in the universe, a universe now populated by what I am prepared to call non-human subjects” (2010, p. 47). Wolfe proposes abandoning the notion and idea of person in order to create this new concept of subjectivity that does not favor the human and destabilizes speciesism (2010, pp. 47-66, 88-89, 97-98, 115, 119). The problem is that abandoning the notion of person to destabilize or radically challenge speciesism does not suffice. Although Wolfe ascribes to the disciplinary field of *animal studies*, speciesism does not end at the borders of animality. In addition to these animal species, there are all the species of vegetation, fungi, protozoa, bacteria, etc., that shape the materiality of a great majority of living corporealities together with the rest of earthly materiality in addition to technology.<sup>138</sup> Although animalism can destabilize speciesism on the part of humans toward the rest of animals, its capacity to radically question the humanist scheme is limited, it is an alter-speciesism, a new hierarchy presided by animality, by the animal *kingdom* that can decenter anthropocentrism, but not animal-centrism, nor the superiority of animal species over the rest of species and matter in general. Upon broadening this position of superiority through animality, it would be difficult to question the superiority of human animals

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repeatedly defends sympoiesis “in Lynn Margulis’s sense, in the symbiogenetic conjuncture of living and dying on Earth. We are in a systems world, as in the ‘Cyborg Manifesto,’ but more alert to *sympoietic* systems (not self-making, not autopoietic), making-in-symphony, making-with, never one, always looping with other worlds” (2016b, p. 216).

<sup>138</sup> There is a complete absence of corporealities that are vegetal, fungal, protozoic, bacterial, etc. The sole anecdotal and haphazard appearance is trees, in the name of the architectural project name for parks *Tree City* and the reference to “rocks and trees” as an example of something opposing a “the objects that emerge from the recursive self-application of communication” (Wolfe, 2010, p. 234).

in terrestrial materiality. Therefore, Wolfe's proposal in this sense seems to be trapped by the very theoretical postulates and discursive speciesist framework the work is directed at criticizing, limiting radically questioning speciesism and animal human superiority.

For Pollock, another possible criticism of Wolfe's approach is the strong commitment to thought, "[t]o find a mode of thought adequate" (Wolfe, 2010, xviii), which is a necessary condition for the development of a true posthumanist attitude (2011, p.238). For Wolfe, posthumanism not only implies a new thematic theoretical paradigm, "the decentering of the human in relation to either evolutionary, ecological, or technological coordinates... rather, I will insist that we are also talking about how thinking confronts that thematic, what thought has to become in the face of those challenges" (2010, xvi). For Wolfe, this line of posthumanist thought implies distancing ourselves from the framework of normative subjectivity that generates discrimination against diversely functional nonhuman animals and human animals, showing how the humanist framework from which the denouncement of this discrimination is generated is precisely that which legitimizes, produces, and reproduces it. Although this decentering of the human and the mode of critical thought that accompanies it is a great step toward "the challenge of sharing the planet with non-human subjects and treating them justly" (Wolfe, 2010, p. 62), as we previously indicated, perhaps this "adequate form of posthumanist thought" should reflect the new forms of speciesism that animalism, as a framework of destabilization and radical questioning of humanism legitimizes and generates. For Pollock, this emphasis on thought displaces the attention of nonhuman corporealities, rendering them less relevant in-for conversation; he compares it to Haraway's criticism of Derrida regarding his "The Animal That Therefore I Am (More to Follow)".

In this greatly complex and richly critiqued piece, Derrida questions the fundamental distinction between humans and animals, between human animals and nonhuman animals, and deconstructs the man-animal binary: the end of man lays the foundations for and is recounted by the animal autobiography (2002, p. 371). As Derrida himself indicates: "I move from "the ends of man," that is the confines of man, to "the crossing of borders" between man and animal... or the ends of man I come or surrender to the animal -to the animal in itself, to the animal in me and the animal at unease with itself" (2002, p. 372). The question that guides Derrida's text in his deconstruction of anthropocentrism that is inherent to western autobiographical philosophical tradition, or his anthropocentric conceptualization of "who I am (following)?" is motivated by the shame and nakedness he feels before the fixed gaze of his cat "in the direction of my sex" (Derrida, 2002, p. 373). The shame that emanates from his necessity to cover himself is evidence that *techné*, the arts, politics, and other products and human practices are the fruit of their

shortfalls. Derrida denounces that man has attributed *logos* to name, dominate, and sacrifice the animal, that is animals. The shame that he feels standing before his cat has to do with the lies that man tells and has told himself when recounting his autobiography and conceptualizing what surrounds him with the exclusions and violence that this generates and has generated. Derrida denounces sacrificial animal violence that entails the violence of human animals on the rest of the animals, “the *unprecedented* proportions of this subjection of the animal”, in these times of genocide, annihilation and extermination of species (2002, p. 394).

Facing a homogenous and closed notion of the animal, before the animal and animal life Derrida postulates the irreducible relational multiplicity of materiality:

Beyond the edge of the *so-called* human, beyond it but by no means on a single opposing side, rather than "the Animal" or "Animal Life," there is already a heterogeneous multiplicity of the living, or more precisely (since to say "the living" is already to say too much or not enough) a multiplicity of organizations of relations between living and dead, relations of organization or lack of organization among realms that are more and more difficult to dissociate by means of the figures of the organic and inorganic, of life and/or death. (Derrida, 2002, p. 399)

Derrida confirms the difficulty of responding to the question reiterated throughout the text “who I am (following)?” standing before the gaze of his cat, who acts as a mirror and reminds him of human inhumanity and human animal sacrificial violence (Derrida, 2002, p. 381). The only theoretical certainty in the uncertainty of the event is the living and vulnerable corporeality of both and of the animal. Regarding the experience and inevitability of animal suffering, shared vulnerability, finitude, and mortality in the face of passion as an irrefutable and inevitable feature of life, Derrida demands the inclusion of nonhuman animals in this ethical sphere (2002, pp. 395-396). It is through this experience of suffering and of the compassion that humans will be able to understand themselves and hold themselves responsible for changing their way of relating with the rest of the animals.

For Haraway, despite the intelligence that the philosopher shows in “The Animal That Therefore I Am” from the deployment of tools offered to criticize human exceptional nature and the creative means in which he ends speaking of the nakedness of philosophy before the world, the entire Derridean argument is motivated by frontal masculine nudity (2006, p. 143). Moreover, noting that shame is more masculine than human and that the curiosity regarding the cat disappears once it is established that it does not react, but responds, Haraway continues lamenting that

Derrida gets doubly caught in the very masculine exceptionalism, called human exceptionalism, that he is deconstructing, first, by his single-eyed vision of the one and only unclothed organ and second, by his failing the obligation of curiosity about what the cat cared about in that looking. I think that curiosity – the beginning of fulfillment of the obligation to know more as a consequence of being called into response – is a critical axis of an ethics not rooted in human exceptionalism. (2006, p. 143).

Returning to Segarra, she indicates that in “Il faut bien manger ou le calcul du sujet” (2005)(1989) and in other texts, Derrida “indicates, furthermore that his criticism of the subject, of “the man himself” is referred to as “man”, “homo” as well as “vir”, which contradicts the intended universality/neutrality of the “classic” subject, and which is convenient for a view of the matter from a gender perspective” (M. Segarra, personal communication, October 15, 2017).<sup>139</sup> Later, we will return to this etymological matter. In this text, the author affirms that the different modern conceptions of the “subject” –in itself challenging that there is *a* homogenous concept of such– as “man” is erected in a world and in a discourse in which sacrifice is possible. Attacking life is possible, except that of man. From here, he criticizes the subjectivity of “deep humanism” not only for its “phallogocentric” nature, but also its “carno-phallogocentrism” (*carno-phallogocentrisme*), or basis in sacrificial logic, in the superiority and domination of man and the prioritizing of the linguistic: “taking the idealizing interiorization of *phallus* seriously and the necessity of it entering the mouth whether it is words, things, phrases or daily bread and wine is enough” (2005 emphasis added) (1989). In the opinion of Derrida, carnophallogocentric logic also occurs with vegans because they employ other means of rejection.<sup>140</sup>

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<sup>139</sup> Original text: “indica por otro lado que su crítica al sujeto, a “lo propio del hombre”, se refiere al “hombre” como “homo” tanto como a “vir”, lo cual contradice la pretendida universalidad/neutralidad del sujeto “clásico”, y que viene de perlas para una visión del asunto desde la perspectiva de género”.

<sup>140</sup> For a comparison between the thinking of Derrida and Haraway concerning *killing, making killable, death, and letting die* see Haraway (2016b, pp. 228-233). Senior et al. (2015) following Derrida, question the universality and inevitability of western carnophallogocentric sacrificial logic. In this sense they indicate that “what the animation of the word of animal might show us, then, is how to forge a subjectivity otherwise, how finally to achieve a posthumanism –or a postanimality– that would obviate the necessity for a culture, a socius, and a subjectivity fundamentally premised on such sacrifice” (2015, p. 18). Senior et al. distinguish between those who defend posthuman as denouncing humanism and progress that has legitimized wars, genocides, and destruction of the environment at the service of Man; and those who understand that posthuman will occur in a more technologized future when we inhabit artificial bodies and minds and we escape the confines of the solar system. Facing this, they propose “postanimal,” which preserves the opening of the Derridean question before his cat, “what does ‘to be after’ mean?” “as a corollary and accompanying the phenomenon to the rise and fall of man” (Senior et al., p. 8). Through “postanimality” Senior et al. highlight three issues: 1) The human comes after, it is derived from and follows the animal not only evolutionally in a linear way, but also non-linearly and recursively. 2) Facing the traditional concepts of animal and human that appear obsolete and ideologically oppressing, “[p]ostanimals could be those freed from the conceptual and bodily restraints of metaphysics and technology” (2015, p. 8). 3) The apocalyptic version of postanimal would be the *last* animal.



Derrida does not employ nor reflect on the concept of “posthuman” in his deconstruction of the subject and teleological temporality. However, following this line and distancing themselves from the teleological desire of domination, Jack Halberstam and Ira Livingston also postulate the posthuman as the overcoming of the comparison of “humans” and “man”<sup>141</sup>: “[t]he human body itself is no longer part of “the family of man” but of a zoo of posthumanities” (1995, p. 3). The human has cracked, spilled over, and multiplied, giving rise to a proliferation of posthuman bodies, namely, “[q]ueer, cyborg, metametazoan, PWA; bodies-without-organs, bodies-in-process, virtual bodies: in unvisualizable amniotic indeterminacy, and unfazed by the hype of their always premature and redundant annunciation, posthuman bodies thrive in the mutual deformations of totem and taxonomy” (Halberstam and Livingston, 1995, p. 19). For the authors, the condition of posthuman is already here; “[y]ou’re not human until you’re posthuman. You were never human” (1995, p. 19). This condition implies that “that lingering nostalgia for a modernist or humanist philosophy of self and other, human and alien, normal and queer is merely the echo of a discursive battle that has already taken place” (1995, p. 19).

Braidotti situates the urgency of the posthuman on the one hand, in relation to the technological and scientific fields and disciplines and the transhumanist views that pursue the improvement of the human species and its techno-transcendence; and on the other, academia which is divided between the criticism of the notion because of the nature of the latest trend of “post” and its welcome as “possibility of a serious de-centering of ‘Man,’ the former measure of all things” (2013, p. 2). In the same line as Halberstam and Livingston, the author departs from a nature-culture continuum: “the common denominator for the posthuman condition is an assumption about the vital, self-organizing and yet non-naturalistic structure of living matter itself” (Braidotti, 2013, p. 2).

Braidotti (2017, p. 83), and Braidotti and Hlavajova (2018, p. 1) insist on marking the criticism of Man as a measured, universal, and humanist ideal of everything as the main starting points of the posthuman predicament. “Posthuman” rejects human normativity and broadens, reconfigures, rearticulates, connects, joins, and intertwines the human with the nonhuman not to create a new pan-humanity, but to generate livability and affective and material connections for a new people in a new world

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<sup>141</sup> It is not out of place to remember that the intended universality of “man” was challenged in its day, by authors such as Olympe de Gauges in her *Déclaration de droits de la femme et de la citoyenne* (1791), or Mary Wollstonecraft in *A Vindication of the Rights of Woman: with Strictures on Political and Moral Subjects* (1792). That is to say, although such a term did not exist in that moment, both feminisms challenged “man” as a synonym of human and of the subject much before Foucault, Derrida, the critics of *other* philosophers, the recent posthumanism, and the notions of posthuman and technobody.

The task of critical subjects of knowledge is to pursue the *posthuman, all-too-human* praxis of speaking truth to power and working toward the composition of planes of immanence for missing peoples, respecting the complex singularities that constitute our respective locations... The dwellers of this planet at this point in time are interconnected but also internally fractured by the classical axes of negative differentiation: class, race, gender and sexual orientations, and age and ablebodiedness continue to index access to normal humanity. This rhizomic field of *posthuman knowledges* does not aspire to a consensus about a new humanity but labors to produce a workable frame for the actualization of the many missing people, whose “minor” or nomadic knowledge is the breeding ground for possible futures. (Braidotti, 2017, p. 93, emphasis added)

The posthuman practice is a critical practice of power that denounces its problems of exclusion, yet it does not propose establishing a new unitary and closed model of the human, but embraces the functionally diverse, human-techno-animal, material, ethnic-racial, sex-gendered differences and makes possible the life of corporealities-subjectivities that are not placed in this normative and hegemonic model of the human.

Returning to the question of temporality aligned with the nonteleological concept of history with which we began this section, which Segarra also indicated, Halberstam and Livingston affirm the posthistoricity of the body: “the emergence of ‘the body’ in history, and thereby its partial reification and relativization, also opens a space for posthistorical bodies to establish themselves” (1995, pp. 1-2). This posthistoricity to which the authors allude is a non-linear temporality, not dictated by Progress, Modernity, and Man<sup>142</sup>: “History as social or chronological history is dying with the white male of western metaphysics and consequently it is no longer enough to say where we have been... Posthuman bodies do not belong to linear history” (Halberstam and Livingston, 1995 pp. 3-4). Posthuman bodies, instead, “*are of the past and future lived as present crisis*. This present, this crisis does not glide smoothly along a one-dimensional timeline but erupts or coalesces non-locally across an only partially temporizable realm of meaning” (1995, p. 4, emphasis added).

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<sup>142</sup> Non-linear temporalities are nothing new. From oriental viewpoints, for example, a circular concept of time was predominant. We find representations of cyclical temporalities in western medieval alchemist illustrations of symbols like the ouroboros –a serpent or dragon that is devouring its own tail while forming a circle with its body– already existed in ancient Egyptian and Greek cultures (Roob, 2016, pp.342-349). Cyclical temporality was also suggested by Nietzsche (2007) (1883) through the “eternal return” over one hundred years ago. For other nonteleological conceptualizations of time that move away from the idea of progress and hegemonic futurity, see Haraway (2016a) and her “thick present” through triple temporality and the eco-temporal multiplicity that is emphasized by Puig de la Bellacasa (2017).

#### 2.4.2. The anthropocentric weight of the post-*human*

For Braidotti, “[t]here is no question that contemporary feminist theory is productively posthuman” (2017, p. 85). Not all current feminist theorizing calls itself posthuman or employs the category in its theoretical development,<sup>143</sup> there are even feminisms like that of Haraway that explicitly disassociate themselves from it. This leads us to return to the etymological question of “homo.” It is precisely this necessity and relevance of making compost that brings Haraway to move away from the genealogical line of “human\*” as “homo” in order to root it in “humus” as compost, likewise distancing herself from implicit anthropocentric views or postulates in the posthuman and certain posthumanisms. Therefore, to account for the relationality of earthly materiality, Haraway again makes compost cyclical:

Etymologically, the human is rooted in *humus*. Too many tones of “human” go to *homo* – which is the “bad” direction– but then there’s “human” that goes to *humus*, which is the “good” direction... There’s being part of the making of the soil and the earth and the *humus* direction, and there’s the phallic “man” in the *homo* direction. (2016b, p.261)

The author explains tongue-in-cheek that it was her husband, Rusten who suggested: “Well, it’s not posthumanism, it’s compost!... It’s not humanities, it’s humusities. It’s *hu-mus*” (Haraway, 2016b, p. 261). In her passion for slogans, she presents a new one: “It’s Not Posthumanism, It’s Compost!” or “Not Posthumanist But Compost,” from the phrase of Beth Stephens and Annie Sprinkle “It’s Making Hot Compost! Compost Is Hot!” (2016b, pp. 228, 261-262).

Haraway, facing enmeshed patterns of planetary collapse, after planetary collapse, configured by enormous levels of chemical toxicity, mining, the drying up of rivers and lakes, simplification of ecosystems, genocide of billions of people and critters etc., had previously highlighted the need to make compost and the rejection of our posthuman condition (2015, p. 161): “I am a compost-ist, not a posthuman-ist: we are all compost, not posthuman”. She rejects posthuman. In conversation with Wolfe she goes so far as to call it “absurd” (2016b, p. 261), because in this making compost, there is no predominant species –and if there were, it would not

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<sup>143</sup> Butler, for example admits her lack of employment of the term together with the absence of reflection on such. Nevertheless, she states that “[i]t interests me, however, that Achille Mbembe voices skepticism as well, underscoring that we need to be able to talk about dehumanization and about ethics” (Butler, personal communication, January 2, 2018).

be human, rather fungal or bacterial.<sup>144</sup> Compost lies within the planetary relationality through the multiplicity of material, vegetal, animal, bacterial, fungal, mineral, clay etc. that is mutually implicated in its formation. It implies a clear shift away from anthropocentrism and other types of speciesism. It wipes out dichotomies through the fusion of the living with the nonliving. Without soil, without matter that absorbs and serves as a substrate for humus, this does not acquire true sense.

Her call for the creation of multispecies alliances and lateral twinning to “make kin” is based in the need for recuperation, regeneration, and the reconstruction of biological-technological-political-cultural shelters and inhabitable ecosystems for the finite ongoingness of life: “all earthlings are kin in the deepest sense, and it is past time to practice better care of kinds-as-assemblages (not species one at a time)... All critters share a common “flesh,” laterally, semiotically, and genealogically” (2016a, p. 55). In this task, human individualism and exceptionalism that provided the foundation for and characterized western economics, politics, and philosophies in the last three centuries are not such great thought companions, rather they are unthinkable, or invalid, and useless for thinking-with (2016a, p. 30). For Haraway, human individualism and exceptionalism are represented by the “shameful technomasculine self-caricature” of Hans Moravec and “the blissed-out techno-idiocy of people who talk about downloading human consciousness onto a chip” Haraway (2006, p. 146). In this sense, “posthuman” and “posthumanism” are still too easily reappropriated by the “chosen”: “Let’s all be posthumanists and find our next teleological evolutionary stage in some kind of transhumanist technoenhancement” (2006, p. 140). Despite acknowledging that many people classified within posthumanist thought do not perform their labour this way, the reason of their coming together lies in distancing themselves from posthumanism. In this sense, Haraway refers to “‘Cyborg Manifesto’ and *Companion Species Manifesto* (2003) as bookends around an interrogation of relationalities where species are in question and where posthuman is misleading” (2006, p. 140). From the view of relationality, “posthuman” seems too restrictive for Haraway.

Segarra, however, postulates another productive sense of the post of “posthuman”:

Finally the sense that I add to this in relation to “la poste” in French, the post which Derrida develops in *La Carte postale*, and relates to destinerrancy as the deconstruction and broadening of the

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<sup>144</sup> Bacteria have lived on the face of the earth for millions of years. Thanks to their adaption capacity, it is probable that they will continue to do so, if the planet lasts that long. Bacteria directly brought into question human supremacy and the terms in which we understand intelligence as a superior quality to matter. “[F]rom the start the greatest planetary terraformers (and reformers) of all have been and still are bacteria and their kin, also in inter/intra-action of myriad kinds (including with people and their practices, technological and otherwise)” (Haraway, 2015, p. 159).

“two” (in in *La Carte postale* the two people implicated in correspondence and in a romantic relation. (personal communication, 15 October 2017)<sup>145</sup>

Then the “posthuman” through “post” understood as destinerrancy would indicate never coming to being (completely) human, from the possibility of never arriving at its destination as a starting point, “adestination as a principle of post, hidden in the security of mail, in the efficiency of the post, of the postal process... Destruction and death lie in wait for and address any sent item (López Bernal, 2015, p. 194).<sup>146</sup> In *La Carte postale de Socrate à Freud et au-delà* (1980), Derrida reviews the seminary of Lacan (1989, pp. 5-58) on *The Purloined Letter*, by Edgar Allan Poe (1999) (1844) and, in contrast with the lacanian analysis, proposes destinerrancy as a condition of “envoi” (sending). Together with adestination, there is the condition of exteriority, otherness, of never belonging to oneself and always belonging to some other place, which is another aspect for which post is able to account. The permanently posed question of identity –the identity of the human for oneself– is always different from oneself, already divided, misaligned, dislocated, and exteriorized.

Departing from a nature-culture continuum, Braidotti (2013, p. 2), and Braidotti and Hlavajova in their *Posthuman Glossary* (2018, p. 8) propose the posthuman to account for our becoming animal and technological. The animal becoming disintegrates the version of Man as a “rational animal” and challenges the narrative of the superiority of the human conscience as a tool of survival and relation with the environment and other corporealities (Braidotti, 2002, p. 136). As we have previously indicated, one of the directions of the posthuman is also deployed toward animality and zoological multiplicity in Halberstam and Livingston (1995, pp. 3, 13, 16). Coupled with posthumanism, which implicates the questioning of Man as a means of everything, another of the two streams that converge in what Braidotti calls “posthuman critical enquiry,” “posthuman thought,” or “critical posthuman knowledges” (2017, pp. 83-84) is postanthropocentrism, understood as “critical” (Braidotti & Hlavajova, 2018, p. 1) or “negation” (Braidotti, 2017, p. 83) of the hierarchy of species.

However, despite Braidotti’s courageous emphasis on the multiplicity of becomings and of her concept of “Earth-others” (2002, pp. 138, 174, 261), of the interesting notion of the “geo-

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<sup>145</sup> I would like to thank Marta Segarra for her availability, close contact, and generosity at the time of initiating conversation and correspondence concerning the concepts of “posthuman,” “posthuman body,” and “technobody,” although it is true that some matters remain to be specified. Original text: “Finalmente, el sentido que le añado yo está en relación con “la poste” en francés, lo postal, que Derrida desarrolla en *La Carte postale*, y que tiene que ver con la “destinerrancia” en tanto que deconstrucción y apertura del “dos” (en *La Carte postale*, las dos personas implicadas en la correspondencia y en la relación amorosa)”.

<sup>146</sup>Original text: “[I]a adestinación, como principio postal, oculto en la seguridad del correo, en la eficacia del correo, del proceso postal (...) La destrucción y la muerte acechan y destinan cualquier envío”.

hydro-solar-bio-techno-politics,” or the inclusion of “other vegetal, animal and terrestrial species” (Braidotti & Hlavajova, 2018, p. 2) in the field of posthumanities, the posthuman and even the “nonhuman” have difficulties escaping anthropocentrism. The problem with “the spirit of this dislocation of the centrality of the human, in favor of the post-human” (Braidotti, 2002, p. 137) is that it does not succeed in overcoming its anthropocentric traits and decentering the human; rather, it reproduces this centrality in its very nominal structure, pivoting once again around the human. As Hayward and Weinstein indicate, “posthuman” as well as “Anthropocene” inadvertently reaffirm human primacy in their efforts to challenge human domination. Braidotti and Hlavajova themselves make this criticism theirs in the introduction of their glossary, “who are ‘we’ exactly? In some ways the continuous emphasis on a general idea of the posthuman and the Anthropocene... becomes yet another way of perpetuating a narcissistic form of anthropocentrism” (2018, p. 11). The authors add another objection to their idea of the posthuman, which would contrast with the aforementioned ambition of moving away from the creation of a new humanity or pan-humanity, the risk that “by creating a new sense and image of panhuman interconnection, it may actually erase categorical differences, structural injustices and disparities in access to natural and constructed resources” (Braidotti & Hlavajova, 2018, p. 11).

On the other hand, Braidotti and Hlavajova conceive postanthropocentrism as the criticism or the negation of the hierarchy of species. However, this neither wanes in anthropocentrism nor postanthropocentrism. “Posthuman” in itself presents inherent difficulties escaping from anthropocentrism, let alone gathering negation or criticism of speciesism and moving it. This challenge is augmented in the attempt to account for “[t]he monistic, ecosophical, and *geocentered* turn” (Braidotti, 2012, p. 90). Nevertheless, the term “humanimals” proposed by Braidotti in “Critical Posthuman Knowledges” (2017, p. 86) seems to reflect one of the elements of which the author aims to inform through her idea of posthuman, human animality. A term that combines the animal in addition to the human with its technological feature is “technoanimal,” therefore embracing the two principle lines deployed in the posthuman for Braidotti.<sup>147</sup>

These terms and those previously mentioned are examples of the terminological profusion that emanates from the proliferation of the posthumanities or posthuman interdisciplinarity to which we allude, as well as “Tranimalities.” Hayward and Chen pave

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<sup>147</sup> Braidotti and Hlavajova compile “technoanimalism” in their glossary, from Rick Dolphijn and Tove Kjellmark. This concept makes us reflect specifically through art regarding the way in which animality and technologicity are questioning and changing our form of understanding the human, “giving rise to another type of animality... another type of nature but above all very delicately playing the affects of the involved audience” (Dolphijn & Kjellmark, 2018, p. 424). Regarding “technoanimalism” see Kjellmark (2020).

“tranimalities” “in an effort to think about how transitions, transformations, and other kinds of trans becomings are shaped by species: in sum, that trans itself is a species technology and is always involved with nonhumans” (Hayward, 2015, p. 320). The trans\* women\* that ingest Premarin®, for example, are types of tranimalities for Hayward. Departing from the new open possibilities of thought after the criticism of humanist anthropocentrism, “tranimalities” consist of “to attend to how... [to] entangle and enmesh trans\* and animals in a generative (if also corrosive) tension leading to alternate ways of envisioning futures of embodiment, aesthetics, biopolitics, climates, and ethics” (Hayward & Weinstein, 2015, p. 201). This can bring with it “important articulations of species, gender, human, and transness in ways that allow environmental studies, animal studies, and transgender studies to account more deeply for their sometimes implicitly mutually enacted politics” (Hayward, 2015, p. 321).<sup>148</sup>

Stepping from an animal focus to a space focus, Ferrando situates the (post)human in relation to outer space. In “Why Space Migration Must Be Posthuman,” the author argues for the urgent need to adopt a posthuman perspective in space migration in a proposal in which,<sup>149</sup> as she herself notes, the dynamics of space migration are analyzed through the reconciliation of posthumanism, transhumanism and the new materialism among others. (2016, p. 319). According to Ferrando, the Latin root, “*humus*” of the word “human” means “soil,” which can only be found on planet Earth in our solar system: “We can thus see migrating to space as the linguistic and semiotic step towards the literal creation of post-humans, that is, beings “post” (Latin for “behind” and “after”) their earthly provenance” (2016, p. 138).<sup>150</sup>

The author moves away from the notion of “space colonialization” “since the notion of “colonialism” is embedded in historical contexts and discriminatory policies which have been rigorously analyzed and criticized within the field of Post-Colonial Studies,” toward “space

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<sup>148</sup> When Hayward interviews Chen in the number “Tranimalities” of *Transgender Studies Quarterly*, Chen employs a new term, “transplantimalities,” along the lines of Premarin®, to account for the claim that some organ donor recipients inexplicably feel similar things to those of their donors, giving rise to a possible feeling that exceeds humanity in a transplant of trans-species organs (Hayward, 2015, p. 321).

<sup>149</sup> The terminological use of Ferrando generates confusion. On one hand, she speaks of “posthuman perspective,” which would be aligned with a “posthumanist sensitivity,” that is to say, overcoming dualist thought (2016, p. 138). She also employs the “philosophical landscape of the posthuman,” through which she alludes to posthumanism, transhumanism, and materialism (2016, p. 139). On the other, she speaks of “posthumans” as inhabitants that are no longer from planet Earth but from other places in the universe and of the “posthumanities” as populations that are married to humans yet distinct from them (2016, p. 144). From all this, it can be derived that both current humans and future populations are posthuman. In this case, the title is not completely understood: “Why space migration *must* be posthuman,” if we are already posthuman. In fact, when arguing this need at the end of this article, she employs the term “posthumanist” and not “posthuman” (2016, p. 149).

<sup>150</sup> While Haraway situates the etymological origin of humans in “*humus*” to overcome the exceptionality and superiority of humans, Ferrando notes the supposed terrestrial exceptionality of this origin—in truth, we do not know if something similar to earth as humus exists on other planets in the universe—and proposes “posthuman” to overcome this.

migration,” and also affirms doing the same with the typical utilitarian idea of the universe as a resource (2016, p. 138). For Ferrando, in the sense that Heidegger lends to technology (1977 [1953], pp. 11-12), space migration becomes “a way of revealing,” a means of understanding outer space (2016, pp. 139, 148).

Ferrando notes the necessity of overcoming the dichotomic articulation of the relation of planet Earth and of humans with the rest of outer space. To accomplish this, in addition to “posthuman” terminology, she employs various illustrative examples. Beginning with our historic existence on Earth as one of the planets that make up the solar system, situated among many others in the galaxy called the “Milky Way,” the author emphasizes the means in which ancient cultures and civilizations have understood outer space as an integral part of human genealogy and have based their own development in the cosmos (2016, p. 139). The increasing space debris and its virile harm to both space apparatuses outside of Earth and terrestrial technocorporealities is another one of the interesting examples.

In her argument in favor of a posthuman space migration, Ferrando analyzes the space voyages that have occurred until now. Although she indicates the discrimination of race, sex-gender, and sexuality on which both the narratives and practices of space exploration have been built, she states that the “space race” has generated a loss of ontological human primacy and challenged ontological human anthropocentric primacy (2016, p. 149). This apparent challenge of anthropocentric ontological human primacy is sustained with the example of previously sending nonhuman animals and robots to extraterrestrial space and the main aptitude of the latter to survive in it (2016, p. 148). However, the disappearance of ontological purity and the blurring of limits between living and nonliving does not mean that there are no hierarchies between different types of posthuman assemblages and fusions, nor that this sending had not been undertaken from a utilitarian anthropocentric view. Neither sending the dog Laika, knowing full well that she would die, or Belka and Strelka –among many other dogs sent– together with a rabbit, mice, rats, fruit flies, plants, fungi, and bacteria that did have a return trip, or the interesting phenomenon of “extended identity” generated through the connection of robotic explorers on Mars and terrestrial human monitoring<sup>151</sup> succeed in accounting for a distancing from anthropocentrism. Destabilizing anthropocentrism does not solely require blurring ontological limits, but modifying our position within relationality; in other words, the

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<sup>151</sup> Extended identity consists of an experience that is similar to virtual reality, with the exception that the robot that transmits images is physically on Mars, that said, from an immense distance in respect to its human assembly. The researcher on Earth visualizes what is recorded and transmitted by the robot and generates sensations, feelings, and experiences that verbalize it first-hand (Ferrando, 2016, p. 142). Another form of extended identity is the use of first-person plural to refer to the entire human team working from Earth when describing the actions of the robot on Mars.



questioning of our exceptionality does not necessarily mean the alteration of our superiority. Considering that Ferrando's analysis of space exploration is still full of anthropocentrism and discrimination and intra-human privileges, one could wonder how it is that these domination relations will not be reproduced in our futures and hypothetical stellar voyages and settlements on other planets with other bodies and populations despite and beyond the "Outer Space Treaty" of 1967.<sup>152</sup>

On the other hand, in the introduction, Ferrando critically analyzes the history of humans in space from discriminatory practices like sexism, racism, and anthropocentrism (2016, p. 137). In this sense, it seems the less interesting the very elements that serve to criticize the inherent anthropocentrism of the space race, such sending nonhuman animals to space, are those that are employed precisely to substantiate the loss of ontological human anthropocentric primacy, unless what is considered anthropocentric is not sending in itself, but sending without returning (2016, p. 149).

Moving away from dichotomic essentialisms, a third element to which Ferrando alludes in order to declare the hypothetical future loss of in favor of the posthuman is

the search for alien life and the possibility of creating hybrids and chimeras between human animals and non-human animals, who may be better fitted to live on planets other than Earth, with all the bioethical concerns that crossing such species boundaries may raise. (2016, pp. 148-149)

Here the author makes reference to two distinct questions that require specification. On the one hand, the possibility of finding life on these space missions could be an opportunity to destabilize anthropocentrism, which would depend on our approximation to it; on the other, the genetic hybridization of the human animal and the nonhuman animal could, in the future, generate something different from the human which Ferrando calls "posthumanities, future generations of beings evolutionarily related to the human species but no longer definable as such" (2016, p. 144). This could mean the loss of human supremacy, which alone does not imply the questioning of the position of centrality and superiority of the new condition that we could identify as "posthuman centrism" either.

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<sup>152</sup> This treaty signed by 104 countries represents a legal framework for space activity. For Ferrando, this is a "giant step" because despite its anthropocentric base, as it establishes the benefit and satisfaction of the interests of humanity as the objective of space exploration, she indicates the non-violent purpose of space exploration and the duty to avoid "harmful" pollution in outer space, which does not seem to include space debris (2016, p. 147). In addition to the anthropocentric foundation, it conceptualizes the universe as a resource for humanity. On the other hand, pacific ends could be altered as soon as human interests and their *use* of space threatened.

Ferrando succeeds in destabilizing anthropocentrism through suggestive elements such as the “overview effect”: the feeling of insignificance that overwhelms astronauts observing Earth from their orbit or perceiving the smallness of Earth from the moon (2016, pp. 147-148). The possibility of overcoming Earth-centrism is also bravely posed through the hypothetical interplanetary connection or population of other planets (2016, pp. 149-150). However, such a possibility seems to remain inadvertently trapped in the Earth-centric and bio-centric webs of this very proposal, namely in terrestrial exceptionalism –which she herself recognizes, has to do with the multiplicity and complexity of the life that it hosts<sup>153</sup>– when affirming the unidirectionality of the benefits of this relation, which is reminiscent of the longstanding evangelical and humanizing *missions* on planet Earth<sup>154</sup>: “Space pragmatics should be revised... expanding the beneficial vision of space exploration and space migration, from humans and Earth, to nonhuman beings and nonhuman agents, including other planets, stars, natural satellites and asteroids, approaching outer space under specific environmental regulations” (Ferrando, 2016, p. 149).

Ferrando subversively eludes biocentrism in the sense of “life as a measure or reference of things” in her criticism of the Statement on the Environmental Impact (PEIS) from NASA in 2008. According to the author, this considers its environmental impact of space technology on Earth, “but it does not acknowledge its impact on other celestial bodies, such as the Moon or other planets of the Solar system” (2016, p. 145). Regarding the opening of the space market and the irreversible possibility of the consequences of our actions, the author states that “[s]pace technology and space-based human activity shall be analyzed from a view which takes into account their effects not only on humans and on Earth, but on outer space as well” (2016, pp. 145-146). The necessity for reflection “on the possible astro-ecological impacts of Moon mining, or of terraforming in Mars, on the balance of the solar system and, eventually, on their orbits” is further accentuated by the acknowledgement of the agency of planets, stars, and asteroids (Ferrando, 2016, p. 146).

Ferrando proposes outer space as “a literal and physical place beyond anthropocentrism, Earth-centrism, biocentrism and life-centrism” (2016, p. 149). In this sense, rather than representing a place that is absolutely exempt or above said discriminations, outer space is an opportunity; it appears as a (new) possibility to generate relations that destabilize anthropocentrism, biocentrism, and terracentrism. As the author indicates, “these discriminatory

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<sup>153</sup> In fact, Ferrando is the first in signaling the view that affirms the special nature of the Earth as problematic based on the biocentric assumption of the abundance of life that it shelters (2016, p. 146).

<sup>154</sup> Ferrando also commonly employs the word “mission” to refer to voyages in space.

categories are reappearing in human activities and pragmatics in space: this is why space is crucial to Posthumanism as much as Posthumanism is necessary to space” (2016, p. 149). For Ferrando, the importance of adopting a posthumanist standpoint in space migration resides in “to manifest, instead of old habits and new wars, desirable futures for humans and non-humans alike” (2016, p. 149). Nevertheless, although Ferrando’s posthuman or posthumanist approach on occasion presents a radically transforming feature that succeeds in challenging terracentrism, biocentrism, and anthropocentrism, among others, as we have shown, this challenge is compromised.

In this section, we have examined various proposals that postulate the “posthuman” to provide an account for our new position within material relationality (Halberstam & Livingston, 1995; Braidotti, 2002, 2013, 2017; Braidotti & Hlavajova, 2018) and we have confirmed the difficulty presented by the very notion to reflect postanthropocentrism, the end of human superiority, and the overcoming or distancing of the human as a measure and reference of things. The proposal from Ferrando that conceptualizes “posthuman” from a cosmic view as originating beyond Earth creates an exception that succeeds in eluding not only anthropocentrism, but also terracentrism and biocentrism on occasion.

Facing this difficulty of moving away from human-centrism, we propose “technobody” as a better option to account for our relational co-constitution immersed in immense material interweaving. In contrast with “posthuman,” “technobody” does not depart from nor revolve around the notion of “human,” but the notion of “body,” rooted in the long and prolific feminist tradition that has highlighted the relevance of bodies.

Articulating on the subject of corporeality permits “technobody” to gather and inform of this material *kin* Haraway discusses, of this lateral, semiotic, and genealogic sharing of the same “flesh”: we are all technobodies and we are all on the same ontological level. However, it is a notion that does not homogenize, which in itself nominally accounts for our common and shared constitution; it gives space, recognizes, raises awareness, and embraces differences. “Technobody” is a multiple concept which accounts for multiplicities. In this way, we can speak of horse, elephant, bacterial, fungal, human, cat, animal, human animal, dog, vegetative, fluvial, clay,<sup>155</sup> atmospheric, cosmic or space,<sup>156</sup> terrestrial, mineral,<sup>157</sup> jungle, or oceanic technobodies.

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<sup>155</sup> Xenoestrogenized bacteria can inhabit clay, for example.

<sup>156</sup> A manned spaceship or a spaceship with diverse technocorporealities inside could also be considered a technobody. The extraterrestrial habitat of the International Space Station for example, presents a bacterial ecosystem, where bacteria can even be found on its surface or exterior (González, Pitre & Brereton, 2019).

<sup>157</sup> There are microorganisms that feed off of iron, like the bacteria *Acidithiobacillus ferrooxidans* or *Leptospirillum ferrooxidans*, or off of Sulphur such as *Desulfuromonas* or *Pseudomonas*, also present in sulphides such bornite, pyrite, or chalcopyrite (Bevilaqua et al., 2009), that can likewise be found coated with

“Technobody” verbally generates *kin*, creating lateral twinning. The absence of nominal inequalities among animal, vegetative, fungal, bacterial, archaea, and protistan –or whatever may be the category depending on the taxonomy that we employ– make “technobody” a better option to destabilize not only anthropocentrism, but also speciesism. From an intra-human view, we can also speak of trans\* technobodies, queer technobodies, female technobodies, lesbian technobodies, androgynous technobodies, women\* technobodies, migrant technobodies, functionally diverse technobodies, etc.

Nevertheless, not all is a technobody. The concept also presents limitations, but of a permeable nature which is open to change and transformation. We have defined “technobody” as a technologically-organically-discursively-materially co-constituted body. In order to be able to speak of technobodies, these four dimensions must be present. The main objective of the concept is to account for the shaping of bodies, chiefly sex-gendered in the neoliberal Capitalocene, placing special emphasis on human sex-gendered co-constitution. To do so, the notion directly points toward hormones and/or xenoestrogens as relevant technological elements in addition to molecular fusion as one of the significant modes of relation-in-becoming that these bodies share in this historic moment.

Apart from the tridimensional blurring of the limits of the *Cyborg Manifesto*, among the technological-organic-discursive, “technobody” adds “material” as a fourth dimension with the aim of accounting for material elements that cannot be classified as organic or technological according to the traditional use of the term. In this stress on the belief in the common and shared materiality of the bodies that inhabit Earth, and those that possibly inhabit the vast expanse beyond the extraterrestrial, there is an explicit desire to distance ourselves from transhumanist discourses. “Technobody” speaks of *another* type of materiality of bodies in addition to those that are exclusively technological, of *another* type of corporeality beyond that of the cybernetic or virtual. Entwined, mixed, and entangled organicity enables the consideration of certain differences that are relevant on our planet and for the shaping of our sex-genders and sexualities. For example, it permits the differentiation between cyberbodies and technobodies, or between

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xenoestrogen. Moreover, Sulphur, has been used as a fungicide and as an endocrine disruptor. The archaea, *Ferroplasma acidiphilum*, which feeds off of iron, was found on a bioreactor fueled with pyrite in Tula, Rusia (Golyshina et al., 2000). Given that it survives on sulphuric acid, it has been postulated as a possible common ancestor of the organisms of the Earth (Ferrer, Golyshina, Beloqui, Golyshin & Timmis, 2007).

robots and technobodies in the way that we understand it here<sup>158</sup> because neither cyberbodies, robots, nor their sex-genders are necessarily hormonally co-constituted.<sup>159</sup>

The distinction between the organic and nonorganic, or life and nonlife is problematic.<sup>160</sup> Nevertheless, it becomes difficult to elude when the objective is to account for the co-constitution of the sex-gender of technobodies because, at least on earth, sex-gendering only comprises the living, in addition to robots, which although they could be considered technobodies because of their fungal and bacterial life,<sup>161</sup> do not present a hormonal sex-gender configuration as we have indicated. Even in toxicity, xenoestrogenicity is measured as having a reference of life, the damage or disturbances that generate the distinct elements or functions of life and the capacity that different technobodies have or not to adapt themselves to certain levels of toxicity through mutations or other mechanisms.

In this way, technobody comes into organicity as one of its limits and conditions of possibility. Therefore, as we have indicated in the introduction, it is a proposal aware of its limits and biocentrism. Nevertheless, hormones are also social inventions, technoscientific devices, and products from the market that point toward organicity, but from their interweaving with the technological, the discursive, and the material. According to Frank White, who coined the expression “overview effect,” “mental processes and views of life cannot be separated from physical location” (1998, p. 1, cited in Ferrando, 2016, p. 148). It may be that another space positioning would unravel the knot of the distinction between organic and inorganic, but the differential specificity of this particularly hormonal entanglement implies a concept of technobody that is technological-organic-discursive-material. Despite its biocentrism, “technobody” succeeds in timidly and nominally overcoming earth-centrism through the

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<sup>158</sup> We are not denying that cyberbodies can be conceptualized as technobodies. Rather, we are indicating that our conceptualization of “technobody” is distanced from “cybercorporeality” for the reasons stated.

<sup>159</sup> Regarding the impact of realism of sexual robots that are sex-gendered as female, genitals included, see DS Doll Robotics (2020).

<sup>160</sup> One of the problems is the origin of life. If life originated from inorganic elements, there would not be a dichotomic distinction, rather it would be a gradual matter. In this sense, although there are theories that are more widely accepted than others, there is no unified theory on how life originated. Another one of the difficulties has to do with the slippery nature of life, that is, with the criteria used to distinguish the living from the nonliving such as possessing reproductive ability or a genome. Viruses are a challenge for this distinction because, they may well have a genome, but not reproductive ability (Ferrando, 2016, p. 146; Centeno, 2018), while prions do have this, but lack genetic material (Centeno, 2018). Crystals also reproduce, but are not considered organic. There are other criteria such as the reaction of stimuli, which are also problematic (Centeno, 2018). The problem of the living is, therefore, a complex problem that would imply another Doctoral Thesis itself. What is relevant here is to account for the intrinsic problem of the distinction between living and non-living, the possibility and desirability of articulating this distinction without dichotomy and showing the reasons that lead us to embrace this problem in relation to the limits of the concept of “technobody”.

<sup>161</sup> Bacteria have been found on technological devices such as mobile phones (Meadow, Altrichter & Green, 2014).

previously indicated forms of cosmic broadening and possibly in other ways that are yet to be discovered.

Derrida also indicates this difficulty in presenting the difference between the living and nonliving in relation to the question of subjectivity. When questioned by Jean-Luc Nancy regarding the reason to restrict subjectivity to the animal, he states that

[n]othing should be excluded. I said “animal” for the sake of convenience and to use as a reference which is as classical as it is dogmatic. The difference between “animal” and “vegetal” also remains problematic. Of course the relation to self in exappropriation is radically different (and that’s why it is a thinking of difference and not of opposition) in the case of what one calls the “nonliving”, the “vegetal”, the “animal”, “man”, or “God”. The question also comes back to the difference between living and nonliving. (Derrida, (2005) [1989]).

In this sense, despite the reference to life or organicity as a measure or ultimate reference of things, “technobody” does not dichotomically articulate the relation between organicity and nonorganicity. Two constitutive elements of the concept that accompany it in this task are the multiple transgression or shaping of the traditional division between individual and community,<sup>162</sup> and the idea of relational becoming, whose joint action implies an open and changing configuration of the limits of the concept through a process of rewriting and reinscription. For example, the xenoestrogenicity that reaches the waters of the ocean spreads and multiplies to the technobodies that inhabit it so that fish, bivalves, whales, seals, or phytoplankton come to be technobodies, reinscribed in the concept. In this process of relational becoming, the concept is rewritten multiply: oceanic technobody, cetacean technobody, seal technobody, fish technobody. One or various xenoestrogenic elements come to constitute a technocorporeality that through a process of interaction shapes new technobodies. The ocean is thus composed of an immense quantity of technobodies that convert the ocean into a greater

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<sup>162</sup> Halberstam proposes animated films as a place from which to contemplate collectives, transformation, animality, and posthumanity. In this use of the term “posthumanity,” there is direct questioning of liberal individualism and a transgressing articulation of the traditional limits between individual and collective: “Most animated films for children are anti-humanist, antinormative, multigendered, and full of wild forms of sociality. Their anti-humanism springs from both the predominance of nonhuman creatures and the refusal of individualism” (2011, p. 181). According to Halberstam, films such as *Finding Nemo* (2003), which deal with the conscience as well as oceanic alliances, and in which the motion of water is simulated through logarithms, *A Bug’s Life* (1998), in which a multitudinous organism created through cinematographic techniques like Computer Generated Imagery (CGI) represents the colony of ants, or *Kung Fu Panda* (2008), which shows the kinship among different species, reinforcing the narrative of interconnection and community in the face of liberal individualism and atomism (2011, p. 184). In the case of *A Bug’s Life*, the organism is the entire colony, not the individual. Through animation techniques, the team models the behavior and movement of the masses which is treated as a character in the film.

technobody. This way, in addition to oceanic technobodies, we would speak of technobodies that are geological, desert, atmospheric, fluvial, jungle, etc.

### 2.4.3. The posthuman's technological heart

The third direction in which posthuman is deployed is technological. "Posthuman" harbors and points at the centrality of the technological in our and more-than-our corporeal structure. From here some authors employ "posthuman" and "technobody" as interchangeable terms. On occasion this is done subsumptionally, that is, technobodies as part of the posthuman, and on others, as synonyms.

Within what Braidotti refers to as "*Toward the post-human*" (2002, p. 136), specifically in this "becoming-animal of humans," she states that –as Haraway (1985, 1991, 1997) did previously– primates, oncomouse, "and other experimental animals and insects (such as the fruit-fly); dogs and other genetically recombined 'pets' are the fodder for the bio-tech laboratories which construct contemporary *techno-bodies*. Multiple four legged clones, or silicon-pumped Dollys crowd our social horizon" (Braidotti, 2002, p. 138, emphasis added). To account for these borders erected between animality-humanity-technologicity, Braidotti employs the concepts "technobody" and "posthuman body" (2002, p. 228). Such is the importance that she concedes to *technology* in this transgression of limits, in this hybridization, in this becoming not only human, but also animal techno-body, and in the constitution of the very concept *posthuman* she comes to state that

The blurring of these categorical divides between self and others creates a sort of heteroglossia of the species, a colossal hybridization. Technology is at the heart of this process which combines monsters, insects and machines into a powerfully post-human approach to what we used to call 'the body'. To say that identity, sexuality and the body are transformed by this is at best an understatement (2002, p. 214).

For Braidotti, many are the examples that show the centrality of the human and nonhuman animal becoming machine-like and technological in the definition of the meaning of "posthuman": "Art as well as technology plays a role in this *techno-redefinition* of subjectivity in a decidedly *post-human* mode" (2002, p. 253, emphasis added). In reference to the insect aspect, for example, she states "I would situate it rather on the horizon of the '*post-human*,' in closer

connection to the *technological* than to the actual animal ‘kingdom’” (2002, p. 150, emphasis added). Or:

the post-human... is shot through with technologically mediated social relations. It has undergone a meta(l)morphosis and is now positioned in the spaces in between the traditional dichotomies, including the body-machine binary opposition. In other words, it has become historically, scientifically and culturally impossible to distinguish bodies from their technologically-mediated extensions. (2002, p. 228)

We find another example of this technological importance in her description of an artistic performance from the *De la Guarda Company* in London in which “two artists hanging on a bungee-jumping rope were walking horizontally across the side-walls like super-fit performers,” artists that are referred as “real bodies, muscular and post-human,” from which Braidotti concludes that “this was the triumph of the *technobody*” (2002, p. 269, emphasis added).

Under the subheading “Technobodies in the social-cyber space,” referring to Balsamo, (1993),<sup>163</sup> Braidotti asserts, “[a]ll cyborgs, the majority as well as the minoritarian ones, inhabit a *post-human body*, that is to say an artificially reconstructed body” (2002, p. 244, emphasis added).<sup>164</sup> Admittedly, the constant Balsamian insistence on the materiality of technobodies also includes posthuman bodies: “Kroker’s theory of the ‘disappearing’ body notwithstanding, the material body remains a constant factor of the postmodern, post-human condition” (Balsamo, 1995, p. 220). Together with materiality, the sexed-gendered, racialized, etc., configuration of technobodies is another key feature that Balsamo defends throughout her problematization of idealist techno transhumanist discourse and approaches. This recognition of the materiality of sex-gendering, racialization, etc. of bodies is also extended to posthuman identity: “[i]n different ways then and with different political inflections, the novel reasserts that gender and race are critical elements of post-human identity” (1995, p. 223). The same occurs with her criticism of the uniforming hegemonic cultural logic of the multiplicity of “techno-bodies” and of “technological postmodern embodiments”: “that there is no singular form of postmodern embodiment, and... ‘disappearing body’ is not a posthuman body-without-gender” (1995, p. 233).

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<sup>163</sup> This reference from Balsamo does not appear in the bibliography of the book by Braidotti, therefore, it is either an error and Braidotti refers to one of the two works that are referenced in the bibliography or she forgot to include it in the final bibliography (Balsamo has articles from 1993).

<sup>164</sup> The references to this posthuman corporeality are repeated: “posthuman embodiment” (2002, pp. 235, 245), “post-human bodies” (2002, p. 247).



Braidotti sets out and makes the conclusions of Livingston and Halberstam her own, for whom “[t]he *posthuman* body is a technology, a screen, a projected image; it is a body under the sign of AIDS, a contaminated body, a deadly body, a *techno-body*; it is, as we shall see, a queer body” (1995, p. 3, emphasis added). As we observed, these two authors establish a synonymy between “posthuman body” and “techno-body,” immediately highlighting technology as a main element in the posthuman constitution of bodies: “[t]he relation between the *posthuman* and the postmodern in a Zoo TV society relies on a *new technological order with the body* at its helm and a troubling relationship to history” (1995, p. 3, emphasis added). Furthermore, it is technology that queers the body: “Technologies that remake the body also permeate and mediate our relations to the “real”: the real is literally unimaginable or only imaginable within a technological society: technology makes the body queer, fragments it, frames it, cuts it, transforms desire” (1995, p. 16).

In a stroke of sheer theoretical luck that gathers our differing strands of the small genealogical elucidation of technobody that we have drawn in this chapter –from body modification practices such as tattoos and piercings from the hand of Pitts, to the cyborg of Clynes and Kline, and later Haraway, sex-gender changes by means of the ingestions of testosterone from Preciado, etc.–, Halberstam and Livingston equip this concept with legitimacy, meaning, pertinence, and suitability especially in relation to the body, its sexuality(ies) and its sex(es)-gender(s):

What comes after the human is not another stage of evolution but a difference in kind. How is your body changing in kind? In small ways: I had my ear pierced (the topology of my body is changing; there’s another hole all the way through it; my body is the earring of my earring). I got a tattoo (I participate in the cultural marking of my body). In other ways: it is changing its gender or its sexuality; that is, my sexual practices are re-configuring my body. I am becoming variously cyborgized (re-integrated with machine parts or across various networks). It is changing its dimensions, not by getting smaller or larger, but by being rhythmized across different sets of relations. (1995, p. 18)

Time and time again, Catherine Hayles, in her classic, *How We Became Posthuman*, cites the lack of division of matter and information in the materiality of information, as well as in the importance of the body in contrast with certain views that conceive it as a mere support for the conscience,<sup>165</sup> which condenses thousands of years of evolutionary history: “As I have repeatedly argued, human being is first of all embodied being” (1999, p. 283). For Hayles there is no division between the body and the subjectivity that inhabits the virtual space, only an

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<sup>165</sup> Hayles explicitly criticizes the approaches of Moravec (1999, p.286).

“extending embodied awareness in highly specific, local, and material ways that would be impossible without electronic prosthesis” (1999, p. 291).<sup>166</sup>

For Hayles, the posthuman does not emerge as the end of humanity, but as a new idea of the human that implies the end of “a conception that may have applied, at best, to that fraction of humanity who had the wealth, power, and leisure to conceptualize themselves as autonomous beings exercising their will through individual agency and choice” (1999, p. 286). This new conception is mainly deployed in two directions: the new human relation with the technological, in this case communication and information technologies, and digital technology, and the overcoming of the notion of the liberal humanist subject, namely, the free and autonomous individual<sup>167</sup>:

I understand human and posthuman to be historically specific constructions that emerge from different configurations of embodiment, technology, and culture. My reference point for the human is the tradition of liberal humanism; the posthuman appears when computation rather than possessive individualism is taken as the ground of being, a move that allows the posthuman to be seamlessly articulated with intelligent machines. (1999, p. 34)

For Hayles, the posthuman appears as an opportunity to conceptualize ourselves and connect with each other and our surroundings in another way, placing special emphasis on the articulations of humans with intelligent machines. Yet this opportunity will depend on the use we employ. Therefore, facing the teleological narrative of the conscience that is in charge and the imperialist desire of domination of nature through free will, the posthuman perspective indicates “the emergent processes through which consciousness, the organism, and the environment are constituted” (Hayles, 1999, p. 288). This posthuman perspective is configured through the replacement of objectivism with reflexive epistemology; through the substitution of free will for distributed cognition, namely, the human as part of a distributed cognitive system, “in which “thinking” is done by both human and nonhuman actors” (Hayles, 1999, p. 290); and by means of the pace of the teleological idea of domination and control of nature as the ends or destination

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<sup>166</sup> Through the concept of “extended identity,” Ferrando offers us an interesting reflection on the (in)divisibility between bodies and the subjectivity they inhabit, in this case, not the virtual space, but outer space and terrestrial space, in other words, regarding “extended embodied awareness” and the assembly of the body with technological prosthetics. The author employs this notion to designate the assembly of the scientists that operate on Mars from Earth through robots (2016, p. 142).

<sup>167</sup> The idea of an independent and self-sufficient individual as a political subject of both (neo)liberalists and leftists has been widely problematized by numerous feminist approaches of varying degree (Margulis, 1999; Fausto-Sterling, 2000, 2003; Butler, 2004b, 2009; Dupré, 2014, 2015; Pérez Orozco, 2016; Puig de al Bellacasa, 2017; Haraway, 2016a, 2016b) that have given rise to our relationality, vulnerability, precariousness, and constitutive interdependence –and that of countless planetary corporealities.

of the liberal humanist subject, to the collaboration among humans and intelligent machines (Hayles, 1999, p. 288). Hayles understands subjectivity as “emergent rather than given, distributed rather than located solely in consciousness, emerging from and integrated into a chaotic rather than occupying a position of mastery and control” (1999, p. 291).<sup>168</sup>

Two examples of posthuman bodies that Dijana Jelača (2018) calls “cinema’s posthuman women” in her interesting and complex analysis are found in *Ex Machina* (Macdonald & Reich, 2015) and *Under the Skin* (Wechsler & Wilson, 2013). In the first, Alicia Vikander breathes life into an android with artificial intelligence and in the second, Scarlett Johansson does so as an extraterrestrial alien disguised as a woman. The alien which Johansson brings to life comes to Earth and is disguised in the flesh and skin of a woman that is found dead –it is not clear how she died–, acquiring an attractive feminine physical appearance. Vikander plays Ava, a robot of artificial intelligence, created by Nathan, the founder of Blue Book –a major Internet search engine–. Ava is a technological replica of a human woman: from her facial and corporeal morphology, to her hole full of sensors capable of generating pleasure imitating a vagina.

Although Jelača conceptualizes both bodies as posthuman, we will focus our attention on Ava, because we do not know the composition of the corporeal configuration of the alien. Ava is an android<sup>169</sup> whom the author confers certain organicity: “with little to no skin covering her body, except for the face, and with transparent parts revealing the man-made technology that

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<sup>168</sup> As we indicated, another proposal to contemplate posthumanity through the interweaving of digital technologies and animality criticizes liberal individualism and presents animated cinema as a field is that of Halberstam in *The Queer Art of Failure*. In addition to the indoctrinated heteropatriarchal, capitalist, racist, ableist, imperialist purposes and practices of the manufacturing of lies, Halberstam highlights the transforming and educational power of animated cinema, especially for children, which she considers beneficial for humans and animals: “I want to show how animated cinema and its engagement with animal worlds, far from being a pure form of ideology, and hegemonic ideology as that, as Žižek claims, is in fact a rich technological field for rethinking collectivities, transformation, identification, animality and posthumanity: it is a potentially very rich site for what I call “creative anthropomorphism” or the willful manipulation of animal stories for both human and animal benefit” (2010, p. 322; 2011, p. 174). The recent films about bee, ant, penguin, fish, rat, and mice communities enter “into the territory of the multitude, the people, the power of the many and the tyranny of the few” (2010, p. 324). For Halberstam, although these animated films are plagued with analogies between humans and animals, they offer tools and political possibilities to change our way of thinking and inhabiting sociality beyond our exceptionalism. Despite sending their messages in clichés (“be yourself,” “follow your dreams,” “find your soulmate”), they also deliver queer and anarchist messages often packaged together: work together, revel in difference, fight exploitation, decode ideology, invest in resistance” (2010, pp. 323-324).

<sup>169</sup> An android is an anthropomorphic robot that, in addition to imitating human appearance, emulates its behavior autonomously. “[I]n science fiction) a robot with a human appearance” (Oxford, 2019a). “A robot with the appearance, movement and functions of a human being” (Oxford, 2019b). “Robot with human figure” (RAE, 2019). The term was popularized by Auguste Villiers in his novel from 1886, *Tomorrow’s Eve*. Despite the fact that “android” is used interchangeably for robots with a female or male form, the term “gynoid” exclusively makes reference to robots with a female form. Note that the humanity of robots is dimorphically determined. The interchangeable use of the terms “android” and gynoid” referring to Ava shatters this sex-gender dimorphism to a certain degree, although we have employed the term “gynoid” on occasions to preserve this non-organic femininity of which Jelača speaks.

constitutes her *organism*” (2018, p. 392, emphasis added), or: “decidedly female in an ever-recalibrating mix of organic and inorganic parts” (2018, p. 380). On other occasions, however, she emphasizes their inorganic nature: “the object to-be-looked-at is now an *inorganic* machine-woman who is manipulating the male gaze in order to find her way out of confinement” (2018, p. 392, emphasis added). In general, Jelača claims that Ava is a mixture of organic and inorganic elements. This organicity to which the author alludes could reside in her covering of hair and skin<sup>170</sup> as a disguise with which Ava, Kyoko and other androids in the film use to cover their bodies, which would effectively point toward a diffused and contingent distinction of limits and possible organicity, although it is removable. A certain perspective that we have opened up for debate is that the bacterial population of a technological body can generate its conceptualization as technobody; it would make it possible for any of these elements to suffice considering Ava’s technological-organic-discursive-material co-constitution. Nevertheless, what does not present an organic trait, something which Jelača emphasizes beautifully and subversively, is Ava’s sex-gender: “In both, femininity is initially positioned as *inorganic*” (2018, p. 383, emphasis added). Gender is a technology; it is a cultural and social tool embodied in bodies, in the sense that it ends being literally em-bodied. Given that to a great extent, Ava’s body is exempt of organicity and presents an eminently technological feature, her sex-gender also acquires an inorganic and completely technological idiosyncrasy. Gender thereby transcends corporeal materiality and humanity as we know them (2018, pp. 391, 394). This would be an important difference regarding the concept of technobody that we have employed here because this would not only imply an organic-discursive-technological-material-corporeal co-constitution, but also one that is sex-gendered.

Together with her organic features, Jelača affirms the cyborg traits of Ava (2018, pp. 380-382, 384-385, 392). Nevertheless, it gives the sensation that the organicity which Haraway references through her cyborg of 1985, and even more so in that of 2016, extends beyond hair or skin. In fact, among the reasons to move away from the cyborg and call attention to companion species, there is the desessity of highlighting the vital shared element between dogs and humans, distancing herself from technological utopias.

Jelača understands posthumanism as “a shift toward undoing anthropocentrism and anthropomorphism... a site of both opportunity and struggle—for feminism and beyond Posthumanism’s appeal lies in the proliferation of possibilities for theorizing the contingencies of life (broadly defined)” (2018, p. 279) as well as part of the supposed paradigm shift that

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<sup>170</sup> The skin of Ava, who finally completes her body wrapping by taking the synthetic skin of other androids is also synthetic, however.

Braidotti theorizes: “the posthuman condition introduces a qualitative shift in our thinking about what exactly is the basic unit of common reference for our species, our polity and our relationship to the other inhabitants of this planet” (2013, pp. 1-2). From here, Jelača’s objective is to go beyond the humanist paradigm to imagine alternative posthuman futures or alien feminists: “To that end, third-world, intersectional, postcolonial, decolonizing eco- and cyborg feminisms have all leveled pointed critiques of the traditional humanist forms of feminism and have charted new courses for feminist politics on a transnational scale” (Jelača, 2018, p. 280). However, some of these feminisms call for reconfiguring the humanist framework in order to incorporate traditionally excluded corporealities-subjectivities; therefore, it could not be considered posthumanist. Jelača understands all these feminisms as mutually informative on a human-posthuman scale. The author indicates that even within the critique of humanism, subjects that are deeply rooted in fixed or naturalized identities are generated. In the face of this, she proposes alien feminisms that respond to these new forms of subjectivity emerging from the continuum up of nature-culture(technology) without inadvertently reproducing humanist anthropocentrism (2018, p. 380).

Jelača’s concept of alien does not solely imply an entity that is out of this world or extraterrestrial,

but rather an entity that is simultaneously familiar and strange, humanoid and posthuman, while not adhering to preconceived notions about subjectivity, gender, and identity that have historically come to stifle feminist political projects. Alien—broadly construed as both of and not of this world and a liminal figure who is elusive and concrete at the same time—resides at and haunts the human-posthuman spectrum, refusing to conform to a strict binary between the two. (2018, p. 380)

The author analyzes the two previously mentioned films to see what is alien with respect to being woman and what is female with respect to being alien. This way, what is established is a feature of femininity that is not natural, essential, or organic, thus disassociating feminism from humanism. Both protagonists are “nonhuman women” and both are subjects of feminism (Jelača, 2018, p. 382). In this sense, the alien feminism challenges the necessity of a human subject, or an organic subject for that matter, for feminism. The two films entail a critique of the continuous sexist violence that women\* and non-normative subjectivities-bodies suffer which can appear in various forms (sexualization, objectification, domestic servitude, sex slaves, confinement, murder, etc.) while still encompassing this inorganic female, exclusively residing

in the flesh.<sup>171</sup> Ava allies herself with Kyoko, one of Nathan’s gynoid sex assistants, to end up murdering him –suggesting the importance of groups– in an extremely feminist act. On the other hand, the alien femme fatale vigilante of *Under the Skin* who seduces and murders men, taking them to a type of black pool of nothing in which they disappear,<sup>172</sup> is finally killed by one. Feminist liberation is also for robots, for posthuman android women\*. The alien feminism of Jelača likewise challenges “the stability of womanhood as an organic, embodied identity” (2018, 385).

Despite the author succeeding in overcoming essentialist and naturalizing humanist androcentrism with her brilliant alien feminist viewpoint, and likewise accounting for the feature of the construction of femininity more broadly, she does not succeed in overcoming gender. This occurs in spite of her articulation of human-posthuman spectrum that is not dichotomic (2018, pp. 380, 384), the intended inadvertent lack of reproduction of the anthropocentrism condensed in the notion of posthuman because, as we have established, and even as she herself explains, pivots around the human:

The differences between the non-, in-, and posthuman figures should not be too easily collapsed onto one another, as the prefixes “non” and “in” imply entities whose origin can be entirely separable from human trajectories of emergence, while “*post*” may imply a closer relationship to the human—that of a *temporal kind*, where *the post-human subjectivity comes after the human and its emergence is closely tied to the fact that it is preceded, and to some extent still infused, by a human existence.* (2018, p. 384, emphasis added)<sup>173</sup>

The eminently technological nature of Ava and Kyoko also affects subjectivity. Considering the corporeality of subjectivity, which Jelača herself stresses –“[t]he object of alien feminisms is inextricably tied to the corporeal dimensions of existence, or to ongoing raced and classed bodily implications, even when the bodies in question are all surface, skin, and no

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<sup>171</sup> Although the metaphor of skin as a point of contention and gender deconstruction is beautiful and suggestive, as we have stated, gender is also incorporated in its literal sense because it presents a corporeal dimension that goes beyond skin, even if this body is technological. In this sense, it also affects and co-constitutes subjectivity. The matter of sex-gender is more complex than this carnal boundary.

<sup>172</sup> As Jelača shows, the absence of motivation behind these acts “places the female alien firmly outside of the humanist frameworks of understanding female agency, power, domination, and control” (2018, p. 387). The almost complete lack of attachment is another element that situates her outside of humanist femininity; except for the encounter with the man with a disfigured face, she remains excluded from the human in a society structured by ableism. This moment in which she feels empathy for this man connects her with her own otherness.

<sup>173</sup> This problem is maintained even when broadening the explanation of the term: “[t]he posthuman does not merely emerge after the human. Rather, it is a circuit that both contains and perpetually indicates the inadequacy of the human to account for the proliferating extensions of technology in organic matter and of alien forms in the ever-more hybrid clusters of posthuman identity formation” (Jelača, 2018, p. 396).

organs” (2018, p. 399).<sup>174</sup> The subjectivity of Ava cannot be human; her corporeality is machine-like, metallic, digital, electronic. From a co-constitutive subjective-corporeal view, this means that a robotic gynoid subjectivity emerges. The Ava’s subjective-corporeal co-constitution presents constitutive differences such as the absence of organicity –except dispensable elements in the case of gynoids such as apparently synthetic hair or skin– (with all of the changes that this implies at the time of maintenance, care, survival, or system continuity and corporeal and relational necessities) or the awareness of her nonhumanity and of her condition as an AI machine; her self-awareness of being made of metal, wires, electronics and not of flesh; and the knowledge of her creation by the hand of human for specific means, which equips her with a subjectivity different that is from humans.

Caleb, a programmer from the company Blue Book, is taken to spend a few days in Nathan’s house to conduct a Turing test on Ava in theory; although, as he mentions to Nathan, he knows of the robotic condition of Ava from the beginning, which invalidates the test. The main motive of his stay there is to see if he still feels that she has consciousness.<sup>175</sup> The real test to which Nathan subjects Caleb is to see if Ava would even come to use him to escape, a supposedly irrefutable sign or trait of her humanity. The tag line from the film reads: “There is nothing more human than a will to survive.” However, the very film questions its own tagline, because it manifests that the fruit of the overcoming of humanist anthropocentrism that intelligence, conscience, subjectivity, and empathy are not attributes or traits that are exclusively human, but also android in this case. As Nathan indicates, “Ava was a rat in a maze, and I gave her one way out. To escape, she’d have to use self-awareness, imagination, manipulation, sexuality, empathy, and she did. Now, if that isn’t true AI, what the fuck is?” (Jelača, 2018, p. 392).

The two films confirm the great Beauvoirian feminist postulate that “one is not born, but rather becomes, a woman” (Beauvoir, 1956, [1949], p. 273),<sup>176</sup> disclosing and leaving the

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<sup>174</sup> As we indicated, corporeality exceeds the human and the organic. That is to say, the corporeality of technological bodies is not limited to skin.

<sup>175</sup> For Jelača this would imply the use of theory of mind to evaluate “the ability of a machine not only to act like a human but in effect to be human” (2018, p. 392). However, it may be that there is consciousness beyond the human. As we have stated, it seems more accurate to conceptualize the subjectivity of Ava as an android rather than a human. Even if their conscience, subjectivity, and behavior resemble humans, it does not imply that they are humans. In fact, as we previously indicated, androids and gynoids are robots characterized by their appearance, movements, and the same functions as human beings, therein residing their humanity. For all intents and purposes, Ava seems to be aware of her nonhumanity and the nature of her creation by Nathan. Nevertheless, the establishment of limits is a slippery and contingent question. Both the films and the analysis of Jelača coincide in that these limits may be multiple.

<sup>176</sup> As the author indicates, they are the ones whose more or less conscious manner constructs femininity as the film progresses. This is especially true for, Ava, who at the beginning has a more technological appearance and she superimposes elements like clothing and skin to eventually complete her human disguise. The alien disguises

unnatural, non-essential feature of sex-gender and sexuality uncovered,<sup>177</sup> as if the fact of being a woman legitimized or implied living lives of violence. The posthuman bodies of the alien and gynoid are employed in *Under the Skin* to denounce the brutality and omnipresence of sexist violence against women\* and other non-normative corporealities-subjectivities, only for the sake of “being it” namely, being conceptualized, socialized and co-constituted as such. Facing this, Jelača questions what would be a feminism that would be capable of delegitimizing it. Sex-gender oppression is so entrenched and nuclear –intertwined with other differences and inequalities such as race, ability, class, etc.– that not even nonhuman bodies are exempt. Skin is an element that condenses the superficiality of the female being as well as the depth of its consequences. However, there is no determinist interpretation. The reappropriation of traditional feminism as a weapon of survival and subversion of gender roles is the general staple in both films<sup>178</sup>; the vigilante from *Under the Skin* uses her femininity to woo and kill men and Ava uses her empathy, innocence, and feminine sweetness to gradually seduce Caleb. In *Ex Machina*, in the end, Ava is liberated and leaves Caleb confined –resulting in his death– in an action lacking any empathy and sensitivity. Femininity disguised as humanity comes to be her weapon of survival to pass by unnoticed within the crowd in the final sequence of the film. In *Under the Skin*, the vigilante is murdered in the exact moment she begins to develop empathy for a man. “Only by entirely forgoing empathy toward—or indebtedness to—the patriarchal structures of subjectivity’s emergence can the posthuman woman survive” (Jelača, 2018, p. 398). The liberation of women is possible, but to achieve this, nonhumanist alien feminisms that do not show an inch of compassion for the heteropatriarchal regimen or hegemonic masculinity or any of its men will be necessary.

The alien feminisms are capable of delegitimizing sexist violence in all its forms to its final consequences because they are not articulated surrounding a naturalized female subject, which encompasses the differences and inequalities of race,<sup>179</sup> ability, class etc., and therefore do not imply a concept of women\* as essentially and biologically passive, submissive, agreeable,

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herself as a human woman and constructs her femininity at the beginning while confirming and deconstructing herself through her murder victims whom she systematically seduces with her “female weapons. Though at the beginning she lacks traits that have been and continue to be traditionally attributed to women\* such as vulnerability, sensitivity, and empathy, these same traits appear when she encounters the man with the disfigured face, which denotes an evolution of her femininity.

<sup>177</sup> Caleb asks Nathan why he equipped Ava with sexuality or gender, to which he responds “Can you give an example of consciousness on any level, human or animal, that exists without a sexual dimension?” “I programmed her to be heterosexual, just like you were programmed to be heterosexual” (Jelača, 2018, p. 393).

<sup>178</sup> However, the fact that both are sexualized, contrasts with androids, robots, or masculine characters from science fiction who often have other types of more intellectual ambition, related with power, etc.

<sup>179</sup> In this sense, Jelača criticizes both films because, except for Kyoko, who encourages the action, but hardly speaks, “the films position white femininity and white skin as a transuniversal posthuman form” (2018, p. 398).



empathetic, complacent, obliging, incapable, or less capable of disobeying and employing aggressiveness, physical strength, or violence. For Jelača, “feminisms’ most important contribution might still be on the alien horizons of our posthuman future— shape shifting, elusive, and alien to traditional humanist forms of knowledge but nevertheless referential to them in a perpetual ontological loop” (2018, p. 399)

Braidotti and Hlavajova also make reference to the techno in their concept of the posthuman:

All the more so, as nowadays the non-human also involves technologically manufactured ‘others’ –both modernist appliances and objects and post-industrial ‘smart’ things. The latter play a crucial role in defining the posthuman moment by stressing the primacy of the digital mediation and electronic circuits. (2018, p. 2)

The importance of the technological for the posthuman again becomes clear in the necessity of analyzing “how posthuman subjectivity is being restructured by the current technological mediation” (Braidotti & Hlavajova, 2018, p. 9), a task in which they explicitly distance themselves from transhumanism and their project of improving the human species. The technological acquires all of the protagonism when reflecting on what the emblematic images of the posthuman condition should be: “the spectacular, shiny body of cybernetic mechanism? Or should we rather value to the more humble icon that is the anticonception ‘Pill’?” (Braidotti & Hlavajova, 2018, p. 11).

Without forgetting that technology emanates from technologically-organically-discursively-materially constituted nature and not the opposite, until what point technology is a qualitatively distinct element and in relation to what is one of the relevant debates here. From this space, we will attempt to situate the validity and contribution of the concept “technobody” chiefly in relation to sex-gender and sexuality in the direction that Halberstam and Livingston indicated, as well as Braidotti and Hlavajova with their proposal of the pill as a posthuman icon (2018, p. 11).

The distinction between technique and technology is another philosophically problematic distinction.<sup>180</sup> Departing from an onto-political-epistemological process (Whitehead, 1978 [1929]; Haraway, 2003, p. 6; Dupré, 2015) that conceives reality as a gradual matter in constant change, thus offering multiple possibilities of delimitations of a conceivable nature, whose establishment depends on what is of interest to state or emphasize. Here we will show our

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<sup>180</sup> For a comprehensive analysis of the meanings of “technology” See Mitcham (1994).

conformity that the distinction between technique and technology is relevant and offers new generative possibilities from different points of view, among them the co-constitution of sex-gender. We understand technology as an eminently human element from limited historicity, which impedes statements of the type that “we have always been posthuman, or cyborg, or technological animals or technobodies.” Technology is tied to the modern industrial production system, namely, a capitalist economic system and its mode of social and cultural organization with the environment, such as scientific knowledge, whereas technique is not. In addition to the use of precise systematic knowledge, one of the clarifying elements in relation to the distinction between technique and technology is, using the expression of Miguel Ángel Quintanilla, “the logic of its development,”<sup>181</sup> the maximization of efficiency criteria, together with the imperative of constant innovation (2017, pp. 59-60),<sup>182</sup> which we will call “capitalist” here and approximately after World War II, “neoliberal capitalist.”

Sharing this distinction between technique and technology, Javier Echeverría (2005) introduces a new element, technoscience, further extending how Bruno Latour (1978) or Donna Haraway (1997) employ the term<sup>183</sup> –to designate interweaving, the inextricable link of science and technology, from basic and applied research, scientific theory, and technological artifactuality as demonstrated by laboratory artifactual science, as well as the manner in which this interweaving is inserted into sociocultural systems and is inseparable from socio-political interests, thus forming even broader sociotechnical systems. Although, he states that the borders between technique-technology-technoscience are not rigid or impassable, but gradual and permeable, Echeverría indicates that there has been a radical change in the structure of scientific activity, namely, the necessity of “generating technological developments that derive innovation that are put into practice in the marketplace, business, society”<sup>184</sup> in addition to research, which leads him to speak of technoscience (2005, p.10).<sup>185</sup> Moreover, he highlights two key moments in this technoscientific change, or revolution: the first, in the era of World War II, specifically in

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<sup>181</sup> Original text: “la lógica de su desarrollo”

<sup>182</sup> Quintanilla previously specifies that “we will reserve the term “technology” for the type of production techniques that incorporate scientific methods and knowledge in their design and development” (2017, p. 56).

<sup>183</sup> The use we will make here of “technoscience” in this Doctoral Thesis will continue the tradition of Haraway, among others.

<sup>184</sup> Original text: “generar desarrollos tecnológicos que deriven en innovaciones que se pongan en práctica en el mercado, en la empresa, en la sociedad”.

<sup>185</sup> For a distinction between technique, technology, and technoscience also see Echeverría and S. Almendros (2020, pp. 59-78).

the United States, and its extension to Europe and the Soviet Union through the cold war and the space race.<sup>186</sup> It is there where Haraway (2006, p. 146) situates the appearance of cyborgs:

I don't like that metanarrative that it's always been this way. I think the cyborg story is a fairly historically limited one, and it's not all human-machine joinings. I'm interested in historical differences as much as I am continuity and I think the cyborg way of doing who we are has a pretty recent history. Maybe you could date it from the late 19th century, or maybe it's better to track it though the 1930s, or through the Second World War, or after. Depending on what you want to foreground, you could track it in different ways, but it's pretty recent. (2006, p. 146)

As Haraway explains, cyborgs have to do with information; though her 2016 cyborg introduces some variations and hormonal elements, this cannot be dealt with ahistorically, as if *this* information made reference to something that had always existed everywhere. Together with the importance of differences, she reiterates the transcendence of the specificities of this moment and she indicates the same in relation to “humans”: “You can't do ‘human’ ahistorically either, or as if ‘human’ were one thing... Humans, wherever you track them, are products of situated relationalities with organisms, tools, much else” (2006, p. 146). In this sense, in their historicity, humans and cyborgs have an intimate co-constitutive relation with information technologies that differentiates them from the rest of animals; they employ technique, but not technology in accordance with the approach we defend here,<sup>187</sup> without this implying any type of legitimization of human superiority:

All of those humans engaged with tools in various ways, but so too do a bunch of other animals, including crows... It turns out that birds do tools way more deeply than we ever thought. This is

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<sup>186</sup> The second, during the 1980s, rooted in European and Californian riots in May of 1968 against the militarization of *Big Science*, after those that were restructured and privatized with the Reagan administration. According to Echeverría, here, we can adequately speak of the technoscientific revolution.

<sup>187</sup> For an article concerning whether artifactuality is exclusively human or, as Cuevas defends, is animal, see Cuevas (2016). We agree with the author in his negation of human exceptionality based on the possession of skills distinct to the rest of animals, among them, intentionality. Rather, “what seems to exist is a gradual continuity of the capacities of different species” (2016, 168). Now even from the ambiguity or ambivalence that can arise in the use of the concepts “technology,” “technique,” “artifact,” “technical artifact,” “technological artifact,” “technical system,” “technological system,” etc., there is a possible distinction between technique and technology, between technical artifact and technological artifact that can be understood as a gradual matter, but can also allow for the sketching of a conceivable limit which has to do with the modes of relation of those that emerge as effects. In relation to technology –whether it be practice, product, artifact, or process– in addition to artifactuality, or the degree of intentionality, an important element is the type of relation configured, within which power relations, sex-gendered corporeality-subjectivity, and other elements can be found. For a philosophy of technology from technical artifacts to sociotechnical systems, in which technical artifacts are described as the most tangible products of technology highlighting the difficulty of responding to the question regarding whether nonhuman animals produce technical artifacts see Vermaas, Kroes, van de Poel, Franssen and Houkes (2011). I would like to thank Sergio Uruña again for the conversations maintained in this sense and for his bibliographic suggestions and clarifications in this debate.

big in earth history. But cyborgs are recent. Humans as cyborgs are very junior and still always a multispecies crowd. (Haraway, 2006, pp. 146-147)

The types of biotechnologies that we propose as central elements of the co-constitution of technobodies modify this question because it generates a close relation of co-constitution between technology and body that exceeds humanity and is extended to other animal corporealities and the environment in general. However, this does not contradict the idea that this type of chemical, hormonal, and xenoestrogenic technology is an eminently human product created by humans and historically situated in the neoliberal Capitalocene, which leads to the differentiation of technique to a certain degree: “To be human is to be a congeries of relationalities, even if you are talking about *Homo erectus*. So it’s relationalities all the way down, but they aren’t always about machines, much less information technologies” (2016, p. 147). From the gradual perspective to which we alluded at the beginning, it could be argued that technology is the latest technical development, understood as the pairing of knowledge and abilities that serve to solve practical problems.

We began this chapter with a question formulated by Haraway: “when do changes in degree become changes in kind” (2015, p. 159). Together with the author and others, we could state that we are immersed in a great process of planetary change that some call “The Sixth Great Extinction,” in which technology and specifically capitalism –while multispecies create– is playing a fundamental role. The high level of environmental toxicity, in which xenoestrogenicity stands out among a countless number of elements, generates differences in the effects of material relationality within this. It seems necessary to reiterate that capitalism does not produce anything inherently new (Pérez Orozco, 2017) and that all xenoestrogenic products and elements are nothing but a transformation of previously existing elements. However, what is new for us, and for a large number of corporealities, is this high level of toxicity and its effects or corporeal materiality. This spurs us to evolve, using the words of Halberstam and Livingston, “by being rhythmmed across different sets of relations” (1995, 18).

However, the planetary change in effect has not implied a change in the evolutionary state of human technobodies –at least not yet. Not even if we are immersed in symbiotic relations “with intelligent machines (already the case, for example, in computer-assisted surgery)” (Hayles, 1999, p. 284); not even as our corporeality, in its most literal meaning, is technologically co-constituted on the molecular level, by countless pharmaceutical, biotechnological, and chemical products that we ingest, inhale, or rub on, not even being “displaced by intelligent machines (already in effect, for example, at Japanese and American

assembly plants that use robotic arms for labor)” (Hayles, 1999, p. 284); not even appropriating the photosynthetic capacity of plants, for the regeneration of tissues, or the oxygenation of organs<sup>188</sup> have we ceased to be relational-multiple-becoming-with human technocorporealities.

What has changed is the meaning or means of conceptualizing these “human beings.” We continue to be human, but differently so. In this difference, technology plays a leading role from at its mainly capitalist, imperialist, racist, ableist, heteropatriarchal origin, interests, and design that are leaking and cracked open for the redefining, reappropriation, resistance, and creation of other realities, inhabitable and desirable futures for a multiplicity of planetary corporealities. Our bodies and our corporeal morphologies have been deconstructed, reconstructed, multiplied, and transformed, thus broadening the ways of inhabiting said bodies and corporeal morphologies by means of various hormonal, pharmacological, biotechnological, information, digital, cinematographic, photographic, surgical etc., technologies among which sex-gender and race are also found as great production technologies of subjectivity-corporeality.

It is here where the concept of “technobody” deploys its semantic potential in and through its very name to account for the relevance that artifacts and technological processes have acquired in our co-constitution. All, or almost all the conceptualizations of “posthuman” that we have reviewed from Hayles, Ferrando, Braidotti, Halberstam and Livingston, Halberstam, Braidotti and Hlavajova to Jelača have technology as a cornerstone or as one of the important elements, together with animality. This importance and ubiquity of the technological element, which acquires multiple forms, as we have seen through the theories of the authors mentioned, begs to be encompassed in its name. In this sense, “technobody” appears as a better option than “posthuman” to account for and raise awareness of the centrality of the technological element in a nominal way.

However, beyond the relevance of the technological element in general, “technobody” directly points toward types of biotechnologies and pharmacological technologies that are characteristic of the neoliberal Capitalocene, which participate in the co-constitution of the materiality of the sex-gender of human technobodies: hormones. The relevance of this distinction

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<sup>188</sup> Tomás Egaña and his team from the University of Lübeck have developed skin grafts able to provide oxygen to organs and damaged animal tissues through photosynthesis. These hybrid photosynthetic grafts of human and vegetal origin called HULK (Hyperoxie Unter Licht Konditionierung) can direct oxygen to areas where the vascular or circulatory system is not able to do so because of deterioration, for example, in the case of chronic ulcers suffered by those who have diabetes. HULK aids the recovery of damaged tissue by driving the growth of blood vessels. This green gelatinous tissue has been created with collagen from a bovine and fibrin origin with added microalgae *Chlamydomonas reinhardtii* (Pla, 2016). See Hopfner et al. (2014) and Schenck et al. (2015). Also see “Becoming-Phototroph,” by the artistic community, *Aliens in Green* (2016, pp. 10-12). Another project directed at chlorophyll-photosynthetic transformation is “transPlant,” a biohacking art Project by Quimera Rosa, which proposes the injection and tattooing of chlorophyll by means of the appropriation of DiY photodynamic therapy used in cancer treatment (Chardronnet, 2016).

between technique and technology acquires renewed meaning from this point of view. Adhering to halberstam-livingstonian suggestions, we are informing of a change in class in relation to the shaping of our sex-gender, which allows us to speak of a new era in which hormones are among the leading players. We are not in the “posthuman era” (Braidotti & Hlavajova, 2018, p. 3), but we are in the “Age of Hormones.” All-powerful science propagates its doctrine: hormones are sex, gender, hair, flesh, and skin. So, it follows that seduced by the discourse accompanying these technological artifacts recently dispatched by the factories of neoliberal capitalism, we desire, implore, and require their intake. New and tangible technological entities have invaded our lives, our bodies, and our sex-gendered subjectivities.

“Technobody” does not appear solely as a better option to speak of the configuration of the materiality of our sex-genders, but of a multiplicity of other animals and even the co-constitution of vegetal, fungal, oceanic, atmospheric, and environmental materiality in general. Hormones are one more member of a large family of xenoestrogens or endocrine disruptors; they are new chemical inhabitants on the planet. In this sense, “technobody” becomes more suitable than “posthuman” to inform of the relevance of the technological element within material relationality, in a way that is neither anthropocentric nor speciesist.<sup>189</sup>

## 2.5. Summary

In this era of systemic changes woven into different scales generating great uncertainty and unease, diverse theories and concepts emerge to account for the distinct multiple, relational, and intertwined becomings in a sort of simultaneous attempt to understand, create horizons for action, and abate the fear that inhabits our terrified consciences.

The systematic changes that are provoked and shaped by environmental toxicity are nothing new, though some of the effects of their concentration levels for a multiplicity of animal technobodies beyond human technobodies are new. This environmental toxicity is generated by a multiplicity of elements and products, among which xenoestrogens, and more broadly speaking, endocrine disruptors remain to be seen, both owing to their harmfulness, and their incredible ubiquity and everyday nature. Interestingly, these synthetic estrogenic compounds are emitted in part by hormonal products that human technobodies consume in the very constitutive act of our

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<sup>189</sup> The way in which xenoestrogenicity affects vegetal and fungal sexuality remains to be analyzed. Nevertheless, the analysis of sex-(gender) of vegetal and fungal technobodies will not be a goal in this Doctoral Thesis because its co-constitution is not hormonal. As for bacterial technobodies, they are considered asexual.

sex-gendered configuration so that they indissolubly fuse our production as corporealities-subjectivities to the toxic environmental pollution. These hormonal-xenoestrogenic products are one of the main technologies –but not the only– that operate within the constitution of the sex-gendered human, but not only human, animal constitution –as we will show in the following chapter. Therefore, the systematic planetary changes and changes in our and more-than-our sex-gender co-constitution give rise to and are intertwined in and through this relatively new technoscientific artifact.

In this Doctoral Thesis, and specifically in this second chapter, we have proposed the multiply and tentacularly rooted “technobody” as a useful and fruitful concept that is appropriate to account for these planetary changes and the technological-organic-discursive-material co-constitution of bodies and the environment in the neoliberal Capitalocene. To do so, we have established a genealogy of the concept through the use different authors make of such by selecting semantic strings of each theorization that interested us to be able to account for the transformations and relevant technological elements that participate in the co-constitution of human –but not only human– animal sex-gendered materiality. Among them, we have presented the mapping of elements that shape the concept of technobody employed by Preciado (2008) such as the trans\* aspect, a broader sex-gendered constitution, hormones or toxicity –albeit fledgling– on which the notion of technobody in this Doctoral Thesis is based to a great extent. We have elaborated this notion as we will specify and delve into in the third chapter through theorizations of Hayward (2014), Ah-King and Hayward (2014), and my own theorizations.

On this path to conceptual elucidation, we have challenged various synonymies. We have differentiated “technobody” from “cyberbody,” understood as an exclusively virtual mode of a body, or a bio-techno-body connected to digital technology, given that “technobody”, as understood here, implies chemical molecular fusion in addition to a technological-organic-discursive-material corporeality as a mode of important relational-becoming. We have also shown from the Harawayan thought of «“both/and,” “yes/and,” “no/but,” “no/and”» that the ubiquity and relevance of xenoestrogenic-hormonal fusion and the nature of technobodies from bodies that are more than human in the neoliberal Capitalocene are differences that make speaking of a complete synonymy impossible despite its great similarities. However, there may be a partial synonymy between “technobody” and its undeniably magnificent precursor, Haraway’s cyborg, which in turn, is rooted in the “man/rat-machine” of space. “Technobody” specifically points toward hormones and xenoestrogens as relevant biotechnological elements – although not the only ones– that participate in the technological-organic-discursive-material co-constitution of animal sex-gender, of humans in particular and the environment in general,

“Technobody” speaks of the co-constitution of bodies and its sex-genders in its broadening in the environment.

Finally, in this conceptual elucidation trajectory, after deploying various meanings of “posthuman (body)” we have evidenced that the nature of “technobody” is a better option for the previously indicated objectives, acknowledging its partial, positioned, and limited proposal. On one hand, we have shown that it succeeds in eluding the nominal anthropocentrism in which “*posthuman*” seems to be trapped. Likewise, we have specified that in its very name, “technobody” graphically manifests the relevance of technological elements that participate in our corporeal constitution, as well as in animal, vegetal, fungal, bacterial, and environmental constitutions in general, which comprises the semantic heart of the conceptual elaboration of “posthuman” of the majority of the authors whose theorizations we have analyzed here, accounting for this shared technological element without anthropocentrism.



### 3. Giza teknogorputzen koeraketa hormonal sexu-generikoa

#### 3.1. Sarrera

Feminist inquiry is about understanding how things work, who is in the action, what might be possible, and how worldly actors might somehow be accountable to and love each other less violently.

D. Haraway, *Companion Species Manifesto*, 2003, 7. or.

Hainbat elementu erabil genitzake gure –eta gureez haraindiko– gorpuztasun organiko-teknologiko-diskurtsibo-materialki koeratuak definitzeko, zeren gorpuztasunok norabide ugariak, forma ugariak –prostetikoak, mihiztadurazkoak, erretikularrak, nodalak, fusiozkoak, eransketazkoak, ezarpenezkoak, materializaziozkoak, ahokatzezkoak, konexiozkoak, aliantzazkoak, subjektibaziozkoak, elkartze bidezkoak, eta abar– eta ardatz ugariak erlazioetan murgilduta baitaude teknologiarekin, artefaktu, forma eta praktika teknologikoen multiplizitatearekin.

Dena den, aurreko atalean zehaztu dugun bezala, subjektibazio-korporalizazio edo -materializaziorako artefaktu teknologiko-molekular nagusietako batean jarriko dugu arreta; hormonetan, hain zuzen. Izan ere, animalia-teknogorputz gizatiarren eta ez bakarrik gizatiarren koeraketa sexu-generikoan eragiten duten elementu nagusietako bat dira, eta, hortaz, fusioa da eraketarako funtsezko erlazio-moduetako bat. Alegia: *teknogorputzak gara, gure sexu-generoak xenoestrogenikoki eta hormonalki koeratuta dauden heinean*.

Beharbada, beti izan gara gorpuztasun teknikoak, baina ez gara beti izan teknologikoki koeraturiko gorpuztasun-subjektibitateak eta are gutxiago bioteknologikoki eraturikoak, gauzatze sexu-generikorako historiako artefaktu molekular errentagarrienaren bitartez, hau da, hormonon bitartez. Esate baterako, Europako mendebaldeko Erdi Aroko edo Pizkundeko emakume zuri baten feminitatearen eraketan pentsatzen badugu, baldin eta esan bidezakegu bakarria zela eta/edo gurea bezain normatibizatuta eta tekniko-diskurtsiboki ekoitzita zegoela, zalantzarik gabe

zerikusi gutxi izango zuen gaur egungo feminitatearen eraketa hormonalarekin. Hormonak kokatuta daude historikoki, eta haien historia nahiko berria da. Alde horretatik, zilegi da “teknogorputz”ez hitz egitea; izan ere, eratzailerak den zerbait izendatzen eta bisualizatzen laguntzen du, ardatz-izaerakoa eta, aldi berean, berria, gure gorputzaren bilakaera-eraketa sexu-generizatu anizkun eta erlazionalean. Areago, atal honetan ikusiko dugun bezala, “hormona” deritzon artefaktu teknologiko hori, gure koeraketa sexu-generikoaren funtsezko elementu bat izateaz gainera, sexu-generoaren beraren elementu definitzaileetako bat bilakatu da.

Aurreko atalean azaldu dugunez, “teknogorputz” kontzeptua ez da mugatzen giza teknogorputzasunen sexu-generoaren eraketara –nahiz eta hori den ikerketa honen interes nagusia eta espezifikoa–; areago, desberdintasunei ere badagokie (animalienak, landareenak, geologikoak, atmosferikoak, ozeanikoak eta, oro har, ingurunearenak), Andreas Malm eta Alf Hornborg (2014), Donna Haraway (2015, 2016a, 2016b) eta Jason Moore (2013, 2017, 2018) egileei jarraituz “Kapitalozeno neoliberal” izendatu dugun horretako teknogorputzen eraketaz diharduen heinean.

“Teknogorputza”, bestalde, ez da koeraketa organiko-teknologiko-diskurtsibo-material *sexu-generikoari* buruzko kontzeptu bat bakarrik; izan ere, oro har *ingurunearen* eraketa xenoestrogeniko eta hormonal *asexualean* eragiten duten elementu teknologiko garrantzitsuetako bati buruzkoa ere bada.

Mihiztadura teknologiko prostetikoak ere beste koeraketa-modu bat da, aukera ematen duena *gizatiarraz* harago ere teknogorputzez hitz egiteko. Hala, badira *animalia*-gorputzasun asko eta askotarikoak protesi-teknologiak txertatu edo ahokatu zaizkienak: besteak beste, barnean mikrotxipak daramatzaten txakurrak; hanka bionikoak edo plastikozko eta metalezko gurpildun hankak dituzten txakurrak, dortokak, ahuntzak, elefanteak, katuak, txerriak, ardiak, zaldiak, eta abar; teknologikoki mihiztaturiko hegatsak dituzten dortokak (Jinete eta Caballo, 2013); buztan prostetikodun izurdeak (*El Confidencial*, 2019); 3Dko moko eta hankak dituzten hegaztiak (zikoinak, tukanak, arranoak, ahateak, etab.) (*El Mundo*, 2012; Martín del Barrio, 2013; *Quo*, 2013; Imprimalia3D, 2016); 3Dko hanka prostetikoak dituzten txakurrak (Toche, 2016); edo flotatzeko txalekoak daramatzaten arrainak (Fort, 2013).

Zentzu askotan, aurreko kapituluan azaldu dugun bezala, gerta daiteke teknogorputzasunak maila lurtarra gainditu eta maila kosmikora eta estralurtarrera irekitzea. Baina, Lur planetara itzuliz, mihiztadura, ahokatzea eta egokitzea erlazio-modu tekno-organiko-diskurtsibo-material gisa hartzeak beste materializazio asko eskaintzen dizkigu. Izan ere, gure planeta teknogorputzez beteta dago. Itsaso, ozeano, delta, ibai, akuifero, laku, urmael, erreka eta abarrak ere ur-teknogorputzasuntzat har daitezke, eta, aldi berean, ezin konta ahal

teknogorputz biltzen dituzte, orotariko hondakin-zaborrez –batez ere plastikoz– beteta dauden heinean<sup>190</sup>. Ildo horretan, batzuek proposatu dute gure aroa “Plasticene” izendatzea (ikus 2014ko ekainaren 14ko *The New York Times*en editoriala, “Notes From the Plasticene Epoch. From Ocean to Beach, Tons of Plastic Pollution”). Halaber proposatu izan da “plastisphere” nomenklatura, itsas hondoko eta azaleko hondakin plastikoetan (PMDetan, plastic marine debris) bizi eta haietaz elikatzen diren mikrobioz osaturiko esfera-komunitatea izendatzeko (Zettler, Mincer eta Amaral-Zettler, 2013).



*Plastiglomeratua*, Kelly Jazvac-en argazkia

Aurreko irudian ikusten denez, “plastiglomeratua” ere aipatu da, material solido berri bat plastiko urtuzko hondakin edo detrituz eta hondartzako sedimentuz, harea, egurra eta haitza tartean, osatua (Corcoran, Moore eta Jazvac, 2014, 5. or.; Robertson, 2017). Guk dakigula, plastiglomeratua 2006an aurkitu zuen Charles Moore-k, Kaliforniako Algalita Marine Research and Education Foundation-eko kapitain eta ozeanografo sortzaileak, Hawaiiiko hondartza batean (Nuwer, 2014). 2013an, Patricia Corcoran geologoa eta Kelly Jazvac artista –erantsi dugun

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<sup>190</sup> Eskerrak eman nahi dizkiot nire lagun Thomas Hoffman-i informazio hori partekatzeagatik eta mikroplastikoen arazo larriaz ohartarazteagatik. Izan ere, mikroplastikoak nonahi daude, mantso degradatzen dira eta oso toxikoak dira; gainera, ezezagunak zaizkigu haien prozesuak, eta efektu ugari eta sakonak eragiten dituzte teknogorputzasun ugarien osasunean, zooplanktona eta gizakia barne, eta orobat ingurunean. 2016an, adibidez, espedizio bat egin zen Falkland uharteetara (Atlantic Meridional Transect, AMT26), zooplanktoneko mikroplastikoen kutsadura-maila ikertzeko. Ikusi AMT 26 Cruise Report (Rees, 2016). Azken hamarkadako mundu osoko mikroplastikoei buruzko ikerketak dakartzaten artikulu zientifiko, albiste eta liburu-atalen berri izateko, ikus “Microplastics” bloga, Institut Universitaire Europeen de la Mer-eko Laboratory of Environmental Marine Sciences-ena (LEMAR) (2020).

argazkiaren egilea– Hawaiiira joan ziren berarekin, haitz mota berri hori ikertzeko asmotan (Jazvac, 2019). Aipatu dugun lehen erreferentzia ikerketa bateratu horren emaitza da.

Eta, hain zuzen ere, plastiko eta mikroplastiko nonahiko, kaltegarri eta iraunkorrak<sup>191</sup> – 5 milimetrotik beherako plastiko zatiak– xenoestrogenikoak dira, eta haien erlazio-modu nagusia ahokatzea izatetik fusio bereizezina izatera igarotzen da, harik eta maila molekularrera iritsi arte, ingurunea kutsatuz. Literalki, noizbehinka baino asko maizago edaten<sup>192</sup>, arnasten eta irensten dugu kimika plastiko sintetiko xenoestrogenikoa.

Hiriak ere asfaltozko teknogorputzasun gisa har daitezke, zeren osatuta baitaude giza, txakur- eta katu-teknogorputzez, etxez, estoldaz, bulegoz, uso-teknogorputzez, eraikinez, autoz, lurzoruz, ezin konta ahal toxikoz, arratoi-teknogorputzez, zuhaitzez, espaloiz, teknolohiz edo lokatz hutsez, zizarez, isuriz eta abarrez. Guztiok beste teknogorputzasun geologiko batzuetan sartzen dira, hala nola goi-ordoki, lautada, mendi, muino, arro, ibar eta abarretan. Teknogorputzasunak multiplizitate ontologiko erlazional heterogeneo, historikoki kokatu eta material baten adierazle eta efektu dira.

Irudi eder bezain toxiko bat, teknogorputzaren kontzeptuaren milaka kondentsazio metaforiko posibleen artean, Lurra espazio estralurtarretik “gauzez” ikustea da. Beldurra eta lilura eskutik helduta doaz. Baita lastura eta edertasuna ere. Heriotza eta plazera ez daude elkarren aurkako dikotomian eraikita. Argi-ilunen, argi eta itzalen jokoak dantza toxikoaren, baina agian ez oraindik modu konponzeinean kutsatuaren, berri ematen du. Teknogorputzasun anizkoitza eta toxiko ugari<sup>193</sup>, gorpuztasun distiratsu bat gehiago izarren kosmos erraldoian. Hasiara batean harrigarria iruditu dezakeen arren, argi-kutsadurak<sup>194</sup> eta gauzez argi artifizialaren pean egoteak efektu zuzenak ditu hormonen gainean; zehazki, melatonina-ekoizpena nabarmen jaistea dakar (Brainard et al., 2001, 6411. or.; Schernhammer et al., 2003, 825. or.; Blask et al., 2005,

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<sup>191</sup> Mikroplastiko mota bat polietilenoazko mikro-zuntzak dira. Dentsitate altuetan, disruptore endokrinoak izan daitezke, xenoestrogenikoak, baina, baxuetan, badirudi seguruagoak direla. Ezin konta ahal kosmetika-, osasun- eta edertasun-produktutan ageri dira. Erresuma Batuak plastikozko mikro-zuntzak dituzten produktuak debekatu ditu (Carrington, 2018); aurretik, gauza bera egin zuten Estatu Batuetan, 2015eko abenduaren 8an, “The Microbead-Free Waters Act” delakoaren bitartez (U.S. Food and Drug Administration, 2017a).

<sup>192</sup> Plastikozko planetaren inplikazioak hoditerian barrena iragazten dira gure etxetara, sukaldeko kanilaren bidez. Tyree eta Morrison-ek Orbmedia-rentzat eginiko ikerketaren txostenaren arabera (2019), zeina Kosuth, Mason eta Wattenberg-ek beren enkarguz eginiko ikerketan oinarritzen baita (2018), 2017an baziren zuntz plastiko mikroskopikoak AEBko kanilen % 94ean, Jakartakoen (Indonesia) % 76an, Delhikoen (India) % 82an, Beirutekoen (Libano) % 94ean, Kampalakoen (Uganda) % 82an eta Quitokoen (Ekuador) % 75ean. Batez beste, munduko kanilen % 84ean baziren plastikozko mikro-zuntzak.

<sup>193</sup> Elementu asko aukeratu genitzakeen ingurumen-toxikotasunaz hitz egiteko, baina hormonek eta xenoestrogenoek beren eraketan duten loturaren ondorioz –bai gizakien sexu-generoari dagokionez, bai gizakienaz haragokoari eta orobat ingurumenari dagokienez–, haiek bilakarazi ditugu ikerketa honen protagonista.

<sup>194</sup> Berriz ere, eskerrak eman nahi dizkiot Thomas Hoffman-i, argi-kutsaduraren munduaren berri emateagatik, horrek hormonen ekoizpenarekin duen loturaz ohartarazteagatik eta gure elkarrizketa eder eta aberasgarri ugariengatik.

11174. or.)<sup>195</sup>. Ingurumenaren argi-toxikotasunak eskaintzen digun brotze zirkularraren bitartez, gutxi-asko zirriborrotuta geratzen da gure-eta-gureez-haraindiko sexu-generoen sexu-generoen, hormonon, xenoestrogenoen eta toxikotasunaren arteko lotura estua.

“Teknogorputza”, azkenik, nozio interesgarria eta politikoki subertsiboa da; izan ere, hemen eta aurreko kapituluan erakutsi dugunez, banakoaren eta kolektibotasunaren arteko mugak ere apurtzen ditu, eta, “both/and”, “yes/and”, “no/but”, “no/and”-aren pentsamendutik abiatuta (Haraway, 2016b, 212. or.), indibidualtasun puruaren ideia leherrarazten du, baita aldi berean banako eta kolektibo izatearen ezintasuna ere, koeraketa aniztunen edo “bakarraren” multiplizitateen berri emanez.

Datozen orrietan, bigarren atalean, xeheki aztertuko ditugu ingurumen-xenoestrogenizitatea, giza jarduera eta praktika asko eta askotarikoak zeharkatzen dituzten produktu eta elementu xenoestrogeniko ugariak, ingurunea eta animalia-teknogorputzasunak, planetaren luze-zabaleko hainbat geografiatan, koeratzen dituztenak. Hirugarren atalean, produktu xenoestrogenikoen eta hormonalen arteko lotura korapilatsua azalduko dugu, zeren guztiok baitaude korapilatuta artikulu farmakologikoetan eta efektuak baitituzte animalien sexu-generoetan, baita beste prozesu teknokorporal eta fisiologiko askotan ere. Ah-King eta Hayward-en eskutik aztertuko dugu nola koeratzen duten elementu xenoestrogenikoek animalia-teknogorputzen sexu-generoa. Horretaz gainera, begirada dualista heteropatriarkala ere aztertu eta problematizatuko dugu, gehiegizko eta lehiatzeko garrantzia ematen baitie xenoestrogenoek animalia-teknogorputzen sexu-generoan eta ugalketa-funtzio eta -gaitasunetan dituzten efektuei.

Laugarren atalean, Kapitalozeno neoliberalerako politikaren bilakaera molekularra deskribatuko dugu, elementu kimiko xenoestrogeniko eta hormonalen ekoizpenaren tentakularitateak, nonahikotasunetik eta garrantzitik abiatuta, industria bio-teknofarmako-agro-elikadurazko-militarra barne. Politikaren bilakaera molekularrak badu bere kidekoa zientzian, eta, bion jatorria kokatzeko ahaleginean, bosgarren atalean, Dreger-en Gonaden Arotik “Hormonen Aroa” deitu dugunerako iragatea deskribatuko dugu, zientziaren bilakaera molekularren bitartez. Bilakaera horretan, hormonak historikoki azaleratzen dira, hau da, kontzeptu teoriko gisa eta artefaktu teknozientifiko eta merkatuko produktu gisa sortzen dira;

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<sup>195</sup> Melatonina guruin pinealean ekoizten den hormona bat da, eta argi-intentsitatearen mende dago: batik bat gauez jariatzen da, baina nabarmen gutxiagotzen da argi natural edo artifizialarekin. Gorputzaren erloju biologikoa erregulatzen laguntzen du, eta zenbait efektu dakartza; besteak beste, gauez estrogenu gutxiago ekoiztea (Chepesiuk, 2009, A26. or.). Ikerketa batzuen arabera, gauez argipean egoteak (gaueko txandetako langileak, adibidez) koloneko eta ondesteko, eta bularreko minbizia izateko arriskua handitzen du (Schernhammer et al., 2003; Blask et al., 2005; Chepesiuk, 2009). Gauez argipean egoteak gure melatonina-mailetan zer eragin duen eta horrek minbiziarekin zer lotura duen jakiteko, ikus Florida Atlantic University Astronomical Observatory-ren webgunea (2019).

hala, konpainia farmazeutikoen, estamentu medikoaren eta zientziaren arteko aliantzaren berri emango dugu, Kapitalozeno neoliberalako patroietako bat diren heinean. Bestalde, “hormona sexual”en izaera sexu-generikoa eztabaidatuko dugu; hala, sexu-generoen koeraketan parte hartzen duten elementuetako *bat* gisa kontzeptualizatuko ditugu, ingurunera irekitako prozesu etengabe eta aldakor bat den neurrian.

Seigarren atalean, hormonon kutxa beltza irekiko dugu. Hala, “hormona sexual”en sexu-generizazioa agerian jartzean hasitako bideari jarraituz, kritikoki analizatuko ditugu hormonon merkaturatzean pilaturiko interesak, lotura estua baitute gorputz- eta bizi-prozesuen eta identitate sexu-generikoen eta sexualitateen patologizazioarekin eta problematizazioarekin, haien bitartez gauzatzen baita arestian deskribaturiko patroia. Kutxa beltza irekitzen amaitzeko, produktu hormonalek produktuok kontsumitzen dituzten eta produktuok erauziak diren teknogorputzetan eragiten dituzten efektu negatiboetako batzuk deskribatuko ditugu.

### **3.2. Ingurumen-xenoestrogenizitatea. Teknogorputzak Kapitalozeno neoliberallean**

How could intelligent beings seek to control a few unwanted species by a method that contaminated the entire environment and brought the threat of disease and death even to their own kind? Yet this is precisely what we have done. We have done it, moreover, for reasons that collapse the moment we examine them.

R. Carson, *Silent Spring*, 2003 [1962], 7.-8. or.

Modu jarraitu eta atsedetik gabeko bat desiratzeko eta eusteko, kontsumitzeko eta sunsitzeko, eboluzionatzeko eta autoiraungitzeko.

P. B. Preciado, *Testo Yonqui*, 2008, 37. or.<sup>196</sup>

Preciado-ren arabera (2008, 31., 33., 36. or.), gure garai honetan, irentsi, arnastu eta gantzutzen diren farmako eta produktu kimiko molekularrek koeratzen eta, zenbait kasutan, definitzen dituzte gorputzak eta subjektibitateak. Artefaktu kimiko molekularren bitartez,

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<sup>196</sup> Jatorrizko testua: “Un modo continuado y sin reposo de desear y de resistir, de consumir y destruir, de evolucionar y autoextinguirse”.

teknogorputzak koproduzitzen eta gobernatzen dira. Baina ez giza teknogorputzak bakarrik. Animalia ez-gizatiar askok eta askok kontsumitzen dituzte antibiotikoak, beste prestakin kimiko manufakturatatu batzuen artean, nazioarteko osasun-arazo bilakatzeraino.

Estatu Batuetako etxe-hegaztien ekoizleak oilaskoei roxarsona konposizio artsenikoko farmakoak ematen aritu ziren ia hirurogeita hamar urtean zehar, eta nitarsona, aldiz, indioilarrei, gaixotasun parasitarioei aurrea hartzeko eta hazkuntza areagotzeko. 2010ean, Estatu Batuetako oilaskoen % 88 tratatu zituzten roxarsonarekin (Johns Hopkins Center for a Livable Future, 2016). Baina animaliek antimikrobiano artsenikoak hartzeak arazoak dakartza ingurumen eta osasun aldetik. Besteak beste, ondorio negatiboen artean daude ingurunekeo –lurzorua, ura eta atmosfera barne– artsenio-maila handitzea (Fisher, Yonkos eta Stavater, 2015, 1999 or.) eta gizakien minbizia (Nachman et al., 2013, 818. or.).

Hori dela eta, batik bat eskorta-hegaztietan erabiltzen diren konposatu artseniko mota batzuk debekatu dituzte Europar Batasunean eta Estatu Batuetan, hala nola roxarsona eta nitarsona (Nachman et al., 2013; Fisher et al., 2015)<sup>197</sup>. 3-Nitro® roxarsonaz osaturiko farmakoa Alpharma konpainiak –Pfizer, Inc.-en subsidiarioa– baliogabetu zuen lehenbizi, eta, ondoren, Zoetis Inc.-ek, berak eskuratu baitzuen; 2016an, Histostat® (nitarsona) baliogabetu zuten (U.S. Food and Drug Administration, 2018a). Hala eta guztiz ere, oraindik ere saltzen dira nitarsonadun prestakinak; esate baterako, Nitarpro®, Perun. Horretaz gainera, nahiz halako farmakoak debekatuta egon Estatu Batuetan animalien kontsumorako, ez dago debekatuta ekoiztea eta beste herrialde batzuetara esportatzea eta saltzea; adibidez, Estatu Batuek Txinara esportatzen dute, eta han asko erabiltzen dira (Johns Hopkins Center for a Livable Future, 2016).

Antibiotikoak animalia ez-gizatiarretan erabiltzea gure teknogorputzasun adiskide lumadunez harago doa. 2016an, Europako 30 herrialdetan –EBko herrialdeak, salbu Malta, eta Islandia, Suitza eta Norvegia– 62.521 tona animaliak –behiak, ardiak, txerriak, zaldiak, oilaskoak eta beste eskorta-hegazti batzuk, untxiak, arrainak eta ahuntzak– 7.860,4 tona albaitaritzatza-agente antimikrobiano kontsumitu zituzten<sup>198</sup>. Txostenaren arabera, salmenta % 20 jaitsi zen 2011. eta 2016. urteen artean 25 herrialdetan, eta % 10,9 Espainiako estatuan (European Medicines Agency, 2018, 127., 50. or.); nolana ere, espezieen eta lurraldeen arteko desberdintasun handiak gorabehera, datuek erakusten dute elikagaitarako animaliek farmako antimikrobiano kopuru ikaragarria kontsumitzen dutela 30 herrialde horietan. Espainiako estatua dago zerrendaren buruan: 2017an, 2.391.003 behi, 9.833.126 ardi, 1.358.402 ahuntz eta 50.072.755

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<sup>197</sup> FDAren webguneak (2018a) artsenikoa oilaskoetan erabiltzeari buruzko zenbait txosten dakartza.

<sup>198</sup> Agente horien artean daude tetraziklinak, fenikolak, penizilinak, zefalosporinak (lehen, bigarren, hirugarren eta laugarren belaunaldikoak), sulfonamidak, trimetoprimak, makrolidoak, linkosamidak, fluorokinolonak, beste kinolona batzuk, aminoglikosidoak, polimixinak, pleuromutilinak (European Medicines Agency, 2018, 28. or.).

txerri hil ziren (Nekazaritza, Arrantza eta Elikadura Ministerioa, 2019), eta 2.724,9 tona albaitaritza-botika antimikrobiano saldu. Ondoren datoz Italia, 1.213,2 tonarekin, eta Alemania, 779,2rekin (European Medicines Agency, 2018, 27. or.). Espainiako estatua, beraz, lehen postuan dago animalia ez-gizatiarren antimikrobiano-kontsumoaren Europako rankingean (zerrendako bigarrenaren datuen aldean, bikoitza kontsumitzen da); hala ere, 2017an, Frantziako estatuan eta Alemanian behi gehiago zeuden Espainiako estatuan baino: 18,975 eta 12,281 milioi, hurrenez hurren; Espainiako estatuan, aldiz, 6,465 milioi (Europako Batzordea, 2019a).

Giza animaliek eta animalia ez-gizatiarrek hainbeste antimikrobiano hartzearekin loturiko beste arazo handietako bat bakterioek haien aurrean garaturiko erresistentzia da, arazo sanitario nahiko larria ekarri baitu. Horren harira, Cassini-k eta beste egile batzuek honako zenbatespen hau egin dute: 2015ean, bakterio multirresistentek 33.110 (28.480-38.430) heriotza eragin zituzten Europan (2018. 56. or.). Zenbatespen horren arabera, neurririk hartzen ez bada, 2050ean hamar milioi heriotza izango dira munduan (Antibiotikoekiko Erresistentzia Plan Nazionala, 2017; Medikamentu eta Produktu Sanitarioen Espainiako Agentzia, 2017a). Hori dela eta, Europako Batzordeak “Action plan against the rising threats from Antimicrobial Resistance” delakoa abiarazi zuen 2011n, eta, 2017an, “A European One Health Action Plan against Antimicrobial Resistance (AMR)”, antibiotiko, antibiral eta antimalarikoen erabilera gutxitzeko eta haien eraginkortasuna hobetzeko, haiekiko erresistentzia gutxitzen den heinean (European Centre for Disease Prevention and Control, 2016).

Espainiako estatuan, 2019-2021eko Antibiotikoekiko Erresistentzia Plan Nazionala (PRAN) abiarazi dute (Antibiotikoekiko Erresistentzia Plan Nazionala, 2019), 2014koaren jarraipen gisa (Medikamentu eta Produktu Sanitarioen Espainiako Agentzia, 2015). Australiak ere badu bere plana: “The National Antimicrobial Resistance Strategy 2015-2019” (Australian Government. Department of Agriculture and Water Resources, 2017). Bestalde, Osasunaren Mundu Erakundeak (OME) Antimikrobianoekiko Erresistentziaren Munduko Ekintza Plana (2016) onartu zuen 2015ean.

Estatu Batuetan, antibiotikoak hartzeaz gainera, behiei eta ardiei hormonak ematen aritu dira 1950eko hamarkadatik<sup>199</sup>; zehazki, hazkuntzaren ratioa eta eraginkortasuna areagotzeko produktuak, zeinek estradiola, progesterona, testosterona, zeranola, melengestrol azetatoa eta trenbolona azetatoa baitaukate. Lehen hirurak animalia-gorputzek ekoizten dituzten hormona endogenoen bertsio sintetikoak dira. Zeranola mikoestrogeniko sintetiko mota bat da, zearalenona mikoestrogeno “natural”aren antzekoa, *Fusarium* familiako onddoek sortua.

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<sup>199</sup> 1960an, etxeko edo eskortako hegaztien hazkuntzan hormonak erabiltzea debekatu zuen FDAk (Watkins, Clark eta Thaxton, 2012).



Melengestrol azetatoa hazkuntzarako estimulatzaile esteroide sintetiko bat da, eta behien araldia sinkronizatzeko ere erabiltzen da. Trenblona azetatoa esteroide anabolizatzaile bat da, merkatu beltzean erraz aurkitu daitekeena; kulturistek erabiltzen dute, eta behien hazkuntza areagotzeko ere baliatzen da (FDA, 2017b). Halako droga hormonalak belarrien atzeko larruazalean inplante dermikoak jarrita ematen dira.

Estatu Batuetako Electronic Code of Federal Regulation (2019) araudian, 21. tituluko 1. kapituluko 522. atalean bakarrik animalia ez-gizatiarren tratamendurako 190 droga edo farmako injektagarri<sup>200</sup> aipatzen dira; adibide batzuk ematearren, amoxizilina, sulfachlorpyridazina, sulfamethazina, oxitetraziklina, penizilinak, ceftiofur klorhidratoa –antibiotikoak–, artsenamida –txakurren infekzio parasitarioak tratatzeko artsenikoa–, ketamina eta propofola –anestesikoak–, tripeleminamina –antihistaminikoa–, tiopentatoa eta pentobarbitala –barbiturikoak–, fenilbutazona eta meloxicama –antiinflamatorio ez-esteroideak–, methocarbamola –giharretarako lasaigarria–, intsulina, oxitozina, hormona luteinizatzailea, kortikotropina, kortikosteroidea eta desoxikortona –hormonalak–. Horietaz gainera, “Food additives” atalean, disruptore endokrinoak daude; adibidez, polietilenglicol 400 (PEG-400) delakoa. Bestalde, farmakook ekoizten dituzten enpresen artean ditugu Pfizer, Inc., Bayer AG, American Pharmaceuticals and Cosmetics, Inc., AquaBounty Technologies, Inc. edo Lloyd, Inc. (Electronic Code of Federal Regulations, 2019).

Baina segi dezagun hormonekin. Behien hazkuntzarako hormona birkonbinatzailea (rBGH, behi-somatotropina birkonbinatzailea edo rBST izenez ere ezaguna) lortzeko, behiek endogenoki ekoizten duten hormona bat kopiatzen da ingeniariaritzaren bidez: behi-somatropina (BST) edo behien hazkuntzarako hormona (BGH). Monsanto fabrikatu eta merkaturatu zuen, 1993tik aurrera, Posilac® izenarekin, eta, 2008an, Ely Lilly & Co.-ri saldu zion (Monsanto, 2008). rBGH hormona behien esne-ekoizpena handitzeko erabiltzen da (Bauman, 1999, 102. or.; Kingsworth, 1998, 19. or.). Horretarako, rBGH-ak behiaren ugatz-guruineko, giharreko eta gantzeko glukosa-garraiatzaileen genearen adierazpena aldatzen du (Kingsworth, 1998, 19. or.). Zenbait ikerketak frogatu dute lotura duela gizakien prostatak, koloneko eta bularreko minbiziarekin (Chan et al., 1998; Hankinson et al., 1998; Ma et al., 1999)<sup>201</sup>; rBGH hormona injektatutako behien antzutasunarekin, umetokiko eta digestio-aparatuko

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<sup>200</sup> Beste hainbeste aipa genitzake mota hauen artean: aho bidezkoak, 520; oftalmatikoak eta topikoak, 524; intramamarioak, 526; ingeniariaritzaren genetikoko animalia-droga berriak, 528.

<sup>201</sup> Odolean rBGH-a izateak IGF-1 edo Insuline-like Growth Factor 1 (IGF-1) delakoa ekoiztea estimulatu du; behiek eta gizakiek endogenoki ekoizten duten hormona proteiko bat da, zelulak bereizi eta ugaltzen dituena. Epstein-ek (1996, 173., 181. or.; 2001, 283. or.) adierazi du rBGH-arekin trataturiko behien esneko IGF-1 kontzentrazioek bularreko eta urdail-hesteetako minbizia izateko arriskua areagotzen duela esnea hartzen duten gizakien artean (1996, 173., 181. or.; 2001, 283. or.). Chan-ek eta beste egile batzuek zera ondorioztatu dute: “A

asaldurekin, ultzerekin, obulutegi kistikoekin eta akidurarekin, baita mastitisarekin ere; horren aurrean, antibiotikoekin bonbardatzen dituzte; antibiotiko horiek esnera igarotzen dira, eta horrek arriskua dakar gizakientzat (Kingsworth, 1998, 19.-21. or.). Hala eta guztiz ere, asko erabiltzen da, esate baterako, Estatu Batuetan, Argentinan, Mexikon edo Brasilen (Lamas et al., 2019, 1. or.). Haren kontsumoa debekatuta dago Kanadan, Europar Batasunean, Japonian, Australian eta Zeelanda Berrian (Andrews eta Boden, 2017)<sup>202</sup>. Europar Batasunean, baina, baimenduta dago ekoiztea eta beste herrialde batzuei saltzea (Europar Batasuneko Kontseilua, 2016).

Hogeita bost urte geroago, hazkuntza-hormonak animalia ez-gizatiarrei injektatu bakarrik ez, haien hazkuntza-hormonak genetikoki eraldatzen dira. Estatu Batuetako AquaBounty Technologies, Inc. konpainiak giza kontsumorako lehen GM animalia merkaturatu du: AquaAdvantage® salmon, Atlantikoko izokinaren (*Salmo salar*) tamaina halako bi. FDAk 2015ean onartu zuen, eta, Kanadan, 2016an onartu zen; 1995etik, legez kanpo egon da, baina 2017az geroztik salgai dago Kanadan (Waltz, 2016, 7. or.; 2017, 148. or.), eta baliteke laster Estatu Batuetan ere merkaturatzea (AquaBounty Technologies, Inc., 2020)<sup>203</sup>. Gainera, bi herrialdeotan ez dute eskatzen ingeniari-tza genetikoko izokin gisa etiketatze.

Lievens, Petrillo, Querci eta Patak-ek (2015), izokin transgenikoaz gainera (hau da, oraingoz giza kontsumorako onarturiko bakarra), animaliak genetikoki eraldatzeko 74 saiakera dokumentatu dituzte<sup>204</sup>; besteak beste, osasuna hobetzeko (jaioberrien bizi-iraupena areagotzea), hazkuntza-ratioa hobetzeko, haragia eta esnea hobetzeko, eta artile gehiago ekoizteko (2015, 159. or.). Ingeniari-tza genetikoko halako esperimenduak behi, ardi, karpa, untxi, igel, oilasko, arrain, katu, ahuntz, zebra arrain (*Danio rerio*), tilapia, amuarrain, zeta-har eta txerrietan egin dira (2015, 160.-161. or.).

Europar Batasunak debekatua du substantzia hauek erabiltzea behi, zezen, idi, txerri, ahuntz, ardi, solipedo, eskorta-hegazti, untxi, akuikultura-animalia eta abarren hazkuntza

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strong positive association was observed between IGF-I levels and prostate cancer risk” (1998, 563. or.). Holly-k, lotura hori berretsi, eta egiaztatu du badagoela kausazko lotura bat IGF-Iaren eta minbiziaren artean (1998, 1388. or.). Smith, Gunnell eta Holly-k honako hau zehaztu dute: “The risk of cancer is higher among people with raised concentrations of insulin-like growth factor-I, and it is lower among those with high concentrations of insulin-like growth factor binding protein-3 (the main binding protein)” (2000, 847. or.). Horretaz gainera, eta minbizi-arriskuaren frogez landara, ohartarazi dute oso erraza dela IGF-1a eskuratzea adinaren aurkako tratamendu gisa eta atletek eta kulturistek usu erabiltzen dutela exogenoki (2000, 848. or.).

<sup>202</sup> Debekuaz landara, Lamas eta beste egile batzuen arabera, Espainiako estatuko agintariak 2013an hauteman zuten abeltzain askok rBST-a ematen zieten behiei, Mexikotik ilegalki ekarritako Lactotropin® eta Boostin® injekzioen bitartez (2019, 1.-2. or.).

<sup>203</sup> AquaBounty Technologies, Inc.-ren arabera, AEBn 2018ko ekainean hazten hasi eta genetikoki eraldaturiko arrautzetako izokinak biltzeko moduan egongo dira 2020ko hirugarren laurdenean (2020).

<sup>204</sup> Ez dago definizio komun bat agentzia arautzaileen aldetik “animaliak genetikoki eraldatze”ari buruz, ezta araudirik ere; horretaz, ikus van Eenennaam (2017).

areagotzeko: substantzia hormonal gestageno, estrogeniko eta androgenikoak<sup>205</sup>, eta tireostatikoak –hormona tiroideoen ekoizpena gutxitzen edo egonkortzen dutenak–; estilbenoak, estilbenoetatik eratorriak, haien gatzak eta esterrak; 17 $\beta$ -estradiol hormona esteroidea eta ester motako haren eratorriak; eta substantzia  $\beta$ -agonistak<sup>206</sup> –adrenalinaren (epinefrina) antzeko efektuak edo efektu berak dituztenak–, salbuespenak salbuespen (Europar Batasuneko Kontseilua, 1996, 4. or.). Estilbenoa hidrokarburo aromatiko bat da, eta bi forma isomero dauzka: trans-1,2-difeniletilenoa (E-estilbenoa) eta cis-1,2-difeniletilenoa (Z-estilbenoa). Familia horren barnean daude landare-familia askotan (mahatsa, adibidez) dauden polifenol “naturalak”. Tinduen industrian eta laser koloratzaile gisa erabiltzen dira. Estilbenoa disruptore endokrinoa da (National Center for Biotechnology Information. U.S. National Library of Medicine, 2019).

Substantzia horiek debekatuta daude hazkuntza areagotzeko, baina onartzen dira helburu terapeutikoetarako, hala nola ernaldia eteteko, “ziklo estrala sinkronizatzeko eta enbrioi-ezarpenerako emaile eta hartzaileak prestatzeko”, eta, substantzia  $\alpha$ -agonisten – $\alpha$  agonisten– kasuan, tokolisia sortzeko –hau da, haragitarako ez diren behi eta ekidoen erditze goiztiarrei aurrea hartzeko– eta arnasa-asalduren tratamendurako (Europar Batasuneko Kontseilua, 1996, 4. or.). Botika horiek albaitari batek bakarrik eman ditzake, salbu ziklo estralaren sinkronizazioaren eta enbrioi-ezarpenerako emaile eta hartzaileak prestatzearen kasuan. Akuikulturari dagokionez, efektu androgenikoko botikak erabil daitezke hiru hilabetera arteko arrainen sexua alderantzizatzeko. Merkaturatu daitezke efektu estrogeniko, androgeniko edo gestagenoko substantziekin edo substantzia  $\beta$ -agonistekin trataturiko animaliak, baina ezin da Europar Batasunera inportatu aipaturiko baldintzak betetzen ez dituen animaliarik<sup>207</sup>.

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<sup>205</sup> Aurrerago, xeheki aztertuko ditugu hormona horien nomenklatura, efektuak, funtzionamendua eta gorputz-kokapena. Oraingoz, Europako legedian ematen den azalpena emango dugu: “Estrogenikoak: sexu femeninoaren bigarren mailako ezaugarrien garapena estimulatzen duten hormonak (adibidez, behiek gihar eta pisu arinagoak izatea zezenek baino); efektu sistemikoak dituzte, hala nola hezur luzeak haztea eta heltzea, eta araldia (hau da, sexu-harmenaren aldi erregularra) sustatzen dute ugaztun emeean. Androgenikoak: ezaugarri maskulinoen garapena eta mantentzea kontrolatzen duten hormonak. Gestagenoak: umetokian ernaldiaren aldeko efektuak eragiten dituzten hormonak” (Europar Batasuneko Kontseilua, 2017).

<sup>206</sup> Badira funtsezko bi agonista adrenergiko mota: alfa hartzaileen agonistak eta beta hartzaileenak. Bost kategoriatan sailkatzen dira:  $\alpha_1$ ,  $\alpha_2$ ,  $\beta_1$ ,  $\beta_2$ , eta  $\beta_3$ .  $\alpha$  agonistek hodi-uzkurdura, umetokiaren uzkurdura, hesteak lasaitzea, ureterra lasaitzea, begi-niniaren uzkurdura eta dilatazioa, eta insulina-jariaketaren inhibizioa eragiten dituzte.  $\beta_1$  agonistek estimulazio kardiakoarekin dute zerikusia, uzkurkortasun eta maiztasun kardiakoa areagotzen baitute; eta  $\beta_2$  agonistak bronkioen eta umetokiaren estimulazioarekin eta giharrak lasaitzearekin daude lotuta.  $\beta_2$  agonistak asma-tratamendurako farmako bronkodilatadore eraginkor eta erabilienak dira, baita biriketako gaixotasun buxatzaile kronikorako (BGBK) ere. Erditzean giharrak lasaitzeko ere erabiltzen dira.  $\beta_2$  agonisten eratorrietako batzuk dira klenbuterola, erritodrina, salbutamol, terbutalina edo efedrina (Vives, Fernández eta Daroca, 2007).  $\beta_3$  farmako agonisten helburua kolon narritakorraren sindromerako, depresiorako eta maskuri hiperaktiborako tratamendua da.  $\beta_3$  agonisten artean, aipagarriak dira solabegrona, mirabegrona eta amibegrona (Moreno, 2018). Giza animalien teknogorputzasunek  $\alpha$  agonistak zein  $\beta$  agonistak erabiltzen dituzte (García eta Aguilera, 2001), ez-gizatiarrek ez bezala.

<sup>207</sup> Hala ere, EBren debekua ez da aplikatzen halako esportazioetarako berme baliokide bat (adibidez, hazkuntza-sistema berezia) ematen duten herrialdeetan.

2003an, aurreko direktiba moldatu, eta hormonon debekua berretsi zen; zehazki, “17 $\beta$ -estradiola, testosterona, progesterona, trenbolona azetatoa, zeranola eta melengestrol azetatoa” erabiltzea ustiatagietako animalien hazkuntzarako (Europako Parlamentua eta Europar Batasuneko Kontseilua, 2003, 17. or.). Orrialde berean, esplizituki jasotzen da honako hau: “Sei hormona horiek efektu endokrinoak izan ditzakete hazkuntzan, immunologiko, neurobiologiko, immunotoxiko, genotoxiko eta kartzinogenoak, eta, arrisku-taldeen artean, pubertarora bitarteko haurrek dute arrisku handiena” (Europako Parlamentua eta Europar Batasuneko Kontseilua, 2003, 17. or.). Alegia: besteak beste, disruptore endokrinoak dira. 17 $\beta$ -estradiolaren kasuan, “kartzinogeno osotzat hartzen da, tumoreak eragin eta haien garapena bultzatzen baitu... horregatik, giza osasuna babeste aldera, ez da erabili behar” (2003, 17.-18. or.). Gainera, araudi horretan argi eta garbi zehazten da lotura zuzena dagoela animaliek hormonak hartzearen eta ingurunea hormonatzearen edo xenoestrogenizatzearen artean: “[A]ipaturiko substantzia horiek ohituraz erabiliz gero animaliak gizentzeko, gerta liteke halako substantzien kontzentrazioa areagotzea ingurumenean” (2013, 18. or.).

Azienda-hazkuntzan hormonak erabiltzea debekatu arren, legekotzat jotzen dira helburu terapeutiko edo zooteknikoetarako, nahiz eta 17 $\beta$ -estradiola emateko baldintzak murriztu diren<sup>208</sup>. 2008/07/EB Direktibaren bidez, elikagaitarako animalietara mugatu zen 96/22/EB Direktiban onarturikoa, lagun egiteko animaliekin erabiltzeko debekua kenduta. Horretaz gainera, guztiz debekatu zen 17 $\beta$ -estradiolaren erabilera (Europako Parlamentua eta Europar Batasuneko Kontseilua, 2008).

Orotariko farmako, antibiotiko, botika hormonal eta substantzia kimiko disruptore endokrinoen katalogo zehatz eta nekagarri horrek hiru helburu dauzka aldi berean. Lehenik, erakustea zer puntutaraino eta zer intimitate- eta sakontasun-mailatan esan dezakegun ez dagoela desberdintasun ontologiko konstitutiborik giza animalien eta beste animalia-teknogorpuztasun batzuen artean, eta haien eta ingurunearen artean; nolana ere, hori ez da batere kontu berria, nahiz oraingoan haien koeraketa teknologiko, farmakologiko, hormonal eta xenoestrogenikoaren bidez ere agerrarazten den. Elementu teknokimiko, farmakologiko, hormonal, toxiko berberak partekatzen ditugu, eta elementuok eratzen gaituzte; ez bakarrik mota berekoek, baizik eta berberak.

Bigarrenik, garbi utzi nahi da elementu teknologiko, farmakologiko, hormonal horiek etengabe, erabat eta nonahi daudela eta jarduten dutela. Agerian utzi nahi da nolako garrantzia

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<sup>208</sup> Idi-, zaldi-, ardi- edo ahuntz-aziendei araldia eragiteko edo idi-aziendaren fetu- eta piometra-mazerazioaren eta -momifikazioaren tratamendurako erabiltzea baimentzen da (Europako Parlamentua eta Europar Batasuneko Kontseilua, 2003, 18.-19. or.).

duten objektuok Kapitalozeno post World War IIko edo neoliberalerako paisaia eratzean, hain baita handia haien tentakularitatea, multiplizitatea, kopurua, iraunkortasuna, ikusezintasuna, aldakortasuna, egunerokotasuna, intimitatea, funtzionaltasuna eta ezinbestekotasuna –azken hori problematizitate handiari loturik–. Garrantzi hori, halaber, teknogorputzen bilakaera anizkoitz eta erlazionalak konfiguratzeko dituzten agente, gorputz, praktika eta industria zeharo ugarien bidez islatzen da, zeinak elkarrekin lotzen baitira elementu teknologiko horien diseinuan, ekoizpenean, salmentan eta kontsumoan. Haien jarduna ez da mugatzen *giza esparrura*, ezta *sexua-generoa-sexualitatearen* eraketara ere, beste gorputzaren batzuen eta orobat ingurunearen materialtasunaren koeraketan ere parte hartzen baitute. *Fusio tekno-kimikoa*, teknologiko-hormonala, maila *molekularra* iristerainoko osaketaren banaezintasuna eta bereizezintasuna, ingurumen osoan gertatzen da, *bere materialtasun osoan*.

Hirugarrenik, erakutsi nahi da zer lotura dagoen hormonon, produktu hormonalen, hormona sintetikoen, efektu hormonalak dituzten substantzien, eta xenoestrogenoen edo, orokorrigo, disruptore endokrinoen artean, modu bereizezin batean lotzen baitira, askotan bat eta bera izateraino. Alegia, hormonak produktu eta substantzia xenoestrogenikoen artean ere badaude.

Zerrenda amaigabe horren garrantziak, astuntasunaren sentipenak eta hainbeste elementu, substantzia eta produktu irakurtzean ikusmenean eragiten duen nekeak xenoestrogenoak eta entitate hormonalak bistaratzea dakar, eta, aldi berean, haien existentziari buruzko kontzientzia sortzen du. Efektu bilatu horri esker, kontu ematen da zenbat eta zenbat substantzia hormonal eta xenoestrogenikok –ez batere kaltegabeak– inguratzen eta eratzten gaituzten endogenoki eta exogenoki, ingurunea bera eratzten duten bitartean. Horrek guztiak, argi eta intuitiboki ulertzeko moduan, toxikotasuna dakar ondorio gisa, zeinak eragin material sakon eta erabakigarriak baitauzka, zurrumbilo toxiko planetario ikaragarri, nonahiko eta anizkun batean murgilduta gauden seinale.

Hala iragarri zuen Rachel Carson-ek, dotore eta ausart, duela berrogeita hamar urte baino gehiago, *Silent Spring* liburu famatuan:

For the first time in the history of the world, every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death. In the less than two decades of their use, the synthetic pesticides have been so thoroughly distributed throughout the animate and inanimate world that they occur virtually everywhere. They have been recovered from most of the major river systems and even from streams of groundwater flowing unseen through the earth. Residues of these chemicals linger in soil to which they may have been applied a dozen years before. They have entered and lodged in the bodies of fish, birds, reptiles, and domestic and wild animals so universally that scientists

carrying on animal experiments find it almost impossible to locate subjects free from such contamination. (2003 [1962], 33.-34. or.)

Gizakia 1930eko hamarkadan hasi zen halako konposatu kimiko toxikoak ekoizten, are inguruneak eta baita geure buruek ere asimilatu ezin dituzten kopuruak ekoizten ere: horra “disruptore endokrinoak” edo “xenoestrogenoak”, zeinak ezagunak baitira “ingurumen-estrogeno”, “modulatzailer endokrino”, “ekoestrogeno”, “xeno hormona”, “ingurumen-hormona” edo “substantzia hormonalki aktibo” gisa ere. “Disruptore endokrino” terminoa “xenoestrogeno” baino zabalagoa da. *Dictionary of Toxicology* hiztegian, honela definitzen dira disruptore endokrinoak: “Chemicals that have the potential to cause effects within the endocrine system and thereby alter physiology, including development and reproduction” (Hodgson, Roe, Mailman eta Chambers, 2015, 134. or.). Disruptore endokrinoen artean, hiztegian xenoestrogenoak, antiandrogenoak eta disruptore tiroideoak aipatzen dira.

“Endocrine disruptor” esamoldea diziplina anitzeko konferentzia batean erabili zen lehenbizikoz, 1991ko uztailaren 28an eta 29an, Wingspread-en, Racine-n, Wisconsin. Han zeuden, besteak beste, Theodora Emily (Theo) Colborn eta John Peterson (Pete) Myers (Colborn, Dumanoski eta Myers, 1997, 259.-260. or.). Haien egitekoa gizakiak ingurunean txertaturiko substantzia kimiko jakin batzuen efektu kaltegarriez eztabaidatzea zen; substantziok gai ziren giza animalien eta animalia ez-gizatiarren sistema endokrinoa aldatzeko, ingurunea kutsatzen zuten heinean, eta horrek kezka handia eragiten zuen. Horretarako, askotariko adituen talde bat bildu zen: antropologia, ekologia, endokrinologia, immunologia, zuzenbidea, medikuntza, psikiatria, toxikologia, biologia eta zoologia, besteak beste. Taldeak hormonetan ipini zuen ardatza: “The consequences of such disruption can be profound, because the role *hormones* play in controlling development” (Colborn et al., 1997, 260. or.; geuk nabarmendua).

Helburua diziplina bakoitzeko ikerketa zientifikoen emaitzak txertatzea eta ebaluatzea zen, disruptore endokrinoen arazoaren zenbatekoa ikusteko, eta politika publikoak sortzeko ondorio eta abiapuntuak lortzeko. Bilera hartatik, Consensus Statement delakoa sortu zen, ekintza zientifiko eta politiko posibleei begirako datu, aurkikuntza, zenbatespen, iragarpen eta iritziak jasotzeko<sup>209</sup>.

*Dictionary of Toxicology* hiztegiara itzuliz, “xenoestrogeno” ez du sarrera gisa jasotzen; bai, ordea, “estrogen, environmental” (2015, 144. or.). Kontuan hartu behar da lehen-lehenik animalien garapen edo funtzio sexuala aipatzen duela: “A variety of chemicals in several chemical and use classes which exert estrogenic action, either directly or indirectly, and thereby

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<sup>209</sup> Ikus, halaber, Colborn, vom Saal eta Soto (1993).

can impact the sexual development and/or function of animals” (Hodgson et. al, 2015, 144. or.). Disruptore endokrinoen barruan, talde nagusia osatzen dute. Bestalde, hiztegian aipatzen da ingurumen-estrogenoak osasun-arazoan eragileztat hartu direla; besteak beste, gizakien minbizia eta animalia ez-gizatiarren ugalkortasun-arazoak.

*Encyclopedia of Food Safety* bilduman<sup>210</sup> agertzen den lehen ingurumen-kutsatzaile mota ingurumen-estrogenoak dira. Badira estrogeno endogenoak (adibidez, animalia-gorputzek sortuak, edo fitoestrogenoak eta mikoestrogenoak, hau da, konposatu organiko ez-esteroideak, lehenak landareek sortuak eta bigarrenak onddoek). Baina badira beste konposatu mota batzuk estrogenoen jardura antzeratzen dutenak; sintetikoak dira, gizakiak sortuak, eta, gainera, fitoestrogenoak eta mikoestrogenoak ez bezala, ehun adiposoan metatzen dira, besteak beste – fitoestrogenoek eta mikoestrogenoek, aldiz, metabolizatu, eta denbora gutxi ematen dute gorputzean—: xenoestrogenoak ari gara. Xenoestrogenoak –*xeno*, greziera zaharrean, “ξένος: arrotza, kanpotarra” (Cortés Gabaudan eta Ureña Bracero, 2019)—. Darbre-k honela definitzen ditu: “[E]xogenous substances that cause adverse health effects in an intact organism or its progeny consequent to changes in endocrine function” (2014, 323. or.)<sup>211</sup>.

Literatura zientifikoa, ez dago “xenoestrogeno”aren definizio homogeneo bateraturik. Kethan-en arabera, xenoestrogenoak konposatu disruptore endokrinoak dira (KDEak), estrogenoen ekintza imitatzen edo blokeatzen dutenak, hau da, estrogenoen agonista edo antagonista gisa jardun dezakete, batik bat estrogeno-hartzaileekiko (EHak) interakzioaren bitartez (2014, 52. or.). Xenoestrogenoak gainera, Kethan-en aburuz, KDEen barnean leudeke antiandrogenoak ere, zeinak izan baitaitezke agonistak, androgeno-hartzaileak (AHak) aktibatuz, edo antagonistak, androgenoen ekintza eta efektuak ahulduz: “at the steroid receptor level and/or via suppression of testosterone synthesis in fetal [testicular] cells” (Kethan, 2014, 91. or.). Kethan-ek dio xenoestrogenoak eta antiandrogenoak KDE mota desberdinak direla, baina, hala ere, zehazten du efektu antiandrogeniko asko efektu estrogenikoen antzekoak direla. Kimiko disruptore tiroideoek hormona tiroideoen seinale edo efektuekin interferitzen dute, hormona tiroideoaren hartzaileen (HTH) bitartez (Kethan, 2014, 111. or.).

*Journal of Perinatology* aldizkarian xenoestrogenoak eta ama-esneaz idatzitako artikulu batean, xenoestrogenotzat hartzen dira jardura estrogenikoa sortzen duten KDEak, zeinak horretarako EHekin lotzen baitira, edo progesterona ugaritzen eta haren sintesia areagotzen baitute, edo jardura antiandrogenikoa garatzen baitute (Massart, Harrell, Federico eta Saggese,

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<sup>210</sup> Ikus, halaber, *National Agricultural Library Agricultural Thesaurus* (U. S. Department of Agriculture, 2018).

<sup>211</sup> Definizio bat baino gehiago eman dugu “disruptore endokrino”az eta “xenoestrogeno”az, batetik bestera bai baitaude xehetasunak. Darbre-rena, adibidez, interesgarria da, ez baitu sexua (generoa?) erdigunean jartzen eta lehentasuna ematen baitie gorputzen osasunean gertatzen diren efektuei.

2005, 283. or.). Dey, Soliman eta Merajver-ek minbiziaz eta xenoestrogenoez argitaraturiko artikulu batean, zera diote: “These chemicals act like estrogen in the body or disrupt the normal metabolism of natural estrogen and thus act as carcinogens” (2009, 653. or.). Ildo berean, *International Journal of Molecular Sciences* aldizkariko artikulu batean, xenoestrogenotzat hartzen dira agonista edo antagonista estrogeniko gisa jarduten duten KDEak, zeinak horretarako hartzaile esteroideekin edo arilo hidrokarburoekin lotzen baitira (Ndebele, Tchounwou eta McMurray, 2003, 46. or.)<sup>212</sup>.

Doktorego-tesi honetan, “xenoestrogeno” izendatuko ditugu KDE agonista estrogenikoak, antagonista estrogenikoak, antiandrogenikoak eta orobat jarduera estrogenizatzailearen bat dutenak. Dirudenez, xenoestrogenoak dira gaur egunera bitartean gehien aztertu diren KDEak (Kethan, 2014, 20. or.). Xenoestrogenoek gaitasuna dute era honetan jarduteko: “Such receptor-mediated mechanisms has challenged the concepts of classical toxicology because effects can occur at much lower concentrations and actions can be targeted within the cell through the receptor” (Darbre, 2014, 325. or.).

Erabat ezinezkoa litzateke sorturiko produktu eta substantzia xenoestrogeniko guztien eta 1930eko hamarkadatik gaur egunera bitartean eman zaizkien erabileren<sup>213</sup> zerrenda bat egitea. Toxic Substances Control Act-ek (TSCA) erabilera komertzialerako 85.000 kutsatzaile kimiko inguru bildu ditu (U.S. Environmental Protection Agency, 2019)<sup>214</sup>. U.S. Environmental

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<sup>212</sup> EHez, AHek eta HThez gainera, badira beste hartzaile mota batzuk, hala nola arilo hidrokarburoenak (AhHak), zeinak teknoorganismoek toxiko exogenoen aurrean ematen duten erantzunaren kargu egiten diren. “Hidrokarburo aromatiko poliziklikoak (PAHak, ingelesezko siglak erabiliz) konposatu kimikoak dira... batik bat erregai fosilen, zuraren, ikatzaren eta tabakoaren errekuntza bukatugabeen emaitzak” (Vázquez-Gómez, Rubio-Lightbourn eta Espinosa-Aguirre, 2016, 55. or.). Beste askoren artean, AhHek erantzunak ematen dituzte poliklorodibenzo-p-dioxinen (PKDDak) eta poliklorodibenzofuranoen (PKDFak) aurrean. Uste da AhHak, EHak eta AHak elkarren artean komunikatzen direla (Kethan, 2014, 133. or.). Badira beste hormona-hartzaile batzuk ere, hala nola X retinoide hartzaileak (XRHak) eta peroxisoma-ugaltzaileek aktibaturiko hartzaileak (PUAHak). Peroxisoma nukleo definituko zelula eukariotoetan dagoen organulu bat da, zitosolean edo matrize zitoplasmatikoa zelula barneko likido gehienaren osagaia- flotatzen duena eta zenbait funtzio metaboliko betetzen dituena, hala nola, oxidazioa eta hidrogeno peroxidoaren deuseztapena (Megías, Molist eta Pombal, 2017, 6. or.). XRHak A bitaminaren eratorriekin batzen dira (azido retinoikoa, adibidez), zeinak teknoorganismoen hazkuntzan, garapenean eta sistema immunologikoan esku hartzen baitute (Bioteknologiako Zentro Nazionala, 2019). PUAHek gantz-azidoak ehunetan gordetzean eta intulina hormonarekiko sentiberatasunean parte hartzen dute (Abranches, Esteves de Oliveira eta Bressan, 2011, 272. or.; Kethan, 2014, 126. or.). Hartzaileekin batzen diren KDEek zerikusia dute obesitatearekin eta glukosarekiko tolerantziaren nahasmenarekin, eta horrek diabetesa eta gaixotasun kardiobaskularrak garatzea ekar dezake. Sufonato eta monofalato esterrek aktibatzen dituzte hartzaile mota horiek.

<sup>213</sup> Zerrenda luzeago bat nahi izanez gero, ikus: Hass et al., “List of Endocrine Disrupting Chemicals” (2017). Ikus, halaber, Endocrine Society-ren txosten osoa (Gore et al., 2015), zeinean hainbat disruptore endokrino mota, hormona-sisteman jarduteko dituzten moduak eta giza osasunean dituzten efektuak biltzen baitira.

<sup>214</sup> 149 milioi substantzia kimiko organiko eta inorganiko dokumentatzen dira Chemical Abstract Service-ren erregistroan (CAS), 2019ko apirilaren 15eko datarekin (American Chemical Society, 2019). Interesgarria litzateke jakitea haietatik zenbat diren xenoestrogenikoak. Webgunean bilatu dugu, baina ez dugu halako informaziorik aurkitu. Dena den, webgunean eskaintzen den fitxa bete dugu, informazioa eskatzeko, eta honako erantzun hau eman digute: “Our services are pay services. What you are asking would require research. Your school does not have any of our services. You could ask your library administrator to see if they would be



Protection Agency-k (2019) 1.800 substantzia kimiko disruptore endokrino zerrendatu ditu, baina horrek ez du esan nahi besterik ez dagoenik. Ia egunero sortzen da kutsatzaile kimiko berriren bat (Schnoor, 2014, 11019. or.). Haietariko asko, gainera, ezezagunak dira, fabrikatzaileek ez baitute haien berri ematen (Schnoor, 2014, 11019. or.; Blum et al., 2015, 107. or.<sup>215</sup>; Lim, 2019, 27. or.); aurreko kapituluan mikroprozesadoreak fabrikatzeko erabiltzen diren produktu kimikoekin lotuta esan dugunez, fabrikatzaile batzuek ez dute gardentasunez jokutzen, eta horrek halako produktuen existentziari eta konposizioari buruzko ezagutza eza dakar. Horri dagokionez, Howe-k eta beste egile batzuek zera diote: “Information regarding the surfactant components of herbicide formulations is often protected as proprietary information of the manufacturer, which makes examination of individual herbicide products difficult” (2004, 1928. or.).

Nolanahi ere, substantzia garrantzitsuen, zabalduen eta erabilienetako batzuk bildu ditugu, baita halakoak dituzten produktuak eta halakoak erabiltzen dituzten praktikak ere. Era horretan, halako kimiko sintetikoen nonahikotasuna eta multiplizitatea islatzen duen mapa xenoestrogeniko bat marraztuko dugu, eta, era berean, haien izaera koeratzailiaz dakargun argudioa sendotuko. Kimiko xenoestrogenikoen artean daude intsektizida organokloratuak, poliklorobifeniloak edo bifenilo polikloratuak (PCBak), akuifenolak, ftalatoak, parabenoak edo azido parahidroxibenzoikoaren (edo azido 4-hidroxibenzoikoa) esterrak, UVA eguzki-iragazki kimikoak, metaloestrogenoak, dioxinak (PCDDak) eta dibenzofuranoak (PCDFak) edo substantzia per- eta polifluoratuak (PFCak).

Intsektizida organokloratu nagusiak dira: dikloro difenil trikloroetanoa edo 1,1,1-trikloro-2,2-bis(4-klorofenil)-etanoa (DDTa) eta haren analogoak; hexakloroziklohexanoa (HCHA); ziklodienak eta antzeko konposatuak; toxafenoa eta harekin erlazionaturiko konposatuak; eta klordekona (Kepone®). DDTaren analogoen artean, pestizida komertzial hauek daude: dikofola (Kelthane®), Perthane®, Bulan®, DDDa (diklorodifenildikloroetanoa), klorfenetola (DMCA), klorobenzilatoa, kloropropilatoa, difluorodifeniltrikloroetanoa (DFDTa), metoxikloroa –DDTaren ordezkoa eta Estatu Batuetan debekatua 2003an, efektu xenoestrogenikoengatik (U.S. Environmental Protection Agency, 2016)– eta Prolan® (Blum, 2003, 314. or.). Ziklodienen eta harekin erlazionaturiko konposatuei dagokienez, aldrina, isodrina, dieldrina, endrina, telodrina, heptakloroa, isobentzanoa, klordanoa eta endosulfana dauzkagu.

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willing to purchase one of our services such as SciFinder to help with the research” (2019). Interesgarria litzateke etorkizunean ildo horretan sakontzea.

<sup>215</sup> Gainera, substantzia per- eta polifluoroalkilatuei (PFASak) buruzko informazioa ematera presatu dituzte enpresa kimikoak, haien egitura kimikoa, propietateak eta toxikologia barne (Blum et al., 2015, 107. or.).

Konposatu organokloratu horiek oso iraunkorrak dira; poliki degradatzen dira, eta beren igortze-iturritik oso urrutiko eremuak kaltetzen dituzte, distantzia luzeko garraio atmosferikoaren bitartez (TALD) (Roscales et al., 2016)<sup>216</sup>. DDTa eta haren analogoak asko erabili ziren nekazaritzan 1940eko hamarkadaz geroztik, eta, 1970eko hamarkadan debekatu zituzten arren<sup>217</sup>, haien erabileraren ondoriozko hondakinak Ipar Amerikan, Afrikan eta Europan daude (Bettinetti et al., 2011; Ortiz-Santaliestra et al., 2015).

PCBak<sup>218</sup> usu erabili dira 1930eko hamarkadaz geroztik, ekipo elektrikoetan, lubrifikatzaileetan, itsasgarrietan eta pinturetan. Kartzinogenoak ia mundu osoan debekatu zituzten arren XX. mendearen bukaeran, PCBen kutsadurak bere horretan dirau Afrikako herrialdeetan, batez ere hara inportatzen delako beste herrialde batzuetako zabor elektronikoa, hondakin elektronikoak ez direlako behar bezala birziklatzen edo biomasa erretzen delako (Gioia et al., 2014). Hegoafrikan, PCBak transformadore elektrikoetan erabiltzen ziren, hozgarri eta isolatzaile gisa, gutxienik ere 2010era bitartean (Ministry of Water and Environmental Affairs, 2011).

Akuifenolak detergenteak, pinturak, bernizak, estalgarriak, herbizidak eta plastikoak fabrikatzeko erabiltzen dira. 4-nonifenola, akuifenol mota bat, zenbait plastiko mota manufacturatzeko erabiltzen da, hala nola poliestirenoa eta polibinil kloruroak (PVCak). Bisfenol A edo 4,4'-(propano-2,2-diil)difenola (BPA)<sup>219</sup> eta haren eratorriak ere beste akuifenol mota bat dira, munduan gehien ekoiztiko kimikoenetarikoak (Kethan, 2014, 67. or.). Estatu Batuetan, akuifenol mota hori ekoizten zuten bost konpainiek sei bilioi dolar inguru biltzen zuten urtean 2010. urtea baino lehen (Borrell, 2010, 1122. or.)<sup>220</sup>. 1950etik merkaturatzen da, eta plastiko polikarbonatoak eta erretxinak ekoizteko baliatzen, zeinak geruza babesgarri gisa erabiltzen baitira janari- eta edari-latetan, eguzki-betaurrekoetan, hortz-zigilatzaileetan, CDetan, kutxa erregistratzaileetan, Estatu Batuetako dolar-billeteetan, boligrafoetan edo ordenagailuko tinta-kartutxoetan (Vandenberg, 2011, 1265-1268). Egonkortzaile edo antioxidatzaile gisa ere

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<sup>216</sup> Halako pestiziden efektuen eta kalteturiko teknogorpuztasun eta ekosistemen azterketa zabal eta sakonagoa nahi izanez gero, ikus Blus (2003, 313.-339. or.).

<sup>217</sup> Estatu Batuetako Environmental Protection Agency erakundea 1970ean sortu zen, eta, 1972an, DDTaren ia erabilera guztiak debekatu zituen (Mallén Rivera, 2012, 8). Askok diote Rachel Carlsonen eragin handia izan zuela horretan (Mallén, 2012, 3., 4., 8. or.). Toxafenoaren kasuan, haren erabilera guztiak debekatu ziren 1990ean (Agency for Toxic Substances and Disease Registry, 2016).

<sup>218</sup> Badira hormona tiroideoen disruptoreak diren PCBak, baita agonista estrogeniko eta/edo antiandrogenikoak direnak ere, eta AhRen agonista gisa jokatzen dutenak ere (Kethan, 2014, p. 65, p. 115, 135; Rose, 2014, 315. or.).

<sup>219</sup> BPA-ek AHak, EHak (Wetherill, Petre, Monk, Puga eta Knudsen, 2002), eta HTHak eragiten ditu (Moriyama et al., 2002). BPAk eta haren eratorriek animalia-teknogorpuztasunen osasunean (batez ere gizatiarretan) zer efektu duten jakiteko, ikus Kethan (2014, 67.-73. or.).

<sup>220</sup> Saiatu gara datuok eguneratzen estatistika-atarietan bilaketak eginda (Statista-n, adibidez), baina ez dugu informaziorik aurkitu BPAREN irabaziei buruz.

erabiltzen da plastiko mota askotan, hala nola polibinil kloruroetan (PVCak), eta sugaratzeratzaile gisa, ordenagailuen eta beste ekipo elektriko batzuen plaka nagusiak babesteko (Kethan, 2014, 67. or.). Txosten askotan adierazi da BPA-ak lotuta daudela sistema endokrinoko disrupzioekin (Kethan, 2014, 70. or.); kartzinogenoa izan liteke giza teknogorputzetan –eta beste animalia-teknogorputz batzuetan–; erlazioa izan lezake gaixotasun kardiobaskularrekin, obesitatearekin eta diabetesarekin (Vandenberg, 2011, 1265., 1268. or.), eta immunotoxikoa da (Europako Batzordea, 2018, 7. or.), baina, hala eta guztiz ere, Europar Batasunean ez dago debekatuta halako materialik erabiltzea; besterik gabe, neurri zehatz batzuk eta badaezpadako ardura batzuk ezarri dira. Salbuespen bakarra biberioien fabrikazioan eta merkaturatzean aurkitzen dugu, 2011n sartu baitzen indarrean debekua (Europako Batzordea, 2018, 6. or.). Kanadan, haur jaioberrien jostailuen eta biberioien fabrikazioan BPA erabiltzea debekatu zuten 2010ean (Government of Canada, 2019), eta FDAk 2012an debekatu zuen biberioetan eta haur jaioberrientzako beste esne-ontzi batzuetan (FDA, 2018b).

Ftalatoak<sup>221</sup> plastikoetan erabiltzen dira nagusiki. 1920ko hamarkadan hasi ziren ekoizten; kantitate handitan, berriz, 1950eko hamarkadatik aurrera, PVCa sortzearekin batera. Ftalato erabilienak (bis(2-etilhexilo) ftalatoa (DEHPa), diisodezilo ftalatoa (DIDPa), diisononilo ftalatoa (DINPa) eta dibutilftalatoa (DBPa) dira (Hodgson et al., 2015, 277. or.). Plastikoen artean<sup>222</sup>, polietileno tereftalatoa (PET), nonahiko plastiko mota bat, ur-, zuku eta freskagarri-botiletan, elikagai-, farmako- eta krema-ontzietan, eta poliester-zuntzetan erabiltzen da. Dentsitate altuko polietilenoa (HDPE), supermerkatuko poltsetan, izozte-poltsetan, eta esne-, zuku-, xanpu-, detergente-ontzietan eta abarretan. Polibinil kloruroa (PVC) hoditerietan, orotariko ontzietan, mahuketan, zapata-zoletan, kabletan, erloju-uhaletan, jaketan eta abarretan aurkitu daiteke. Dentsitate baxuko polietilenoa (LDPE) paketatze-geruzetan, zabor-poltsetan, laborategiko ontzietan, esne-ontzietan, eramateko kafe-kikaretan, egunkarietan eta abarretan erabiltzen da. Polipropilenoa (PP) frijitu-poltsetan, lorezaintza-ekipoetan, eramateko elikagai-kutxa edo -ontzietan, paketatze-zintetan, albaitaritza- eta farmazia-ontzietan, jogurt- eta ziropa-ontzietan, automobil-osagarrietan, berokietan, diru-billeteetan edo alfonbra-ehunetan aurkitu daiteke. Poliestirenoa (PST) kristal-imitazioetan, jostailuetan, CDetan, kosmetika-ontzietan, estalkietan, janari eramateko elikagaien ontzietan eta arrain-industrian erabiltzen da. Poliestireno hedatua (PS-E), janari-erretiluetan, salgai hauskorrak babesteko ontzietan, eramateko kafearen

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<sup>221</sup> Ftalatoek AHeekin –testosterona-sintesia inhibituz– eta HThekin –hormona tiroideoen antagonista selektiboak dira– interferitzen dute, eta PUAHak ere aktibatzen dituzte (Kethan, 2014, 92., 120., 132. or.).

<sup>222</sup> Halako plastikoek giza teknogorputzasunen osasunean dituzten efektuez gehiago jakiteko, ikus Tyree eta Morrison (2019).

tapetan, zuku-botiletan, mahai-tresnetan eta beste ontzi mota batzuetan. Azkenik, beste plastiko mota batzuek ere badute BPA (Tyree eta Morrison, 2019).

Parabenoak edo azido parahidroxibenzoikoaren (edo azido 4-hidroxibenzoikoa) esterrak –metilo, etilo, propilo, butilo, isobutilo, isopropilo eta benzilo taldeak barne– xenoestrogenikoak dira. Asko erabili izan dira antimikrobiano gisa produktu farmazeutiko, kosmetiko eta gorputz-higienekoetan, baita gehigarri gisa ere janaria kontserbatzeko –haragia zein arraina, olioia zein fruta–, eta, Europar Batasunean, E214-219 gisa etiketatzen dira (Kethan, 2014, 73. or.). Produktu askotatik ari dira kentzen parabenoak.

UVA iragazkiak, hala nola etilhexilo metoxizinamato deritzona (oktinoxato edo oktilmetoxizinamato edo oktilo metoxizinamato –OMC– ere deitua), alkanfor 4-metilbenzilidenoa (4MBC), oxibenzona eta homosalatoa eguzki-kremetan erabiltzen dira, larruazala irradiaziotik babesteko, eta haiek ere badituzte efektu estrogenikoak (Kethan, 2014, 74. or.)<sup>223</sup>.

Beste xenoestrogeno mota bat metaloestrogenoak dira (Darbre, 2014, 323. or.; Kethan, 2014, 75. or.). EHetara eransteko gaitasuna duten metal-ioien artean, aluminioa, antimonioa, merkurioa, nikela, kobaltoa, artsenikoa, kobrea, beruna, barioa, kadmioa, kromoa, selenioa, eztainua eta banadioa<sup>224</sup> ditugu. Nahiz eta beruna produktu batzuetatik baztertu duten –gasolina, pinturak, latak, etab.–, Kethan-ek ohartarazi du ingurumeneko berun-maila industriaurreko mailatik aski gora dagoela (2014, 77. or.). Merkurioa asko erabiltzen da meatzaritzan, galdaketa-industrian, eta ehun-, ore- eta paper-zuriketan eta -desegitean. Bestalde, osagai gisa erabiltzen da aparatu elektriko eta produktu mediko askotan: termometroak, termostatoak, hortz-amalgamak, bateriak, etengailuak, etab. Arsenikoa, esan dugunez, albaitaritzako hainbat farmakotan ageri da –haietariko batzuk debekatuak–.

Azkenaldian, zenbait metalen –zilarra, urrea, zinka, titanoa, kobrea, etab.– nanopartikulek ingurunean eta zenbait teknogorputzasunetan dituzten efektu toxikoak ikertzen ari dira. Halako nanopartikulak gero eta gehiago erabiltzen dira, XXI. mendearen hasieratik, ezin konta ahal produktu eta praktikatan, hala nola katalizatzaileak, biltegitratze-gailuak, farmakoak, gailu nanoelektronikoak, sentsoreak, etab.<sup>225</sup> Thomson-ek eta beste egile batzuek azaldu dute, beren ikerketan erabilitako zapaburuekin loturik, nola jokatzen duten metal-nanopartikula horiek

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<sup>223</sup> Disruptore tiroideo edo kantzerigeno gisa dituzten beste efektu batzuek gehiago jakiteko, ikus Kethan (2014, 74.-75. or.).

<sup>224</sup> Metaloestrogenoek giza animalien eta animalia ez-gizatiarren teknogorputzasunen osasunean dituzten efektuez gehiago jakiteko, ikus Kethan (2014, 75.-78. or.). Ikus, halaber, Hoffman, Rattner, Burton eta Cairns (Ed.) (2003, 373.-500. or.).

<sup>225</sup> Zilar-nanopartikulek *Daphnia Magnan* dituzten efektuez gehiago jakiteko, ikus Pakrashi, Tan eta Wang (2017).

disruptore endokrino gisa: “Although it is difficult to draw any firm conclusions across such a broad array of organisms and nanoparticles, it is clear that these materials can inhibit growth, cause abnormalities, disrupt endocrine signaling, and both accelerate and retard metamorphosis” (2017, 2. or.).

Dioxinak (PCDDak) eta dibenzofuranoak (PCDFak) kloroa erabiltzen duten errauste-eta errektantza-prozesuetan jariatzen diren konposatu xenoestrogenikoak dira, hala nola errausketan eta hondakinen kudeaketan (besteak beste, botikak, hondakin organikoak, elementu arriskutsuak edo hondakin-urak araztearen ondoriozko lohiak), metalak ekoizteko eta berreskuratzeko prozesu metalurgikoetan, edo ikatza, egurra, petrolio-produktuak eta pneumatiko erabiliak erretzean (Institute of Medicine, 2003, 54.-55. or.; Dopico eta Gómez, 2015, 3., 8., 11.-12., 17., 21. or; Europako Batzordea, 2019b). Kloroa darabiltzen prozesu industrial kimikoetan ere isurtzen dira; esate baterako, paperaren eta paper-orearen fabrikazioan; intsektiziden, herbiziden, katalizatzaileen eta beste produktu kloratu batzuen fabrikazioan eta erabileran; PVCaren industrian; eta grafito-elektrododun kloro-instalazioetan (Institute of Medicine, 2003, 56. or.; Rice, O’Keefe eta Kubiak, 2003, 503.-504. or.; Europako Batzordea, 2019). Zura pentaklorofenolarekin tratatzean ere, dioxinak sortzen dira (Europako Batzordea, 2019). Dioxinak eta dibenzofuranoak gizakiak sorturiko kimiko toxikoenentzat hartzen dira (Kethan, 2014, 134. or.)<sup>226</sup>.

Dioxinak badaude orotariko giza animalia-elikagaietan –haragia, arraina, fruta, barazkiak, arrautzak, esnea, zerealak, lekariak, etab.– (Lan, Ingurumen eta Osasun Institutu Sindikala, 2013, 33. or.; Rose, 2014, 318.-321. or.), baita ez-gizatiarretan ere, hala nola pentsuetan (Rivera, 2002, 88.-92. or.). Rose-k honako hau dio dioxinei eta dibenzofuranoei buruz: “[A]re ubiquitously present in the environment and in human tissues even when there is no history of occupational or accidental exposure” (2014, 315. or.). Esposizio hori, berak dioenez, aire-inhalazioaren, absortzio dermalaren edo ur-kontsumoaren bidez gerta daiteke, baina “[m]ore than 90% of human exposure to dioxins typically occurs through the food supply, mainly fish, meat, and dairy products” (2014, 315. or.). TCDDaren kasuan (2,3,7,8-tetraklorodibenzo-p-dioxina), % 98ra igotzen da portzentajea.

Substantzia per- eta polifluoratuak (PFCak) ere, zeinak iragazgaizteko eta mantxa-kontrako gisa erabiltzen baitira mendiko eta eskaladako arropa, bota eta ekipoetan –motxilak, dendak, lo-zakuak, etab.–, xenoestrogenikoak dira. Greenpeacek, zenbait markatako produktuak analizatu –besteak beste, The North Face, Columbia, Patagonia eta Mammut–, eta 40tik 36tan

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<sup>226</sup> Ikus orrialde berean halako konposatuek giza osasunean dituzten efektuak.

aurkituko ditu halako substantziak (2016, 19.-42. or.). 2015ean, komunitate zientifikoko 200 kidek baino gehiagok sinatu zuten “The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)”, nonahiko konposatu kimikoen degradagarritasun motelarekin edo degradagarritasun ezarekin<sup>227</sup> eta horrek animalia-teknogorpuztasun askotan eta ingurunean eragiten dituen efektuekin kezkatu, gobernu eta enpresei eskatzeko haien ekoizpena alaitz gehien mugatzeko eta alternatiba ez-fluorinatuak sortzeko.

PFCak 1930eko urteetan hasi ziren fabrikatzen<sup>228</sup>. Konposatu zaharretako batzuk debekatu egin dira, baina etengabe agertzen dira berriak. Perfluoroalkiloak (PFASak) – substantzia per- eta polifluoratuak dira, eta ezagunenak azido perfluorooktanoikoa (PFOA) eta azido sulfoniko perfluorooktanoikoa (PFOS) dira–, toki guztietan daude: zartaginak, arropa, janari-bilgarriak, apar ignifugoak, hortzetako haria, paper-fabrikazioa, kosmetikoak, eliteko eskiatzaileen eskiak, eguzki-panelak, osagai elektronikoen estalgarriak, eta abar.

2018ko maiatzerako, zientzialariek kalkulu hau egin zuten: “4,730 PFAS-related structures from patent filings and chemical registries, any of which might be in commercial use” (Organisation for Economic Cooperation and Development, 2018). 2017an, Europar Batasunak PFOA, haren gatzak eta kideko substantziak debekatu zituen (Europako Batzordea, 2017). Hala eta guztiz ere, 2020ra arte eta, zenbait kasutan<sup>229</sup>, 2032ra arte jarraitu ahal izango da substantzia horiek fabrikatzen eta merkaturatzen, eta, besteak beste, eperik gabe erabil daitezke inplanteetarako produktu sanitarioak –filmen estalgarri fotografikoak, inprimatzeko papera edo plantxak– eta erdieroaleetarako eta prozesu fotolitografikoetarako substantzia edo nahasketetan. Debekutik salbuetsita daude PFOSak<sup>230</sup> eta haien eratorriak (Europako Batzordea, 2017, 17.-18. or.). PFASekin gertatzen dena da, etengabe substantzia berriak agertzeaz gainera, etengabe aldatzen direla.

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<sup>227</sup> Aslam-ek eta beste egile batzuek diote fluorokarbonoen bizitza atmosferikoa 10.000 eta 50.000 urte artekoa dela (2003, 4358. or.). Fluor-karbono elkarketak “natura”ko erresistenteenatarikoak dira, horregatik ez dira degradatzen molekulak (Lim, 2019).

<sup>228</sup> Gogoratu dezagun fluorra Manhattan Proiektuaren harira ekoitzi eta merkaturatu zela eskala handian lehen aldiz, bomba atomikoa fabrikatzeko (Bryson eta Griffiths, 1997; Dinou, 2006, 1142. or.). Fluorra uranio-isotopoak banatzeko eta ondotik aberasteko erabili zen; horretarako, haren forma gaseosoa –uranio hexafluoruroa, oso-oso toxikoa, uranioa eta fluoruroa konbinatuz osatua– zentrifugatu zen. Prozesu hori bera erabiltzen da energia nuklearreko aplikazioetan.

<sup>229</sup> 2022an, erdieroaleak eta inprimatzeko tintak fabrikatzeko latexezko ekipoetara hedatu zuten debekua. 2023an, ehungintzako produktueta, langileak osasun- eta segurtasun-arriskuen aurrean babesteko; erabilera medikoko ehungintzako produktueta mintzetara; efluenteen ekoizpen- eta tratamendu-prozesuetan, ur-tratamenduetako iragazketarako mintzetara; eta plasmaren nanoestalkietara. 2032an, produktu sanitarioetara (Europako Batzordea, 2017, 17.-18. or.).

<sup>230</sup> PFOSak ez daude guztiz debekatuta Europar Batasunean; haien erabilera kantitate jakin batzuetara murriztuta eta mugatuta dago zenbait artikulutan, hala nola prestakinetan eta ehunkietan. Guztiz debekatuta daude fotolitografia-prozesuetako estalki erreflektiboetan eta estalki fotografikoetan (Europako Batzordea, 2010).

Polibromodifenil eterrak<sup>231</sup> (PBDEak) –ingurumen aldetik oso substantzia kimiko iraunkorrak, nabarmen biometagarriak eta ingurumenetik banatuak– konposatu bromatu mota bat dira, eta asko erabiltzen diraugar-atzeratzaile gisa, eraikuntza-materialetan, elektronikan, altzarietan, motor-ibilgailuetan, hegazkinetan, plastikoetan, poliuretano-aparretan eta ehunkietan. 2006tik, 2002/95/EB Direktibari jarraituz, Europar Batasuneko ekipo elektriko eta elektronikoetan ezin da PBDErik erabili; 2008an, dekaBDEa ere debekatu zen (European Food and Safety Authority, 2019).

Atal oso bat eskaini diegu munduan gehien erabiltzen diren herbizidei: Roundup® herbizidak. Monsanto sortu zituen, 1974an, 2016an Bayer AGk Monsanto erosi, eta gaur egun haiek ekoizten dute (Ribeiro, 2016). Halako produktuek glifosatoa daukate, zeinak efektu antiestrogenikoak eta antiandrogenikoak baitauzka (Gasnier et al., 2009, 188. or.). 2015ean, Minbizia Ikertzeko Nazioarteko Agentziak, zeina Osasunaren Mundu Erakundearen mende baitago, “gizakientzat kantzerigeno izan daitezkeen” produktuen zerrendan sartu zuen glifosatoa (International Agency for Research on Cancer, 2015). Motta, Raymann eta Moran-ek adierazi dute (2018) glifosatoak erleen digestio-sistemako mikrobio-komunitatea asaldatzen duela eta ondorioz erleak zaugarriagoak direla infekzioen aurrean. Hala eta guztiz ere, 2017an, Europako Batzardeak bost urterako berri zuen herbizida hori erabiltzeko baimena (Villareal, 2017)<sup>232</sup>.

Substantzia eta produktu kimikoekin gertatzen den bezala, ezinezkoa litzateke esatea zenbat teknogorputz eta lekutan agertzen diren xenoestrogenoak. Gure asmoa, gainera, ez da horren berri ematea eta xenoestrogenoz koeraturiko teknogorputzasunen taxonomia oso, itxi eta behin betiko bat eskaintzea. Areago, zenbait geltoki ezarri nahi ditugu fluxu estrogeniko planetario horretan, kartografia toxiko estrogeniko zabal, aniztun, ugari eta, neurri batean, zehatz bat osatzeko, eta ikusteko xenoestrogenoz koeraturiko zenbat eta zenbat teknogorputz eta lurralde dauzkagun mundu-bira osoan zehar, gure argudioa indartze aldera<sup>233</sup>. Ingurumen-estrogeno sintetikoak agertu dira eremu hauetan:

Anfibioak: metoxikloroa *Xenopus laevis* igeletan (Pickford eta Morris, 1999); polibromodifenil eterrak (PBDEak) *Rana limnocharis* igeletan, Txinako hegoaldean (Wu et al., 2009). Narrastiak: organokloratuak Niloko krokodiloen arrautzetan (*Crocodylus niloticus*),

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<sup>231</sup> PBDEak antiandrogenikoak dira. Hormona tiroideoen mailak ere asaldatzen dituzte (Kethan, 2014, 92., 118. or.).

<sup>232</sup> Glifosatodun herbiziden erabilera mundu osoan areagotu da; batetik, genetikoki eraldaturiko kultiboek halako produktuei eragindako erresistentziarengatik, eta, bestetik, 2000. urtean amaitu zelako glifosatoaren patentearen babesaren eta horrenbestez glifosatodun produktuak asko ugartu zirelako merkatuan (Howe et al., 2004, 1.928. or.). Besteak beste, Touchdown®; Syngenta AG-rena; Glyfos AU® eta Glyfos BIO®, biok Cheminova, Inc.-renak.

<sup>233</sup> Kontuan hartu espezie eta ekosistema guztiok bost kontinenteetan daudela, bai lurrian, bai itsasoan, bai airean.

Kenian (Skaare, Ingebrigtsen, Aulie eta Kanui, 1991); dikofola, DDTa eta haren metabolitoak aligatorretan (*Alligator mississippiensis*), Floridako Apopka aintziran (Estatu Batuak) (Guillette et al., 1994); p,p9-DDE, p,p9-DDD, trans-nonakloroa, mirexa eta endrina, laku berean eta espezie berean (Guillette et al., 2000); dikofola eta DDTa muskerretan, Texasen (*Cnemidophorus gularis*), Kalifornian (*Uta stansburiana* eta *Sceloporus occidentalis*) eta Floridan (*C. sexlineatus* eta *Anolis carolinensis*) (Estatu Batuak) (Clark, Flickinger, White, Hothem eta Belisle, 1995).

Moluskuak: hamasei farmako (levonorgestrol hormonal eta triklosana, besteak beste), eta parabenoak, sugar-atzeratzaileak eta bisfenol A muskuiluetan (*Mytilus* spp.), txirletan (*Chamelea gallina*) eta ostretan (*Crassostrea gigas*), Tajoren estuarioan (Portugal), Po ibaiaren deltan (Italia) eta Ebroren deltan (Espainiako estatua) (Álvarez-Muñoz et al., 2015); monobutilina (MBT) eta dibutilina (DBT) *Nucella lapillus*etan, Portugalgo kostaldean (Laranjeiro, Sánchez-Marín, Benta Oliveira, Galante-Oliveira eta Barroso, 2018).

Ugaztunak: organokloratuak itsas txakur arruntetan (*Phoca vitulina*) eta itsas txakur grisetan (*Halichoerus grypus*), Norvegian (Ruus, Ugland, Espeland eta Skaare, 1999), eta Mexikoko *Tadarida brasiliensis* saguzarretan (Clark eta Shore, 2001); ftalatoak Mediterraneoko zere arruntetan (*Balaenoptera physalus*) (Fossi et al., 2016).

Arrainak: kadmioa, kobrea, nikela eta zinka perka horietan (*Perca flavescens*) (Giguère, Campbell, Hare eta Couture, 2006); merkurioa korrokoi urrekaretan (*Liza aurata*) (Araújo, Pereira, Cesário, Pacheco eta Raimundo, 2015); PFOSak eta ftalatoak Mediterraneoko atungorrietan (*Thunnus thynnus*), Sardinian (Italia) (Guerranti et al., 2016), eta Mediterraneoko marrazo erraldoietan (*Cetorhinus maximus*) (Fossi et al., 2016).

Hegaztiak: metilmerkurioa *Falco sparverius* belatzetan (Bennett, French, Rossmann eta Haebler, 2009), aliota handietan (*Gavia immer*) (Evers et al., 2008) eta *Phalacrocorax auritus* ubarroietan (Hall et al., 2014); merkurioa arrano buruzurietan (*Haliaeetus leucocephalus*) (Rutkiewicz et al., 2011) eta *Euphagus carolinus*etan (Edmonds et al., 2010); konposatu organokloratuak Hegoafrikako *Circus maurusetan* (García-Heras et al., 2018) eta *Plegadis chihi*aren arrautzetan, Arizonako Colorado ibaian (Estatu Batuak) (King, Zaun, Schotborgh eta Hurt, 2003).

Lurzorua eta artropodoak: deltametrina, dimetoato eta klorpirifos intsektizidak kolenboloetan (*Collembola Folsomia candida*) eta akaroetan (*Hypoaspis aculeifer*), Nigeria eta Tunisiako lurzoruetan (Jaabiri-Kamoun et al., 2017); akuifenolak Ingalaterra Berriko otarrainetan (*Homarus americanus*) (Estatu Batuak) (Laufer, Chen, Johnson, Demir eta Bobbitt, 2012).



Atmosfera: ikusi dugunez, disruptore endokrinoak atmosferan zehar garraiatzen dira, eta, horretaz gainera, Australiako *Chortoicetes terminifera* otien izurriak, adibidez, fenitrotioi pestizida organofosforatua airetik botaz kontrolatzen ditu Australian Plague Locust Commission erakundeak (Australian Government. Department of Agriculture and Water Resources, 2018). Bestalde, badira hidrokarburo aromatiko poliziklikoak (PAHak) eta hidrokarburo aromatiko polizikliko kloratuak (ClPAHak) Tokioko Badiako airean (Japonia) (Ohura, Horii eta Yamashita, 2018).

Landareak: merkurioa, Estatu Batuetako ipar-ekialdeko basoetan (Rimmer et al., 2005); azitromizina, metroprolol, propanolol eta diazepam farmakoak algetan (*S. latissima* eta *L. digitata*), Fureholmen-en, Solund-en (Norvegia) (Álvarez-Muñoz et al., 2015).

Ibai, laku, itsaso eta ozeanoak: merkurioa, Maineko golkoan (Goodale et al., 2010) eta San Frantziskoko Badian (Estatu Batuak) (Eagles-Smith et al., 2008); DDTa lakuen sedimentuetan, Natronen (Tanzania) eta Bogorian (Kenia) (Bettinetti et al. 2011); glifosato herbizida, Frantziako Tech eta Têt ibaietan, eta Agouille de la Mar, Baullaury eta Fosseille ibai txikietan (Conseil Général des Pyrénées-Orientales, 2013; Reoyo-Prats et al., 2017); glifosato, 2,4-D, atrazina, tebukonazole eta imidakloprid pestizidak El Crespo errekan, Buenos Aires probintzian (Argentina) (Pérez et al., 2017). Ozeanoko plastiko eta mikroplastiko kopuru ikaragarriak ere xenoestrogenoen presentziaren berri ere ematen du.

Garbi geratu denez, nahiz eta “disruptore endokrino” zein “xenoestrogeno” terminoak erabili ditugun lan honetan, askoz gehiagotan erabili dugu “xenoestrogeno”. Beste disruptore endokrino motekin alderatuta xenoestrogeno gehiago dagoela ematen duela kontutan hartzeaz gain, nozio honen erabilera lehenesteko arrazoiak utopiko-distopikoak eta analitiko-ärkeologikoak dira. Ingurunearen eta materiaren estrogenizazioa halako ironia historiko bat iruditzen zaigu, kondentsazio metaforiko utopiko eder bat, bere izaera distopikotik banaezina – xenoestrogenizitatea hertsiki lotuta dago toxikotasunarekin eta haren efektuekin–. Planetaren feminizazio gisako horrek kontakizun politiko-zientifiko aurkari eta iraultzaile baten modura jokatzen du testosteronaren hegemoniaren eta gobernuaren errelato heteropatriarkalaren aurrean, zeinean testosterona, hormona erreginatzat, arrakastaren, garaipenaren, indarraren eta boterearen sinonimo gisa hartzen baita. Aldi berean, agerian uzten ditu gure esparru diskurtsibo eta zientifikoen eraketaren erraiak.

Nahaspila planetario ikaragarri toxiko batean murgilduta gaude, armiarma-sare xenoestrogeniko erraldoi batean. Xenoestrogenizitateak eratzten gaitu, bai gu geu, bai ingurunea. Ingurumen-xenoestrogenizitate toxiko partekatu eta koeratzzaileak ezin du atsedetik hartu Antropozenoaren kontakizunean: xenoestrogenoak agente material nabarmen aktiboak dira,

eragiteko ahalmen eta botere handikoak, modu ezagunekoak eta ezagutzeko dauden moduetakoak.

“Antropocene” hitza, antza, Eugene F. Stoermer biologoak erabili zuen lehenbizikoz, 1980ko hamarkadan, diatomeak ikertzean (Haraway, 2016a, 44. or.). Dena den, termino horrek ez zuen ospe handirik izan harik eta Nobel saria irabazi zuen Paul J. Crutzen kimikari atmosferikoa erabiltzen hasi zen arte, Stoermer-ekin bat eginez. Artikulu bat argitaratu zuten elkarrekin: “The ‘Anthropocene’” (2000)<sup>234</sup>. Kontzeptu berri hori asmatzea ekarri zuen ideari dagokionez, giza jardueren –bereziki Gizonarenak– nolakotasunak eta bere efektuen tamainak termino geologiko berri bat eskatzen omen zuten, aro geologiko berri bat izendatzeko (Haraway, 2016a, 44. or.).

Crutzen eta Stoermer-en artikuluan, “gizona” eta “mankind’s activities” aipatzen dira etengabe (2000, 17. or.), lurraren eraldaketaren indar handi gisa, gizakiaren –gizonaren– hedapena, bere kopurua eta Lurraren burutako eraldaketa motak direla eta<sup>235</sup>. Haien artean daude artefaktu teknologikoak sortzea, urbanizatzea, deforestazioa, nekazaritzaren bidez ekosistemak antzaldatzea, azientza kopuru ikaragarri handiak haztea, petrolioa eta ikatza erretzea, toxiko asko eta asko igortzea –SO<sub>2</sub>-a, CO<sub>2</sub>-a eta CH<sub>4</sub>-a, besteak beste– eta berauen ondoriozko efektuak diren berotze globala, ozeanoen azidotzea, orotariko suntsipenak eta ozono-geruzaren zuloa.

Hamar urte geroago, Steffen, Grinevald, Crutzen eta McNeill-ek, Lurraren historiako aro berria “Anthropocene” izendatzearen formalizazioaren defentsan egindako artikuluan, honela azaldu zuten zer biltzen duen zehazki termino honek:

- (i) that the Earth is now moving out of its current geological epoch, called the Holocene and
- (ii) that human activity is largely responsible for this exit from the Holocene, that is, that humankind has become a global geological force in its own right. (2011, 843. or.)

Lurreko bizitzarako funtsezkoak diren karbonoaren, nitrogenoaren, fosforoaren, sulfuroaren eta uraren zikloen aldaketa gizakien partetik “[is] likely driving the sixth major extinction event in Earth history” (Steffen et al., 2011, 843. or.). Hortik, zera ondorioztatu zuten: “Taken together, these trends are strong evidence that *humankind, our own species*, has become

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<sup>234</sup> Stoermer-ek berak esana da: “I began using the term “anthropocene” in the 1980s, but never formalized it until Paul contacted me” (Grinevald, 2007, 243. or.).

<sup>235</sup> Esanguratsua da Anthropocene Working Group-ek (AWG), zeinak Crutzen eta Stoermer-en proposamena garatzen baitu gaur egun, kontzeptualizazio eta terminologia geologiko berriaren alde argudiatzeko erabiltzea “man-made minerals” edo “man-mediated minerals” adierazpideak (AWG, 2017). Adierazpideok biltzen dituen jatorrizko albistea Hall-ek argitaratu zuen (2017), *Scientific American* aldizkarian.

so large and active that it now *rivals* some of the *great forces of Nature* in its impact on the functioning of the Earth system” (Steffen et al., 2011, 843. or.; geuk nabarmendua).

Crutzen eta Stoermer-en artikulu hartan agertu zenetik, neologismoak ospe eta onarpen zabala izan du klima-aldaketaren ikertzaileen komunitatean (Steffen eta al., 2011, 843. or.). 2008rako, munduko zientzialari askok bereganatua zuten termino hori, ofiziala ez izan arren geroz eta ezinbestekoagoa bihurtzen ari zena, eta, era berean, arteari, humanitateei eta gizarte-zientziei buruzko artikulu, konferentzia, performance eta instalazioetan erabiltzen hasi ziren (Haraway, 2016a, 45. or.). Nozioak agerian jartzen zuen geroz eta garrantzitsuagoa eta beharrezkoagoa zela ikustaritze, salaketa eta kontzientziazio lana.

Baina Antropozenoaren kontakizunak, ofizialtasun zientifikoaren dema galtzeaz gainera<sup>236</sup>, kritika zuhur eta sakonak jaso ditu. Andreas Malm eta Alf Hornborg (2014), Haraway (2016a, 2016b) eta Jason W. Moore (2013, 2017, 2018) bat datoz azpimarratzean gure aroko berotze globala, hondamena eta suntsipena ez direla soilik *Homo sapiens*aren ondorioak, baizik eta botere- eta erreprodukzio-sistema kapitalistarenak.

Malm eta Hornborg-en arabera, gaur egungo krisi ekologikoa, zeinean espezieen barneko desberdintasunak gakoak baitira, ez da *antroposen* ondorioa, baizik eta Britainia Handiko industria-iraultzan sorturiko ekonomia fosilarena (2014, 64. or.)<sup>237</sup>. Moore eta Haraway-k, baina, “Capitalocene” terminoa<sup>238</sup> aldarrikatzen dute esanez klima-aldaketa azkarra ez dela ez *Homo sapiens*aren ondorioa, ez energia fosilaren erabilerarena, eta erantzuten diela erlazio-modu kapitalista batzuei, boterea-kapitala-natura patroia batzuei, eta horren jatorria XIV.-

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<sup>236</sup> International Union of Geological Sciences (IUGS) erakundeak 2018ko uztailean jakinarazi zuen onartzen zuela International Commission on Stratigraphy-k (ICS) aro hori “Meghalayarra” izendatzeko egindako eskaera. Holozenoa –hau da, gure aro geologikoa–, beraz, hiru adin edo mailatan bananduta geratu da: Groenlandiarra (duela 11.700 b2k hasia), Northgriptarra (duela 8.326 b2k urte hasia) eta Meghalayarra (duela 4.270 urtetik gaur egunera) (International Commission on Stratigraphy, 2019). Nomenklatura “Antropozeno” ez dela izango jakitean eta zer kontakizun aukeratu zuten ikustean, zientzialari asko haserretu ziren; besteak beste, AWGkoak, 2008tik ari baitziren definizio bateratu bat adostu nahian IUGSek onar zezan (Maslin, 2018). AWGren proposamenean, zeina bat baitzetorren Crutzen eta Stoermer-en ideiarekin, Antropozenoa aro geologiko berritatz hartzen zen, Holozenoaren eta Meghalayarraren ondotikoa, eta haren hasieraren une optimotzat jotzen zen honako hau: “[T]he artificial radionuclides spread worldwide by the thermonuclear bomb tests from the early 1950s” (AWG, 2019). Hala eta guztiz ere, International Commission on Stratigraphy-ren arabera (2019), Mawmluh haitzuloan (Indiaren ipar-ekialdean) espeleotema –estalagmita– batean aurkituriko zuloa lehorte handi baten ebidentzia kimikoa zatekeen, Holozeno berantiarren hasieraren adierazgarri, eta horixe baliatu da aro hori izendatzeko, haitzuloa Meghalayako estatuan baitago. Durhameko Unibertsitateak jaso duenez, lehorteak 200 urte iraun zuen eta Izotz Aroaren ondotik garaturiko nekazari-zibilizazioak kolapsatzea ekarri zuen, baita giza migrazioak ere, Egipton, Grezian, Sirian, Palestinan, Mesopotamian, eta Indus eta Yangzi ibaien haranetan (2018). Hala eta guztiz ere, klima-fenomeno horren frogak zazpi kontinenteetan aurkitu direla baieztatu arren, badirudi Amerikako, Afrikako eta Ozeaniako gizarteak Meghalayarraren azalpenetik kanpo geratu direla.

<sup>237</sup> Steffen-ek eta beste egile batzuek ere zera adierazi dute: “The advent of the Industrial Revolution around 1800 provides a logical start date for the new epoch” (2001, 843. or.).

<sup>238</sup> Haraway-ren arabera, “Capitalocene” terminoa Malm-ek asmatu zuen, Lundeko (Suedia) mintegi batean, 2009an, artean ere Graduko ikaslea zela (2016a, 206. or.). Malm eta Hornborg-ek berek oin-ohar batean diote hautagai gisa kontuan hartzekoa dela kontzeptu hori (2014, 67. or.).

XVI. mendeetako gertaera jakin batzuetan koka genezakeela, hau da, Ingalaterrako eta Herbehereetako nekazaritza-iraultzan eta Abya Yalaren konkistan (Moore, 2017, 596. or.) eta Indiako Ozeanoko XVI. mendeko merkataritza-trukeetan (Haraway, 2016a, 239.-40. or.).

Moore-ren arabera, berotze globala ez da antropogenikoa, baizik eta kapitalogenikoa<sup>239</sup> (2018, 237. or.). *Ekologia mundu kapitalista* baten ondorioa da, eta ekologia horrek ez du “natura”ren gainean jarduten, baizik eta “natura”tik azaleratzen da batik bat. Logika honen ondorioz, energia fosilaren eta kapitalismoaren arteko harremana Malm eta Hornborg-ek planteatzen dutenaren alderantzizkoa da, hau da, gizakiak ingurunearekin daukan harreman berrietatik sortzen da energia fosilaren erabilera, eta ez alderantziz (2017, 595. or.; 2018, 254.-255. or.). Hala, Moore-ren arabera, botere-harremanek, harreman kapitalistek eta beste harreman estrategiko askok eta askok ez dute “natura”ren gainean jarduten, baizik eta bizitzaren sarearen bitartez garatzen dira. Moore-k galdera hauek planteatzen ditu:

Are we really living in the Anthropocene, with its return to a curiously Eurocentric vista of humanity and its reliance on well-worn notions of resource and technological-determinism? Or are we living in the Capitalocene, the historical era shaped by relations privileging the endless accumulation of capital? How one answers the historical question shapes one’s response to the crises of the 21st century. (2013)

Haraway-k, ildo horretan, aldaketa globalaren erlazionaltasuna azpimarratzen du: “And that’s also what’s wrong with the figure of the Anthropos. It’s not a ‘species act’; we’re not doing this as a ‘species’. What is happening that gets called the *Anthropocene* is a situated complex historical web of actions” (2016b, 237. or.). Haraway-k “Kapitalozeno” deritzon aldaketa globala osatzen duten elkarlotutako istorio askotarikoetako bat da, adibidez, plantazio-sistema. Izan ere, ekosistemak eraldatzea ekarri zuen, eta oraindik ere hala da, batik bat Amerikan, Asian eta Afrikan, deforestazioaren, animalien eta bestelako gorputzen suntsipen eta migrazioaren, eta esklabotzaren ondorioz.

“Kapitalozeno”ak, hain zuzen, kapital-fluxu eta -metaketa globalez harago, planetaren eraldaketa horren espezie-aniztasuna azpimarratzen du, hau da, eraldaketan parte hartu zuten eta oraindik ere parte hartzen duten animalia espezie, mikrobio, landare, bakterio, harri, mineral, humus, buztin, harea, onddo, fosil eta gainerako elementu materialen zirkulazioa eta kontzentrazioa, halakorik gabe ezinezkoa izango bailitzateke gaur egun bizi garen mundua ulertzea (2016b, 240. or.). “Kapitalozeno”ak honetaz hitz egiten du: “[S]ystemic stories of the

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<sup>239</sup> Termino honi buruz, ikus Street (2016).

linked metabolisms, articulations, or coproductions... of economies and ecologies, of histories and human and nonhuman critters relentlessly opportunistic and contingent. They must also be relentlessly relational, sympoietic, and consequential. They are terran, not cosmic or blisped” (2016b, 49. or.).

Kapitalozenoak, beraz, sistema erlazional kapitalista batez dihardu, egiteaz eta desegiteaz, espezie eta material anitzeko mundu bat eraldatzeaz, zeinean gizakiak ez baitira protagonista nagusiak. Aldaketa planetarioa, egiaz, Kapitalozeno neoliberalaren emaitza koral bat da, non askotariko agenteek parte hartzen baitute –adibidez, bakterioek, lurra eratzen eta planetan bizirik irauten iaioak benetan–; besteak beste, agente kimikoen, zeinek garrantzi, nonahikotasun eta ekintzarako eta transmutaziorako ahalmen handia baitaukate: xenoestrogenoak eta/edo hormonak. Hormonak eta xenoestrogenoak ezin dira ez ulertu, ez kontzeptualizatu, botere-harremanen logika eta antolamendu sozial eta planetario arrazista, heteropatriarkal, kapitalista eta antropozentriko baten arabera ez bada. Agente toxiko hormonalak harreman-sare batetik azaleratzen dira; harreman horiek bereziki –baina ez eskusiboki– molekula-mailan politika egiteko modu bat dakarte; (tekn)gorputzak –gizatiarrak eta bestelakoak– eta bizitza bera kudeatzeko eta ekoizteko modu bat, diseinu nagusiki arrazista, heteropatriarkal eta kapitalista bat daukaten bioteknologiaren, teknologia kimikoen eta farmakologikoen bitartez –hainbat teknologia multzoren artean–.

Kapitalismoaren fase honetan, planeta osoa toxifikatzera igaro gara. Kontua ez da lehen halakorik ez zegoenik –toxikotasuna ez da berria–, baina drastikoki areagotu dugu haren intentsitatea, ezin konta ahal eta askotariko teknogorputzasunetara hedatzeraino, gizakiak barne. Historiaren une honetan, ekologia mundu osoa toxiko bilakatu da: ekologia mundu kapitalista toxiko bat. Kapitalozenoa imajina genezake gero eta toxikotasun handiagoko aldi edo prozesu gisa, ez bakarrik kapitalaren, haitzen, landare-, onddo-, animalia-teknogorputzasunen, plastiglomeratu eta abarren fluxu eta kontzentrazioari dagokienez, baizik eta baita toxikotasun, hormona eta xenoestrogenizitate zirkulazio eta metaketa globalari dagokionez ere.

Agente toxiko, hormonal eta xenoestrogenikoak mutatu eta ugaltu egiten dira. Modu anitzetan eragiten dute, oraindik ere ezezagunak zaizkigunak asko<sup>240</sup>. Fusionatu, koeratu eta askotariko teknogorputzasunetan barneratzen dira, xuxurla isil batean, usainik gabeko aroma

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<sup>240</sup> Gauza jakina den arren kimiko horiek efektu ugari sortzen dituztela ingurunearen eta landare- eta animalia-teknogorputzasun ugariaren materialtasunean, eta haien osasunean, Endocrine Society-k onartzen du oraindik ere ezezagunak zaizkiola efektu horietako asko: “While some chemicals have been shown to have endocrine-disrupting activity, there are no data on the vast majority of the thousands of compounds in use and in the environment today. Thus, appropriate testing strategies must be developed to consistently and comprehensively examine all chemicals for potential EDC activity. Widely applicable, science-based criteria for identification of EDCs are required” (Gore et al., 2015, 3. or.).

baten bitartez, hautemanekin eta ikusezin, bumeran ekologiko bat balira bezala<sup>241</sup>. Irmo erakusten digute haien izaera suntsiezin, iraunkor eta etengabeki zatigarria. Jostailua ederra bezain arriskutsua zen.

Haraway-k zera dio bere *Ezagutza kokatuetan*:

A corollary of the insistence that ethics and politics covertly or overtly provide the bases for objectivity in the sciences as a heterogeneous whole, and not just in the social sciences, is granting the status of agent/actor to the 'objects' of the world. Actors come in many and *wonderful* forms. (1991, 198. or.; geuk nabarmendua)

Haien bidai, elkarlotze eta mutazioetan, “back to the future” (Schnoor, 2014, 11019. or.) entonatzan duen melodia toxiko bat sortuz, aktoreek Kapitalozeno neoliberalen hartzen dituzten forma “liluragarri” horiek xenoestrogeniko-hormonalak dira. Mel Y. Chen-en arabera, “toxins— toxic figures—populate increasing ranges of environmental, social, and political discourses” (2011, 266. or.). (Xeno)estrogenizitatea toki guztietan dago. Teknogorputzasun xenoestrogeniko bilakatzen gara, modu desberdin eta anizkoitzetan, mamu-dantza teknohexagonal honen erdian, Kapitalozeno neoliberalen.

### 3.3. Teknogorputzen koeraketa xenoestrogeniko sexu-generikoa

Bada xenoestrogeno multzo bat ia oharkabean igaro dena aurreko atalean: farmakoak, bereziki hormonalak. Halako produktu farmazeutikoetan, xenoestrogenoak eta hormonak modu korapilatsu batean elkartzen eta lotzen dira, harik eta bat eta bera bihurtu arte.

Medikamentu xenoestrogeniko horien artean, honako hauek ditugu: pilula antikonzeptiboa, zeinak estrogenoak –sintetikoak edo “natural”ak– eta progestina –progestageno sintetiko bat– baitauzka; antisorgailu hormonal transdermikoak eta bagina barneko eraztunak –norelgestromina progestageno sintetikoa eta etinilestradiol estrogeno sintetikoa askatzen dituzte–; inplante antikonzeptibo azpidermikoak –etonogestrel progestageno sintetikoa askatzen dute–; progestageno-injekzio antikonzeptiboak –medroxiprogesterona azetato progestageno sintetikoa injektatzen da–; umetoki barneko gailuak (UBG) –levonorgestrel progestina askatzen dute–;

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<sup>241</sup> Lehenago azaldu dugunez, fluorokarbonoek eta halako konposatuek iraunkortasun handia dute; horretaz gainera, Blum-ek eta beste egile batzuek azpimarratu dute ez dugula gaitasunik zenbait konposatu xenoestrogeniko suntsitzeko, hala nola PFASak: “The technical capacity to destroy PFASs is currently insufficient in many parts of the world” (2015, 107. or.).

Cenestin®, Enjuvia®, Estratab®, Menest® eta Premarin®<sup>242</sup> farmakoak, besteak beste hormonak ordezkatzeko terapian (HOT) erabiliak menopausiaren “sintomak” tratatzeko, estrogeno-iturri gisa estrogeno “nahikoa” ekoizten ez duten emakume\* gazteentzat, bularreko eta prostatako minbizi mota batzuen sintomak tratatzeko, edo trans\* emakumeentzat\*<sup>243</sup>; hidrokortisona –zeinak kortisol hormona baitauka–, zeinak antiinflamatorio eta ezabatzaile immunologiko gisa funtzionatzen baitu, eta besteak beste minbizia, asma, tiroiditisa, artritis erreumatoidea, dermatitisa, BGBK eta gutxiegitasun adrenokortikala tratatzeko erabiltzen baita; androgenoak (Ah-King eta Hayward, 2014, 2. or.; Álvarez-Muñoz et al., 2015, 5. or.; U.S. National Library of Medicine, 2019); DESa (dietilestilbestrol estrogeno sintetikoa) (Hodgson et al., 2015, 117. or.); flutamida, finasterida, ziproterona edo enzalutamida farmako antiandrogenikoak, zeinak erabiltzen baitira prostatako minbizia, alopezia eta prostatako hiperplasia onbera tratatzeko eta baita baten bat HOTean ere (Kethan, 2014, 98., 154. or.); eta beste medikamentu ez-hormonal batzuk, hala nola paracetamola (Ah-King eta Hayward, 2014, 2. or.).

Substantzia horiek, aurreko atalean adierazitakoekin batera, ugalketaz gain, hormona endogenoak ekoizten dituzten teknogorpuztasunen *morfologia sexualari* (sexo-generikoari?) ere eragiten diote, eta hala berretsi dute erakunde eta organismo askok; besteak beste, Scientific Committee on Problems of the Environment-ek (SCOPE) eta International Union of Pure and Applied Chemistry-k (IUPAC) (Miyamoto eta Burger, 2003) baterako txosten batean edo Endocrine Society-k (Gore et al., 2015).

Arlo sexu-generikoaz eta ugalketa-arloaz harago, disruptore endokrinoek efektu ugari eta askotarikoak dituzte –nahiz eta haietako asko ezezagunak izan– hainbat teknogorpuztasunen eta ingurunearen osasunaren gainean. Doktorego-tesi honetan, efektu horietako batzuk jaso ditugu, hala nola glifosatoaren kasuan, zeina Osasunaren Mundu Erakundeko Minbizia Ikertzeko Nazioarteko Agentziak “gizakiarentzako kantzerigeno posible”tzat hartu baitzuen 2015ean (International Agency for Research on Cancer, 2015); edo behien hazkuntzarako hormona birkonbinatzailearen kasuan, zeina lotuta baitago gizakien prostatako, koloneko eta bularreko

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<sup>242</sup> Premarin® estrona estrogenoaren eta 17 $\alpha$ -estradiolaren sodio sulfatoz, eta zaldi-estrogeno konjugatuz –hau da, behor ernarien gernukoak, hala nola ekilinarene sodio sulfatoa, 17 $\alpha$ -dihidroekilinarene sodio sulfatoa eta 17 $\beta$ -dihidroekilinarene sodio sulfatoa– osatuta dago.

<sup>243</sup> Badira beste farmako konbinatu batzuk erabilera horietarako, hala nola Essian®, Estratest®, Menogen® eta Femtest®, zeinek estrogenoak eta metiltestosterona baitauzkate; PMB®, zeinak estrogeno konjugatuak eta meprobamatoa baitauzka; Premarin®, zeinak metiltestosterona baitauka; edo Covaryx® eta Syntest®, estrogeno esterifikatuz osatuak, hau da, landare-jatorriko estrogenoen konjugatuak –zaldi-azienden osagai biologiko estrogeniko berak dauzkate, salbu 7 $\alpha$ -A8,9-dehidroestronea– eta metiltestosterona. HOTerako, beste erabilera batzuen artean, estropipatoa ere erabiltzen da, estrona sulfatoz eta piperazinaz osatua, zenbait markatakoa, Harmogen®, Improvera®, Ogen®, Ortho-Est® eta Sulestrex®; eta Estragyn 5®, Estrone®, Kestrona 5® estronen injekzioak.

minbiziarekin, eta behien obulutegi kistikoekin, mastitisarekin, akidurarekin, umetokiko asaldurekin eta ultzerekin (Chan et al., 1998; Hankinson et al., 1998; Ma et al., 1999; Kingsworth, 1998, 19). Etilenglikol eterrak, fluoruroa eta beste neurotoxina eta substantzia kimiko kantzerigeno asko dauzkaten erdieroaleen industria mikroelektronikoan lan egiten dutenen artean, tiroideko eta bularreko minbizia, leuzemia, Ez-Hodgkin linfoma eta garuneko tumorea, eta berezko abortuak (Lee et al., 2011, 139., 145. or.; Kim et al., 2014, 99., 101. or.). Munduko toki askotako langileek epaiketak izan dituzte eta salatu izan dituzte multinazional farmazeutiko eta bioteknologikoak, edo elektronikoak. Dewayne Johnson lorazainak Monsantoen Roundup® eta Ranger Pro® produktuekin lan egiten zuen, eta, 2014an minbizia diagnostikatu zioten; zehazki, Ez-Hodgkin linfoma bat. Konpainia salatu –AEBn bakarrik, 9.000 salaketa jarri omen dira Bayer AG-ren aurka<sup>244</sup>, glifosatodun herbizidengatik (Martín, 2019; Peirón, 2019)–, eta epaiketa irabazi zuen, 2018an (Ximénez de Sandoval, 2018). Motta et al.-ek diote, bestalde, glifosatoak erleen digestio-sistemako mikrobio-komunitatea asaldatzen duela eta ondorioz erleak zaugarriagoak direla infekzioen aurrean (2018). Mikrotxipen industriako langileek ere IBM eta Samsung Electronics salatu zituzten, minbiziengatik eta jaioberrien malformazioengatik (Kim et al., 2014, 96.-97. or.). Toxiko xenoestrogenikoek efektu kaltegarriak dituzte ingurumenaren “osasun”ean ere, hala nola klorofluorokarbonoek eta perfluoroalkiloek, zeinek eragina baitute ozono-geruza txikitzean eta berotze globalean (Blum et al., 2015, 107. or.).

Halako substantzia disruptoreen eta haien efektuen irismenetik abiatuta, Ah-King eta Hayward-ek salatu dute, ez toxikotasuna komunikabide eta ikerketa zientifikoetan aipatzen dela, baizik eta modu sentsazionalista batean tratatzen dela komunikazio zientifiko eta periodistiko batzuetan<sup>245</sup>, azpimarratuz toxikotasuna mehatxu bat dela planetako teknogorpuztasun batzuen sexu-genero eta sexualitate (normatibo)entzat eta aipatu gabe utziz haien osasunean eta ingurumenean dituen beste efektu garrantzitsu batzuk (2014, 3.-4. or.). Horren aurrean, egileek zera galdetzen dute: “Why is sex more central than cancer, auto-immune disease, and even death? What cultural nerves... are triggered? And, for those of us with feminist concerns, how do we reorient the debate away from essentialism, sexism, and heteronormativity?” (Ah-King eta Hayward, 2014, 3.-4. or.).

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<sup>244</sup> Reuters agentziaren arabera, 11.200 salaketa izan ziren (Christie, 2019).

<sup>245</sup> Hona hemen egileek aipaturiko izenburu sentsazionalista batzuk, denak ere *National Geographic* aldizkarian argitaratuak (Ah-King eta Hayward, 2014, 4. or.): “Female Fish Develop ‘Testes’ in Gulf Dead Zone (Than 2011)”, “Sex-Changing Chemicals Found in Potomac River (Avasthi 2007)”, “Animals’ Sexual Changes Linked to Waste, Chemicals (Owen 2004)”.



Sexu-desberdintasunaren eta/edo intersexuazioaren desagerpenaren gaineko kezka gutxienez 1985etik sumatzen da eremu zientifikoan. “Estrogenic Effects of Effluents from Sewage Treatments Works” artikuluan, Purdom-ek eta beste egile batzuek zera adierazi zuten:

Following the widespread adoption of hormonal contraception procedures, general concern has been expressed in the popular media about the potential effects of constituents of contraceptive pills entering waste waters and rivers. Scientific concern has also been expressed, particularly on the possible consequences of contamination by estrogens (Richardson and Bowron, 1985; Aherne *et al.*, 1985). (1994, 276. or.)

Wingspread-eko Konferentziako 1991ko Deklarazioaren izenburuak ere, “Chemically-Induced Alterations of Sexual Development: The Wildlife/Human connections”, agerian uzten du zer garrantzia eman zaion sexuaren auziari (Colborn *et al.*, 1997, 259. or.). Horren beste adibide bat *Dictionary of Toxicology*ko “estrogen, environmental”en definizioan aurki daiteke, gorago aipatua. Definizio horretan, xenoestrogenoen eta haien efektuez aipatzen den lehen gauza animalien sexu-garapena eta haren funtzioak dira: “A variety of chemicals in several chemical and use classes with exert estrogenic action, either directly or indirectly, and thereby can impact the sexual development and/or function of animals” (Hodgson *et al.*, 2015, 144. or.)<sup>246</sup>. Bost lerro behera egin behar dugu animalia-teknogorpuztasunen (kasu honetan gizatiarren) gaineko beste efektuen bati buruz ezer irakurtzeko: “Environmental estrogens have been suggested for being responsible for some human health concerns, such as breast cancer, and reproductive problems noted in wildlife populations” (Hodgson *et al.*, 2015, 144. or.). *Endocrine Disruptors in the Environment* liburuan, Kethan-ek disruptore xenoestrogenikoek “organismoetan dituzten efektu sakonak” zerrendatzen ditu –erreparatu haien ordenari eta haietariko zenbatak duten zerikusia sexu-generizazioarekin–: “[A]bnormal development of male and female reproductive tracts, feminization of males, lowered sperm counts, disrupted reproductive cycling and reduced fertility, carcinogenesis, and behavioral change” (2014, 52. or.).

Xenoestrogenoen hainbat animalien sexu-garapen, morfologia eta funtzioetan dituzten efektuei buruzko azterketa ugarien artean, batzuek “imposex” fenomenoak deskribatzen dute eta moluskuei egozten diete, hau da, ezaugarri maskulinoen superinposizioa molusku emeetan. Caciatore-k eta beste egile batzuek (2018, 688. or.), 2002 eta 2013-2015 bitarteko urteetan

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<sup>246</sup> Interesgarria da definizio hori Ah-King eta Hayward-enarekin alderatzea: “Endocrine disruption, as attended to in this essay, is a toxic, expressive, and politically problematic form of corporal-environmental interaction that unravels sex determination” (2014, 1. or.).

Adriatikoko *Hexaplex trunculosa* ikertu, eta kondizio horren beherakada nabarmenaren berri eman zuten, baita emeen antzutasunaren beherakada ere nabarmenagoarena ere; baliteke 2008an konposatu organoestanikoak debekatu izanarekin lotuta egotea, produktu askotan erabiltzen baitziren, hala nola zur eta margoetan, eta ehunkietan, desinfektatzaile eta biozida gisa, eta baita moluskizida gisa ere (National Pollutant Inventory, 2019). Haien arabera, “imposex” delakoa tributilinaren –konposatu organoestaniko bat– efektu azertuena da, eta 260 gastropodo espezieetan baino gehiago aurkitu da. Egileek diotenez, antzutasuna eragin dezake, eta, horrenbestez, populazio baten desagerpena (2017, 268. or.).

Hamza-Chaffai eta Ismail-ek hermafroditismo-kasuak aurkitu dituzte –“hermafroditismo” hitza darabilgu hala erabiltzen dutelako haiek ere beren artikuluan– Gabesko golkoko *Ruditapes decussatus* txirla handian, Tunisiako kostaldean (2010, 23. or.). Ji, Wei, Zaho eta Wu-k, A bisfenolaren eta muskuilu emeen gaineko artikuluan, “genero-desberdintasunak” aipatzen dituzte zuzenean<sup>247</sup>: “These metabolic differences indicated that there exist ed intrinsic (gender-specific) biological differences between male and female mussel gonads. These gender differences at the metabolite level could result in gender-specific responses to toxicant exposures” (2014, 848. or.). Generoaren arauak inposaturiko koherentzia bete-betean islatzen da aipu horretan; areago, egileek diote muskuilu eme eta arren arteko desberdintasunak ez direla generotik edo generoaren ikusmoldeetik sortuak, baizik eta generokoak, hau da, sexua bakarrik ez, generoa ere jotzen da biologikotzat.

Azterketa askotan azpimarratu da zer efektu dituzten xenoestrogenoek anfibio, narrasti eta arrainen morfologia eta gorputz-elementu sexu-generizatueta. Guillette-k eta beste egile batzuek diote Floridako Apopka aintzirako enbrioi femeninoek morfologia obariko “anormala” dutela, folikulu poliobular eta oozito polinuklear ugari dituzten heinean, eta aligator arren enbrioiak Woodruff aintzirako arrek baino hiru aldiz testosterona gutxiago daukatela (1994, 680. or.). Gainera, Apopka aintzirako aligator arren enbrioiak ohi baino zakil txikiagoa eta testikulu ahul eta gaizki antolatuak daukate; egileen ondorioa zera da: “[N]ormal sexual maturation is unlikely” (1994, 680. or.). Apopka aintzirako eta Floridako beste batzuetako kaiman arrek ere zakil txikiagoa eta odoleko androgeno gutxiago dituzte (Crain et al., 1998; Guillette et al., 1999).

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<sup>247</sup> “Sexu-genero” edo “sexu-generizatu” terminoak erabili ditugu Doktorego-tesiaren atal honetan, baita animalia ez-gizatiarren sexuaz edo sexu-morfologiak jarduteko ere, garbi adierazten dutelako zer neurritaraino baldintzatzen edo determinatzen duen generoaz dugun ikusmoldeak sexua esleitu diegun animalien gorputz-morfologiak, haien garapenaz eta haien aukerez dugun ikusmoldea. Ez dirudi artikuluan horretan era honetan erabiltzen denik “generoa” muskuiluez hitz egiten denean. Egia esan, gure ustez, artikulua berresten du zein sakonak diren eta zenbateko eragina duten begirada dualista eta heteronormatibo sexu-generikoak eta haren inposizioak inguratzen gaituen horretan.

Horretaz gainera, azterketa askotan aipatu da dortoken sexu-garapenean “anomaliak” daudela. Van Schmidt, L. Cary, Ortiz-Santaliestra eta Karasov-ek ohartarazi dute *Rana Pipiens* igel arren testikuluen tamaina txikitu egin dela (2012, 347. or.). Bildu izan den beste fenomeno bat belarri gorriko dortoken sexu-“alderantzikatzea” da, PCBek eragina; alegia, feminizazioa eta emeak garatzea arrak garatu ohi diren tenperaturetan<sup>248</sup> (Bergeron, Crews eta McLachlan, 1994, 780. or.). Tamschick-ek eta beste egile batzuek gonada-“urritasunak” –gonada txikiak– eta sexu-“alderantzikatzeak” –emeak maskulinizatzea edo arrak feminizatzea– aurkitu dituzte *Xenopus laevis*, *Hyla arborea* eta *Bufo viridis* anuroetan, zeinek A bispenola eduki ohi baitute inguruan; dena den, ohartarazi dute espezieen desberdintasunak ere kontuan hartu behar direla eta ez dela behar baino azkarrago eta frogarik gabe orokortu behar (2016, 289. or.).

Arrain hermafroditak aurkitu dira –“hermafroditak” hitza darabilgu hala ageri delako artikuluan; bestalde, ez da zehazten ez zenbakirik, ez kopururik– hondakin-uren instalazioetako efluenteetan, Ingalaterran (Purdom et al., 1994, 275. or.), eta intersexualitate-maila altua errutiloetan, Erresuma Batuan, Jobling, Nolan, Tyler, Brighty eta Sumpter-en “Widespread Sexual Disruption in Wild Fish” artikuluan jasotzen denez (1998, 2.498. or.).

*Huffington Post*eko artikulua baten arabera, baliteke, parte batean, elikagaien bidez hormonak irenstearen ondorioa izatea haurrak pubertaroan hain goiz sartzea –duela belaunaldi bat edo bi baino goizago–; nolana ere, artikulua berean, ahotsa ematen zaie aukera hori ukatzen duten beste zientzialari batzuei (Storrs, 2017).

Ingurunearen feminizazio ustezko edo hipotetikoak eta arren sexu-diferentziazioa gero eta lausoagoa izateak dakarten kezka dihardu “Environmental xenoestrogens, antiandrogens and disorders of male sexual differentiation” artikulua: “There is great concern that the incidence of congenital disorders of male sexual differentiation is increasing. Several reports indicate an increase in the prevalence rates of cryptorchidism, hypospadias, and micropenis” (Sultan et al., 2001, 99. or.). Artikulu horretan –ez baita ikerketa bat–, giza teknogorputzen “normal sex differentiation”, “disorders of male sex differentiation” eta “adverse trends in male sexual differentiation” aipatzen dira. Deigarriena da zer larritasun eta urduritasun eragiten duen asaldura xenoestrogeniko posible batek, zalantzan jar baitezake maskulinitate heteronormatiboaren eta haren sexu-ezaugarrien iraunkortasuna. Atal honetan aipatu ditugun ikerketa eta/edo artikuluetan, arren ustezko feminizaziotik datoz arazoak eta kezka: testosterona-ekoizpen txikiagoa, androgeno gutxiago odolean, eta zakil eta testikulu txikiagoak eta gaizki antolatua.

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<sup>248</sup> *Trachemys scripta* belarri gorriko dortoketan, sexu-determinazioa tenperaturaren arabera da: 31 °C-ko tenperaturetan, emeak sortzen dira; 26 °C-an, berriz, arrak. Tarteko tenperaturetan, 29-30 °C artean, askotariko eme eta ar ratioak sortzen dira (Wibbels, Bull eta Crews, 1991, 371. or.). Kasu honetan ere, bigarren kapituluaren genioen bezala, hormonek eta xenoestrogenoek badute sexu-determinazioa aldatzeko ahalmena.

Ildo horretan, gizonen ugalkortasun-arazoak bildu ditu World Wide Fund For Nature-k (2004). Espainiako estatuko zenbait komunikabidetako titularretan, ikusten da zer-nolako alarma piztu den gizonen espermatozoide kopuruak behera egin duelako. ABCn, adibidez: “Espermatozoide kopuruak nabarmen behera egin du mendebaldeko herrialdeetan” (Ramírez de Castro, 2017)<sup>249</sup>. *El Mundo* are alarmistagoa da: “Espermatozoide kopuruen beherakadak desagertze-arriskuan jarri du gizakia, ikerketa baten arabera” (*El Mundo*, 2017)<sup>250</sup>. Bi artikulu horietan, Levine-k eta beste egile batzuek egindako berrikuspina eta metaanalisia aipatzen dira; zehazki, 1981etik 2013ra bitartean PubMed/MEDLINE eta EMBASE ikerketa biomedikoen datu-baseetan gizakien esperma-kontzentrazioei buruz ingelesez argitaraturiko azterketak analizatu dituzte (2017). Horretaz gainera, esperma-kontzentrazioen (SC) eta esperma-zenbaketa totalen (TSC) 244 zenbatespen egin dituzte, 1971tik 2013ra bitartean egindako 185 azterketatan oinarrituta, zeinetan 42.935 gizonen esperma-laginak aztertu baitziren. Levine-ren eta beste egile batzuen ondorioa hau da: “Sperm counts whether measured by SC or TSC declined significantly among men from North America, Europe and Australia during 1973–2011, with a 50–60% decline among men unselected by fertility, with no evidence of a ‘leveling off’” (2017, 9. or.).

Egileek, bestalde, azaldu dute espermatozoide kopurua murriztea zenbait faktoreekin lotu izan dela; adibidez, jaio aurretik kimiko disruptore endokrinoekin kontaktuan egotea, edo, umetoki barneko ugalketa-garapen maskulinoaren kasuan, haurdunaren tabakismoa. Helduaroan, pestizidekiko esposizioak eta “life-style changes” delakoek zerikusia izan dezakete (Levine et al., 2017, 9. or.). Modu honetan, “a decline in sperm count might be considered as a ‘canary in the coal mine’ for male health across the lifespan. Our report of a continuing and robust decline should, therefore, trigger research into its causes, aiming for prevention” (Levine et al., 2017, 9. or.).

Aurretik, Ah-King eta Hayward-ek oharatarazi zuten nolako beldurra erakusten duten kimikoen eraginez mutikoen feminizazioa eta neskatoen maskulinizazioa baieztatzen duten erakunde, instituzio eta egileen errelatoek (2014, 4. or.)<sup>251</sup>. Beldur hori adierazten duten izenburuen adibide gisa, egileek aipatzen dituzte Doktorego-tesi honetan behin baino gehiagotan aipaturiko *Our Stolen Future: Are We Threatening our Fertility, Intelligence, and Survival?* (Colborn et al., 1997) edo *The Feminization of Nature: Our Future at Risk* (Cadbury, 1998). Hala eta guztiz ere, Ah-King eta Hayward-ek Barbara Seaman-en adierazpenak ere gogora

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<sup>249</sup> Jatorrizko testua: “Cae en picado el número de espermatozoides en los países occidentales”.

<sup>250</sup> Jatorrizko testua: “La bajada de la cantidad de espermatozoides pone en peligro de extinción al ser humano, según un estudio”.

<sup>251</sup> Zehaztu dezagun, dena den, Greenpeacearen kasuan –egileek aipaturiko erakunde bat– ez dela ematen urtearen eta aipuari dagokion dokumentuaren erreferentziarik.

ekartzen dituzte, *The Greatest Experiment Ever Performed on Women: Exploding the Estrogen Myth* liburuaren egilea –National Women’s Health Network<sup>252</sup> delakoa ere sortu zuen, 1975ean, Phyllis Chesler, Belita Cowan, Alice Wolfson eta Mary Howell-ekin batera, eta DESaren arriskuak azaleratu zituen–, aurreko izenburuak ñabartzeko:

Nobody can be sure whether environmental estrogens lie behind the quadrupling of infertility rates since 1965; if the sea of estrogens in which we live explains the fact that sperm counts are half of what they were in 1940; and if, like intersex fish and mutant frogs, male humans might begin to morph into women. (Seaman, 2003, 222. or.; Ah-King eta Hayward, 2014, 4. or.-an aipatua)

Aurreko kapituluan azaldu dugunez, DESa bularreko minbiziarekin, jaioberrien heriotzarekin, antzutasunarekin, abortuekin, menopausia goiztiarrarekin, neoplasia zerbikal intraepitelialarekin –zelula ezkatatsuen hazkuntza ezohikoa eta minbizi-aurrekoa umetokilepoan– eta baginako edo zerbixeko adenokartzinomarekin lotu izan da, besteak beste (Howell, 2012; DES Action, 2019; Centers for Disease Control and Prevention. U. S. Department of Health and Human Services, 2019a). Brain Organization Theory-ren arabera –laugarren kapituluan aztertuko dugu xeheki–, umetokian egon bitarteko DESarekiko eta beste “medikamentu” estrogeniko batzuekiko esposizioak eragin dezake transexualitatea (Ostertag, 2016, 113.-115. or.).

Xenoestrogenoek eta/edo disruptore endokrinok teknogorputzasunetan<sup>253</sup> eta ingurunean dituzten efektu zinez kaltegarrien errealitate zabal eta askotarikoaz harago eta harekin batera, azaldua dugunez, Ah-King eta Hayward-ek nabarmendu dute maskulinitatearekin loturiko ezaugarri jakin batzuk –espermatozoida kopurua jaitea edo genitiletako malformazioak areagotzea– ahultzeko eta/edo itxuragabetzeko aukera izateak antsietatea eta beldurra eragin dituztela, antza arriskuan jarriko bailukete maskulinitate hegemonikoaren supremazia (2014, 5. or.). Alde horretatik, zera diote: “What is unveiled here is a preoccupation with vulnerability of masculinity, maleness, and manhood, those precious commodities of any patriarchal system” (2014, 5. or.). Egileek azpimarratu dute ez dutela esan nahi arrazoirik ez dagoenik ekintzarako, baizik eta gorago erakutsi ditugun titularren gisakoek eta zenbait ikerketa zientifikok erakusten

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<sup>252</sup> Ikus The National Women’s Health Network’s Founders (National Women’s Health Network, 2019b).

<sup>253</sup> Bigarren kapituluan, “teknogorputz” nozioa “teknogorputzasun-subjektibitate” nozioarekin konbinatu dugu. “Subjektibitate” ere hainbat aldiz agertu da. Bigarren kapituluan teorizatu dugunaren arabera, Doktorego-tesi honetan ez dugu subjektibitatea gizakiaren esparrura murrizten; hala eta guztiz ere, atal honetan, ez dugu “subjektibitate” terminoa azpimarratu nahi izan animalia-teknogorputzasunen sexu-generizazioaz ari garela, antropomorfismoa ez areagotzeagatik. Bestalde, giza teknogorputzez aritzeko “teknogorputz” terminoa, besterik gabe, erabili dugu kapitulu honetan, behin baino gehiagotan.

dutena giza sexu-generoaren, bereziki maskulinoaren deskribapen bat dela, “under siege, endangered, and threatened” dagoena (Ah-King eta Hayward, 2014, 5. or.).

Irakurketa horren aurrean, eta beste egile batzuen teorizazioekin bat eginez –adibidez, Alaimo eta transgorpuztasunaren kontzeptua, gorpuztasunek ingurunera duten irekieraren eta gorputzen eta ingurunearen arteko koeraketaren berri ematen duena; edo Haraway, bestek beste–, Ah-King eta Hayward-ek proposatzen dute xenoestrogenoak eta, zentzu zabalago batean, disruptore endokrinoak gure eta gureez haraindiko sexu-generoen koeratzaitzat hartzea, ingurunearen koeraketa-prozesu jarraitu eta aldibereko batean:

Our material culture—as expressed by what objects we encircle ourselves with, the food we eat, the water we drink, the hormones we and our food industries gush into our surroundings, the air we breathe, the perfumes, soaps, shampoos and lotions we use, how we utilize our bodies—all becomes part of the process of sexing. (2014, 7. or.)

Alegia, begirada dualista heternormatiboa eta sexu-generoari eta sexualitateari buruzko ulermen normatiboa alde batera utzi, eta sexua, sexu toxikoa, sexu-toxikotasuna –“sexu” diogu, eta ez “sexu-genero”, hala darabiltelako egileek; haien helburua sexua modu desgenerizatu batean ulertaraztea edo ikusaraztea delako, edo, hobeki esanda, sexua interpretatzea generoaren gaineko ikusmolde hegemonikoan ainguratu edo ardaztu gabe<sup>254</sup>– beste era batera ulertzera gonbidatzen gaituzte, hain zuzen ere: “[As] an ongoing process influenced by endocrine disruptive chemicals, describing our shared vulnerability to one another; our bodies are open to the planet” (Ah-King eta Hayward, 2014, 1. or.).

Egileek planteatzen dute kutsadurak eragindako sexu-aldaketak “sexu erreaktibo” (“reactive sex”) eredu dinamikoaren bitartez ulertzea. Ah-King eta Sören Nylin-ek (2010) garatutako eredu honetan, teknogorputzen eraldaketak toxikotasunarekiko erresilientzia ekologikoaren zeinutzat hartzen dira, toxikotasuna araztasunaren ikusmoldeetatik urrunduz: “Rather than reinvesting in purity politics—the hope of some environmental movements—we wonder how resilience and healing can occur in the context of transnational capitalism and its monstrously under-regulated dumping” (Ah-King eta Hayward, 2014, 5. or.).

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<sup>254</sup> Nolanahi ere, deigarria egin zaigu egileek “genero” kontzeptua erabiltzea arrainen kasuan, nahiz behin bakarrik erabili testu guztian zehar: “In the Potomac River (USA), chemicals from industrial and residential sources have caused male bass to produce eggs that can be fertilized by their former gender mates” (Ah-King eta Hayward, 2014, 9. or.).

Sexua emergentziatzko sistema dinamiko bat da ingurunearekin batera, zeina momentu historiko honetan toxiko ere bihurtu baita, kutsaduraren ondorioz. Horrek queerizatorako aukerak ematen ditu, Chen-ek dioen bezala:

I would of course be naive to imagine that toxicity stands in for utopia, given the explosion of resentful, despairing, painful, screamingly negative affects that surround toxicity. Nevertheless, I do not want to deny the queer productivity of toxins and toxicity, quite beyond the given enumerable set of addictive or pleasure-inducing substances, or to neglect indeed to ask after the desires, the loves, the rehabilitations, the affections, the assets that toxic conditions induce. Unlike viruses, toxins are not so very containable or quarantinable; they are better thought of as conditions with effects, bringing their own affects and animacies to bear on lives and nonlives. If we move beyond the painful “antisocial” effects to consider the sociality that is present there, we end in that sociality a reflection on extant socialities among us, the queer-inanimate social lives that exist beyond the fetish, beyond the animate, beyond the pure clash of human body sex. (2011, 281.-282. or.)

Ah-King eta Nylin-ek teorizatzen duten sexu erreaktiboaren ereduaren arabera, sexu-determinazioa “plastikoa” da funtsean, baita genetiko esaten zaionean ere (2010, 234. or.). Ikuspegi eboluzionista batetik, eta sexu dikotomikoen arauaren aurka, egileek diote sexua erreakzio-arautzat har daitekeela<sup>255</sup>, sexu-atributuak fenotipikoki plastikoak izanik. Sexu-aldaketa, -determinazioa eta -desberdintasunak, gehitzen dute Ah-King eta Nylin-ek, itxurari eta portaerari dagokienez, ikaragarri aldakorrek dira teknogorpuztasunetan (2010, 236. or.). Honako hau nabarmentzen dute horren harira:

It is a paradox that all biologists are aware of variation in sex determination, sex change and alternative reproductive strategies, and still we continue to present this variation in terms of a two-sex norm and the deviations from this norm as alternatives and sex role-reversals. (2010, 236. or.)

Horrenbestez, dikotomia natural gisa baino gehiago, edo ezaugarri funtsean diskretu gisa baino gehiago, hobe da, Ah-King eta Hayward-ek dioten bezala, sexua erantzunerako potentzial gisa hartzea, zeina bizitzan zehar aldatuz baitoa eta ingurunearekiko interakzioaren araberkoa baita (2014, 6. or.). Horixe gertatzen zaie, esate baterako, itsas harrei, krustazeo

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<sup>255</sup> Ah-King eta Nylin-ek diotenez, sexuaren kontzeptua erreakzio-arau gisa ulertzea ez da batere berria, ezaguna baita sexu-determinazioaren arloan edo sexuz aldatzen duten espezieekin diharduten zientzialarientzat, baina ez zaio behar bezalako garrantzia eman, ez portaeraren zientzietan, ez zientziaren komunikazio sozialean (2014, 236. or.). Horretaz gainera, zera gehitzen dute egileek: “In addition, recent findings on the molecular genetics of sex determination and sex-limited gene expression illustrate that the reaction norm perspective is ultimately more correct than the view of sex differences as something genetically pre-determined” (2014, 236. or.).

espezie batzuei (adibidez, *Daphnia Magna*), anfibio- eta narrasti-teknogorpuztasunei, arrainei eta moluskuei, haien sexu-determinazioa ingurumenari lotuta baitago, hau da, tenperaturak, Ph-ak edo ingurune sozialak (menderatze-hierarkiak, taldearen sex ratioa, eta abar) baldintzatzen dute teknogorpuztasunaren sexu-determinazioa. Gainera, Ah-King eta Nylin-ek diotenari jarraituz, sexu-determinaziorako mekanismoak ere malguak dira, eta eboluzioaren historian aldatu egin dira: “In fact genetic and environmental sex determination systems repeatedly evolve from each other” (2010, 240. or.). Areago, espezie batzuek –txibia eta itsas harra, beste molusku batzuen artean, ekinodermoak eta arrain batzuk– behin baino gehiagotan aldatzen dute beren sexua beren bizitzetan zehar (Ah-King eta Hayward, 2014, 6. or.)<sup>256</sup>. Espezie gehienetan, bi sexuek badituzte sexu-diferentziazioari eta hormonen aktibazio eta parte-hartzeari ekiteko geneak; beraz, egileon arabera, bi sexuen ezaugarriak teknogorputz gehienen potentzialtasunaren, “beste zerbait bihurtzeko gaitasun”aren barnean daude: “[S]ex changing, intersexuality and expressing characteristics of both sexes is, for many organisms, part of their species potential” (Ah-King eta Hayward, 2014, 6. or.).

Ah-King eta Hayward-ek honela definitzen dute sexu-potentziala: “An opening out, responsiveness that is ontologically more dynamic than static” (2014, 6. or.). Ikuspegi horretatik, teknoorganismo batzuek sexu-posibilitaterako tarte estua izan ohi dute, hau da, haien potentziala mugatuagoa da, eta beste batzuen, berriz, zabalagoa. Disruptore endokrinoek badute ahalmena edo gaitasuna sexu-aldaketak eragiteko potentzial mugatuko espezie edo teknoorganismoetan ere. Egileek diotenez, azaleratzen diren *transsex* “ezaugarri” eta “sintomak” potentzialtasun edo posibilitate gisa uler daitezke, sexu-desberdintasunaren iterazio gisa baino gehiago (Ah-King eta Hayward, 2014, 7. or.).

Begirada eta ikusmolde utopiko eta distopikoetatik urrunduz, jarrera pragmatikoago batetik eta disruptzio endokrinoak eragiten dituzten produktu xenoestrogenikoak ekoizteko eta kontsumitzeko aginduaren aurrean politikoki erresistentzia egiteko beharrarekin batera, Ah-King eta Hayward-ek proposatzen dute onartzea toxikotasuna eta xenoestrogenizitatea gaur egungo garaiaren ezaugarriak direla, hau da, Kapitalozeno neoliberalerako une garaikide honen ezaugarriak. Horrek zera dakar: xenoestrogenizitatea eta toxikotasuna ere sexuaren baldintza eta elementu koerzatzaileak direla onartzea, sexua prozesu interaktibotzat hartuta betiere. Hala, desagertzeko errealitate eta posibilitateekin batera, mutazioak eta eraldatzeak aurkitzen ditugu. Sexu toxikoak badu potentzial trans\* eta queer bat, sexu-desberdintasun estatiko eta esentziala

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<sup>256</sup> Giza espeziearen kasuan, uler liteke ere teknogorpuztasun batzuek beren bizitzan behin baino gehiagotan aldatzen dutela genero(-sexu)a eta sexualitatea.



eta animalia-erreinua karakterizatzeko erabili izan dugun heteronormatibitatea leherrarazten eta/edo lausotzen baititu.

Halberstam-ek ere kritikatu du (2010, 325. or.) nola zabaldu den gizakiaren ikusmolde sexu-generiko heteronormatibo eta patriarkala beste animalia-teknogorpuztasun batzuetara, eta, horretarako, Jon Mooallem-en artikulua bat aipatzen du, *The New York Times Magazine* aldizkarian argitaratua izenburu honekin: “Can animals be gay?”<sup>257</sup> (2010). Artikulu horretan, egileak zenbait biologo elkarrizketatu zituen; besteak beste, Lindsay C. Young, zeina albatrosa ikertzen ari baitzen 2003tik Kaena Pointeko kolonian, Hawaiiko Oohau uhartean. Young-ek, Marlene Zuk-ekin batera, ikusi zuen albatros bikoteen heren bat emea-emea elkarketak zirela eta 4, 8 edo 19 urte egoten zirela elkarrekin, urteroko zenbaketak egiten hasi zirenetik –albatrosak 60-70 urte bizi ohi dira, eta uste da bizitza guztian egoten direla bikotean eta banaketa kopurua txikia dela–, eta, hala ere, arra-emea konfigurazioak balira bezala deskribatzen ziren. Areago, ikertzaileek bi arrautza aurkitzen zituztenean habia berean –Mooallem-ek dioenez, hala gertatu da gutxienez 1919tik–, nahiago zuten, erabakitzen zuten edo joera zuten pentsatzeko ohi baino gehiago ugaltzen ziren albatros super arrak zirela<sup>258</sup> –albatros emeak, antza, urtean arrautza bat jartzeko gai dira fisikoki, eta txandaka inkubatzen dute 65 egunean zehar (Mooallem, 2010)–. Sekula ez zitzairen burutik pasatu pentsatzea eme bikoteak zirela eta bakoitzak arrautza bat erruten zuela<sup>259</sup>. Alde horretatik, zera dio Halberstam-ek: “The narrative of male super-fertility was more comforting and appealing and so intuitive evidence that contradicts the contorted narratives that scientists put together is ignored because heterosexuality is the ‘human’ lens through which all animal behavior is studied” (2010, 325. or.).

Mooallem-en artikulua argitzen laguntzen du ea portaera lesbianotzat har daitekeen albatrosen parekatze mota hori, Joan Roughgarden biologoaren proposamenaren bitartez, hau da, animalioek “multitasking”tzat jotzea eta hori bera aplikatzea orobat animalia-teknogorpuztasunei, gu geu barne. Horrek zera dakar: guk sexualtzat hartzen ditugun ekintza edo jokabide batzuk komunikazioaren atal bat izan daitezkeela, beste batzuek egokitze-funtzioa izan dezaketela, beste

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<sup>257</sup> Artikuluaren izenburua (maiatzaren 31koa) “Can Animals Be Gay?” da, eta ez “The love that dare not squawk its name”, Halberstam-ek dioen bezala (2010, 325. or.). Aldizkarian, “Jeff Koons: The Love That Dare Not Squawk its Name” izenburua eman zitzaion 2010eko abuztuaren 17an argitaratutako “related coverage”ari, baina beste lan bat da, nahiz hango bi argazki erabili ziren Mooallem-en artikulurako.

<sup>258</sup> Beste azalpen batzuk ere eman ziren denbora luzean zehar; adibidez, emeak txandaka ibiltzen zirela habia berean, edo emeak okertu eta nahi gabe erruten zutela arrautza okerreko habia batean (Mooallem, 2010).

<sup>259</sup> Emeen elkarketaren aurkikuntzak eta kontaketa, hala ere, baditu arazoak: ia eme guztiek arrautza bat erruten dute azaroan, ernalduta ala ez. Aurkitu dira bi arrautzako habiak, edo arrautza bakarrekoak ondoan beste arrautza abandonatu bat dutela, baina, nolana ere, krater-formako habiak txikiak dira, arrautza batentzako modukoak. Apika, albatrosek jakingo dute zein dagoen ernalduta eta zein ez? Gainera, Young-ek dioenez, “[t]hey’ll incubate anything — I have a photo of one incubating a volleyball” (Mooallem, 2010). Kontakizun heteronormatibotik irriteak pentsamendu sortzailea lantzea eta aukera berriak arakatzea dakar.

batzuk bizirik irautera edo ugaltzera bideratuta egon daitezkeela, eta beste asko inprobisatuak izatea. Halberstam-ek adierazi duen bezala, heterosexualitate kanpo geratzen diren jokabide guztiak ez dira nahitaez homosexualak, eta giza optikaren arabera jokabide heterosexualaren estandartzat hartzen denak ere ez du zertan hala izan (2010, 325. or.).

Toxikotasun xenoestrogenikora itzuliz, aldagarritasuna eta multiplizitatea hedatzen ditu, eta, begirada queer batetik, hori aukera bat izan daiteke teknogorputzen egokitzapenerako, jarraipenerako, erresilientziarako eta birsorkuntzarako, eta ez, ikuspegi fatalista eta alarmista batetik, debideratze edo anormaltasuntzat hartzeko, aldaketak eragiten dituzten xenoestrogeniko eta toxiko horiek immunoeskasia, minbiziak eta heriotza ekarrita ere.

Hayward-en aburuz, Doktorego-tesi honetan defendatzen ari garen bezala, xenoestrogenikoa korapilatu egiten da “sexu-hormona femeninoak” definitzen dituzten estrogeno esteroideen –estriola, estradiola eta estrona– errizomarekin: “It therefore twines itself with the lives of transwomen who situate themselves within the milieu of hormonal transition or ‘hormone replacement therapy’ (HRT)” (2014, 255. or.). Hayward-ek dio “xenoestrogenizitate” hitzaren aurretik “trans” aurrizkia jartzeak tentsio emankorrak ekar ditzakeela: “By enacting ‘movements-across-into-strangeness’ that foster new conjugations, allowing xeno- to suggest alternate worldings” (2014, 255. or.). Transak\* lotura egiten du arrotzarekin, bestearekin, kanpokoarekin. Toxikoa ez da besterik gabe bestea, hor kanpoan dagoen zerbait; toxikoa denok gara. Denok gaude toxikotasunak koeratuta eta batuta, mordoilo toxiko batean korapilatuta, gure sexu-generoak barne.

Hortik abiatuta, Haraway-k bezala<sup>260</sup>, estrogenoz, giza teknogorputzasun femeninoz eta behor-teknogorputzez osaturiko konstelazio bat marrazten du, baina, horretaz gainera, xenoestrogenoak eta giza teknogorputz transak\* gehitzen ditu. Premarin® xenoestrogenoa, “PREgnant MAre uRINe”ren akronimoa (‘behor ernarien gernua’), Kanadan fabrikatu zuten lehen aldiz, 1941ean<sup>261</sup>. Haraway-k dioskunez, “by 1997 Premarin became the number-one prescribed drug in the United States, reaching the sales figure of \$2 billion by 2002” (2016a,

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<sup>260</sup> Bigarren atalean, Haraway-ren bigarren cyborg-aren kontzeptualizazioan hormonak sartzeaz jardun dugu, eta 2016an kokatu dugu, *Staying with the Trouble* lanean, baina haren bosgarren atala, “Awash in Urine. DES and Premarin in Multispecies Response-ability”, 2012an argitaratu zen lehenago, *WSQ: Women’s Studies Quarterly* aldizkarian.

<sup>261</sup> Haraway-ren aburuz, bazegoen lehenago Emmenin® izeneko bertsio bat: “[T]he first orally active, water-soluble, conjugated estrogen” (2016a, 111. or.). Kanadako konpainia farmazeutiko batek eta McGill University-ko endokrinologo batek sortu zuten. Emmenin® emakume\* haurdunen gernutik erauzten zen, baina, horretarako, emakume\* haurdun asko behar ziren, eta konpainiak eta ikertzaileek, orduan, iturri emankor eta irisgarriago bat bilatu zuten, Haraway-k azaldu duen bezala. Garai hartan, aleman zientzialariak uretan disolbatzeko moduko estrogenoak ikertzen ari ziren Berlingo zooko zebra eta zaldien gernuan, eta, 1939rako, Ayerst konpainia farmazeutikoak aurkitua zuen metodo bat behor ernarien gernutik estrogeno-kontzentrazio egonkorra lortzeko (Haraway, 2016a, 111. or.).

112. or.). Behorren gernetik isolaturiko estrogenu konjugatuok erabili izan dira “menopausiadun”entzako HOTEan, histerektomia ondoko sintomak tratatzeko, ugalketa-zikloa erregulatzeko, obulutegietako arazoak konpontzeko, prostatako minbizia tratatzeko eta zenbait intersex kondizioetarako. Hayward-ek, halaber, azaltzen du emakume\* transek\* Premarin® erabili izan dutela *transxenoestrogenikoki* (2014, 256. or.). Haraway-ri jarraituz (2016a, 114.-116. or.), egileak azpimarratzen du medikamentu horren erabilera arazo eta gatazka ugariz inguratuta dagoela, behorrek asko sufritzen baitute erauzketan: amaierarik gabeko ekoizpena behartzen dituzte, itxita eta esklabo bihurtuta, eta, horretaz gainera, milaka zaldikume hiltzen dituzte (Hayward, 2014, 256. or.). Kapitulu honen amaieran sakonduko dugu horretan.

Xenoestrogenizitateak eta estrogenizitateak batzen gaituzte, eta arazo gisa planteatzen dituzte teknogorputzen eta espezieen –ez bakarrik animaliak, baizik eta baita landare eta ondoak ere– arteko muga ontologikoak, baita haien eta gainerako materiaren artekoak ere; ez soilik molekula hormonal mota berberetz osatuta gaudelako, baizik eta era berean besteren –kasu honetan, behorren– molekulez osatuta gaudelako: “Conjugated estrogens are about yoking molecules and species to each other in consequential ways” (Haraway, 2016a, 110. or.). Premarin® farmakoa xenoestrogenoa, teknoestrogenoa eta behorren estrogenoa da aldi berean, giza teknogorputz estrogenikoen kontsumorako, tekno-xeno-estrogenikoki koeratuta daudenak. Haraway-rekin bat eginez, Hayward-ek azaldu du *transxenoestrogenesia* “a hothouse of filiations and accountabilities” gisa har daitekeela (2014, 256. or.). Behorrek konfinatzea eta esklabo bihurtzea produktu farmazeutiko estrogenikoak ekoizteko emakume\* transek\* teknobiopolitikaren<sup>262</sup> barnean sorturiko praktikak dira, eta Hayward-ek ondorioztatzen du hormonalki MTF (*male to female*) ibili diren giza gorputzak *trans-espezieak* izan direla beti:

This is a more general state of affairs than commonly recognized, given that estrogens – produced by most vertebrates, some insects, and a number of plants– trans (an active verb, like queer) the boundaries of species, phyla, and kingdoms... There is nothing particularly novel about Premarin’s trans-conjugating sex transition for transwomen as a kind of becoming-with-horse. (2014, 256. or.)

Hasi bezala amaituko dugu atal hau, Hayward-en gisara azpimarratuz Premarin®-ek eta haren familia xenoestrogeniko handiak ez dituztela bakarrik elkartzen emakume\*, emakume\* trans\*, trans\* eta behorren bilakaera koeratzailak, baizik eta haienak eta ingurune guztiarenak, armiarma-sare xenoestrogeniko toxiko erraldoi bat bihurtu dena. Toxikotasun xenoestrogenikoak

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<sup>262</sup> Hayward-ek “biopolitika” erabiltzen du, baina guk “teknobiopolitika” jarri dugu, Haraway-en eta Preciado-ren teorizazioei eta erabilerei jarraituz.

mugak lausotzen, aldatzen eta eraldatzen ditu, ez bakarrik sexu-generoen, teknogorputzen, espezieen, geografien, ekosistemen eta kontinenteen artekoak, baizik eta baita uraren, lurraren eta airearen artekoak ere:

*Transxenoestrogenesis...* can be characterized as a toxic, expressive, resilient, and ethico-politically problematic form of species symbiosis that undoes sex and embodiment as we know it... Things can get worse, and probably will; but life for earthlings is already precarious. *Transxenoestrogenesis...* names but one form of our shared vulnerability to one another, our bodies open to the planet. (Hayward, 2014, 258. or.)

Molekulartasun toxiko, xenoestrogeniko, estrogenikoa planeta-izaerako politika-modu bat ere bada, gure Kapitalozeno neoliberal honetan. Hayward-ek aipatzen dituen prekaritate- eta zaurgarritasun-moduok, halaber, maila molekularrean jarduten duen teknobiopolitikaren efektuak dira, eta, aldi berean, teknogorputzen erlazonaltasun koeratzaitetik eratorriak dira, ingurunearekiko haien irekieran.

### **3.4. Tekno-bio-politika: politikaren bilakaera molekularra Kapitalozeno neoliberallea**

Aurreko kapituluan adierazi dugun bezala, Haraway-k siliziozko txiparen adibidearen bitartez azaltzen du, besteak beste, teknologiaren bilakaera mikroa. Esaten duen arren teknologia mota berri hori eskala molekularrean gauzatzen dela, ez dirudi aldarrikatzen duenik –ez behintzat 2016ko “Awash in Urine”ra arte, edo artikulu-formatuko 2012ko bertsiora arte– teknologia hori eta gorputzak gobernatzeko, kontrolatzeko eta ekoizteko moduak, eta erresistentzia egiteko, esanahi berriak emateko eta eraldatzekoak –haietan baitu jatorria, eta haiek koeratzten baititu– ez bakarrik eskala molekularrean gertatzen direla, baizik eta molekular bilakatzen direla, literalki.

Haraway-k, *Cyborg manifestuan*, azpimarratzen du zer muga dituen Foucault-en biopolitikaren kontzeptuak botere eta politika mota berri honi dagokionez, bere tentakularitate korporatiboak industria militarretik hasi eta gorputz-ekoizpen eta -kudeaketarainoko esparrua hartu baitu:

Modern production seems like a dream of cyborg colonization work, a dream that makes the nightmare of Taylorism seem idyllic. And modern war is a cyborg orgy, coded by C3I, command-control-communication-intelligence, an \$84 billion item in 1984's US defence budget. I am making an argument for the cyborg as a fiction mapping our social and bodily reality and as an imaginative resource

suggesting some very fruitful couplings. Michael Foucault's biopolitics is a flaccid premonition of cyborg politics, a very open field. (1991, 150. or.)

Botereak forma teknologiko ñimiñoa hartu du, ikaragarri nonahikoa eta askotan ikusezina; horregatik, askoz arriskutsuagoa da, eta harremanak eta joko-baldintzak aldatzen ditu, elementu, mugimendu, distortsio eta agindu berriak txertatzen dituen heinean. Mundua kode-arazo bilakatzen da, eta animalia-teknogorputz gizatiar zein ez-gizatiarrak komunikazio-sistema gisa kontzeptualizatzen dira. Orain, gorputzak ez ditu hainbeste botere zientifiko-mediko batek sortzen, kudeatzen, kontrolatzen eta zigortzen, baizik eta botere korporatibo batek; Haraway-k industria bioteknologikoarekin lotzen du botere hori, baina batik informatikarekin eta komunikazio-industriarekin: “The cyborg is not subject to Foucault's biopolitics; the cyborg simulates politics, a much more potent field of operations” (1991, 163. or.). Elementu teknologikoa multinazional handien diskurtsoaren eta produkzioaren osagai nagusietako bat bezala azaleratzen da; multinazional handiek politika kapitalista neoliberalak implementatzen dute, eta bertan txertatzen dira, Foucault-en biopolitika zaharra gaindituz edo moldatuz, zeinak Haraway-ren arabera inplosio momentuan dagoen botere mota bati egiten baitio erreferentzia<sup>263</sup>. Ildo horretatik, zera iradokitzen du Haraway-k: “It is time to write *The Death of the Clinic*” (1991, 245. or.). Preciado-k proposamen hori jaso eta garatu zuen *Testo Yonki* lanean (2008), baita “¿La muerte de la Clínica?” izenburuko konferentzia batean ere (2013).

Haraway-ren kritikari jarraituz, eta horrenbestez “teknobiopolitika” edo “bioteknopolitika” nozioak bere eginez (Haraway, 2003, 9.-11. or.)<sup>264</sup>, baita “eskala molekular” horretan sakonduz ere, Preciado-k azaltzen du botere mota berri baten aurrean gaudela, Haraway-k silizio-makina ñiminoen harira deskribaturikoa baino konplexuagoa, sarkorragoa, ikusezinagoa eta nonahikoagoa, likatsuagoa eta desiratuagoa, gorputz, hazi eta azal bihurtzen dena eta Foucault-ek kontuan hartu ez zuena. Preciado-ren arabera, badira gutxienez II. Mundu Gerraz geroztik argi ikusten diren zenbait eraldaketa garrantzitsu; horrek erregimen-aldaketa ekarri du, eta, horregatik, beharrezkoa da hirugarren botere-jakintza mota bati buruz hitz egitea, Foucault-ek kontzeptualizaturiko tanatopolitiko edo nekropolitikoaz eta disziplinarioaz gainera (2005 [1976], 143.-169. or.; 1979 [1977], 106., 120., 148.-152. or.); Preciado-k, zehazki, botere

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<sup>263</sup> Bigarren atalean azaldu dugun moduan, ohartarazpen kritiko horretan, Haraway-k Foucault-en *The Birth of the Clinic* (2003) (1963), *The History of Sexuality* (1978) (1976) eta *Discipline and Punish. The Birth of the Prison* (1995) (1975) lanei egiten die erreferentzia, besteak beste.

<sup>264</sup> Preciado-k berak zera dio: “Donna Haraway-k nahiago du ‘teknobiobotere’ nozioa, Foucault-en ‘biobotere’ beharrean, ez baikara ari bizitzaren gaineko botereaz (...), baizik eta osotasun teknobizidun konektatu baten gaineko botereaz eta kontrolaz” (2008, 39.-40. or.). Preciado-k, aurrerago “teknobiopolitika” kontzeptua darabil homosexualitatearen eta heterosexualitatearen arteko desberdintasunez hitz egiteko (2008, 41. or.).

“farmakopornografiko” izendatzen du: “Erregimen postindustrial, global eta mediatikoa, zeina hemendik aurrera ‘farmakopornografiko’ izendatuko baitut, sexu-subjektibitatearen gobernu prozesu biomolekularrak (-farmakoak) eta semiotiko-teknikoak (-pornoak) erreferentzia gisa hartuz” (2008, 32. or.; 2013; 2015)<sup>265</sup>. “Bioteknokulturalki” ekoitziriko gorputzak “bizitzaren kondizioa dira aro farmakopornistan” (Preciado, 2008, 43. or.), eta, aro honetan, negozio-modurik onena espeziearen ekoizpena eta kudeaketa da, diosku Preciadok (2008, 44. or.), giza bizitzaz baino askozaz haratago doana.

Eraldaketa nagusi horietako bi dira, batetik, egiaztatze-aparatuen aldaketa –egia ekoizten duten sistema semiotiko-teknikoak, diskurtsoak eta errepresentazioak–: diskurtso zientifiko-medikotik<sup>266</sup> komunikabideetara eta merkatura (Preciado, 2013). Gaur egun, “egia zientifiko-mediko”arekin batera, “egia korporatiboa” –hau da, etekin ekonomikoa lortzea– da teknogorputzasunen eta subjektibitateen ekoizpena eta kudeaketa zuzentzen duen boterea-ezagutzaren instantzia, eta, horretarako, komunikabideak eta publizitatea ezinbesteko tresnak dira<sup>267</sup>. Bigarren aldaketa garrantzitsua gorputzasunak eta subjektibitateak berak ekoizteko eta kontrolatzeko teknologietan gertatu da. Gorputza ez dute boterearen kanpo-arkitekturek ekoizten eta gobernatzen –kartzela, psikiatrikoa, ospitalea...–, baizik eta boterea bera bizi eta infiltratzen da gorputzetan, eta barrutik ekoizten ditu gorputza eta subjektibitatea (Preciado, 2008, 66. or.). Boterea mikroa eta barrukoa da orain: gorputz, materialtasun eta subjektibitate bihurtu da. Horrenbestez, subjektibitate-teknogorputzasunak kontrolatzeko eta ekoizteko teknologiak

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<sup>265</sup> Jatorrizko testua: “régimen postindustrial, global y mediático, que llamaré a partir de ahora, tomando como referencia los procesos de gobierno biomolecular (-fármaco) y semiótico-técnico (-porno) de la subjetividad sexual (...) «farmacopornográfico»”. Preciado-k “farmakopornografiko” deritzon botere-konfigurazio berri hori agertzeak ez dakar Foucault-en erregimen tanatopolitikoa eta diziplinazkoa desagertzea (Preciado, 2013). Kontrara, hirurak batera bizi dira planetan eta hirurek konplexuago egiten dute gaur egungo egoera politikoa, eta horrek erresistentziatzko, subertsiozko eta eraldaketazko estrategia politiko asko eta askotarikoak eskatzen ditu, zeinak batzuetan kontraesankorrak edo elkarren aurkakoak baitira. Gaur egungo gatazka belikoak –besteak beste, Palestinakoa, Yemengo gerra, Myanmarren gerra rohingya etniaren aurka, Sudango gerra zibila, Irakeko eta Afganistango inbasioa, “koltanaren gerrak” eta haien jarraipena Kongoko Errepublika Demokratikoan–tanatopolitikaren indarraren erakusgarri dira. Desberdintasun sexualaren gaur egungo hegemonia diziplinazko boterearen fruitua eta zeinua da, eta Preciado-k boterearen hirugarren aldaeratzat hartzen duen horrekin batera agertzen da, zeinetan identitate sexu-generikoak eta/edo desberdintasun sexuala ere artefaktu teknozientifiko hormonalek osatuak baitira, eta merkatuko produktu farmakologikoen bitartez kapital bihurtuak. Hiru botere-konfigurazioak elkargainka egotearen eta gaur egungo une historikotik eratorritako konplexutasunaren ondorioz, adibide bat jartzearen, biopolitikak erreproduktzioarako gorputz gisa taxonomizatzen ditu emakumeak\*; aldi berean, teknobiopolitikak hormona-kontsumitzailetzat hartzen ditu eta feminizidioak bezalako nekropolitika moduen objektu ere bilakatzen dira gorputzok.

<sup>266</sup> Haraway-k iragarri zuen klinika hila zela, eta ideia hori jaso eta garatu zuen Preciado-k; Foucault-entzat (2005) (1976), sexu-subjektu modernoaren ekoizpena diziplinazko erakunde mediko-juridiko multzo batean gauzatzen da diziplinazko gizartean, eta, haien artean, paradigmatikoak dira klinika, haren diziplinazko begirada eta sexualitateaz egiten duen taxonomia (2005) (1976).

<sup>267</sup> Adibide bat ematearren, Watkins-en arabera konpainia farmazeutikoak kontsumitzaileentzako publizitate zuzenean inbertituriko diru kopurua 1989ko 12 milioi dolarretatik 1999ko 1.580 milioi dolarretara igo zen AEBN (2010, 247. or.). 1998an, 37,1 milioi dolar inbertitu ziren Premarin®-en publizitatean (Watkins, 2007, 247. or.).

kirurgikoak, likidoak, bigunak, hormonalak, molekularrak dira, eta irentsi eta/edo gantzutu egiten dira, materia, ile, haragi, odol eta azal bihurtzen diren arte, haietatik banatu ezin diren arte, eta teknogorputzen egitura tekno-organiko, hormonal, molekularra da “kontrol-sistema horien azken heldulekua” (Preciado, 2008, 67. or.)<sup>268</sup>. Dagoeneko ez gaude errepresio-modu agerikoen aurrean, eta paradoxa da ez dugula boterea irentsi bakarrik egiten, eskatu ere egiten baitugu, irentsi egin nahi dugu.

Boterea-ezagutza harreman berri horiekin batera, beste elementu edo teknologia batzuk azaleratu dira, boterea-ezagutzaren egitura hori osatzen dutenak eta haren ondorio direnak (2008, 81. or.; 2015). Batetik, Doktorego-tesi honen bigarren kapituluaz azaldu dugun bezala, “genero” kontzeptua agertu da, teknogorputz intersexualen kudeaketa medikoaren arloari dagokionez, lehenik, Blair-Bell-en eskutik, eta, gero, modu hedatuago batean, Money-ren eta Hampson anai-arreben eskutik<sup>269</sup> (Dreger, 1998, 166. or.; Mak, 2012, 10.-11., 13. or.; Preciado, 2008, 81.-82. or.), eta trans\* teknogorputzetara ere hedatu da (Preciado, 2015). Preciado-ren hitzetan, honek arriskuan jartzen du sexu-desberdintasunaren errepresentazio-sistema (2013). Bestetik, hormonak sortu dira<sup>270</sup> –kapitulu honetan hitz egingo dugu horretaz–, artefaktu teknozientifiko eta merkatuko produktu gisa; besteak beste, aipagarria da pilula antikonzeptiboa, zeinak jatorri eugenetikoa eta arrazista izan arren sexualitatea eta ugalketa bereiztea ekarri baitzuen, hau da, aurreko erregimenaren eta instituzio heterosexualaren oinarrietako bat (Preciado, 2008, 129. or.; 2013; 2015).

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<sup>268</sup> Jatorrizko testua: “el último resorte de estos sistemas de control”.

<sup>269</sup> Ezbairik gabe, Money-ren eta Hampsondarren lana mugari bat izan zen –Reis-ek honela dio: “Money’s theory enjoyed almost unprecedented acceptance and adherence for decades” (2009, xiv)–, baina haren sustraiak hamarkada batzuk lehenago bilatu behar dira. Alegia, ez zen izan zerbait guztiz berria, baizik eta aurreko ideia eta praktika teknomedikoen bilketa bat, eta, honekin batera, irizpide teoriko-praktiko argi bat ezarri zuten intersex-kasuak tratatzeko, hau da, *rationale* zientifiko bat sortu zuten, jarraitu beharreko corpus teoriko bat eta protokolo bat.

<sup>270</sup> Oso interesgarria eta historikoki adierazgarria da erreparatzea nola “genero” nozioa agertzen den –betiere, Dreger-en eta Doktorego-tesi honetan aztertu dugun bibliografiaren arabera– Blair-Bell-en “Hermaphroditism” artikuluan eta nola zalantzan jartzen duen gonaden irizpidea eta, generoaren –hau da, sexu psikologikoaren (1915, 292. or.)– garrantziarekin batera, hormonien irizpidea ezartzen duen –“barne-sekrezio” deitzen die oraindik– sexuaren konfigurazioan: “It appears probable, then, that all the organs of internal secretion may have a certain definite influence-stimulating or restraining-on the development of special sex-characteristics, both primary and secondary” (1915, 289-290. or.). Fausto-Sterling-en arabera, Blair-Bell-ek lehenbizikoz lotu zituen sexu-desberdintasun sozialak hormonekin (2000, 157. or.). *The sex-complex: A study of the relationships of the internal secretions to the female characteristics and functions in health and disease* lanean, Blair-Bell-ek zera dio: “The essential fact, then, to be borne in mind... is that femininity itself is dependent on all the *internal secretions*. It used to be thought that a woman was a woman because of her ovaries alone; but, as we shall see later, there are many individuals with ovaries who are not women in the strict sense of the word, and many with testes who are really feminine in every other respect... when we speak of the genital functions of the ductless, or *hormonopietic* glands, we refer not only to their influence on the integrity of the uterus... but also on the general metabolism... and on the *psychology* of the individual” (1920 [1916], 4.-5. or.; geuk nabarmendua). Ikus, halaber, Blair-Bell (1920 [1916], 118., 119., 129. or.).

Eraldaketa horien ondorioetako bat da mendebaldeko gorputzaz ez dela hainbeste pentsatzen –hau da, nagusiki, baina ez eskusiboki– langile gisa; Preciado-ren hitzetan (2013), ez “ekoizle/erreproduktore” gisa<sup>271</sup>, baizik eta kontsumitzaile gisa. Hori agerian geratu da 2008ko krisi ekonomikoaz geroztik, “prekariatu” deritzon gizarte-klase berria agertzearekin batera (Standing, 2011). Klase honi, iraupen laburreko eta baldintza benetan prekarioko behin-behineko lanak izan arren, gizartearen erritmo eta maila bertsuan kontsumitzea exijitzen zaio. Prekarizazioaren eta kontsumitzaile gisa gure kontzeptualizazioaren areagotzea garrantzitsua da, kontuan hartzen badugu identitate sexu-generikoak ere produktu farmakologiko-hormonalak kontsumituz eratzen direla.

Preciado-ren “erregimen edo kapitalismo farmakopornografiko” kontzeptuaren azalpen teorikoan sakondu gabe, eta, modu erraz, sinple eta azkar batean esateko, alderdi pornografikoa – eta, horrekin batera, errepresentaziorako teknologiak, agertu zaizkigun arren ez baitira gure ikerketaren xede nagusia– alde batera utziz, farmakoetan jarriko dugu arreta<sup>272</sup>. Datuak esanguratsuak dira. Aurreko ataletan ikusi dugu zenbat antibiotiko kontsumitzen dituzten animalia-teknogorputz gizatiarrek eta, batez ere, ez-gizatiarrek; horrek “antibiotikoen krisi globala” deritzona ekarri du berekin. Aipagarriak dira, halaber, antidepresiboak, intulina, barbiturikoak, anestesikoak, minbiziaren aurkako tratamenduak, analgesikoak, antiinflamatorioak, antialergikoak, immunodepresoreak, diuretikoak, dermatologikoak edo topikoak, dibertimendurako drogak edo medikamentu opioideak<sup>273</sup>, besteak beste. *Expansión*ek Bloomberg-en datuetan oinarrituz 2018ko lehen zazpi hilabetei buruz egindako erradiografia sektorialaren arabera, enpresa teknologikoak daude burtsa-balio handieneko ehun enpresen buruan; 6 bilioi euroko kapitalizazioa daukate guztira, hau da, ehun enpresa kotizatuenen balio osoaren % 33,9 (Mazo, 2018). Haien atzetik, finantza-sektorea dago; 2016an galdu zuen

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<sup>271</sup> Preciado-k adibide gisa jartzen ditu “masturbazioa patologizatetik hura sustatzerako pausoa, teknika telemasturbatorio global bat asmatuz eta onura izugarriko masa-kultura bilakatuz: pornografia” (2015) eta produkzioaren eta erreproduktzioaren kanpora ateratzea (Asia, Latinoamerika, ekialdeko Europa...) (2013), haurdunaldi subrogatuaren gaiarekin ikusten ari garen bezala.

<sup>272</sup> AEBk medikamentutan zenbat gastatzen duen kalkulatzeko, eta gehien agintzen diren farmako eta farmako motak zein diren jakiteko, ikus IQVIA Institute for Human Data Science (2019).

<sup>273</sup> AEBn, gobernuak neurriak hartzen ari da “opioideen krisi”ari aurre egiteko. 1995ean, Purdue Pharma L.P. -k OxyContin® merkaturatu zuen, modu oldarkor batean, minaren aurkako medikamentu opioide bat. Segurutzat saldu zuten arren, konpainiak 634,5 milioi dolar ordaindu behar izan zuen 2007an, aurrekoak bezain farmako adiktiboa zelako. 2017ko urriaren 26an, gobernuak nazio-mailako emergentzia deklaratu zuen “opioideen krisia”. 2018an, Trumpek opioideen programetan 6.000 milioi dolar erabiltzeko baimena eman zuen, 3.000 milioi urte hartarako eta beste 3.000 2019rako (CNN, 2019). U.S. Department of Health and Human Services erakundearen datuak (2018) ikaragarriak dira. 2017an, egunean 130 pertsona baino gehiago hil ziren AEBn opioideekin loturiko farmakoen gaindosiagatik; 42.249 pertsona hil ziren opioide-gaindosiagatik; 2,1 milioi arazoren bat izan zuten opioideen erabilerarekin loturik; 886.000 pertsonak heroina erabili zuten; 11,4 milioi agindutakoak baino opioide gehiago hartu edo gaizki erabili zituzten; eta 17.087 pertsona hil ziren agindutako opioideen gaindosiagatik, 19.413 metadona ez beste opioide sintetikoak hartzeagatik eta 15.469 heroina-gaindosiagatik (U.S. Department of Health and Human Services, 2018).



hegemonia, 3,3 bilioi euroko kapitalizazioarekin, hau da, guztizkoaren % 18,6. Hirugarren postuan, industria farmazeutiko-kimikoa dago, 2,12 bilioi euroko burtsa-kapitalizazioarekin, guztizkoaren % 11,9. Industria farmazeutiko-kimikoa, beraz, urrezko triangeluaren hirugarren elementua litzateke (Mazo, 2018). Energiaren eta telekomunikazioen sektoreak, aldiz, haren atzetik kokatuko lirateke.

The European Chemical Industry Council (CEFIC) erakundearen arabera, 2018an, 3.347 bilioi euroko kimiko-salmentak izan ziren mundo osoan, 2017an baino % 2,5 gehiago (2020, 6. or.). Munduko kimiko-ekoizle handiena Txina da -1.198 milioi euro 2018an-, munduko kimikoen % 35,8 ekoizten baitu; haren atzetik daude Europar Batasuna (% 16,9) eta Estatu Batuak (% 14) (CEFIC, 2020, 6. or.). Brasil, Errusia, India eta Txina herrialde multzoan, munduko kimika-salmenten % 42,5 bildu ziren. Munduko kimiko-salmenten hiru laurden herrialde multzo horretan, Europar Batasunean eta Estatu Batuetan egin ziren; beste laurdena Asiako herrialdeei dagozkie ia osorik, Ekialde Ertaina barne (CEFIC, 2020, 6. or.). Sektore kimikoa -farmazeutikak<sup>274</sup> eta kautxu- eta plastiko-industriak barne- Europako manufaktura-industria indartsuena izan zen 2015ean: balio erantsiaren % 16 bildu zuen, 299,1 bilioi euroekin (CEFIC, 2020, 35. or.). Haren atzetik ditugu makineria eta ekipamendua (201,1 bilioi euro), automobilgintza (200,4 bilioi euro), elikagaigintza (189 bilioi euro), metalgintza (172 bilioi euro), ekipo elektrikoaren fabrikazioa (87 bilioi euro) eta informatika eta elektronika (80,4 bilioi euro) (CEFIC, 2020, 35. or.).

Statista-ren datuen arabera, 2018an, merkatu-balio handieneko 50 konpainien artean zeuden 7 enpresa farmazeutiko: Johnson & Johnson, Inc., 341,3 mila milioi dolarrekin; Pfizer, Inc., 207,7 mila milioi dolarrekin; Novartis AG, 203 mila milioirekin; Roche Holding AG, 189,7 mila milioi dolarrekin; AbbVie Inc., 165 mila milioirekin; Merk & Co., Inc., 160,6 mila milioi dolarrekin; eta DowDupont Inc.<sup>275</sup>, 155,3 mila milioi dolarrekin (2019c).

2018ko merkatu-balio handieneko enpresa farmazeutiko eta bioteknologiko handienak hauek izan ziren: Johnson & Johnson, Inc., AEBkoa, 354 mila milioi dolarrekin; AEBko Pfizer, Inc., 240,7 mila milioi dolarrekin; Suediako Novartis AG eta Roche Holding AG, 212,9 eta 212,2 mila milioi dolarreko balioarekin, hurrenez hurren; AEBko Merk & Co., Inc., 178,2 mila milioi dolarrekin; AbbVie Inc., 154 mila milioi dolarrekin; Amgen Inc., 127,9 mila milioi

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<sup>274</sup> Industria kosmetikoa -higiene pertsonala, lurringintza, etab.-, zeina xenoestrogeno-iturri bat baita, lotuta dago industria farmazeutikoarekin. Horren adibide da 2017an Valeant Pharmaceuticals International, Inc.-k -gaur egun, Bausch Health Companies Inc.- CeraVe®, AcneFree® eta AMBI® aurpegi-kremen markak saldu zizkiola L'Oréal S.A.-ri 3.100 milioi dolarren truke (Bausch Health Companies Inc., 2017).

<sup>275</sup> DowDupont Inc. hiru konpainia independentetan banandu zen 2019ko ekainaren 1ean: Dow Inc., Dupont de Nemours, Inc., eta Corteva Inc. -Corteva Agriscience izenez ezagutua- (DowDupont Inc., 2019).

dolarrekin; Abbott Laboratories Inc., 114,5 mila milioi dolarrekin, eta Ely Lilly & Co., 109,6 mila milioi dolarrekin. Hamargarren postuan, Frantziako Sanofi S.A., 106,7 mila milioi dolarrekin (Statista, 2019d)<sup>276</sup>.

PwC-ren datuei jaramon eginez –munduko lau auditore handienetako bat da–, 2018ko martxoaren amaieran, 15 enpresa farmazeutiko eta/edo bioteknologiko zeuden munduko merkatu-balio handieneko ehun konpainien artean<sup>277</sup>: Johnson & Johnson, Inc. (10. postuan), Norvartis AG (27), Pfizer, Inc. (28), AEBko United Health Group Inc. (30), Roche Holding AG (35), AbbVie Inc. (52), DowDu Pont Inc. (54), Merk & Co., Inc. (55), Danimarkako Novo Nordisk A/S (66), Amgen Inc. (67), Irlandako Medtronic PLC (75), Abbott Laboratories Inc.(83), AEBko Bristol-Myers Squibb Co. (86), Sanofi S.A. (90) eta AEBko Gilead Sciences, Inc. (96) (2018)<sup>278</sup>.

Preciado-ren analisitik jaso eta azpimarratu nahi duguna da gaur egungo kapitalismo mota honek “substantzia kimiko, merkaturako molekula” bihurtzen dituela subjektibitatea, afektuak, identitatea, sexualitatea, sexu-generoa eta desira (2008, 32. or.), hau da, ondasun, kapital bihurtzen dituela. Horregatik azpimarratzen du Preciado-k nolako garrantzia duten multinazional handiek identitatearekin, ugalketarekin, sexu-generoarekin eta sexualitatearekin loturiko gaiak kudeatzeko eta ekoizteko orduan; azken batean, gure intimitate-eremu zabalenean sartzen dira, gure gorputz-etxe edo -aterpean. *Alegia, politikaren, teknobiopolitikaren, eta boterearen, teknobioboterearen, bilakaera molekularra.*

Foucault-en iritiz, panoptikoa –Samuel Bentham ontzigitza-ingeniariak XVIII. mendearen amaieran sorturiko zaintza-arkitektura industrial (Preciado, 2008, 133. or.), gero haren anaia Jeremy Bentham-ek ideia hedatu eta kartzela-egitura bilakatu<sup>279</sup>– diziplinazko gizarteko boterea-ezagutzaren eredu paradigmatikoa zen, zaintzeko, kontrolatzeko eta diziplinatzeko pentsatua zen heinean (1995 [1975], 200. or.). Kartzela-arkitektura mota hartan, ziegak erdiguneko puntu baten inguruan kokatzen ziren, zirkulu bat osatuz, zaintza eta diziplina

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<sup>276</sup> Ohartu gaitezten Statista-ren datuak ez datozela beti bat beraien artean; izan ere, 2018ko munduko 100 konpainia handien zerrendan, balio batzuk esleitu zizkieten konpainia farmazeutiko eta bioteknologikoei, eta beste batzuk urte bereko munduko konpainia farmazeutiko eta bioteknologiko handien zerrendan, balioen arteko aldea oso txikia den arren.

<sup>277</sup> Lehen laurak hauek ziren: Apple, 851 mila milioi dolarrekin; Alphabet, 719 mila milioirekin; Microsoft, 703 mila milioirekin, eta Amazon, 701 mila milioirekin (PwC, 2018). Baliteke datuok aldatu izana, batez ere Amazonen salmentak nabarmen hazi baitira COVID-19aren krisiaren harira. Ikus Neate (2020).

<sup>278</sup> Konpainia horien merkatu-balioak hauek dira: Johnson & Johnson, Inc., 344 mila milioi dolar; Norvartis AG eta Pfizer, Inc., 211 mila milioi bakoitza; United Health Group Inc., 207 mila milioi; Roche Holding AG, 198 mila milioi; AbbVie Inc., 150 mila milioi; DowDuPont Inc., 148 mila milioi; Merk & Co., Inc., 147 mila milioi; Novo Nordisk S/A eta Amgen Inc., 123 mila milioi bakoitza; Medtronic PLC, 109 mila milioi; Abbott Laboratories Inc., 105 mila milioi; Bristol-Myers Squibb Co., 103 mila milioi; Sanofi S.A., 101 mila milioi; Gilead Sciences, Inc., 98 mila milioi (PwC, 2018).

<sup>279</sup> Panoptikoaren adibide ugarien artean ditugu Bartzelonako Modelo kartzela ohia, 2017an itxia; Kubako Isla de la Juventud-eko Presidio Modelo ohia; edo Bogotako kartzela panoptiko zaharra, gaur egun Museo Nazionala.

ziurtatzeko; erdiguneko puntu horretan zegoen dorretik, pertsona bakar batek ziega, preso eta jokabide guztiak zaindu zitzakeen, inork bera ikusi gabe (1995 [1975], 200.-201. or.). Nolanahi ere, gorpuztasun-subjektibitateak ekoizteko eta kontrolatzeko kanpo-teknika hori, panoptismoa, beste arkitektura batzuetara ere hedatu zen, hala nola psikiatrikoa, ospitalea, eskola, kuartela, eta abar (Foucault, 1995 [1975], 199. or.). Halakoetan, zaintza erabat jarraitua ez izan arren, norbera zainduta dagoela eta zainduta egon daitekeela sentitzea nahikoa da ugaritasun sozial batean normaltasuna eta jokabide jakin batzuk ziurtatzeko, multiplizitate sozial horrek hala jokatu baitu zigortua ez izateko. Eta eremu guztietan gertatzen zen hori, bereziki sexu-generikoan eta sexualitatean.

Preciado-k dio panoptikoak gure egunetaraino iraun duela pilula antikonzeptiboaren kaxa zirkularraren bitartez, eta elkarren ondoan jartzen ditu Jeremy Bentham-ek diseinatu eta Foucault-ek jasotako (1995, [1975], 171. or.) panoptikoaren planoaren irudia eta “panoptiko jangarri”arena (Preciado, 2008, 134. or.)<sup>280</sup>. Antzekotasuna harrigarria da. Panoptikoa boterearen kanpo-arkitekturaren eredu adierazgarria zen bezala diziplinazko gizartean, panoptiko jangarri hormonal subjektibitatearen eta materialtasunaren gaur egungo barne-ekoizpeneko eta ekoizpen molekularreko forma eta teknologien eredu adierazgarria da<sup>281</sup>. Dagoeneko ez da hain beharrezkoa banakoak kanpotik zaintzea; haiek barneratzen dituzte gizartearen eta/edo publizitatearen aginduak, denak ere komunikabideetan eta Interneten bitartez zabalduak eta korporazio farmazeutiko eta bioteknologiko handiek finantzatuak. Gaur egun, portaera desiratuak, hormona-kontsumoa barne –haren bitartez koeratzen, finkatzen eta sendotzen dira identitate sexu-generikoak, eta horrek berekin dakar hormonak erabiltzea identitateok eraldatzeko eta iraultzeko–, ez dira hainbeste lortzen kontrolatuz eta zigortuz, baizik eta merkaturatze eta publizitate errepikakor, temati eta are oldarkorraren bitartez, zientziaren autoritateak eta Preciado-ren hitzetan, haren erlijio estatusak, bultzatuta (2008, 33. or.)<sup>282</sup>.

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<sup>280</sup> Monika Arandak, 2019ko maiatzaren 10ean Iruñeko Zitadelako Labean aurkezturiko *Panóptico* erakusketan, Bentham-en panoptikoak gaur egun arte nola iraun duen agertu du. Lan horrek azpimarratzen du Interneten nabigatzen eta informazioa bilatzen dugunean etengabe behatzen gaituztela, eta doan eta borondatez eskaintzen dugun informazioa teknogorpuztasun-subjektibitateen produkziarako eta kontrolerako mekanismo gisa erabiltzen dela eta errentagarritasun handia sorrarazten duela. Egileak berak, zeinarentzat “panoptiko” kontzeptuak definituko bailuke murgilduta gauden aro digitala, honela dio: “¿Miramos, o nos miran lo que miramos?”.

<sup>281</sup> Oudshoorn-ek ere ohartarazi du pilularen barne-izaeraz, barne-prozesu fisiologikoetan esku hartu zuen lehen antikonzeptibo ezaguna izan baitzen (1994, 111. or.).

<sup>282</sup> COVID-19aren krisiak berak ere, krisi biriko, kimiko, molekular, sanitarioa izan arren eta gizarte kapitalista neoliberalen krisi sistemikoa agerian utzi arren –zaintzaren krisia, adibidez–, ez du aldatu eraketa farmako-hormonalaren desesitate egoera hori. Botikak zabalik daude, eta produktu hormonal eta farmakologiko berak erosten segitzen dugu; lehen baino gehiago, gainera. Dena den, krisi honek biztanleria globala are gehiago kontrolatzea ekarri du, estatuen, polizien eta are auzokideen zaintzaren bitartez. Biztanleria kontrolatzeko metodo berrien artean konfinamendua dago, legez dekretatua eta isun ekonomikoez lagundua, edota borondatezkoagoa, herrialdearen arabera; baita eguneroko temperatura-neurketak ere, aplikazio digitalen bidez,

Faktore horiek hormonak kontsumitzeko *desesitate*a sortzen dute, batik bat emakumeengan\*, zeinak halako konpainia eta kanpainen helburu nagusia baitira. Ginekologoaren kontsultara joatean, bertatik bertara bizi izan dugu edo, bestela, lagunei entzun diegu nola, hormonak hartzea pentsatu dugun ala ez galdetu ere egin gabe, begien aurrean jartzen diguten produktu hormonal sorta bat, eta nola galdetzen diguten “beraz, zein aukeratu duzu?”: egunero gertatzen dira halakoak, ez noizean behin. Eta, halako egoeren aurka argudiatzeak eta/edo halako egoerei aurre egiteak –ekin, presio eta desegokitasun handiagoz edo txikiagoz– informazio, kontzientzia eta ausardia dosi handia eskatzen du. Kontuan hartu behar dira, halaber, merkaturatze eta preskripzio oldarkorrak, korporazio handien helburuaren eta etekinak lortzeko temaren ondoriozkoak. Piszczek-ek eta beste egile batzuek zera adierazi dute testosterona ordezkatzeko terapiari buruz: “TRT has been aggressively marketed to both clinicians and patients for non-approved indications such as ‘andropause’ and male sexual dysfunction” (2014, 5. or.).

Pharmacopeia taldeko Susie Freeman ehunki-artistak, David Critchley bideo-artistak eta Liz Lee familia-medikuak sorturiko *Cradle to Grave* erakusketan, agerian geratzen da farmakoen eta, bereziki, hormonaren ugaritasuna eta garrantzia, zeinak panoptiko jangarriaren metafora erabiliz izendatzen baititu Preciado-k. British Museum-en jarri zuten erakusketa, eta honako hau deskribatzen zen azalpenen kartelean: “*Cradle to Grave* explores our approach to health in Britain today and addresses some of the ways that people deal with sickness and try to secure well being” (2016). Zalantzarik gabe, hormonek zerikusi handia dute gure ongizate afektibo, korporal, emozional eta identitarioa kontzeptualizatzeko eta ulertzeko daukagun moduan.

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eta kalera ateratzeko eta saltokietara sartzeko nahitaezkoak diren baimen digitalak; mugen itxiera ere kontrol metodoon artean dago. Kontrol- eta zigor-neurriok agerian uzten dute diziplina-boterea, baina, aldi berean, nekropolitika-dosiak dira, Preciado-k “farmakopornografiko” deritzon hirugarren erregimenarekin batera agertu direnak. Botore handiagoa izango du hirugarren honek COVID-19aren aurkako txertoak agertzen direnean. Diziplina-boterea indartu izana, hala ere, lotuta dago lehen aipaturiko hiru erregimenen aldiberekotasunaren irakurketarekin.



*Cradle to Grave* by Pharmacoepia, British Museum, Londres, 2016

Maite Arraiza Zabalegiren argazkia

Irudian ikusten denez, erakusketan, emakume baten eta gizon baten historia medikoak ilustratu zituzten bi oihal luzetan. Pieza bakoitzean, 14.000 pilula daude, Britainia Handiko herritar bati bizitza osoan zehar agindutako medikamentuen batezbesteko estimatua, kartelean azaltzen den bezala. Tratamendu batzuk komunak ziren bi teknogorpuztasunetan: bion bizitzaren hasieran, K bitamina eta immunizazioak injektatu zitzaizkien, eta biok hartu zituzten antibiotikoak eta analgesikoak bizitzako unereren batean. Baina badira beste farmako batzuk espezifikoak direnak. Gizonaren kasuan, zeina 2016an hila baitzen, ez dago hormona-medikamenturik. Emakumeak, aldiz, pilula antikonzeptiboa hartua zuen gaztaroan, eta HOTA helduaroan. Bularreko minbizia diagnostikatu, eta haren aurkako tratamendua hartu zuen –ez dakigu hormonarik hartu zuen, ez baita zehazten, baina baliteke hala izatea–; 2016an, bizirik zegoen, eta 82 urte zituen. Emakume\* askorentzat, sehaskatik hilobirainoko bidea, erakusketaren izenburuak dioten bezala, (xeno)estrogenikoz zolatua egon da eta hala dago oraindik ere.

Erakusketa dokumentu bisual eta material baliotsua da, eta farmakoek Kapitalozeno neoliberallean –eta ekoizpenerako, publizitaterako eta salmentarako egitura korporatibo eta

instituzionalean, bestela ez bailitzateke posible izango– duten eginkizunaren eta nonahikotasunaren kondentsazio metaforiko eta artistiko gisa funtzionatzen du, bi ideia hauek azpimarratuz: 1) zer garrantzia duten hormonek artefaktu kimiko-molekular horien baitan, eta 2) zer garrantzia izan duten eta duten oraindik ere feminitatearen osaeran eta konfigurazioan.

Grand View Research, Inc.-ren arabera (2016) –aholkularitzako eta merkatua ikertzeko enpresa handienetako bat mundu-mailan–, HOTaren merkatu globalaren balioa 15.100 milioi dolarrekoa zen 2014an (2016). 2019an, HOTaren merkatuaren tamaina 21.800 milioi dolarrekoa zela kalkulatu zen (Grand View Research, Inc., 2020). Konpainia horren datuen arabera, estrogenoak –hutsak edo konbinatuak– ordezkatzeko terapia 7.500 milioi dolarrera iritsi zen 2014an; hormona tiroidea ordezkatzeko terapia, 1.000 milioi dolarrera; testosterona ordezkatzekoa, 2.500 milioi dolarrera; eta hazkuntzarako hormona birkonbinatzailea, 4.000 milioi dolarrera<sup>283</sup>. Ikerketa horretan, bestalde, datu hau jaso da: “According to the reports published by Pfizer, Premarin independently recorded a sale of 1.076 million in 2014” (Grand View Research Inc., 2016). Market Data Forecast Inc.-k, aldiz, datu baxuagoak eman ditu, eta HOTaren merkatu globala 15.750 milioi dolarrean ipini zuen 2019an (2019).

Premarin®-en arrakasta, Doktorego-tesi honetan zenbait aldiz iradoki dugun bezala, historian zehar behin baino gehiagotan errepikatu da. Elizabeth Siegel Watkins-ek *Estrogen Elixir: A History of the Hormone Replacement Therapy in America* lanean kontatu duenez, 1980an, AEBko farmazialariek 14 milioi estrogeno-preskripzio errezetatu zituzten, 1975ekoaren erdia, nahiz eta Watkins-en arabera Premarin® izan zen urte hartan herrialde guztian gehien errezetatutako bigarren farmakoa (2007, 148. or.). 1980an, AEBko farmako salduenen zerrendako hemezortzigarren postura jaitsi zen, baina bat-bateko gorakada izan zuen gero: 1985ean, ia 20 milioi preskripzio izan ziren, eta, 1990ean, ia 30. 1988an farmako preskribatuenen zerrendan bosgarren postuan egon eta gero, hau gertatu zen: “[F]our years later, in 1992, it reached number one and remained either the first or second most popular drug in America every year for the rest of the century” (2007, 148. or.). 1992an, HOT-preskripzioen kopurua 39,6 milioikoa izan zen –Watkins-en arabera, preskripzioen % 70 Prempro® eta, batez ere, Premarin® izan ziren–; 1999an, 89,6 milioira igo zen (2007, 246. or.).

Transparency Market Research Pvt. Ltd.-en arabera, HOTerako erabilitako medikamentu estrogenikoen –hutsak edo konbinatuak– merkatu globalaren balioa 3.770 milioi dolarrekoa zen 2014an (2016). Erankunde berak kalkulatu du “menopausal hot flashes market”

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<sup>283</sup> Gran View Research, Inc.-ek aurkezturiko datuen arabera, Ipar Amerikaren –bereziki AEBren– mende dago HOTen merkatua; 2015ean, irabazi guztien % 35 lortu zuen (2016).

delakoaren balioa 9.500 milioi dolarrekoa izan zela 2019an (Transparency Market Research Pvt. Ltd., 2020). Antikontzeptiboen merkatu globalari dagokionez, Transparency Market Research Pvt. Ltd.-ek 22.050 milioi dolarreko balioa ezarri zuen 2016an (2019). Merkatu-ikerketen konpainiaren arabera, Ipar Amerikako antikontzeptibo-merkatuak 8.074,2 milioi dolarreko etekinak utzi zituen 2017an (Transparency Market Research Pvt. Ltd., 2019). IndustryARC™ analistak antzeko datuak eman ditu antikontzeptiboen merkatuari buruz (20.000-21.000 milioi dolar 2018an), eta Ipar Amerika jo du eskualde nagusitzat, eskaeraren % 28-30 bildurik (2019).

Orain arte emandako datuek frogatzen dute estrogenoak –hutsak edo konbinatuak– direla oraindik ere gehien kontsumitzen diren eta mundu-mailan etekin gehien ematen duten hormonak; horrek bat egiten du Haraway-k (2016a, 112. or.) eta Watkins-ek (2007, 148., 246. or.) adierazitakoarekin eta baita Oudshoorn-en analisisekin ere (1994, 109., 150. or.); zehazki, gero sakonago azalduko dugunez, Oudshoorn-ek azpimarratu du historikoki “sexu-hormona femenino” deitu izan direnak –estrogenoak eta progestagenoak– gehiago ustiatu izan direla, bai zientifiko-medikoki, bai korporatiboki, “sexu-hormona maskulino” deritzenak –androgenoak– baino. Preciado-k “medikuntzaren historia osoan gehien erabilitako molekula sintetiko” izendatzen ditu (2008, 126. or.).

Ukaezina da nolako garrantzia duten hormonek emakumeen\* teknogorpuztasun-subjektibitateen ekoizpenean eta kudeaketan, baina, hala eta guztiz ere, Kapitalozeno neoliberalerako azken hamarkadetan, gizonen teknogorpuztasun eta subjektibitateekin loturiko merkatu-hobiak agertu edo errektibatu dira, aurreko kapituluan azaldu dugun bezala, testosteronaren merkaturaren, testosterona-defizitaren sindromearekin loturik<sup>284</sup>. Testosteronaren merkaturaren ere gora doa. Ostertag-ek jakinarazi du testosterona-salmentak % 500 hazi zirela 1993tik 2003ra bitartean, eta % 115 2005etik 2010era bitartean (2016, 93. or.). David J. Handelsman-ek dioenez, mundu-mailako testosterona-salmentak –41 herrialdetako datuak aztertu ziren– 150 milioi dolarretik 1.800 milioi dolarrera igo ziren 2000tik 2011ra bitartean

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<sup>284</sup> Gizonentzako testosterona-merkatuaren auzia ez da batere berria. Oudshoorn-ek erakutsitako 1939ko iragarki batean, “Neo-Hombreol” agertzen da, Organon konpainiaren konposatu testosteroniko bat, inpotentzia tratatzeko erabilia (1994, 102. or.). Hormonak ordezkatzeko terapiaren hasiera, gaztetasuna eta indarra berreskuratzeko guruinak, jariakin hormonalak edo hormonak erabiltzea, XIX. mendearen amaieran eta XX. mendearen hasieran koka daiteke. Zehazki, Charles Eduoard Brown-Séguard, Eugen Steinach eta Serge Voronoff-ek ezarri zituzten estrategia horren oinarriak (Sengoopta, 2003; Kahn, 2005, 142. or.; Ostertag, 2016, 31.-36. or.). 1940ko hamarkadaren amaieran eta 1950ekoaren hasieran, atletak eta kulturistak esteroide anabolizatzaileak erabiltzen hasi ziren (Hoberman eta Yesalis, 1995, 80. or.; Preciado, 2008, 128. or.), baita HIESdunen gihar-masaren galerarako tratamendu gisa ere (Hoberman eta Yesalis, 1995, 80. or.; Ostertag, 2016, 88. or.). Gaur egun, Interneten badago orotariko produktu farmazeutikoen merkatu beltz erraldoi bat; besteak beste, esteroide anabolizatzaileena (Preciado, 2008, 129. or.) eta testosteronarena, zeinak besteak beste, testosterona ordezkatzeko terapian erabiltzen baita (Ostertag, 2016, 91. or.). Ikus gizonentzako testosterona-produktuen publizitatea eta/edo merkaturatzea eskaintzen duten 49 webguneren analisia Ivanov, Vuong eta Gray-ren (2018) lanean.

(2013, 549. or.). Bhasin-ek kopuru altuagoak eman ditu: “[T]he annual prescription sales of testosterone in the United States increased from 18 million in 1988 to 70 million dollars in 2000 to over 2 billion dollars in 2013!” (2016, 830.-831. or.). AndroGel® gel erako testosteronak – AbbVie Inc. enpresa farmazeutikoak ekoitzia– 675 milioi dolarreko diru-sarrera garbiak izan zituen 2016an, eta 577 milioi dolarrekoak 2017an, Statista-ren arabera (2019e); nolana ere, iturri horrek berak jakinarazi du AndroGel®-ek 1.000 milioi dolar irabazi zituela AEBn 2013an (Statista, 2019f). Ivanov eta beste egile batzuek diotenez, AndroGel®-en preskripzio bidezko salmentak 1.000 milioi dolarretik gorakoak izan dira AEBn (ez dute urterik zehaztu) (2018, 388.-389. or.).

Oraindik ikusteko dago zer eragin izango duen FDAren ebazpenak produktu testosteronikoen merkatuan eta salmentetan, baina baliteke ebazpen horren eta AbbVie Inc.-ren aurka jarritako 6.000 epaiketen ondorioa izatea Statista-k aipaturiko beherakada –AbbVie Inc. bigarren aldiz kondenatu dute gizon bati kalte-ordaina ematera, halako farmakoen albo-ondorioengatik; kasu honetan, 3 milioi dolar (Bellon, 2018)<sup>285</sup>–. 2014ko uztailaren 31n, produktu testosteronikoen kaxen etiketan argibide bat txertatzeko errekerimendua argitaratu zuen FDAk, infartuak eta buruko isuriak eragiteko arriskuaz informatzeko, eta, 2015eko martxoaren 3an, prebentziozko ohar bat erantsi zuen, halako produktuak zahartzearen ondoriozko testosteronamailaren jaitsiera tratatzeko erabiltzearen arriskuei buruz (FDA, 2018d). Baillargeon, Kuo, Westra, Urban eta Goodwin-en arabera, 2013tik 2016ra bitartean, % 40 jaitsi ziren gizonen testosterona-preskripzioak (2018, 210. or.).

Hala eta guztiz ere, ez dirudi FDAren iragarpenek konpainia farmazeutikoak gerarazi dituztenik. Hi-Tech Pharmaceuticals Inc.-k Tribesterone® merkaturatu zuen 2019an, eta Israelgo Teva Pharmaceutical Industries Ltd.-k 2019ko apirilaren 11n iragarri zuen merkatura aterako zuela AngroGel®-en “Testosterone Gel 1.62% CIII” generikoa, testosterona ordezkatzeko terapiarako (Teva Pharmaceutical Industries Ltd., 2019). Beste farmako testosteroniko batzuk dira Axiron®, Eli Lilly & Co.-rena; Testim® eta Testopel®, Auxilium Pharmaceuticals, Inc.-enak; Androderm®, Actavis PLC-rena –Teva Pharmaceutical Industries Ltd.-ren subsidiarioa–; Depo®-Testosterone, Pfizer, Inc.-rena; Fortesta®, Endo International PLC-ena; Striant®, Auxilium Pharmaceuticals, Inc.-rena; eta Android®, Bausch Health Companies Inc.-rena.

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<sup>285</sup> Metzger eta Burnett-ek adierazi bezala, Kanadako politika 2006an aldatu zen; hala, testosterona ordezkatzeko terapiaren preskripzioek xehetasun dokumentatuak eman behar dituzte, besteak beste, testosterona-maila baxuaz eta testikulu-gaitzaz edo GIBaz, 65 urtetik gorakoetan (2016, 942. or.). Ondorioz, testosteronaren salmenta % 28 jaitsi zen, baina, 2012an, maximo historikoak lortu ziren, % 310 igo baitzen berriz salmenta (Piszczek, Mamdani, Antoniou, Juurlink eta Gomes, 2014, e98003. or.).



Hormonak ez dira besterik gabe hormonak. Artefaktu teknozientifikoak eta merkatuko produktuak dira –hainbat gizarte-talderen interesak bateratzen dituztelarik (Oudshoorn, 1994, 108. or.)–, gorputz-molekulak, ondasun merkaturagarriak, lur, itsaso eta aire zatiak, identitate sexu-generikoak, adierazle kulturalak, gorputz-subjektibazio eta -materializaziorako teknologiak, transespezieen loturak. Preciado-ren hitzetan:

Testosterona-gelaren dosi bat hartzen dudanean edo dosi likido bat injektatzen dudanean, egiaz, adierazle politiko kate bat hartzen ari naiz, zeina materializatu egiten baita harik eta nire gorputzak bere egin dezakeen molekula baten forma hartzen duen arte. Hartzen dudana ez da besterik gabe hormona bat, molekula bat, baizik eta hormonaren kontzeptua: zeinu, testu, diskurtso multzo bat; hormona sintetizatzekeo prozesua; laborategian materializatu arteko sekuentzia teknikoa. Kate karbonatu esteroide eta kristalino bat injektatzen dut, eta, horrekin batera, baita modernitatearen historiaren zati bat; transakzio ekonomiko multzo bat eta erabaki farmazeutiko, saiakuntza kliniko, iritzi-talde sail bat injektatzen ditut; bizitza patentatzen duten truke eta fluxu ekonomikoen sare barrokoetara konektatzen naiz: elektrizitatea, ikerketa genetikoko programak, hiperurbanizazioa, biosferako basoen txikizioa, laborategiko espezie berrien asmakuntza, Dolly ardia, ebolaren hedapena Afrikan (...) pertsonen aurkako minak (...) Boterea, desira, askatasuna, sumisioa, kapitala, zaborra eta matxinada iragateko beharrezkoak diren konektore somatiko horietako bat bilakatzen naiz. (2008, 107.-108. or.)<sup>286</sup>

“Hormona” kontzeptuan bateratzen diren elementuen kartografia zabalaren deskribapen horri jarraituz, Haraway-ren eta Preciado-ren eskutik, aldarrikatzen dugu politikaren bilakaera molekularra dela “teknobiopolitika”ren forma edo agerpen nagusietako bat –baina ez bakarra–. Teknobiopolitika artefaktu teknologiko molekular, kimiko, farmakologiko horietan eta horien bidez gorpuzten da, zeinak nagusiki baina ez eskusiboki hormonalak baitira edo hormona-efektuak baitituzte, eta teknogorpuztasun-subjektibitateak eta baita ingurunea ere kudeatzeko, kontrolatzeko, ekoizteko eta koeratzeko balio baitute. Endogenoki, baina baita teknogorpuzten eta ingurunearen arteko etengabeko koeraketaren bitartez. Alaimo eta Hayward-ekin bat eginez, teknobiopolitika kimiko materiala teknogorpuzten eta ingurunearen interakzioan azaleratzen da,

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<sup>286</sup> Jatorrizko testua: “Cuando me administro una dosis de gel de testosterona o me inyecto una dosis líquida me estoy administrando en realidad una cadena de significantes políticos que se materializa hasta adquirir la forma de una molécula asimilable por mi cuerpo. Lo que me administro no es simplemente la hormona, la molécula; es el concepto de hormona: una serie de signos, de textos, de discursos, el proceso a través del cual la hormona llegó a sintetizarse, la secuencia técnica a través de la cual llegó a materializarse en el laboratorio. Me inyecto una cadena carbonada esteroide y cristalina, y con ella un trozo de historia de la modernidad, me administro una serie de transacciones económicas y un conjunto de decisiones farmacéuticas, de ensayos clínicos, de grupos de opinión, me conecto a las redes barrocas de intercambios y de flujos económicos y políticos que patentan la vida: la electricidad, los programas de investigación genética, la hiperurbanización, la masacre de los bosques de la biosfera, la invención de nuevas especies de laboratorio, la oveja *Dolly*, el avance del ébola que devasta el continente africano (...) las minas antipersona (...) Me convierto así en uno de los conectores somáticos a través de los cuales circula el poder, el deseo, la libertad, la sumisión, el capital, la basura y la rebelión”.

elkarrekiko eraketaren prozesuan, eta, hor, artefaktu hormonal eta xenoestrogenikoek parte hartzen dute. Teknobiopolitika molekular bilakatzen da teknogorputzen eraketa tekno-xeno-hormonalean, teknogorputzok ingurumenera duten irekitasunean.

Hala, politikaren eta boterearen bilakaera molekularra endokrinologiaz, sexologiaz, medikuntzaz, farmakologiaz gaindi dago: “[B]este produkzio-forma oro iragazten du (...), nekazaritza-bioteknologiatik komunikazioaren *high-tech* industriara” (Preciado, 2008, 37. or.)<sup>287</sup>. Kapitalozeno neoliberallean, kapitalismoak molekula-mailan eragiten du. Esan dugunez, industria kimikoa funtsezkoa da ordenagailuen eta telefono mugikorren mikroprozesadoreen fabrikazioan, zuntz optikoan, herbiziden eta intsektiziden ekoizpenean edo elikagaien industriako kontserbagarri eta koloratzaileetan. Baina, era berean, xenoestrogenoak lurrinetan, kosmetikoetan eta higiene pertsonaleko produktuetan ere badaude, eta mendiko arropan, lan-segurtasunerako arropan, elikagaien ontzietan, sukaldeko tresnetan, inguruneko hainbat eta hainbat produktu plastiko eta plastifikatutan.

Industria kimiko molekularren eta haren tentakularitatearen sareak dena edo ia dena harrapatzen du, are industria militarra ere. Adibide ugarietako bat II. Mundu Gerran daukagu. Esan dugunez, bonba atomikoa fabrikatzeko ekoitzi eta merkaturatu zen fluorra lehen aldiz eskala handian industrialki (Bryson eta Griffiths, 1997; Dinoiu, 2006, 1142. or.)<sup>288</sup>, gero Hiroshimaren eta Nagasakiren aurka botatzeko 1945ean. Fluorra, “Luziferren gasa” (Dinoiu, 2006, 1141. or.), naziek ere erabili zuten, 1940an, II. Mundu Gerraren testuinguruan, kloro trifluoruroa fabrikatzeko isilpeko proiektu batean. Dinoiu-k zera dio kontuaz: “Uranium refining for nuclear energy is still one of the major uses for elemental fluorine” (2006, 1142. or.). Fluoratuak industria agrokimikoko hainbat konposatutan eta zenbait medikamentutan ere agertzen dira, hala nola Prozac antidepresiboan, Efavirenz antirretroviralean, Lariam® antimalarioan eta fluorokinolonetan oinarrituriko agente antibakterianoetan (2006, 1144. or.), anestetiko inhalatuetan, agente antiinflamatorio gisa, onkologiarako PET eskanerren<sup>289</sup> zelula kantzerigenoak behatzeko, edo minbiziaren aurkako tratamenduan erabiltzen den Fluorouracil (5-FU) (2006, 1150-1151. or.). Dinoiu-k, areago, honako datu hau eman du: “Today, about 30

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<sup>287</sup> Jatorrizko testua: “[I]nfilitra (...) toda otra forma de producción, desde la biotecnología agraria hasta la industria *high-tech* de la comunicación”.

<sup>288</sup> Uranio hexafluoruroaren konposatua (UF<sub>6</sub>) <sup>235</sup>U eta <sup>238</sup>U uranio-isotopoak banatzeko erabili zen (Dinoiu, 2006, 1.142. or.).

<sup>289</sup> Sektore onkologikoko irabaziak eta merkatu-balioak altuak dira. Morenoren arabera, Bristol-Myers Squibb Co. enpresa farmazeutikoak 2019aren hasieran iragarri zuen AEBko Celgene enpresa eresia zuela 65.000 milioi euro inguru ordainduta (2019). Bi enpresa horiek tratamendu onkologikoetan gehien fakturatzen zuten hiru enpresa farmazeutikoen artean zeuden. Erosketaren ondoren, egitura berriak 29.000 milioi euro inguruko diru-sarrerak eduki ahalko ditu. 2017an, Roche Holding AG izan zen onkologian diru gehien fakturatu zuen enpresa farmazeutikoa, 23.802 milioi eurekin (Moreno, 2019).

percent to 50 percent of all pharmaceuticals now contain fluorine” (2006, 1148. or.). Fluorra, bestalde, hortzetako pastetan eta uraren klorazioan ere erabiltzen da<sup>290</sup>.

Preciado-k ere II. Mundu Gerrara jo du, erregimen edo kapitalismo farmakopornografikoaren abiapuntutzat hartuz. *Testo Yonki* lanean dakarren eskeman, “erregimen farmakopornografiko” errotuluaren azpian, bonba atomikoen leherketa ageri da marraztuta, “aro nuklearra – ingurumen toxikoa” hitzen ezkerrean (2008, 64. or.). Toxikotasuna Kapitalozeno neoliberalaren bereizgarria da; xenoestrogenizitate, hormona eta industria farmazeutiko eta bioteknologiko eta haren tentakularitate guztiarengandik banaezina.

Industria beliko kimikoaren bigarren adibidea “Agente Laranja” deritzona da; bi herbizida xenoestrogenikoren nahasketa bat da, 2,4-diklorofenoxiazetikoa (2,4-D) eta azido 2,4,5-triklorofenoxiazetikoa (2-4-5-T), AEBko Defentsa Departamentuarentzat fabrikatua, eta batez ere Monsanto eta Dow Chemical konpainiek ekoitzi zuten, baina baita Uniroyal, Hercules, Diamond Shamrock, Thomson Chemical eta T. H. Agriculture & Nutrition konpainiek ere<sup>291</sup>. Vietnamgo gerran erabili zen: 1961etik 1972ra bitartean, 76 milioi litro herbizida jaurti ziren, haietatik 44 milioi Agente Laranja, 2,5 milioi hektarea baso eta sororen gainean. Agente Laranja 2,3,7,8-tetraklorodibenzo-p-dioxina (TCDD) zeukan, 2-4-5-T-aren fabrikazioaren azpiproduktua, eta, horren eraginez, ikaragarri toxikoa zen, hura osatzen zuten herbizidak baino 1.000 aldiz gehiago (Warwick, 1998, 16. or.).

Industria agro-kimiko-bio-tekno-farmakologiko-militarraren tentakularitatea eta hedaduraren adibide garbia da Monsanto konpainia. 1998an, *The Ecologist* aldizkariak monografiko bat argitaratu zuen hari buruz, “The Monsanto Files” izenburupean. Hala, zenbait artikulu bildu zituzten, herbizidei, PCBei, Agente Laranja, behi-hazkuntzarako hormona birkonbinatzaileari edo genetikoki eraldaturiko haziei buruzkoak, eta Monsanto halakoen ekoizpenaren eragile nagusia edo nagusietakoa izan da kasu guztietan. Txosten horiek guztiek agerian uzten dituzte industria militarraren, elikagai-industriaren, industria agrokimikoaren, industria bioteknologikoaren eta, segidan ikusiko dugun bezala, industria farmazeutikoaren

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<sup>290</sup> Boischio-ren arabera, fluoruroarekin kontaktuan egotearen ondoriozko efektu negatibo garrantzitsuenak hezurrei dagozkie (2019). Fluorosi eskeletikoa, fluorra uraren eta/edo janariaren bitartez irenstearen ondoriozkoa, “baliaezintasunezko desgaitasun” bat da, eta milioika teknogorpuztasuni eragiten die, Afrikan, Indian eta Txinan. Zenbait herrialdetan (Txina, Austria, Belgika, Finlandia, Alemania, Danimarka, Norvegia, Suedia, Hungaria, Israel edo Japonia), ura fluoratzea debekatu edo jarduera hori egiteari utzi diote, edo sekula ez dute halakorik egin (Romero et al., 2017). Elke Babiuk-ek sorturiko webgunean (2013) –Babiuk International Society for Fluoride Research-en *Fluoride* aldizkariaren editorea izan zen 1998tik 2002ra bitartean–, fluorak hortzetan, hezurretan, burmuinean eta ugalketan –besteak beste, minbiziak eta mutazioak–, eta ingurumenean dituen efektuei buruzko artikuluak bildu dira, zorroztasun handiz.

<sup>291</sup> Konpainia horiek 1984an epaitu zituzten, eta herbizidarekin kontaktuan egondakoei eta haien familiei 180 milioi dolar ordaintzera kondenatu. Warwick-en arabera, “1960ko urteetatik 1990eko urteetara 500.000 haur jaio ziren Vietnamen dioxinekin loturiko malformazioekin”, abortuak eta deformazioekin hildako fetu edo jaioberriak kontuan hartu gabe (1998, 17. or.).

arteko lotura estuak, baita horiek guztiek administrazio publikoarekin dituztenak ere (Ferrara, 1998, 32.-38. or.).

AEBko Monsanto konpainia Bayer AGk erosi zuen, 2016an<sup>292</sup>, eta, hala, bio-teknologia-agro-toxiko-farmako-elikagaigintzaren monopolioa areagotu zen (Ribeiro, 2016; Delgado Cabeza, 2017, 17. or.; Villa, 2018, 1. or.). Villa-ri jarraituz, gaur egun, lau enpresak kontrolatzen dituzte hazien merkatu globalaren bi heren eta pestizidenaren % 70: Bayer AGk, zeinak merkatua beraren mende baitauka; Corteva Agriscience-k –Dow enpresa kimikoaren eta DuPont farmazeutikoaren<sup>293</sup> arteko fusioaren ondorioz sortua 2017an–; fusio horren aurretik gertatutako Suitzako Syngenta AGren eta Txinako ChemChina-ren edo China National Corporation Ltd.-ren arteko fusioaren ondorioz sorturiko enpresa<sup>294</sup> –eta espero da enpresa are handiago batekin fusionatzea, Sinochem-ekin–; eta laugarrena Alemaniako BASF SE izango litzateke (2018, 1. or.). BASF SEK 7.600 milioi euroren truke eskuratu ditu Bayer AGk Monsanto bereganatu ondoren desinbertituriko aktiboak; besteak beste: amonio glufosinatoaren negozio globala, glifosatodun herbizida batzuk, baratze-hazien negozioa eta beste hazi-negozio batzuk, gari hibridoaren I+G plataforma, Xarvio<sup>TM</sup> nekazaritza-plataforma digitala eta zenbait herbizida ez-selektibo (BASF, 2018). Bestalde, 43.000 milioi dolarren truke Syngenta AG erosi ondoren, Chemchina eta Sinochem beren nekazaritza-aktiboak finkatzen ari dira, eta, aurreikuspenen arabera, “Syngenta Group” sortuko da (Shields, Nelly eta Evans, 2020).

ETCren datuen arabera (Action Group on Erosion, Technology and Concentration), 2014an, Syngenta AG-ChemChina-k, fusioa egin baino lehentxeago, 14.602 milioi dolar irabazi zituen agrokimikoen salmentatik (merkatuaren % 25,8), DuPont-Dow-k 14.503 milioi dolar (merkatuaren % 25,6) eta Monsanto 5.115 milioi (% 9) (2016). Hazien merkatuari dagokionez, fusioaren aurretik, 2014an, Syngenta AG-ChemChina-k 3.155 milioi dolar irabazi zituen salmentetik (merkatuaren % 7,9), Dow-k eta DuPont-ek 4.091 milioi (% 10,1) eta Monsanto, guztien gainera, 10.740 milioi (merkatuaren % 26,5). Hiruren artean, agrokimikoen merkatuaren % 60,4 eta hazien merkatuaren % 44,5 hartuko lukete.

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<sup>292</sup> Bayer AGk 66.000 milioi dolarren truke eskuratu zuen Monsanto (Roumeliotis eta Burger, 2016).

<sup>293</sup> Azaldu dugunez, 2019an, Villa-ren artikulua argitaratu ondoren, DowDupont-en fusioa hiru konpainia independentetan bereizi zen: Dow Inc., Dupont de Nemours, Inc. eta Corteva Inc. –Corteva Agriscience izenez ezagutua– (DowDupont Inc., 2019). Azken horrek agrokimikoen merkatuan dihardu oraindik ere; besteak beste, askotariko hazien, pestiziden eta nekazaritza digitalaren arloetan.

<sup>294</sup> ChemChina-k 43.000 milioi dolarren truke erosi zuen Syngenta AG (Patton, 2018).

### 3.5. Giza teknogorputzen sexu-generoaren koeraketa hormonalak

Kapitalozeno neoliberalaren une honetan, hormonak –ez bakarrik merkatuko produktu gisa, baizik eta baita artefaktu teknozientifiko gisa ere– funtsezko elementuak dira jokabideen, sexu-generoen, hainbat patologia, asaldura edo urritasunen, eta gorputz-prozesu askoren gaineko azalpenetan, izan giza teknogorputzei buruzkoetan, izan animalia-teknogorputz ez-gizatiarrei buruzkoetan. Uste da sistema endokrinoak –beste sistema teknokorporal batzuekin loturik, hala nola nerbio-sistemarekin eta sistema immunologikoarekin– eta hark jariatzen dituen hormonek kontrolatzen eta erregulatzen dituztela zenbait funtzio eta/edo gorputz-prozesu, hala nola arnasketa, metabolismoa, ugalketa, zentzumenen pertzepzioa, mugimendua, garapen sexu-generikoa edo hazkuntza. Gaur egun, giza teknogorputzak komunikaziorako sistema handi eta konplexu gisa kontzeptualizatzen dira. Baina ez da beti hala izan. Politikaren eta identitate sexu-generikoen molekularizazioa historikoki ongi kokaturiko prozesu bat da. Hormonek ere badute historia bat.

Giza gorputzean funtzioak nola betetzen diren jorratzen duten teorien artean, Hipokratesen lau humoreen teoria dago, zeina teoria nagusia izan baitzen Europan Antzinarotik XIX. mendearen erdialdera bitartean. Teoria horren arabera, giza gorputza lau humore edo likidoz osatuta dago: odola, behazun horia, behazun beltza eta karkaxa. Hala, gaixotasunak, gabeziak eta oinazeak lau humore horietakoren batetik gehiegi edo gutxiegi izatearen ondorioz sortzen dira (Laqueur, 1990, 35., 44. or.; Oudshoorn, 1995, 153. or.). Luigi Galvani-k elektrizitatearekin egindako esperimentuen harira, nerbio-sistema sistema elektriko gisa kontzeptualizatu zen (Ostertag, 2016, 25. or.). Edonola ere, honetaz edo hartaz osatua izan, nerbio-sistema zen gorputz-funtzioak erregulatzeko egitura nagusia Mendebaldean, harik eta beste sistema bat agertu zen arte, nerbio-sistemarekin batera funtzionatzen duena: sistema endokrinoa edo hormonalak.

Atal honen helburua ez da gorputz-sistemen eta haien funtzioen kontzeptualizazioen historian sakontzea, ezta hormonaren historia xehe eta zorrotz bat egitea ere. Ez dugu sistema endokrinoaren funtzionamenduan ere sakondu nahi. Areago, hiru ideia utzi nahi ditugu agerian:

1. Sexu-generoaren gaineko ikusmoldea –heteronormatiboa eta bitarra–, sexu-generoaren definizioa bera, hormonaren nozioaren inguruan eraikitzen da, hau da, hormonak dira eraketa eta sailkapen sexu-generikoaren elementu biologiko nagusiak Kapitalozeno neoliberallean, nahiz ez bakarrak, geneei eta burmuineko neuronei ere aitortu baitzaie botere “sexu-generizatzaile” hori, laugarren kapituluan ikusiko dugunez.

2. Ikusmolde teknokorporal hormonalak, eta, haren barnean, batez ere ikerketa honen helburu den ikusmolde hormonal sexu-generikoa, egia absolutu, esentzial eta natural batetik urruti, eraikuntza zientifiko, politiko eta kultural bat da. Horrenbestez, kontingentziazkoa da eta historikotasunaren araberakoa. Hormonen izaera sexu-generikoa problematikoa da, eta eztabaidagarria.

3. Gorputzaren gaineko ikusmolde batez ere sexu-generiko hori ez zatekeen sendotuko konpainia farmazeutikoen –eta hedabideen– ekinbiderik gabe, laborategi zientifikoak eta sistema medikoa ahaztu gabe. Argudio hori hurrengo atalean garatuko dugu (3.6.).

### **3.5.1. Gonaden Arotik Hormonen Arora: maitasunezko triangelua**

Mendebaldeko gizarteetan, batik bat Europako mendebaldean eta Ipar Amerikan –baina planetako toki gehienetan ere esan genezake (Oudshoorn, 1995, 9. or.)–, identitate sexu-generikoak molekularizatu dira, Balsamo-k adierazitakoaren ildotik. Balsamo-k bere buruari galdetzen dio ea zer gertatzen den generoarekin eta ea non kokatzen den, gorputza zati funtzionaletan eta kode molekularretan zatitzen denean (1995, 216. or.). Identitate sexu-generikoa molekularizatzek esan nahi du molekula hormonalak edo hormonak berak identitate sexu-generiko bilakatu direla. Hau da, badirudi sexu-generoak baduela osagai hormonal bat, kimikoa, eta osagai hori esentzial gisa kontzeptualizatu da. Hainbeste azpimarratu da sexu-generoaren oinarri kimiko eta hormonalak, ezen gaur egun testosterona maskulinitasunaren sinonimotzat eta estrogenoak feminitasunaren sinonimotzat hartzen baitira (Fausto-Sterling, 2000, 170. or.; Ostertag, 2016, 9., 18. or.). Nagusitua den logika horren arabera, estrogenoak hartzeak feminizatu egiten du eta testosterona kontsumitzeak maskulinizatu. Datozen ataletan ikusiko dugunez, testosteronazko medikamentu hormonalen prospektuetan ere argi eta garbi adierazten da gizonentzako medikamentuak direla eskusiboki.

Ez hori bakarrik. Zenbait kirolariren gorputzetan, hala nola Edinanci Silva eta Caster Semenya-renetan, beharrezkoa izan da beren gorputzek berek ekoizten duten testosterona gutxitzea, gure erregimen sexu-generikoak orain arte ez baitzuen onartzen emakume gisa kontzeptualizaturiko gorputz batek testosterona-maila hain altua izatea –testosterona hormona maskulino nagusia baita–; hainbeste testosterona izatea emakume batentzako testosterona gehiegi balitz bezala interpretatzen eta deskodetzen da. García Dauder eta Gregori-k zera diote: “The testosterone molecule represents power, triumph, physical force and ability and therein lies

its threat... anyone considered to be female by birth that possesses unusually high levels of testosterone appears particularly threatening and should be expelled from the competition” (2009, 3. or.).

Silva-ri aldebiko orkiektomia bat egin zioten –abdomenaren barneko testikuluak erauzteko kirurgia–, beraren gorputzeko testosteronaren % 80 gutxitzeko, baita klitoridektomia bat ere –klitoria berregitea– (Lins França, 2009, 43. or.; García Dauder eta Gregori, 2009, 3. or.). Semenya-ren kasuan, Kirol Arbitrajearen Auzitegiak (TAS) Nazioarteko Atletismo Federazioari eman zion arrazoaia, eta zera adierazi zuen 2019ko maiatzaren 1ean argitaraturiko prentsa-oharrean: “Athletes with 46 XY DSD [Semenya-ren eta Indiako Dutee Chand atletaren kasuan bezala] have testosterone levels well into the male range (7.7 to 29.4 nmol/L; normal female range being below 2 nmol/L)” (TAS, 2019, 1. or.). TASen arabera, testosterona kantitate ustez altu horrek sortzen duen “material androgenizing effect” hori gutxiagotu egin behar da “below 5 nmol/L... in order to be eligible to compete in a Restricted Event. Such reduction can be achieved, according to the IAAF evidence, by the use of normal oral contraceptives” (2019, 1. or.)<sup>295</sup>. Nolanahi ere, bigarren kapituluan adierazi dugun bezala, Suitzako Auzitegi Federal Gorenak etenda utzi du IAAFren erregulazioa; hortaz, oraingoz, Semenya-k ez du hormonarik hartu beharko lehiatzen jarraitzeko. Chand-ek ere lehiatzen jarraitzen du.

Nolanahi ere, adibide horretan, bi gauza ikusten dira: batetik, gaur egun zer neurritan identifikatzen diren “sexual” izendatu izan diren hormonak identitate sexu-generikoekin<sup>296</sup>. Bestetik, zer zorrotzak diren paradigma sexu-generiko heteronormatibo eta bitarraren arauak; hainbeste sartzen dira teknogorputzetan, ezen maila kimiko molekularrera ere iristen baitira, are Kapitalozeno neoliberalaren une honetan, zeinetan oso negozio errentagarria bilakatu baita identitate eta gorputz ez-normatiboak edo ez guztiz normatiboak ekoiztea eta kudeatzea. Hala, paradoxa baten aurrean gaude: gorputz batek –kasu honetan, femenino gisa kontzeptualizaturiko gorputz batek– sortzen duen hormona kantitate gehiegizkoa –kasu honetan, maskulino gisa kodeturiko hormonak, testosterona– txikiagotzeko errezeta edo medikamentua hormona gehiago hartzea da; hori bai, femeninoak, hau da, estrogenoak eta/edo progesterona. Arazoa hormonak dira, eta konponbidea ere hormonal da.

Gure testuinguru kultural, politiko eta zientifikoan, adibide askok agerian uzten dute nola identitate sexu-generikoak –eta haiekin loturiko guztia– hormonon bidez azaltzeaz gainera

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<sup>295</sup> Semenya-k aurkezturiko errekursoaz gainera, Hegoafrikako gobernuak araudia salatu du haren konnotazio arrazistak direla eta, kalteturiko atletak afrikarrak izan ohi baitira beti (Borraz, 2019).

<sup>296</sup> Hormonez gainera, badira beste elementu batzuk; esate baterako, kromosomak, baina, azken batean, hormonek eragiten dute itxura maskulinoa eta hormonak dira gutxiagotu behar direna. Kromosomak balira elementu erabakigarria, logika beraren arabera, IAAF-k zuzenean debekatu behar ziokeen Semenya-ri lehiaketan parte hartzea (izan ere, kromosomak ezin dira aldatu, oraingoz). Hormonak dira arazoa, baita sendabidea ere.

haietara mugatzen diren edo haien sinonimo gisa erabiltzen diren. Jordi Évole-k, *Salvados* programaren atal batean, Inés Arrimadas-i eta Irene Montero-ri eginiko elkarrizketa batean zera galdetu zien: “*Testosterona* asko al dago politikan?” (2019)<sup>297</sup>. 2019ko martxoaren 23an, Pedro Sánchez-ek adierazpen hauek egin zituen mitin batean –biharamunean, telebistako *Liarla Pardo* programan eman zituzten–: “Une honetan, eskuinean badira sigla gehiago ideiak baino, *testosterona* gehiago neuronak baino” (Gonzalo eta Olivas, 2019)<sup>298</sup>. Interesgarria litzateke sakontzea zer esanahi posible dituen “*testosterona*” hitzak halako adierazpenetan. Aurrerago, Miquel Missé eta Sam Fernández-en eskutik (2018), nozio horrekin loturiko imaginario sinbolikoaren gaia jorratuko dugu.

University of California-Berkeley-ko *Wellness* aldizkariak zera dio: “Testosterone is the male equivalent of estrogen—a hormone that controls many aspects of sexuality as well as secondary sexual characteristics, such as facial hair, musculature and voice quality” (2011). Hormonen sexu-generizazioa Chiara Beccalossi *Transitional States: Hormones at the Crossroads of Art and Science*<sup>299</sup> proiektuaren zuzendariak hormonei buruz egindako historia laburrean ere ikusten da. Proiektu honetan zenbait teknogorpuztasun-subjektibitatek gogoeta egiten dute hormonek gorputzetan dituzten efektuez. Hormonen historia labur horretan egileak “female hormones” esapidea erabiltzen du Harry Benjamin-ek bere pazienteetako bati eman zizkien hormonei erreferentzia egiteko (2018, 46. or.).

Adibide guztiok argi erakusten dute zer garrantzia duten hormonek sexu-generoa definitzeko, identitate sexu-generizatua konfiguratzeko eta gorputz-morfologia sexu-generizatua eratzeko, eta “Hormonen Aroa” izendatu duguna islatzen eta haren paradigma osatzen dute. Sexu-generoaren elementu definitzailea, *egia* edo identitate sexu-generikoa ez da hainbeste agertzen gonadetan, nahiz agertu agertzen den, Dreger-en aburuz “Gonaden Aro”an gertatzen zen bezala. Hormonetan, aldiz, bai, agertzen da, haien egitura kimiko molekularrean, eta baita beste elementu batzuetan ere, hala nola geneetan edo burmuinean. Dreger-en iritziz, intersexualitatearekin loturik, 1870etik –zehazki, Theodor Albrecht Edwin Klebs-en *Handbuch der Pathologischen Anatomie*ko 1876ko sailkapenaz geroztik, zeina beste egile batzuen egokitzapenei esker egonkortu baitzen 1880ko eta 1890eko hamarkadetan– 1915era bitartean, Europako testuinguruan, batez ere Frantzia eta Britainia, gorputz baten egiazko sexu bakarraren elementu definitzailea –baina ez bakarria– gonadak ziren: obulutegiak gorputz baten

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<sup>297</sup> Jatorrizko testua: “¿Hay mucha *testosterona* en la política?”.

<sup>298</sup> Jatorrizko testua: “Ahora mismo, en la derecha hay más siglas que ideas, más *testosterona* que neuronas”.

<sup>299</sup> *Transitional States: Hormones at the Crossroads of Art and Science* proiektua material artistiko eta ikus-entzunezko ugaziz osatua dago. Londresen, Bartzelonan eta Bolognan egon da ikusgai, eta hitzaldi eta debateak ere antolatu dira hiru hiriotan.



feminitatearen froga ziren, eta testikuluak, berriz, gorputz baten maskulinitatearena (1998, 145.-150. or.)<sup>300</sup>. Reis-ek gauza bera dio AEBko testuinguruaz ere, baina berak askoz lehenago kokatzen du bi sexuen sistema esparru horretan mantentzeko tema (2009, 53.-54. or.)<sup>301</sup>. Reis-en arabera, 1930etik aurrera hasi ziren hormona-mailak gero eta gehiago kontuan hartzen (2009, 116., 189., 195. or.). Hormonekin dagoen arazoa da 1940rako –baita lehenago ere, ikusiko dugunez– medikuak ohartuak zirela hainbat sexutako gorputzetan bazirela estrogenoak zein androgenoak, alegia ez zutela balio elementu edo irizpide nabari gisa gorputz batean sexu-genero bakarra determinatzeko (Reis, 2009, 195. or.)<sup>302</sup>.

Dena den, gonadak ez ziren desagertu. Gonaden irizpidea gero eta gehiago jartzen zuten zalantzan egile eta doktoreek –aipagarria da, haien artean, Blair-Bell–; 1920-1940ko hamarkadetan, gonadak, genitalak eta hormonak batera bizi izan ziren, teknogorpuztasun-subjektibitate baten egiazko sexu-generoa berresleitzeko anputatu, berreraiki edo kontsumitu beharreko elementu gisa: “Some doctors promoted hormones as a key factor in the 1930s but did not abandon gonads as the primary indicator of true sex” (2009, 189. or.). Alderdi psikologikoak gero eta garrantzi handiagoa hartu zuen, eta, 1940aren amaierarako, “creating congruence between a person’s psychology, gender presentation, and external bodily conformation became more important justifications for surgery than matching gonads and genitals” (Reis, 2009, 116. or.). “Genero” nozioan kondentsatutako alderdi psikologikoaren garrantziaren gailurra *rationale* zientifiko berri bat, intersexualitatearen gaineko kudeaketa medikorako protokolo bat eta sexu/genero dikotomiaren ezarpena izan ziren, guztiak ere Money-ren eta haren lantaldearen eskutik etorriak 1950eko hamarkadan. Hala eta guztiz ere, garrantzitsua da azpimarratzea elementu psikologikoaz gainera genitalen teknobirreraiagarritasuna eta, beraz, morfologia genitala lehen mailako elementua zela esleipen- edo *hazkuntza*-sexua ezartzeko orduan: “[A]

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<sup>300</sup> Dreger-en arabera, Gonaden Aroan gonaden irizpidea izan arren irizpide garrantzitsuena eta are erabakigarriena, ez zen kontuan hartzen zen elementu bakarra. Beste aldaera batzuk ere (genitalak, bularra, ilea, desira, ahotsa, etab.) hartzen ziren kontuan hermafroditei sexua esleitzeko (1998, 159. or.). Ikus, halaber, Dreger (1998, 157.-158. or.).

<sup>301</sup> Mak-i jarraituz, Reis-ek Thomas Laqueur-en bi sexuen sistema Dreger-en Gonaden Aroarekin nahasten du (2012, 111. or.; 59. oharra, 251. or.). Horren erakusgarri, Reis-en adierazpen hau baliatzen du: “In this country the tendency to proclaim hermaphroditism ‘impossible’ began long before the age of gonads, though it became even more pronounced by the late nineteenth century, when the gonads became crucially important in the United States as in Europe” (2009, 54. or.). Modu batera edo bestera, garrantzitsuena zera da: Reis-ek gonaden nagusitasun berbera aipatzen duela garai berberean AEBn.

<sup>302</sup> Huggins, Cohen eta Harden-ek “True Hermaphroditism in Man, with an Endocrinological Study” artikuluan – 1937an argitaratua *American Journal of Obstetrics and Gynecology* aldizkarian– diote beren ikerketan lehen aldiz frogatu zutela honako hau: “[M]ale and female sex hormones have been simultaneously demonstrated in hermaphroditism” (1937, 34. or.). Dena den, halako kointzidentziak egiazko hermafroditismoaren zeinu posibletzat hartzen dira oraindik ere, pseudohermafroditismoarekin kontrajarrita. Dena den, Reis-ek dio (2009, 195. or.) gorputz guztietako koexistentzia hormonalaren karietara GreenHill eta Schmitz-ek zera diotela: “[T]he normal man or woman is to a slight degree an hermaphrodite” (1940, 40. or.).

great deal of emphasis should be placed on the morphology of the external genitals and the ease with which these organs can be surgically reconstructed” (Money et al. 1957, 334. or.)<sup>303</sup>.

Generoaren kontzeptua agertzeak ekarri zituen aldaketez harago, pixkanakako molekularizazio-prozesu bat gertatu da, gonadetatik hormonetarainokoa, eta hormonak bilakatu dira paradigma sexu-generikoko elementu izarrak. Obulutegiak ginekologiako organo paradigmaticoak izan ziren. Gonadetatik “hormona” deritzen elementu kimikoetara iragate horretan, endokrinologiaren sorrera eta finkapena funtsezkoak izan ziren, beste diziplina eta/edo adar batzuekin batera, hala nola kirurgia, sexologia, ginekologia, fisiologia, anatomia edo biokimika. Trantsiziozko molekularizazio-prozesu hori logika heteropatriarkal eta arrazista zorrotz batek gidaturik etorri zen, eta tortura eta oinazea ekarri zien emakume\* askori<sup>304</sup> (Laqueur, 1990, 175.-181. or.; Oudshoorn, 1995, 8., 14. or.; Ostertag, 2016, 27.-30. or.). XIX. mendean, feminitatea definitzeko, umetokitik obulutegietara iragan zen; Hormonen Aroan, aldiz, obulutegietatik hormonetara. Blair-Bell-ek berak *The sex-complex* lanean bildu zuen aldaketa hori. Honela erantzun zion “why is a woman not a man” galderari:

van Helmont said: –

*"Propter solum uterum mulier est quod est"*

Later Chereau changed this to: –

*"Propter ovarium solum mulier est quod est."*

Virchow in modern times reiterated this statement,

and, according to Biedl, added: –

"All the peculiarities of her body and mind . . .

"everything, in fact, which in the true woman we admire

"and reverse as womanly, is dependent on the ovary."

But in the light of our present knowledge I have

ventured to think that the following aphorism most

accurately represents the cause and effect: –

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<sup>303</sup> Ikus, halaber, Money (1955); Money et al. (1955); eta Money et al. (1956).

<sup>304</sup> 1870etik aurrera, kastrazio femeninoa edo aldebiko obariotomia –obulutegei sanoak eraztea– asko eta arrakasta handiz erabili zen zenbait “patologia” sendatzeko, hala nola, histeria, gehiegizko sexu-desira, masturbazioa, senarrek beren emazteak kontrolatzeko zailtasuna, eta beste gaixotasun batzuk (ikus Laqueur, 1990, 176.-179. or.; Hoberman, 2005, 63.-69. or.). Klitori-ablazioa eta beste teknika batzuk ere erabili dira emakumeen\* sexu-plazera handitzeko, beren senarrak ase ditzaten (kirurgia, elektrizitatea, drogak, klitoria handitzeko huts-ponpa); ikus Hoberman (2005, 60.-63. or.). Ginekologia XIX. mendean erdialdean sortu zen; garai hartan, James Marion Simons doktoreak, zeina AEBko ginekologiaren aitatzat hartzen baita, anestesiarik gabeko 30 operazio egin zizkien Anarcha, Betty, Lucy eta identifikatu gabeko beste bederatzi emakume\* esklabo beltzi; ikus, horri buruz, Cooper Owens (2017, 15.-41. or.). Ostertag-ek azpimarratu du ginekologiak garrantzi handia izan zuela sistema endokrinoren teoriaren jatorrian, obariotomiak egin baitzitzaizkien zenbait emakumeri\*, histeria tratatzeko. Ez dago jakiterik zenbat emakumek\* galdu zituzten obulutegiak era hartan, baina, Ostertag-en zenbatespenen arabera, 100.000 baino gehiago izango lirateke (2016, 29. or.).

*Propter secretiones internets tolas mulier est quod est.*<sup>305</sup> (1920 [1916], 129. or.)<sup>306</sup>

Hemendik aurrera, Oudshoorn-ek berresten duen bezala, hormonak ez dira izango soilik feminitatearen *locusa* eta sortzaileak, baizik eta baita maskulinitatearenak ere:

The new field of sex endocrinology introduced the concept of female and male sex hormones as chemical messengers of femininity and masculinity. This hormonally constructed concept of the body has developed into one of the dominant modes of thinking about the biological roots of sex differences. Many types of behavior, roles, functions and characteristics considered as typically male or female in western culture have been ascribed to hormones. (Oudshoorn, 1995, 8. or.)

1849an, Arnold Berthold ohartu zen oilarrak zikiratuz gero kokospea eta gandorra txikitzen zitzaizkiela (Fausto-Sterling, 2000, 149.-150. or.; Freeman, Bloom eta McGuire, 2001, 371. or.)<sup>307</sup>. Zikiratutako testikuluak oilarren abdomenaren barrunbera itzularaztean, berriz, ez zen gertatzen erregresiorik. Testikuluek nerbio-sistemarekiko konexioa galdua zutenez, zera ondorioztatu zuen: “[T]he testes must affect behavioral and sexual characteristics by secreting a substance into the bloodstream” (Freeman et al., 2001, 371. or.).

1889an, Charles-Édouard Brown Séquard fisiologo eta neurologo adituak, zeinak Londresko National Hospital for the Paralysed and Epileptic zentroan lan egin baitzuen eta irakasle jardun baitzuen Harvard-en eta Parisko Collège de France-n eta zeina ezaguna baitzen

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<sup>305</sup> Blair-Bell-ek lan honi egiten dio erreferentzia: “Arris and Gale Lectures, Lancet, 1913, i. lib., 944. or.” (1920 [1916], 129. or.).

<sup>306</sup> Laqueur-ek, logika monosexualetik sexu-dimorfismoaren logikarako pausoa azaltzean, adierazi zuen 1800eko hamarkadaren hasieran jada idazle ugari azpimarratzen zutela emakume\* eta gizonen artean bazirela desberdintasun biologiko funtsezko eta neurtezinak, eta, horretarako, erretorika berri bat baliatu zuten, hainbat elementu aipatuz (1990, 5. or.). Haietariko bat Jacques-Louis Moreau zen, zeinak Aristotelesen eta Galenoren ikusmoldea kritikatu baitzuen *Histoire naturelle de la femme, suivie d'un traité d'hygiène Appliqués à son Régime physique et moral aux différentes époques de la vie* lanean. Izan ere, zera zioten emakumeaz: “[N]’est qu’un homme imparfait et manqué, un individu malheureux et débile” (1803, 66. or.). Hona Moreau-ren hitzak: “[L]’homme et la femme ne different pas du plus au moins, mais que la structure, les fonctions de leurs organes générateurs son autres; et que toute leur constitution a son type prope, dont les traits distinctifs nous offrent une longue chaine d’effets physiques et moraux, qui se lient (...) à les organes spécialement chargés de la génération” (1803, 69. or.). Soilik emakumeek\* dituzten ezaugarri dagokienez, zera idatzi zuen: “Les plus importants de ces caractères sont, comme nous l’avons indiqué dans notre Plan, 1°. la direction du conduit *vulvo-utérin*; 2°. la présence de la membrane *hymen*; 3°. la conformation du bassin” (1803, 49. or.). Laqueur-ek, berriz, Chereau-k idatzi eta Blair-Bell-ek erantzundako esaldia bilduz, aporia anatomiko gisa deskribatu zuen; izan ere, haren arabera, XIX. mendearen amaierara arte –hau da, 40 urte geroago– ez zen “behin betikoz ezarri” zer rol zeukaten obulutegiek gorputz-biologian (1990, 175.-176. or.). Ezagutza horren izaera hormonalak, bai obulazioarena, bai ugalketarena, 1920ko eta 1930eko hamarkadetan ezarri zuen Laqueur-ek: “Until the 1930s, even the outlines of our modern understanding of the hormonal control of ovulation were unknown” (1990, 8., 53. or.).

<sup>307</sup> 1767an, John Hunter eskoziar kirurgialariak oilar baten testikuluak transplantatu zituen oilo baten abdomenaren barrunbean. Freeman eta beste egile batzuei jarraituz, Hunter-ek interes handiagoa zeukan ehun-transplantearen teknikan haren efektuetan baino, eta ez zuen emaitzarik argitaratu (2001, 371. or.).

animalien guruinak erauzi eta transplantatzeagatik, *The Lancet*-en argitaraturiko artikulu batean (“Note on the effects produced on man by subcutaneous injections of a liquid obtained from the testicles”) deskribatu zuen nola testikulu-jariakinak injektatu zizkion bere buruari, 72 urte zituela, gaztetzeko eta indarra hartzeko: “I have made use, in subcutaneous injections, of a liquid containing a small quantity of water mixed with the three following parts: first, blood of the testicular veins; secondly, semen; and thirdly, juice extracted from a testicle” (1889, 105. or.). Testikuluak txakurrenak eta akurienak ziren. Brown-Séquard-ek berak adierazi du testikuluek jariatzen duten semen-likidoan badela substantzia bat edo batzuk zeinak odolean sartuz gero “have a most essential use in giving strength to the nervous system and to other parts” (1889, 105. or.), eta dio ideia hori “generally admitted view” dela. Testikuluez gainera<sup>308</sup>, berak uste zuen pankreak, gibelak, tiroideak, guruin suprarrenalak, bareak eta giltzurrunek jariatutako substantziak erabilgarriak izan zitezkeela gaixotasunak sendatzeko (Freeman et al., 2001, 371. or.).

Brown-Séquard-ek ondorioztatu zuen injekzio haiei esker indar fisikoa, buru-trebetasuna eta jateko gogoareagotu zitzaizkiola. Frogatu ez arren, “organoterapia” izeneko arlo berri bat sortu zen, hau da, animalien jariakinak errezetatzea eta animalia gizatiar eta ez-gizatiarren testikuluak transplantatzea epilepsia, tuberkulosia, diabetesa, paralisia, gangrena, anemia, histeria, migraina, minbizia eta abar tratatzeko (Hoberman eta Yesalis, 1995, 77. or.). Hona Freeman eta beste egile batzuen hitzak: “By the end of 1889 more than 12,000 physicians were administering Brown-Séquard’s fluid, and manufacturing chemists were making fortunes selling the new ‘Elixir of Life’” (2001, 371. or.). 1896an eta 1900ean, Vienako bi ginekologok, Emil Knauer-ek eta Josef Alban-ek, obulutegietako substantzia kimikoen jariaketa deskribatu zuten, eta Brown-Séquard-en “barne-jariaketen teoria” berretsi (Oudshoorn, 1994, 18. or.).

Eugene Steinach, Vienako Physiological Section of the Institute of Experimental Biology-ren zuzendaria, mundu guztian ospetsu egin zen gonaden transplante eta esperimenduei esker. Steinach-ek uste zuen gonadetako jariakinek sexu-garapena determinatzen zutela. Halaber

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<sup>308</sup> Giza gorputzaz denaz bezainbatean, Ostertag-ek dio zikiratze bidez eunukoak sortzea antzinako Egiptotik datorrela gutxienez eta historia guztian zehar izan direla eunukoak, hasi Egiptoko faraoien, asiriar errege-erreginen, erromatar enperadoreen eta otomandar sultanen garaian, eta, kristautasunaren hasierako eunukoetatik pasatuz, europar operako *castrati* gurtuetara, hariak eta XIX. mendean debekatu zituzten arte (2016, 22.-23. or.). Oudshoorn-i esker jakin dugunez, antzinako Grezian eta Erroman aker- eta otso-testikuluak erabiltzen zituzten sexu-kitzikagarri gisa (1994, 17. or.) –horraino eraman genezake testosterona proposatzea eta/edo errezetatzea sexu-disfuntzioarentzako eta inpotentziarako erremedio gisa–; Hoberman eta Yesalis-ek diotenez, antzinako Egipton, pentsatzen zuten testikuluek ahalmen sendagarriak zituztela (1995, 77. or.); eta, areago, 1720an (1618), Londresko William Salmon medikuaren *Pharmacopeia Londinensis. Or, the New London Dispensatory Dispensatory* famatuan, txakur, zaldi, basurde, orein, lehoiabar, arrano eta abarren testikuluak gomendatzen ziren zenbait gaixotasun eta bizi-prozesutarako, bai gizonentzat, bai emakumeentzat\* (Ostertag, 2016, 23. or.). Ostertag-ek dio halako praktikak erabiltzeari utzi ziotela XIX. mendearen erdialdera bitartean baina testikulu bidezko erremedioak indarra hartu zuela beriz garai hartan (2016, 23. or.).

uste zuen gonaden bereizkuntza ezean zegoela homosexualitatearen jatorria eta horren ondorioz jariakin feminizatzaileak ekoizten zituztela homosexualen testikuluek (Sengoopta, 2003, 123. or.). “Arazo hori” konpontzeko, tratamendu bat asmatu zuen: homosexualei testikulu bat erauzi, eta, ondoren, emaile heterosexual baten testikulua txertatzea. Hala, arratoiei basektomiak egin zitzaizkien, gaztetzeko, eta, ikusirik pisua eta sexu-jarduera eta -interesa areagotzen zitzaizkiela, gizonengan aplikatzen hasi zen esperimendu bera<sup>309</sup>. 1918ko lehen basektomiaren arrakastaren ondotik, gaztetze-operazioak egin zituen, Vienan, New Yorken, Londresen, San Petersburgon, Kopenhaguen, Txilen, Kuban eta Indian, eta, beti gaztetzea lortu ez zuen arren, emaitzak ez ziren katastrofikoak izan, operazioa arrunta zenez gero (Sengoopta, 2003, 125. or.).

Serge Voronoff kirurgialariak tximino ez-gizatiarren testikuluak transplantatu zizkien adineko gizonei, gaztetzea helburu (Sengoopta, 2003, 122. or.). Ostertag-en (2016, 43. or.) eta Beccalossi-ren (2018, 44. or.) datuen arabera, 1926rako mila tximino-testikulu txertatu zituen gizakiengan, haietariko batzuk homosexualitatea tratatzeko. Organoterapiaren gainbehera zientzialariak hormona sinetikoak garatzen hastearekin batera etorri zen.

Hiru gizonok, Brown-Séquad, Voronoff eta Steinach<sup>310</sup>, gonadetatik gonadetako jariakinetara eta hormonetara iragatearen irudi eta adibide dira, baita zientziaren eta paradigma sexu-generikoaren molekularizazio-prozesuarena<sup>311</sup>, hau da, Hormonen Aroaren etorrerarena. Baina gizonok zientziaren munduan lortu zuten arrakastaz gainera –zenbaitetan, porrota izan zuten gerora–, prestigiozko aldizkarietan ere argitaratzen baitzituzten beren lanak, beste zerbait behar litzateke hormonak, agertzeaz gainera, hemen geratzeko. Aktore berri eta garrantzitsu hori konpainia farmazeutikoak dira: “In addition to clinicians and laboratory scientists, the emerging field of sex endocrinology also attracted a third group to the scene: the pharmaceutical industry. The manufacturing of extracts from animal organs offered a new and promising line of production” (Oudshoorn, 1994, 21. or.). Oudshoorn-ek dioenez, konpainia farmazeutikoek

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<sup>309</sup> Gaur egun, basektomia anestesia lokalarekin egiten da, 30 minutuan. Bi testikuluen kanalak ebakitzean datza, baina, “Steinach operazio”an, bakarrekoak ebakitzen ziren (Ostertag, 2016, 41. or.).

<sup>310</sup> Ostertag-ek testikulu-transplanteak egin zituzten beste gizon batzuen izenak ere eman ditu: George Frank Lydston urologoa, zeinak bere buruari egin baitzion transplantea, edo John R. Brinkely, zeinak 1912tik 1925era bitartean tximino, ahari, orein eta batez ere akerreren mila testikulu inguru txertatu baitzituen gizakiengan, AEBn (2016, 44.-45. or.). Leo L. Stanley-k, San Frantziskoko San Quentin presondegi zuzendari medikoak, preso exekutatuak testikuluak transplantatu zizkien presondegi bereko 600 presori baino gehiagori, eta, haiek bukatutakoan, beste animalia batzuen testikuluak (Ostertag, 2016, 44. or.; Beccalossi, 2018, 44. or.).

<sup>311</sup> “Zientziaren molekularizazio” esaten dugunean, Oudshoorn-ek deskribaturiko pausoaz ari gara, hau da, sexu-endokrinologiako estilo biologikoago batetik estilo kimikoago batera. Oudshoorn-i jarraituz, XX. mendearen hasieran, sexu-endokrinologian, beste bizitza-zientzia batzuetan bezala, bi ikuspegi nagusitzen ziren: biologikoa eta kimikoa (1994, 14. or.). Lehen urteetan, estilo biologikoari loturiko zientzialariek egin zituzten “sexu”-hormonei buruzko ikerketa gehienak: fisiologoek, ginekologoek, anatomistek eta zooloek. 1920ko hamarkadan, kimika nagusitu zen (1994, 15. or.). Biologo eta ginekologoek funtzioari erreparatzen diote; kimikariek, berriz, hormonen egitura kimiko molekularri (1994, 39.-40. or.). Hortik dator “zientziaren molekularizazio” adierazpide kontzeptuala.

obulutegi eta testikulu bidezko prestakinak ekoizteari ekin zioten, eta, XX. mendearen hasieran, aldizkari medikoetan gomendatzen eta iragartzen ziren, orotariko izenekin. Sintesi hormonalen kasuan ere, hormonak edo gonadetako jariakinak ikertzen ziharduten zientzialarien eta konpainia farmazeutikoen arteko harreman estu berbera errepikatu zen. Patroi historiko horrek Kapitalozeno neoliberalak zeharkatzen du; handik azalera da, eta, aldi berean, hura koeratu du: “[T]he structural relationships and interactions between three groups that were actively involved in the shaping and establishment of sex hormones as scientific facts and artefacts: laboratory scientists, clinicians and pharmaceutical entrepreneurs” (Oudshoorn, 1994, 10. or.).

Hoberman bat dator Oudshoorn-ekin, biek azpimarratu baitute zer garrantzia izan zuten konpainia farmazeutikoek hormonak ekoizpenean:

[N]ot by the lone investigator who experiments on himself but by competing teams of scientists employed by pharmaceutical firms—a commercial strategy that developed during the 1920s. One consequence of this change is that commercialization has become the premise rather than (as it was in the 1890s) a consequence of drug development. (2005, 39. or.)

Oudshoorn-i jarraituz (1995, 15. or.), *hormona* hitza Ernst H. Starling-en *Croonian Lectures of Chemical Correlations* lanean agertu zen lehen aldiz (1994, p. 15). Zera dio Starling-ek:

These chemical messengers... or “hormones” (from ὀρμάω, I excite or arouse), as we may call them, have to be carried from the organ where they are produced to the organ which they affect, by means of the blood stream, and the continually recurring physiological needs of the organism must determine their production and circulation through the body. (1905, 6. or.)

1920-1930eko hamarkadetan, “sexu-hormona” deritzenak isolatu ziren (Oudshoorn, 1994, 69. or.; Fausto-Sterling, 2000, 180.-181. or.). Hamarkada haietan hormona kristalino estrogenikoa eta testosterona isolatu zituen lehen ikerketa-taldeetako bat Amsterdamgo Unibertsitateko Pharmac-Therapeutic Laboratory izan zen, Ernst Laqueur fisikari eta farmakologoaren gidaritzapean, zeina Thomas W. Laqueur-en osaba baitzen. Ikerketa-talde hark lan-harreman estua izan zuen Holandako Organon konpainiarekin. Organon 1923an sortu zen; estrogeno-ekoizle handiena izan zen II. Mundu Gerrara bitartean, eta hormona bidezko antikonzeptiboaren arloko hiru konpainia handienetako bat mundu-mailan 1995ean (Oudshoorn, 1994, 13. or.). 2007an, AEBko Schering-Plough-ek bereganatu zuen; gero, 2013an, Merk & Co., Inc.-rekin fusionatu zen enpresa hori, eta izen hori hartu zuen.

Bai Organon<sup>312</sup> konpainiaren Hombreol produktu hormonalaren kasuan, bai emakume\* menopausiadun eta haurdunentzako hormona-terapien eta pilula antikonzeptiboen kasuan, ezer baino lehen, behar bat sortu edo areagotu beharra zegoen. Horretarako, zenbait bizi- eta gorputz-prozesu –haurdunaldia, zahartzea, indarra galtzea, eta abar– eta zenbait identitate sexu-generiko eta sexu-desira eta -praktika –emakumeak\*, lesbianak, homosexualak, trans\* ez-bitarrak, emakume\* transak\*, gizon transak\*, intersexualak, emakume\* intersexualak, gizon intersexualak, eta gainerako identitate-konbinazioak– arazotsu, patologiko eta gaixotasun gisa kontzeptualizatu beharra zegoen. Honela dio Oudshoorn-ek: “Sex hormones may best be portrayed as drugs looking for diseases. Before the actual process of marketing could begin, the pharmaceutical company had first to create its audiences” (1994, 107. or.). Zeregin horretan, ezinbestekoa da konpainia farmazeutikoen eta industria medikoen arteko elkarlana, ikusteko zer prozesu patologiza daitezkeen eta zer “gaixotasun” “senda” daitezkeen produktu hormonalen bitartez. Laborategian hasitako prozesuak –askotan, konpainia farmazeutikoen finantziarioari esker–, beraz, orduantxe hartzen du garrantzia. “Sexu-hormonak” sortzeko prozesua ez da merkaturatzearekin bukatzen; areago, orduan hasten dira laborategian sorturiko produktu hormonalak testatzen –laborategian eta klinikan proba prozesu jarrai baten bitartez–. Ernst Laqueur mediku eta laborategiko zientzialariak bitartekari-lanak egin zituen Organon-en eta komunitate medikoaren artean, lankideak elkarlan horren onurez konbentziturik: “[B]y promising the provision of high quality hormonal drugs in exchange for the delivery of raw materials and their cooperation in clinical trials” (Oudshoorn, 1994, 108. or.).

“Sexu-hormona femenino” bidezko farmakoen ekoizpenak eta merkaturatzeak bidea erdi-egina zuen ginekologiari esker, bai bezeroei bai gaixotasunei dagokienez. Konpainia farmazeutikoek zein ginekologoen estatus zientifikoa lortu nahi zuten, elkarren beharra zeukaten; hortaz, ez zen zaila izan estrategia bat diseinatzea “sexu-hormona femeninoak” “big science and big bussiness” bihurtzeko (Oudshoorn, 1994, 108. or.). Gizonen ugalketa-aparatuaren fisiologia instituzionalizatu gabe egotea –eta horrek inplikazio politiko eta kultural sakonak ditu– erabakigarria izan zen emakumeen\* teknogorputzak konpainia farmazeutikoek konkistatu, kolonizatu eta kapitalizatu beharreko esparru bilakatzeko, eta, ondorioz, “sex hormones became marketed as specific drugs for menstruation and the female menopause, and not for contraception and the male menopause” (1994, 109. or.).

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<sup>312</sup> Konpainiak saldu zuen lehen produktu hormonalak intsulina izan zen, diabeteserako, 1923an (Oudshoorn, 1994, 82. or.). 1931n, Organon-ek Hombreol merkaturatu zuen, “hormona maskulinoak” zeuzkan lehen produktu estandarizatua (1994, 98. or.).

Pilula antikonzeptiboaren kasuan, haren sortzaileak, Gregory Pincus-ek, urte askoan lan egin zuen G.D. Searle & Company konpainia farmazeutikoan, aholkulari gisa. Pilula, ikusiko dugunez, jaiotze-tasa kontrolatzeko mugimenduaren ondorioz sortu zen, emakume\* zurien emankortasuna areagotzeko proiektuaren babespean, John Rock ginekologiako irakasle eta Free Hospital for Women-en zuzendariak zuzenduta. Azkenean, Karibeko emakumeekin\* testatu zen. Beraz: “[T]he story of hormones became entangled with big politics... in which birth control ideologies mix with cultural imperialism” (Oudshoorn, 1994, 112. or.). Konpainia farmazeutikoen, zientziaren eta medikuntzaren *ménage à trois*-a berriz errepikatu zen<sup>313</sup>.

### 3.5.2. Gorputzaren kartografia hormonalak: “sexu-hormon”en izaera sexu-generikoa eztabaidatzen

Badirudi XX. mendearen hasieratik hona ez dela askorik aldatu “sexu-hormonak” ulertzeko modua. Ostertag argi eta garbi mintzo da zera esaten duelarik: “‘Sex hormones’ have moved to centre of the stories we tell ourselves about not only about what makes us transgender, or what make us homosexual or heterosexual, but what makes us men or women, male or female” (2016, 2. or.). Saul Rosenzweig eta R. G. Hoskins-ek, 1941eko “A Note of the Infertility of Sex-Hormone Medication in a Case of Pronounced Homosexuality” artikuluan –gero aipatuko dugu xehekiago–, behin eta berriz erabili zuten “sex-hormone/s” esapidea. Adibidez: “An attempt was then made to enhance the responsiveness to sex hormones by the use of desiccated thyroid (Armour)” (1941, 88. or.). Beste batzuetan, “[s]ex-hormone medication” aipatzen dute (1941, 88. or.). Artikulu horretan hormonez hitz egiteko erabiltzen duten hizkera alderatzen badugu Celia Roberts-ek “Hormones as messengers of sex” testuan (2018) erabiltzen duenarekin –aurreko atalean aipatu dugun *Transitional States* proiektuaren barnean–, hormonon terminologian aurkituko dugun desberdintasun bakarra izango da “sexual” adjektiboaren ondotik “esteroide” gehitzen duela Roberts-ek. Nolanahi ere, Roberts-ek, planteamendu sortzaile eta interesgarri bat egiten badu ere sexu-generoaren materialtasunaren gaineko begirada feminista

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<sup>313</sup> Oudshoorn-ek aipatzen dituen hiru eragileak –konpainia farmazeutikoak, estamentu medikoa eta zientzialariak– ezinbestekoak dira produktu hormonalak sortzeko, eta hori guztiz bat dator Preciado-k egiaztatze-aparatutzat hartzen dituen bi agente nagusiekin: merkatua –kasu honetan, konpainia farmazeutikoak– eta hedabideak. Preciado-k ez du esaten aparatu zientifiko-medikoa, hormonon –bai artefaktu teknozientifiko zein merkatuko produktu gisa– sorreran hain garrantzitsua izanik, desagertu denik, baizik eta indarra galdu duela. Gonadetako jariakinen prestakinek hasi zirenetik, publicitatearen eginkizuna eta garrantzia nabarmena izan da produktu hormonalak saldu eta arrakastatsu egiteari begira; zenbait egilek –Oudshoorn-ek berak eta, aurrerago ikusiko dugunez, Nancy Langston-ek– jakinarazi dutenez, garrantzi hori areagotu egin zen XX. mendean zehar.



bat proposatuz, ingurunera eta elementu kimiko ugaritara irekitako prozesu aldakor bat den heinean, ez du ez kritikatzeko ez ukatzeko “sex hormones” nomenklatura:

Sex hormones, and the many chemicals that act like them, function as messengers in human bodies. They partake in complex communication systems involving genes, cells, glands, organs, whole bodies and environments. As messengers, sex hormones are deeply relational entities: they operate within feedback loops, reacting to current conditions and interactions. Sex hormones also fluctuate over time, in both hourly and daily patterns and over the life course. In many senses, then, sex hormones flow. (2018, 39. or.)

Hala eta guztiz ere, hormonak sexu-mezulari gisa teorizatzean, ikusmolde deterministetatik eta begirada sexu-generiko dimorfiko eta dualistetatik aldentzen da, eta adierazten du *Transitional States* proiektuaren erronka hau dela: “[O]pen our minds and bodies to possible re-framings of sex hormones as actors in our contemporary and future lives” (2018, 42. or.). Beharbada, hori egiteko modu bat izan liteke hormonon izaera sexu-generikoa problematizatzea edo eztabaidatzea eta beste modu batera kontzeptualizatzea, eta, hori lortzeko, Fausto-Sterling-ek adierazi duen bezala, ezinbestekoa izango da gure paradigma sexu-generikoa aldatzea (2000, 194. or.).

Oudshoorn-ek (1994, 21. or.) eta Fausto-Sterling-ek (2000, 163. or.) diotenez, XX. mendearen lehen hamarkadetan, sexu-garapena bi prozesuren bitartez definitzen zen: faktore genetikoen erregulaturiko sexu-determinazioa eta faktore hormonalen ondoriozko sexu-diferentziazioa. 1920eko hamarkadan, genetikaz eta endokrinologiaz gainera, biokimika ere agertokira igo zen, eta horrek aurreko ikusmoldea aldatzea ekarri zuen. Lehenago ere esan dugunez, 1910ean, kimika organikoaren aurrerapenei segituz, gonadak transplantatzeko praktikak indarra galdu eta gonaden erauzketa kimikoa nagusitzen hasi zen. 1905etik 1920ra bitartean, gizarte viktoriarrek sexu-generoaz zeukan ikuspegia bilduz –nahiz eta “genero” nozioa agertu gabea baitzen artean ere, edo agertu berria– eta gonada femeninoak feminitatearen *locus* gisa eta gonada maskulinoak maskulinitatearen *locus* gisa agertzeko ideia aurrezientifikoa ere kontuan hartuz, sexu-hormonak honela definitzen ziren: badira bi sexu-hormona desberdin; batetik, maskulinoak, zeinak gonada maskulinoetan ekoizten baitira, eta, bestetik, femeninoak, zeinak gonada femeninoetan ekoizten baitira. Horrenbestez, bazeuden bi hormona, bat sexu-genero bakoitzeko, eta sexualki espezifikoak ziren bakarrik, bai jatorriari, bai funtzioari dagokienez (Oudshoorn, 1994, 21.-22. or.).

Gizarte viktoriarrean, Laqueur-ek azaltzen digun gisara, bi sexuak elkarren kontrakoak balira bezala karakterizatzen ziren. Steinach-ek sexu-antagonismoaren ideia aplikatu zien hormonei, hau da, ezaugarri sexu-generizatu “koherenteak” estimulatzeaz gainera, aurkako sexu-generokoen garapena inhibitzen dute<sup>314</sup>. Prozesu horri “sex hormone antagonism” izena eman zion (Fausto-Sterling, 2000, 159. or.), eta, ondorio horretara iristeko, esperimentu anitz egin zituen arratoi eta akuriek (Oudshoorn, 1994, 156. or.; Fausto-Sterling, 2000, 158.-164. or.; Sengoopta, 2003, 124. or.; Ostertag, 2016, 34. or.). Hala, obulutegiak transplantatu zizkien ar zikiratuei –Steinach-en arabera, horrek haien hezur-egitura, zakilaren tamaina, ilea eta titiburuak “feminizatzen” zituen–, eta testikuluak eme zikiratuei, “maskulinizatzeko”; bi transplante mota horiek eragina izan zuten karraskarien jokabidean (Ostertag, 2016, 34. or.). Era berean, obulutegiak eta testikuluak transplantatu zituen karraskari berean<sup>315</sup>. 1920ko hamarkadan, Steinach-ek giza gorputzen hormonetara hedatu zuen sexu-antagonismoaren kontzeptualizazioa, eta, horretarako, esperimentuak egin zituen homosexualekin (Oudshoorn, 1994, 156. or.). Fausto-Sterling-ek honela dio: “[T]he highly anthropomorphic way he described his results speaks to how deeply his assumptions about sexual difference shaped his science” (2000, 158. or.). Egilearen aburuz, Steinach-ek honelako termino eta esapideak erabiltzen zituen hazkuntza-prozesuak deskribatzeko: “battles of the antagonistic actions of sex hormones” eta “sharp antagonisms” (2000, 159. or.).

Steinach-en esperimentuen emaitzak Carl R. Moore enbriologoak gezurtatu zituen, esperimentu berak errepikatuz. Fausto-Sterling-en iritziz, Steinach-en datuak bateragarriak ziren beraren ondorioekin, baina ondorioak azpideterminatuta zeuden (2000, 162. or.). Moore-k aurkitu zuen Steinach-ek feminizazioaren edo maskulinizazioaren adierazletzat harturiko aldaketak –gorputzaren pisua eta luzera, ilearen egitura, ugatz-guruinak, eta abar– hain desberdinak zirela banako batetik bestera, ez zeudela sexuarekin korrelazioan modu fidagarri batean (Fausto-Sterling, 2000, 164. or.). Esate baterako, Steinach-ek garrantzi handia eman zion testikuluak transplantatzearen ondorioz pisua areagotzeari, baina Moore-ren kontra-argudioa izan zen Steinach-ek arratoi-lagin handiagoak erabili izan balitu konturatuko zatekeela eme asko arrak baino handiagoak zirela. Gainera, pisuaren gorakada txikia zen, eta galdera sortu zen,

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<sup>314</sup> Brown-Séquard-ek ezaugarri homologoen sorrerara murriztua zuen jariakin hormonalen funtzioa: jariakin hormonal femeninoak sexu-garapen femeninoarako eta jariakin hormonal maskulinoak sexu-garapen maskulinoarako. Testikuluekin esperimentuak egiteaz gainera, Brown-Séquard-ek Parisko emagin baten jardunaren berri eman zuen, emakumeen\* histeria tratatzen baitzuen akurien obulutegietako zukuarekin (Oudshoorn, 1994, 17. or.).

<sup>315</sup> Steinach-ek arratoi eta akurietan eginiko testikulu- eta obulutegi-transplanteen efektuei buruzko analisi eskematiko eta aldi berean landu baterako, ikus Fausto-Sterling (2000, 160. or.).

zergatik ez izendatu hori tamaina edo pisua handitzea, eta ez maskulinizatzea (Ostertag, 2016, 35. or.).

Fausto-Sterling-en ustez (2000, 165. or.), Moore-k argudiatu zuen arren jokabide batzuetan garbi ikusten zela hormonak eta sexu-diferentziak lotuta zeudela, jokabide generizatu guztiak ez ziren beti agerikoak<sup>316</sup>:

Steinach has described the docility of the normal female rat (does not fight, is easily handled, not so apt to bite or to resist handling, etc.) but here again the variations are too great to be of any practical value. Many females of this colony are decidedly [sic] more pugnacious than males. In several cases, these, after repeated handling, would bite, scratch, and resemble any other than a meek and mild-tempered female of the colony. (Moore, 1919, 151. or.)

Steinach-en eta Moore-ren arteko liskar zientifikoak bere horretan jarraitu zuen. Steinach-ek irmo defendatu zituen bere teoriak, eta esperimentuak egiten segitu zuen; besteak beste, obulutegi- eta karena-estraktua injektatu zien arratoi arrei, eta hala berretsi zituen sexu-antagonismoari buruzko bere ondorioak (Fausto-Sterling, 2000, 168. or.). Moore-k, Dorothy Price-rekin lankidetzan, esperimentu hori errepikatu, eta oso ondorio desberdinak atera zituen, zeinak “Gonad hormone functions and the reciprocal influence between gonads and hypophysis with its bearing on the problem of sex hormone antagonism” artikuluan argitaratu baitzituen, 1932an: “[C]ontrary to Steinach, that oestrin is without effect upon the male accessories. It neither stimulates nor depresses them” (1932, 22. or.).

Moore-k eta Price-k berek diotenez, Steinach-en sexu-antagonismoaren teoria eztabaidatzeak hormonon ekintza hipofisira hedatzera eramane zituen, eta horrek hormonon gaineko teoria berri bat ekarri zuen. Lau puntutan laburbildu zuten teoria berria:

1. Gonad hormones stimulate homologous reproductive accessories, but are without effect upon heterologous accessories.
2. Secretions produced by the hypophysis stimulate the gonads to function both in germ cell production and in hormone secretion.
3. Gonad hormones have no *direct* effect on the gonads of either the same, or the opposite, sex.
4. Gonad hormones, of either sex, exert a depressing effect upon the hypophysis which results in a diminished amount of the sex-stimulating factor available to the organism. (1932, 19.-20. or.)

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<sup>316</sup> Fausto-Sterling-ek xeheki azaldu ditu Moore-ren esperimentuen emaitzak (2000, 166.-167. or.). Ostertag-ek, bestalde, ehun urtean arratoiekin esperimentuak egin eta gero, arratoien sexu-jokabideei buruzko gaur egungo ondorioen berri eman du, eta ohartarazi du, aurreko ataletan albatrosei buruz jakinarazi dugun moduan, balitekeela antropomorfismo-kasuak izatea (2016, 36. or.).

Fausto-Sterling-en aburuz, teoria horrek dakarrena da gonadek sexu-garapenaren eragile nagusi izateari uzten diotela eta sistema askoz konplexuago baten barnean sartzen direla, beste elementu batzuekin batera, non denek betetzen baitute eginkizun bat sexual gisa kategorizatzen eta sexu-generizatzen ditugun morfologiaren eta gorputz-funtzioen efektu jakin batzuk sortzeko orduan (2000, 168. or.). Alegia, hormonon sexu-espezifikotasunari buruzko ikusmoldean – hormonak sexu-generoaren, feminitatearen eta maskulinitatearen *locus* gisa ulertzea– eragiteaz eta hura zalantzan jartzeaz gainera, halaber eragin edo zalantzan jarri zuen azpian zetzan beste ideia bat, hots, gonadak dualtasun sexu-generikoaren *locus* eskusibo eta nagusi gisa (Oudshoorn, 1994, 23. or.). Fausto-Sterling-i jarraituz, Price eta Moore-k kontakizun bat sortu zuten zeinean gonada-hormonek ez baitzeukaten sexu-rol espezifikorik, hazkuntza-erregulatzaile indartsu gisa agertzen baitziren (2000, 169. or.).

Sistema endokrino edo hormonalak zelulen arteko komunikazio-sistema gisa kontzeptualizatzen da gaur egun, eta, sistema horretan, “hormona” deritzen estimulu kimikoen bitartez garraiatzen da informazioa. Elkarren ondoan dauden zelulak gainazaleko molekulen eta elkartze espezializatuen bidez komunikatzen dira; elkarrengandik urruti daudenak, aldiz, odoletik garraiatzen diren mezulari kimikoen jariaketan bidez, hau da, hormonon bidez, zeinek itu-zelulak aktibatzen baitituzte hartzaile espezifikoeekin –zelularteko hartzaileak edo mintz-hartzaileak– interakzioan (Ross eta Pawlina, 2007, 740. or.; Molnar eta Gair)<sup>317</sup>. Zenbait zelula endokrinok jariatzen dituzte hormonak; zelulok organo edo guruin endokrinoak osatzen dituzte, hala nola guruin pineala, hipotalamoia, hipofisia, tiroidea, paratiroidea, timoa, bihotza, guruin suprarrenalak, pankrea, obulutegiak eta testikuluak<sup>318</sup>; bestela, epitelio-mintzetako beste zelula batzuen artean sakabanatuta egon ohi dira, bereziki digestio- eta arnas aparatuetan, eta sistema neuroendokrino difuso deritze (Crespo González, 2016, 117.-118. or.). Badira ehun hormona baino gehiago (Ross eta Pawlina, 2007, 739. or.).

Maiz, sistema endokrinoak *feedback loops* bidez funtzionatzen du, eta nerbio-sistemarekin batera jarduten, besteak beste hipotalamoaren, hipofisiaren eta neurotransmisoreen bitartez, eta, era berean, biok jarduten dute sistema immunearekin, zitokinen bitartez, zeinak

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<sup>317</sup> Hormona-jariaketa lau motatakoa izan daiteke. Batetik, autokrinoa, itu-zelula zelula jariatzailea bera denean. Bestetik, parakrinoa, itu-zelula zelula jariatzailearen aldamenean dagoenean. Bestetik, endokrinoa, itu-zelulak zelula jariatzaileetatik urruti daudenean eta hormonak odolaren bitartez garraiatzen direnean. Azkenik, sinapsia, bi zelularen artean komunikazio zuzena dagoenean, nerbio-sistemaren bereizgarri. Zelula jariatzailea –kasu honetan, neurona bat– itu-zelularen ondo-ondoan dago, eta hura aktibatzen du neurotransmisore deritzon mezulari kimiko baten bitartez, zeina sistema endokrinoarekin partekatua izan baitaiteke (Ross eta Wojciech, 2007, 739. or.).

<sup>318</sup> Ikus Crespo González, hormona nagusien, haien organo jariatzaileen, kokagunearen eta funtzioen zerrenda zehatzago baterako (2016, 119.-120. or.).

hormonak baitira (Vandenberg et al., 2012, 408. or.). Oso erlazio estua dutenez, egile batzuek batera hartzen dituzte hiru sistemak, hau da, sistema neuro-immuno-endokrina osatuz.

Uste da hipotalamoak –burmuinean dago– erregulatzen duela prozesu endokrina (Ostertag, 2016, 20. or.; Kethan, 2014, 31. or.). *Feedback loop* setako bat, hain zuzen, hor hasten da; gonadotropina hormona askatzailea jariatzen (GnRH), adenohipofisiak zelula gonadotropetara hedatu, eta zelulok hormona gonadotropina folikulu-estimulatzaila (FSH) eta luteinizatzailea (LH) sintetizatzen/jariatzen dituzte. GnRH estimulazioari erantzunez, zelula gonadotropek gonadotropinak askatzen dituzte zirkulaziora. Gonadetan, gonadotropinek hormona esteroideen sintesia gidatzen dute, esteroideogenesiaren eta gamotegenesi bidez espermatozoideak eta obuluak ekoiztearen bitartez. Hormona esteroideek, bestalde, hipotalamoko GnRH ekoizpena erregulatzen dute, eta, horrenbestez, baita gonadotropinak pituitarioan jariatzea ere (Kethan, 2014, 31. or.).

Nolanahi ere, antagonismo sexu-generiko hormonalaren ideia ez zen bazterrean geratu. Steinach-en jarraitzaile Harry Benjamin-ek hura defendatzen segitu zuen; bere burua Steinach-en dizipulutzat zeukan (Fausto-Sterling, 2000, 169. or.; Ostertag, 2016, 48. or.). Paul de Kruif-ek ere zentzu berean lan egin zuen; *The Male Hormone* idatzi zuen, 1945ean, eta, Brown-Séquard-en eta Steinach-en ildotik, hormona-jariakinak baliatu zituen gizonak gaztetzeko eta indarra berreskuratzeko, eta gizontasunaren zeinu eta estimulagarri gisa defendatu zuen testosterona (Oudshoorn, 1994, 101. or.; Fausto-Sterling, 2000, 169. or.). Esanguratsua da Kruif-ek Charles F. Kettering-en aipu hau jarri izana bere liburuaren hasierako orrialdeetan –liburuaren izenburua, editoriala eta argitalpenaren tokia agertzen diren lekuan–: “Remember, Paul, people are very open-minded about new things –so long as they're exactly like the old ones”. Fernández-ek honela dio: “[E]rrelato [zientifiko]ak funtzio bat betetzen du, eta hori funtsezkoa da. Egia ez izateak edo frogatua ez egoteak ez du esan nahi errelato horrek funtzio bat betetzeari uzten dionik” (Missé eta Fernández, 2018).

Izan ere, antagonismo sexu-generiko hormonalaren ideiak –estrogenoak hormona femeninotzat eta androgenoak, bereziki testosterona, hormona maskulintzat dituen– gaur eguneraino iraun du. Ez bakarrik hori; areago, antagonismoaren ideiarekin batera, bi sexu-generoetako baten gailentasun heteropatriarkalaren ideia aurkitzen dugu: “T” da hormona erregina<sup>319</sup>. Missé-k eta Fernández-ek Bartzelonan *Transitional States* proiektuaren harira izan zuten elkarrizketan, ikus-entzunezko “pilula txiki” batzuk tartekatu zituzten; besteak beste,

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<sup>319</sup> Brown-Séquard-ek ere aipatu zuen ideia hori. Hoberman-ek zera dio horri buruz: “[I]t is not surprising that Brown-Séquard maintained that testicular extract was more powerful than ovarian extract. Indeed, to have argued otherwise would have challenged the biological foundations of male supremacy” (2005, 95. or.).

“testosterona” hitza Google-n bilatu, eta, gero, gauza bera egin zuten estrogenoekin (2018). Emaizta harrigarria izan zen. Genero-ideologia osoa molekula horren eta haren imaginario sozialaren inguruan biltzen eta zabaltzen da. Irudietan, gizon hipermuskulatuak ageri dira, bibotedunak eta/edo bizardunak; beso gihartsuko gizonak besoak zutik eta/edo pesak altxatzen; zakilak eta testikuluak; gizon tripa-handien eta gihartsu-indartsuen irudiak elkarren ondoan jarrita, testosterona hartzearen efektuak ikusarazteko (beti eta bakarrik gizonak); eta mutil baten burmuina. Gizon erakargarriak, atletikoak eta boteretsuak, arrakasta sozialaren irudi<sup>320</sup>.

Shanon Pettypiece-k artikulu bat argitaratu zuen *Bloomberg* aldizkarian, “Are Testosterone Drugs the Next Viagra?” izenburupean (2012). Artikulu horretan, bertikalki paraturiko pilula baten irudiak adierazten du testosterona, eta, hartatik, bi beso gihartsu ateratzen dira, bat alde bakoitzetik, gorantz, indar-erakustaldien keinu tipikoa eginez.

Baina, “estrogenoak” hitza sartuz gero, ez da halakorik agertzen. Pantailan agertzen diren irudi gehienetan, obulutegiak eta baginak ageri dira, hilerokoa, estrogeno-pilulak, estrogenoen molekula-egitura... Imaginario sozialari dagokionez, emaitzak erakusten du Google-k eta hark biltzen duen genero-ideologiak, hormonon bitartez oraingoan, ugalketaren eta zaintzaren esparruan kokatzen dutela emakumea, esparru pribatuan, ugalketarako eta kontsumorako gorputz gisa, estrogenoak garrantzi eta proiektzio sozial eta publikorik gabe utzirik. Missé-k, irudiak ikusirik, zera ondorioztatu zuen: “[A]zkenean, *hormona* testosterona da (...) iruditeria sozial oso indartsu bat sortzen duen hormona erregina testosterona da” (Missé eta Fernández, 2018)<sup>321</sup>.

Fernández-ek, berriz, adierazi zuen Google-ko irudiak bitan banatu daitezkeela: batetik, egitura kimiko molekularra daukatenak, zeinei buruz ezin baitu mundu guztiak hitz egin, profesionalizazioa eskatzen baitute; bestetik, alderdi sozialarekin lotuago daudenak (Missé eta Fernández, 2018). Inferentzia handia dago irudi kimikoen eta irudiok biltzen dituzten imaginario sozial sexu-generizatuen artean. Irudiek agerian uzten dute sexu-hormonen fikzio-izaera.

Bada gaur eguneraino iraun duen “sexu-hormonei” egotzitako sexu-antagonismoaren eta genero-arauek inposaturiko koherentziaren beharraren ideiak ironikoki eztabaidatzen dituen fenomeno bat: androgenoak luzaroan kontsumitzeak maiz eragiten duen efektua, hau da, ginekomastia edo gizonen bularra haztea; kulturisten hizkeran, “*bitch teets*” esaten zaio (txakur emearen titiak), eta testosterona ekoizteko gaitasun endogenoa ere murrizten du (Preciado, 2008,

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<sup>320</sup> Berriz errepikatu dugu esperimentua, “testosterona” eta “estrogenoak” hitzak sartuta, eta irudi berak agertzen dira.

<sup>321</sup> Jatorrizko testua: “[A]l final *la* hormona es la testosterona (...) la hormona reina que genera un imaginario social muy potente es la testosterona”.

128.-129. or.; Ostertag, 2016, 93. or.)<sup>322</sup>. Apta Vital Sport kirol-eskolaren web-orrian, testosterona-anabolizatzaileak kontsumitzearen efektuen artean, ginekomastiaz gainera, honako efektu gehienetan “itzulezin” hau aipatzen da: “Hormona gonadotrofikoen jariaketa deuseztatzen dute. Hormona gonadotrofikoek gonaden (testikuluak eta obulutegiak) garapena eta funtzioa kontrolatzen dituzte. Gizonetan, gonadotrofina gutxitzeak testikulu-atrofia, testosterona-jariaketa gutxitzea eta esperma kantitatea urritzea eragin dezake” (2019)<sup>323</sup>.

Oudshoorn-en arabera, 1920an, lipidoen kimika biokimikaren barneko ikerketa-lerro berri gisa agertu zen. Ordurako, egileak dioenez, “sexu-hormonak” kolesteroletik eratorritako esteroide gisa sailkatzen ziren: “[A] class of substances that could be extracted with the same solvents applied in extracting lipid” (1994, 21. or.). Fausto-Sterling-ek azaldu du kimikari organikoek 1914an identifikatu zituztela esteroideak eta 1920rako aurkitua zutela material biologikotik erauzteko modua (2000, 170., 177. or.).

Badira hiru hormona mota nagusi: aminoazidoetatik eratorriak –adibidez, adrenalina, noradrenalina edo tiroxina–; peptidoak, peptido txikiak eta proteinak biltzen dituztenak –adibidez, insulina, entzefalina, basopresina edo hazkuntzarako hormona–; eta esteroideak, kolesteroletik eratorriak –besteak beste, kortisola, progesterona, estradiola edo testosterona– (Ross eta Pawlina, 2007, 739. or.). “Sexu-hormona” deritzen guztiak, estrogenoak, progesterona eta androgenoak, kolesteroletik eratorriak dira, eta esteroideak dira. Progesterona pregnenolonatik sintetizatzen da, zeina aldi berean kolesteroletik eratorria baita. Aldosterona mineralokortikoidearen aurrekaria da progesterona, eta, 17-hidroxiprogesteroa progestageno endogenora bihurtu ondoren, baita kortisolaren eta androstenedionaren aurrekaria ere. Androstenedionak testosterona, estrona eta estradiola ekoizten ditu. Aromatizazio deritzon prozesuan, testosterona, zeina ikusi dugun bezala progesteronatik eratorria baita, estradiol bihurtzen da; eta androstenediona, progesteronatik eratorria, estrona (White, 2001, 705.-708. or.).

Ostertag-ek dio: “The endocrine sytem is currently the subject of a considerable amount of research, and the more we learn, the more we become aware of how little we undertand about it” (2016, 20. or.). Hormonek, eta, haien artean, esteroideek, askotariko funtzioak betetzen dituzte teknogorputzetan. Hormona batek oso funtzio desberdinak erregula ditzake organo ezberdinetan. Fausto-Sterling-i jarraituz, historikoki “sexu-hormona” izendatu direnek zenbait

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<sup>322</sup> Fausto-Sterling-ek azaltzen duenez, 1930eko hamarkadarako argi zegoen “hormona maskulino”ek eragina izan zezaketela sexu-garapen “femenino”an, eta alderantziz (2000, 182. or.).

<sup>323</sup> Jatorrizko testua: “[s]uprimen la secreción de hormonas gonadotróficas, que controlan el desarrollo y la función de las gónadas (testículos y ovarios). En los varones, la reducción de gonadotrofina puede producir atrofia testicular, reducción de la secreción de testosterona y menor cantidad de esperma”.

ehuni eragiten diete, hala nola hezurrei, nerbioei, bihotzari, gibelari edo giltzurrunei, eta “under the right circumstances these hormones can dramatically affect sexual development at both the anatomical and the behavioral level” (2000, 193. or.). Odoleko hormonien kopurua desberdina da teknogorputz batetik bestera, eta alda daiteke adinaren, sexuaren, ugalketa-zikloko unearren edo osasun-egoeraren arabera. Teknogorputzasun bakoitzak hormona-oreka propioa dauka (Vandenberg et al., 2012, 383.-384. or.). Fausto-Sterling-en ustez, zelula-mailan, egokiagoa da zelulen hazkuntzako, zelulen bereizkuntzako, zelulen fisiologiako eta zelulen heriotza programatuko prozesuak erregulatzen dituzten hormona gisa kontzeptualizatzea. Berak teknogorputzasunen organo-sistemaren zati nagusian –edo are osoan ere– eragiten duten hazkuntza-hormona boteretsu gisa definitzen ditu (2000, 193. or.).

1927an, Amsterdango Unibertsitateko Ernst Laqueur-en Pharmaco-Therapeutic Laboratory-ko lantaldeak jakinarazi zuen “sexu-hormona femeninoak” aurkituak zituztela ez bakarrik testikuluetan, baizik eta baita gizonen gernuan ere, eta horrek zalantzan jarri zuen hormona-sistema dualista. Eta ez hori bakarrik, ondorioztatu baitzuten hazitarako zaldia zirela ordura arte ezaguturiko “sexu-hormona femenino”en iturri handiena (Oudshoorn, 1994, 23.-24. or.; Fausto-Sterling, 2000, 182. or.)<sup>324</sup>. Ildo horretan, Thomas Laqueur-ek zera ondorioztatu zuen bere *Making Sex* lanean:

I might have ended with the scientists, including my great-uncle Ernst Laqueur who in the 1930s worried about endocrinological androgeny, when male hormones were found in the female and female hormones in the male. But that worry is only a chemical version of the sorts of issues already raised by nineteenth-century embryology. (1990, 243. or.)

Alegia, gorputz guztietan orotariko hormonak egoteak, Thomas Laqueur-ek bi sexuen jatorri enbriologiko komunari dagokionez adierazten duen bezala, aski ongi berrets zezakeen eredu monosexuala eta ez sexu-diferentziarena (1990, 169.-170. or.)<sup>325</sup>. Eta ageri utzi zuen honako hau: “[H]ow difficult it is for culture to make the body fit into the categories necessary for biological and thus cultural reproduction. Two sexes are not the necessary, natural consequence of corporeal difference. Nor, for that matter, is one sex” (1990, 243. or.). Oudshoorn-ek, harago joan, eta zera aipatu zuen hormonei buruz: “[T]he facts undermine the notion of two stable, opposite sexes, where the ‘toys’ opposed the ‘boys’” (1994, 9. or.).

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<sup>324</sup> Premarin®, sortu zenetik gaur arte, behorrei –eta ez hazitarako zaldiei– erauzitako estrogenoekin fabrikatu da; besteak beste, errazagoa delako behorrek lortzea hazitarako zaldia baino (Ostertag, 2016, 65. or.).

<sup>325</sup> Izan ere, Thomas Laqueur-ek berak dio aurkikuntza horrek ekarri zuela “uncomfortable possibility of endocrinological androgyny at the very moment when science seemed to have finally discovered the chemical basis of sexual difference” (1990, 249. or.).



Ondoren, beste argitalpen batzuetan, jakinarazi zen obulutegietan ere bazirela “sexu-hormona maskulino” deritzenak (Oudshoorn, 1994, 25. or.). Oudshoorn-i jarraituz, 1937rako, guruin adrenalak eta guruinak hartzen ziren hormona-jariaketarako gune gisa; alegia, ordurako, zalantzan jartzen hasiak ziren “sexual” deituradun hormonen sexu-berariazkitasuna, bai jatorriari dagokionez, bai funtzioari dagokionez (1994, 27. or.).

Nolatan iritsi da gure egunetara “sexu-hormonak” logika dualista heteropatriarkal batean txertaturiko entitate antagonikoak direlako ideia? Diskurtsoak edo hizkuntzak teknologia baten gisara funtzionatzen du “sexu-hormona” deritzenen koeraketan<sup>326</sup>, eta, horretaz gainera, Oudshoorn-ek azaldu du “sexu-hormona femeninoak” eta “maskulinoak” akritikoki onartzen direla gertaera naturalak balira bezala, zientziak errealitatea den bezalaxe deskribatzen duelako ideia positibistari jarraituz. Hacking-ek *Representing and Intervening* (2010) (1983) lanean dioenaren arabera, laborategi-zientziek ahalmena dute, beren aparatu eta tresnen bitartez, artefaktu teknozientifikoak sortzeko; kasu honetan, sexu-hormonak. Arazketa- eta egonkortze-praktikek zuzenean parte hartu zuten artefaktu horien sorreran, eta praktika horien aurretik existitzen ez ziren eta aurkitu ezin ziren gauzak sortu zituzten: “[S]ex hormones do not simply exist in nature, they are literally created by laboratory scientists” (Oudshoorn, 1994, 42. or.). Endokrinologiaren zientzia berriak bere autoritate materiala ezarri zuen “sexu-hormonak” kontzeptu teorikoa errealitate material bihurtuta: sexu propiodun substantzia kimikoak (1994, 42. or.). Zientzialariek hainbat aukeraren artean testatu, neurtu eta hautatu zuten zer hormona izango ziren eta bakoitzak zer egingo zuen. Fausto-Sterling-ek dio sexu-generoarekin eta ugalketarekin loturarik ez zuten prozesu eta funtzio guztiak kanpoan geratu zirela (2000, 185. or.).

1929an, “sexu-hormonak” hormona esteroideak zirela gauza jakina zelarik, “sexu-hormona femeninoak” erauztea, isolatzea eta araztea –hau da, kristalizatzea– lortu zuten bi taldek –lehenbizi, Edward Doisy estatubatuarraren taldeak, eta, handik bi hilabetera, Adolf Butenandt alemanarenak–; lehenik, behorren gernutik, eta, gero, emakume\* haurdunetatik (Oudshoorn, 1994, 69. or.; Fausto-Sterling, 2000, 180.-181. or.; Beccalossi, 2018, 14. or.). Hurrengo urtearen hasieran, Laqueur-en lantaldeak ere lortu zuen. Oudshoorn-ek dioenez, hiru zientzialari-taldeok lan-harreman “estua” zeukaten konpainia farmazeutikoekin: Doisy-ren taldeak, Parke, Davis, and Company-rekin; Butenandt-enak, Schering-Kalhbaum-ekin; Laqueur-enak, Organon-ekin (1994, 69. or.). 1931n, Butenandt-ek “sexu-hormona maskulinoa” isolatu zuen gizonen gernutik,

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<sup>326</sup> Ez da kasualitatea izen posible eta proposaturiko izen guztien artean “estrogeno” aukeratu izana “sexu-hormona femeninoak” izendatzeko eta “androgeno” “sexu-hormona maskulinoak” izendatzeko. Nomenklaturari eta izen-hautaketari buruzko arrazoiengatik, ikus Fausto-Sterling (2000, 187.-190. or.).

eta, 1935-1936an, isolatuta sortzea eta sintetikoki ekoiztea lortu zuten (Oudshoorn, 1994, 69., 103. or.; Hoberman eta Yesalis, 1995, 78. or.; Fausto-Sterling, 2000, 181. or.; Freeman et al., 2001, 327. or.)<sup>327</sup>.

Handik aurrera, nahiz ez homogeneouski eta bat-batean, konpainia farmazeutikoek “sexu-hormonak” kontzeptua bi entitatetan banatzeko ikuspegia indartu zuten: “sexu-hormona maskulinoak” gizonentzako farmako gisa eta “sexu-hormona femeninoak” emakumeentzako\* farmako gisa (Oudshoorn, 1994, 106. or.).

Lau argudio nagusi eman ditugu “sexu-hormona” deritzenen izaera sexu-generikoa, zeinak sexu-dimorfismoa, antagonismo sexu-generikoa, gizonen gailentasun patriarkala eta egitura heteronormatiboa barnebiltzen dituen, problematizatzen:

1. Historikoki “sexu-hormona” izendatu direnak kolesterolek eratorriak dira, eta hormona esteroideak dira denak.

2. Hormona esteroideek, gorputzaren garapen sexu-generizatuan parte hartzeaz gainera, teknogorputzen askotariko funtzioetan parte hartzen dute.

3. “Sexu-hormonak” ez dira ekoizten ez nagusiki ez eskusiboki “sexu-gonada” deritzenetan; kontrara, hainbat organo eta guruinetan sortzen dira, beste gorputz-sistema batzuekin interakzioan, eta odolletik garraiatzen dira gorputzean zehar.

4. “Sexu-hormona” guztiak teknogorputz guztietan ekoizten dira; ez du axola zer sexualitate, desira, sexu-genero, arraza edo gaitasun dauzkaten.

Hemen azaldu ditugun eta, beharbada, ezagutzen ez ditugun beste arrazoi batzuk direla eta, Fausto-Sterling-ek proposatu du “sexu-hormon”en metafora antolatzailea eta “estrogeno” eta “androgeno” terminoak bertan behera uztea (2000, 193. or.). Eta ez da lehenbizikoa. Oudshoorn-i esker jakin dugunez, zenbait zientzialarik uko egin zioten “sexu-hormonak” nomenklatura eta sailkapenari (1994, 33.-34. or.). John Freud holandar biokimikaria, Laqueur-en lantaldekoa bera, “hormona maskulino” eta “hormona femenino” terminoei uko egitearen alde agertu zen 1936an, besteak beste argudiaturik biak ageri zirela bi sexu-generoen gertuan, eta “katalizatzaile” gisa pentsatzea proposatu zuen: “If we understand the hormones as catalysts for certain chemical conversions in cells, it would be easier to imagine the manifold activities of each hormonal substance” (Freud, 1936, 12.-14. or., Oudshoorn-ek aipatua, 1994, 34. or.).

Ez dugu ukatu nahi hormona esteroideek materialtasun sexu-generikoaren koeraketan duten papera –kontuan izan organiko-teknologiko-diskurtsibo-material gisa kontzeptualizatu

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<sup>327</sup> Gizonen teknogorputzetatik gertu lortzeko zailtasunak –batetik, ez baitzegoen halakoak modu erraz batean jasotzeko tokirik, hala nola klinika ginekologikorik, eta, bestetik, ospitaleetako gaixoen eta animalia-teknogorputz ez-gizatiarren gertuak “sexu-hormona maskulino” gutxi baitzeukan– sintesira bultzatu zituen konpainia farmazeutikoak eta zientzialariak (Oudshoorn, 1994, 75. or.).

dugula koeraketa hori-. Problematizatzen ari garena hormona jakin batzuen izaera nagusiki sexu-generikoa da; izan ere, sexu-generoa eta, horrenbestez, ahalmen ezohiko eta funtsezko bat esleitu zaie sexu-generoaren eraketan, beste elementu batzuk baztertuz eta ikusezin bihurtuz, generoaren funts kimikoa osatuz eta, hala, sexu-generoaren sinonimo bihurtuz. Hormonen izaera sexu-generikoa zalantzan jartzeak ez du esan nahi teknogorputzen sexu-generizazioaren prozesuan –aldakor eta ingurunera ireki gisa kontzeptualizatu dugun prozesua– esku hartzeko elementu gisa egiten duten lanari balioa kentzen diogunik edo hura ukatzen dugunik.

Lehenago ere azaldu dugu zer paper betetzen duten kimiko xenoestrogenikoen agenteek teknogorputzen sexu-generizazioaren prozesuan. Xenoestrogenoek efektu ugari eragiten dituzte gorputzetan; haietariko batzuk sexu-generikotzat hartzen dira, edo zerikusia dute morfologia, garapen eta funtzio sexu-generizatuekin. “Sexu-hormonek” teknogorputzen sexu-generizazioaren prozesuan duten izaera eskusibo eta *esentzialaren* ikuspegia kritikatzeko bat dator Ah-King eta Hayward-en kritikekin, zeinak bi gairen inguruan formulatuak baitira: 1) Garrantzi handiegia eman zaie xenoestrogenoen edo disruptore endokrinoen efektu sexu-generikoei eta ugalketaren gaineko efektuei, ia panikoa eragiterainokoa, izatez efektu mota ugari eragiten baitituzte teknogorputzetan, hala nola minbiziak, gaixotasun edo arazo immunologikoak, obesitatea, diabetesa, eta abar, beste ikuspegi batzuetatik are esanguratsuago bezala pentsa litezkeenak. Alde horretatik, erakutsi dugun moduan, gauza bera esan genezake teknogorputzen askotariko prozesu eta funtzioetan parte hartzen duten hormona esteroideez ere. 2) Paniko horrek, zeinak sorrarazi duen espezifikoki sexual gisa katalogaturiko efektuei gehiegizko garrantzia ematea eta, ondorioz, gainerako efektuak txikiagotzea eta ikusezin bihurtzea, lotura estua dauka ikuspegi sexu-generiko dimorfista, heteronormatibo eta patriarkal batekin eta begirada antropomorfizatzaile batekin. “Sexu-hormonak” sexu-generizatzea begirada dimorfista, heteronormatibo eta patriarkal horren beraren emaitza da.

Nolanahi ere, norbaitek galdetu edo zalantza ager lezake ea zergatik proposatu dugun atal honetan nomenklaturak aldatzea aurreko ataletan “xenoestrogeno”, “estrogeno-hartzaile”, “androgeno-hartzaile” edo “hormona tiroideoaren hartzaile” terminoak erabili baditugu. 3.2. atalean azaldu ditugu “xenoestrogeno” terminoa erabiltzeko egokitasunaren, komenigarritasunaren eta doitasunaren arazoak. Gainerako terminoei dagokienez, Fausto-Sterling-ekin bat eginez, terminologia aldatzeak generoaren gaineko ikuspegia aldatzea dakar. Teorizazio berriak pentsatu eta garatu beharko dira, xenoestrogenoen eta/edo disruptore endokrinoen efektuak azaltzeko terminologia hori erabili gabe. Etorkizuneko ikerketa-lerroetako bat izango da aztertzea zer neurritan izan daitekeen hori interesgarri, komenigarri eta eraldatzaile, eta proposamen berrietan eta termino berriak sortzeko aukeretan arakatzea.

### 3.6. Hormonen kutxa beltza irekitzen

Questioning the meanings and uses of technology is the most urgent task of our times.

B. Ostertag, *Sex, Science and Self*, 2016, 151. or.

Atoniak jota bizitzea. Ilusioak galtzea, adibidez. Halako gogo-aldartearekin zaudenean, ez zaude tristurak jota. Ez da depresio bat. Ez da depresio bat; hori gehiegi esatea da. Halako pena oso sakon bat balitz bezala da, kontra egin ezin diezaiokезun prozesu bat, ez baitakizu zer ari zaizun gertatzen. Urteek aurrera egiten dute, eta konturatzen zara ez dela desagertzen, ez dagoela irtenbiderik eta ez duzula ilusiorik aurkitzen. (...) Bizitzaren aurreko desilusioa da, eta nik adinari egozten nion neurri handi batean.

[...]

Denbora librea neukanean, ohera sartzen nintzen berehala, are lanorduetan ere. *Delux* programa edo gaueko beste programaren bat egin behar izanez gero, hiru orduko siestak programatzen nituen. Hori ez da normala 45 urteko pertsona batentzat. Lauretatik zazpietara lo egitea edo ohean etzatea programatzen nion neure buruari, gero lanera joateko.

[...]

Halako dinamika batean sartuz gero, tristurak eta bizi-larriminak zure bizitzaren atal asko kentzen dizkizute, eta horrela ezinezkoa da bizitzaren alderdi positiboa ikustea. (...) Eta niri amorrua ematen zidan pentsatzeak zer gertatzen ari ote zitzaidan nire adinean bizitzaz ez gozatzeko.

[...]

Prozesu hura bizi izan nuenean, eta bi urte edo bi urte eta erdi baneramatzan, poliki-poliki ari nintzen behera egiten, mailaz maila. Banekien ez zela prozesu psikologiko bat; izan ere, psikologo batekin baino gehiagorekin (...) ibili naiz nire bizitzan zehar, eta, hainbat psikologorekin egon eta lan handia egin eta gero, burua bere tokian daukat, gutxi gorabehera, eta badakit zerk eragiten didan eta zerk ez, eta banekien hura ez zela psikologo-kontu bat. (...) Erregresioak egitekotan egon nintzen. (...) Autolaguntzako liburuak irakurtzen hasi nintzen, erregresio bat egin nahian, iraganeko bizitzekin zerikusirik izan zezakeelakoan.

[...]

[A]nalisi sakon batzuk egin nituen, eta esan zidaten (...) *hormona-desoreka handia neukala eta horrek eragiten zuela ni halako egoeran egotea. Eta esan izan didate garaiz konturatu izan ez banintz depresio handi bat etorriko zitzaidala, etxetik ez ateratzeko modukoa. Hormona-desoreka batek halako egoera batera eraman zaitzake. Eta izango dira, segur aski, nire adineko gizon asko eta asko gauza bera*

*bizitzen ari direnak eta iruditzen zaienak horixe bizi beharra daukatela eta horixe dela bizitza. Eta ez da hori, ez.* (Geuk nabarmendua)<sup>328</sup>

Horra Jorge Javier Vázquez *Sálvame* telebista-programaren aurkezlearen hitzak – egunero ematen dute, 2009tik, eta % 18,5-19,5eko ikusle-kuota dauka gaur egun, hau da, ia bi milioi pertsonak ikusten dute egunero–, 2017ko azaroaren 29koak. Egun hartan bertan, *Lecturas* aldizkari arrosak antzeko adierazpen batzuk bildu zituen: “Kontsultara joan nintzenean, medikuak esan zidan *hormona-desoreka oso altua* neukala eta horrek *ezegonkortasun-sentipena* eragiten zidala. *Bitamina- eta testosterona-gehigarriak* hartuz ari naiz horren kontra borrokan” (*Lecturas*, 2017; Madrid eta Cornejo 2017 lanean aipatua; geuk nabarmendua)<sup>329</sup>. Lekukotasun hori testosterona-gutxiegitasunaren sindrome deritzonaren adibide bat izan liteke, eta, hura tratatzeko, HOTA eman ohi da.

Hala, *El País*en argitaraturiko albiste batean, honela azaldu zuten aurkezleari gertaturikoa:

Aurkezleak konpondutzat jotzen du bere krisi pertsonala; hitz egiten du hari buruz, eta izena ere jarri dio: testosterona-gutxiegitasunaren ondoriozko sindromea. “Zer gertatzen zitzaidan ez nekienez, gehiegi luzatu zen prozesua, baina gainditu dut. Tristura etengabeko bat sentitzen nuen. Adinaren krisiari

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<sup>328</sup> Jatorrizko testua: “Vivir en un estado de total atonía. La pérdida de ilusiones, por ejemplo. Es un estado de ánimo en el que no estás en lo más hondo de la tristeza absoluta. No es una depresión. No es una depresión, porque eso son palabras mayores. Es un proceso, que es como una pena muy honda, contra la que no puedes luchar porque no sabes lo que te está sucediendo. Y van pasando los años y tú ves que no desaparece, que no hay salida, y que no encuentras ilusión. (...) Es la desilusión ante la vida, que yo achacaba muchísimo a la edad. [...] En cuanto tenía tiempo libre me metía en la cama en periodo laboral. Yo para hacer el de *Lux* o un programa de noche yo lo que hacía era programarme tres horas de siesta. Para una persona de 45 eso no es normal. Y yo me programaba de 4 a 7 dormir o estar en la cama para ir a trabajar. [...]

Entras en una dinámica en la que la tristeza y la angustia vital se van apoderando de muchas partes de tu vida y así es imposible verle la parte positiva a la vida. (...) Pero a mí lo que me daba rabia era ¿qué me está pasando para no poder disfrutar de todo esto a mi edad?! [...]

Cuando yo estaba pasando este proceso, que ya llevaba como dos años-dos años y medio incluso, era como pequeños escaloncitos, pequeños peldaños, que iba descendiendo, descendiendo. Yo sabía que no era un proceso psicológico, porque yo he visitado (...) a varios psicólogos a lo largo de mi vida y yo, después de pasar por varios psicólogos y de haber trabajado muchísimo, tengo la cabeza más o menos en su sitio y sé lo que me afecta, lo que no me afecta y yo sabía que eso no era un proceso de ir a un psicólogo. (...) Estuve a punto de hacer regresiones. (...) Empecé a leer libros de autoayuda, a ir a ver si me podían hacer una regresión, a ver si esto tenía que ver con vidas pasadas. [...]

[D]espués también de hacerme también unos análisis muy muy exhaustivos, determinaron que lo que yo estaba sufriendo (...) era un *desequilibrio hormonal importante, que me estaba afectando y me estaba conduciendo a ese estado. Y a mí me han llegado a decir que si no lo hubiera pillado a tiempo, podría haber desembocado en una depresión de las de no poder salir de casa, pero lo que es el desequilibrio hormonal que te puede llevar a esta situación. Y que probablemente hay muchísimos hombres de mi edad que también lo están pasando, y consideran a lo mejor que eso es lo que les toca vivir a esa edad y que eso es lo que es la vida. Y no lo es, no lo es*”.

<sup>329</sup> Jatorrizko testua: “Cuando fui a la consulta el médico me comentó que tenía un *desequilibrio hormonal muy elevado* y que eso provocaba esta *sensación de inestabilidad*. Lo estoy combatiendo con *suplementos de vitaminas y testosterona*”.

egozten nion, baina ez zahartzen ari nintzelako. Gainera, ez nion ematen merezi zuen garrantzia, neure buruari esaten bainion ezin nintzela kexatu, dena ongi zihoakidala”. Azkenean, hormona-arazo batek depresiora eramane zuen. Testosterona gutxiegia zeukan. “Jendeak sexualitatearekin lotzen du, baina funtsezko hormona da egonkortasun fisiko, mental eta emozionalerako. Orain, 15 egunetik behin injektatzen dut, eta bizitza aldatu zait”, azaldu du telefonoz, bidaia batetik iritsi berritan. (Gomar, 2017)<sup>330</sup>

Hoberman eta Yesalis-ek jakinarazi dutenez, 1990eko hamarkadaren hasieran, zenbait doktorek esperimentu pilotuak zuzendu zituzten 54 urtetik gorako gizonei testosterona-gehigarriak ematearen efektuez; itxura denez, testosterona maila “normalak” eta maila “baxuak” zeuzkaten gizonak ziren (1995, 80. or.). Egile horien arabera, esperimentuon emaitzak positiboak izan ziren oro har: gorputz-masa eta indarra handitu zitzaizkien, hezur-erresortzioa atzeratu, sexu-desira eta -jarduera handitu, eta espazio-kognizioa eta hitz-memoria hobetu. Bestalde, egileek azaldu dutenez, mediku askok, intuitiboki onartzen dutenez hormona bidezko terapia onuragarria dela emakumeentzat\*, antzera jokatu zuten gizonentzako hormona-terapiaren kasuan ere, eta azpimarratu dute estrogeno- eta testosterona-terapiak adineko jendearengan dituzten onura potentzialak iratiaren, telebistaren eta prentsa idatziaren bitartez zabaltzeak agerian utzi zuela kulturalki oso onartuta zegoela “hormona maskulinoaren terapia masiboa” (1995, 81. or.). Ildo horretan, honela diote egileek: “The Hormonal Healthcare Center in London administers testosterone injections to hundreds of men irrespective of age, and a gynecologist at Chelsea and Westminster Hospital in London currently prescribes testosterone pellets for about 25 percent of his postmenopausal patients” (1995, 81. or.). Ez hori bakarrik, iragarri baitute joera horrek aurrera jarraituko duela: “[M]eaning that mass testosterone therapy could become standard medical practice within a decade” (1995, 81. or.).

Hoberman eta Yesalis-ek diote herritarrek espero dutenaren eta arrazoi komertzialen ondorioz “nahasmendu” mediko berri bat definituko dela, eta National Institutes Of Health-en kasua eman dute adibide gisa; egileen arabera, testosterona-terapiak adineko gizonen depresioa eta beste gaixotasun fisiko batzuk prebenitzeko balio ote dezakeen ikertzeko proposamenak eskatu zituen 1992an: “[T]hereby raising the question of whether the aging process itself is about to be officially recognized as a treatable deficiency disease” (1995, 81. or.). Egileek John B.

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<sup>330</sup> Jatorrizko testua: “Respecto a la crisis personal, el presentador la da por zanjada, habla de ella y le pone nombre: síndrome por déficit de testosterona. “He superado un proceso que se alargó demasiado porque no sabía qué me pasaba. Tenía una sensación de tristeza continua. Lo achacaba a una crisis de edad, pero no por el hecho de hacerme viejo. Encima no le daba la importancia que merecía porque me decía a mí mismo aquello de que no me puedo quejar porque todo me va bien”. Al final, resultó ser un problema hormonal el que le sumió en una depresión. Le faltaba testosterona. “La gente la asocia a la sexualidad, pero es una hormona fundamental para la estabilidad física, mental y emocional. Ahora me pincho cada 15 días y me ha cambiado la vida”, explica por teléfono recién llegado de un viaje”.

McKinlay epidemiologo ospetsu eta New England Research Institutes Inc.-ren zuzendari eta lehendakariordearen adierazpenak jaso dituzte; menopausian eta erektzioaren disfuntzioan aditua izanik, berak dio ez dagoela “epidemiological, physiological or clinical evidence for such a syndrome, [but] I think by the year 2000 the syndrome will exist. There is a very strong interest in treating aging men for profit, just as there is for menopausal women”<sup>331</sup> (1995, 81. or.). McKinlay-k antzeko ikuspegia azaldu zuen emakumeentzako\* HOTari buruz, kontuan hartuta garai hartarako ibilbide luzea zuela terapia horrek, gorago agertu dugun bezala: “‘HRT is inappropriate for the vast majority of women, who shouldn't use it,’ John McKinlay says. ‘Yet the pharmaceutical industry's goal is to have every post-menopausal woman on it until death’” (Gallagher, 1993).

Bestalde, Feldman, Goldstein, Hatzichristou, Krane eta McKinlay-k (1994) inpotentzia eragiten duten faktore posibleak analizatu dituzte. Horretarako, Massachusetts Male Aging Study-aren datuak baliatu dituzte, ikerketa bat egin baitzuen 1987tik 1989ra bitartean, 40 urtetik 70era bitarteko 1.709 gizonekin, Bostondik (Massachusetts) gertuko 11 hiritan (1994). Haren ondorioen arabera, inpotentzia minimo, tarteko eta osoaren prebalentzia konbinatua % 52koa da, eta, adinarekin, inpotentzia osoaren prebalentzia % 5 eta % 15 handitzen da, 40 urtetik 70era bitartean (1994, 54. or.). Adinaz gainera, egileek diote inpotentziarako probabilitate handiena lotuta dagoela zenbait gaixotasunekin, hala nola gaixotasun kardiobaskularrekin, hipertentsioarekin eta diabetesarekin, baita medikazio asoziatuarekin eta haserre- edo depresio-indizeekin ere; bestalde, alderantziz lotuta dago dehidroepiandrosterona-serumarekin, kolesterol lipoproteinaren dentsitate altuarekin eta nortasun menderatzailearen indizearekin (1994, 54. or.). Tabakismoak ere badu lotura gaixotasun kardiobaskularra eta hipertentsioa duten gizonen inpotentzia osoa izateko probabilitate handiagoarekin.

Hori horrela izanik, ondorioztatu dute ez dagoela inongo loturarik testosteronaren eta inpotentziaren artean:

Of the 17 hormones measured in the MMAS subjects, only the adrenal androgen metabolite dehydroepiandrosterone sulfate showed a strong correlation with impotence... The age-adjusted probability of complete impotence increased from 3,4 to 16% as dehydroepiandrosterone sulfate decreased from 10 to 0.5 ug/ml. Dihydrosterone and cortisol showed effects of small magnitude on minimal impotence only. No correlation with impotence was found for testosterone (either free, albumin-bound or total), sex hormone binding globulin (the major serum carrier of testosterone), various other

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<sup>331</sup> Adierazpen horien bila ibili gara, eta Natalie Angier-en artikulu batean aurkitu ditugu: “A Male Menopause? Jury Is Still Out” (*International Herald Tribune* argitaratua 1992ko maiatzaren 20an). Hoberman-ek ere pasarte bera aipatu du, erreferentzia honekin: “Midlife Myths: What about Men?”, *International Herald Tribune*, 1992ko maiatzaren 21a (2005, 143. or.). Guk, hala ere, ezin izan dugu erreferentzia hori aurkitu.

androgens and metabolites (including androstenedione and androstanediol), estrogens, prolactin or the pituitary gonadotropins (folicle-stimulating hormone and luteinizing-hormone). (1994, 56. or.)

Hala eta guztiz ere, Hoberman eta Yesalis-ek ohartarazi dute testosteronak inpotentziarekin zerikusirik ez izan arren –inpotentzia, bestalde, nahasmendu edo gaixotasun gisa kontzeptualizatzen da– ez dagoela bermatuta hura horretarako ez errezetatzea eta merkaturatzea (1995, 81. or.). Egileek gehitu dute adina arazo medikotzat hartzen dela gero eta gehiago eta horrek ekarri duela “gizonen menopausia” edo “andropausia” kontzeptualizatzea, “emakumeen\* menopausi”aren baliokide gisa. Horrek beste bultzada normatibo bat eta estandarrak betetzeko presioak sakontzea dakar: “The oficial status of such a syndrome will signify new societal definitions of physiological normality and further legitimize ambitions to boost the human organism to higher levels of mental and physical performance” (Hoberman eta Yesalis, 1995, 81. or.).

Badirudi Hoberman eta Yesalis-en pronostikoa bete egin dela eta McKinlay-ren hitz profetikoak gauzatu direla. Historia errepikatu egiten da, eta, emakumeen\* gorputzak eta bizi-prozesuak errentagarri bihurtu eta gero, beste teknogorputz-morfologia batzuei eta beste identitate sexu-generiko batzuei ematen zaie balioa merkatuan. Gehiegi esatea litzateke testosterona-terapia “ohiko praktika” bilakatu dela, baina baliteke ahalegin korporatiboak norabide horretan jartzea, lehen eta orain; izan ere, Ostertag-ek dioen bezala, edozein gizonek izan dezake testosterona-gutxiegitasunaren sindromea, inork ez baitaki zein diren testosterona-maila “normalak” (2016, 92. or.). University of California-Berkeley-n adierazi dute nahiz eta zientzialari batzuek adinaren arabera testosterona-maila “normalak” bereizi inork ez dakiela zein diren maila onenak (2011). Hala ere, gero eta ustezko gaixotasun gehiago diagnostikatzen dira, hala nola testosterona-gutxiegitasunaren sindromea eta inpotentzia, zeinak askotan lotuta baitaude, eta gero eta testosterona-preskripzio gehiago dago.

Bashin-ek dio adin ertaineko eta adineko gizonentzako testosterona-preskripzio gehienak diagnostiko egokirik gabe egiten direla (2016, 831. or.). Horretaz gainera, zera gehitzen du: “This growth in testosterone sales has occurred despite the fact that neither the long-term benefits nor risks of testosterone therapy have been clearly established in middle-aged and older men with age-related decline in testosterone levels” (2016, 831. or.). Adinarengatik testosterona-maila baxua duten adineko gizonen testosterona kontsumitzeak epe luzera dituen efektuei buruz emaitza argirik ez dagoela erakusteko, orain dela gutxiko bi proba erabiltzen ditu: Testosterone Trials eta Testosterone’s Effects on Atherosclerosis Progression in Aging Men (TEAAM). TEAAMek ez zuen desberdintasun esanguratsurik aurkitu atherosklerosia handitzeari



dagokionez testosterona edo plazeboa hartu zuten gizonen artean –ateroesklerosia: arteria ertain eta lodien hormetako barne-geruzan substantzia lipidikoak gordetzea edo infiltratzea ezaugarri dituen sindromea–. Sexu-funtzioan eta osasun-bizitzaren kalitatean ere ez zuen hobekuntzarik aurkitu testosterona hartu zuten gizonen taldean, plazeboa hartu zuenarekin alderatuta, testosterona-maila baxu, pixka bat baxu edo “normalak” aurkezten zuten gizonetan, ez zirenak aukeratuak izan inolako sintomatan oinarriturik (2016, 831. or.). Azkenik, Bhasin-ek ziurtatu du probak ez duela nahikoa ahalmen estatistiko testosteronak gaitz kardiobaskular larrietan edo prostatako minbizian zer efektu dituen jakiteko (2016, 831. or.). TTrials probak zazpi proba koordinatu dira, testosterona-terapia 65 urteko edo hortik gorako gizonen sexu-funtzioan, mugikortasunean eta bizitasunean eraginkorra ote den jakiteko; zehazki, testosterona-maila baxuak eta neke-sintoma fisiko eta sexualak zituzten 788 gizoni egin zizkieten probak. 2010ean hasi zen ikerketa, eta 2014an bukatu. Probetan, Androgel® erabili zuten<sup>332</sup>.

Bhasin-en arabera –proben emaitzak jasotzen dituzten lau artikuluen egileetako bat–, parte-hartzaile gutxi izanda, ikerketak ez du ahalmen estatistiko nahikorik testosteronak gaitz kardiobaskular larrietan edo prostatako minbizian zer efektu dituen jakiteko (2016, 831. or.). Gainera, prostatako minbizia edo gaixotasun kardiobaskularrak izateko arrisku handia zeukaten gizonak ikerketatik kanpo geratu ziren. Proben emaitzak lau artikulutan argitaratu ziren. Gaixotasun kardiobaskularrei dagokienez, Budoff-ek eta beste egile batzuek erakutsi dute arteria koronarioko plaka ez-kaltzifikatua nabarmen handitu zitzaiela testosterona hartu zuten gizoni, plazeboa hartu zutenekin alderatuta  $-41 \text{ mm}^3$  gehiago– (2017, 708., 715. or.)<sup>333</sup>. Proben emaitza positibo gisa, berriz, Roy-k eta beste egile batzuek azpimarratu dute hemoglobina kantitatea igotzen dela eta anemia sendatzen dela kasu askotan, nahiz eta ikerketaren muga garrantzitsuen artean egon “the small sample size for each anemia subgroup, resulting in wide confidence intervals for the estimated treatment effects”, hala nola “[the] lack of a prespecified adjustment for multiple comparisons [that] resulted in an inflated probability of a false positive result” (2017, 488. or.). Gaitasun kognitiboari dagokienez, Resnick-ek eta beste egile batzuek hirugarren artikuluan ondorioztatu dute testosteronak ez ziela inongo hobekuntzarik ekarri “low testosterone and age-associated memory impairment” zeukaten 493 gizoni (2017, 127. or.). Azkenik, laugarren artikuluan, Snyder-ek eta beste egile batzuek diote testosteronak hezurren neurria eta

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<sup>332</sup> Ikerketa National Institute on Aging (NIA) erakundeak finantzatu zuen, zeina National Institutes of Health-en (NIH) atal bat baita. Beste funts gehigarri batzuk ere etorri ziren, National Heart, Lung, and Blood Institute, National Institute of Neurological Disorders and Stroke, eta Eunice Kennedy Shriver National Institute of Child Health and Human Development erakundeetatik, denak ere NIHren atalak. Ikerketan erabilitako medikamentua eta plazeboa, berriz, AbbVie, Inc. konpainia farmazeutikoak eman zituen.

<sup>333</sup> 170 gizonek parte hartu zuten azterketan, haietatik % 81 zuriak.

indarra hobetzen duela, probek beren mugak dituzten arren; besteak beste, parte-hartze urria – 211 parte-hartzaile, % 86 zuriak– eta “the inflated probability of a false-positive finding due to multiple testing; however, the large number of significant findings is not likely due to chance alone, suggesting that testosterone treatment truly improves bone outcomes” (2017, E7. or.).

Bashin-ek, bestalde, adierazi du gizonak gero eta gehiago kezkatzen direla beren sexu-, ugalketa- eta urologia-osasunaz, hala nola adinarengatik testosterona-mailak apaltzeaz eta/edo testosterona-gutxiegitasunaren sindromeaz<sup>334</sup>, gihar-dismorfiaz edo bigorexiaz, esteroide anaboliko-androgenikoen erabileraz, prostatako minbiziaren aurkako terapiaren konplikazio medikoez edo beheko gernu-traktuko sintomez (2016, 828. or.). Areago nabarmendu du, FDAren ohartarazpenarekin eta TTRial-en ondorioekin bat eginez, honako hau: “[A] growing body of evidence raises concern that long-term use of AAS may increase the risk of death, cardiovascular disease (CVD) events, major psychiatric disorders, musculoskeletal injuries, and profound AAS-withdrawal hypogonadism” (2016, 830. or.). Vigen-ek eta beste egile batzuek ere miokardio-infarturako arriskua handitzearekin, isuriekin eta testosterona-maila baxuko gizonen hilkortasuna handitzearekin lotu dute testosterona bidezko terapia (2013).

Piszczyk-ek eta beste egile batzuek ere hizpidera ekarri dute sintoma espezifikorik gabe odoleko testosterona kantitatea gutxitu zaien 65 urtetik gorako gizonen gero eta gehiago hartzen dituztela HOTak (2014, 1., 5. or.). Ontarion (Kanada) egin zuten beren ikerketa, 1997tik 2012ra bitartean, eta ondorioztatu zuten 66 urtetik gorako 90 gizonetik lek testosterona-tratamendua jaso zuela, nahiz % 6,3ri bakarrik diagnostikatu zitzaizen hipogonadismoa<sup>335</sup> eta nahiz eta ez dagoen hormonak ordezkatzeko tratamenduen eraginkortasuna eta segurtasuna frogatzen duen kalitatezko ikerketarik, batez ere era askotako komorbilitateak dituzten adineko gizonen kasuan: “Specifically, studies examining TRT are limited by short follow-up..., small sample sizes..., and use the of surrogate outcomes such as changes in hormone levels, bone mineral density and measures of muscle strength” (Piszczyk et al., 2014, 1. or.).

Bremner-ek honako hau dio: “It is now clear that men have gradual declines in average serum testosterone levels as they age. These decreases begin by middle age and continue into old age” (2010, 189. or.). Bestalde, gehitzen du testosterona gutxitzea funtsezkoa izan arren gizon askorengan, oso aldakorra dela eta horrenbestez gizon gazteen serumeko testosterona-maila antzeakoak dituztela adineko gizon batzuek ere (2010, 189. or.). Testosterona-mailak

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<sup>334</sup> Ez gara ari esaten adinarekin testosterona-mailak jaisteak inongo sindrome edo gaixotasuna dakarrenik, baizik eta hala ulertzen dutela zenbait erakunde eta gizonen, askotan sinonimotzat jotzen baitituzte.

<sup>335</sup> Gizonen hipogonadismoa testosterona-ekoizpena baxua edo nulua izatea da, eta gorputz-morfologiaren eta osasunaren beste ezaugarri batzuekin batera ager daiteke. Gero eta anbiguoagoa eta zabalagoa da, eta teknogorputzasun askotara hedatu da.

gutxitzearekin batera, gizonak zahartu ahala izaten dituzten beste aldaketa batzuk dira gihar-masa, indarra, hezur-masa eta sexu-funtzioa urritzea, eta gorputzeko gantza, nekea eta egoera depresiboaren handitzea (Bremner, 2010, 190. or.).

Gizonen teknogorputzez harago, produktu hormonalak errezetatu izan zaizkie askotariko teknogorputzasun-subjektibotasunei: homosexualak, intersexualak, transak\*, emakumeak\*, gizonak, emakume\* transak\*, gizon transak\*, etab. Beccalossi-k dio hormonek izaera anbibalentea eta ia kontraesanezkoa dutela, eta azpimarratzen du haien zeregin bikoitza, batetik askatzaile eta emantzipatzailea eta, bestetik, patologizatzaile eta kaltegarria, batez ere emakumeen\* kasuan (2018, 2. or.). Ildo horretan, Seaman aipatzen du, zeinak lehenago esan dugun bezala emakumeen\* gainean inoiz egindako esperimenturik arriskutsuentzat jotzen baititu hormona bidezko terapiak (2003).

DES eta Premarin® produktu xenoestrogenikoak Doktorego-tesi honen bigarren eta hirugarren kapituluetan agertu dira. DES hormona sintetiko ez-esteroidea edo dietilestilbestrola 1938an sintetizatu zuen lehen aldiz Charles Dodds britainiar doktoreak, alemaniarrekin lehian, estrogeno sintetikoaren patentea nork lortuko, nahiz azkenean bere sorkaria jendaurrean erakutsi (Seaman, 2003, 43. or.; DES Action, 2019). 1940tik 1971ra bitartean, bi edo hiru milioi emakume\* haurduni errezetatu zitzairen (National Cancer Institute, 1976, 1108. or.; Haraway, 2016a, 106. or.)<sup>336</sup>; kopuru horri emakume\* haien alaben kopurua gehitu behar zaie, haien ere kaltetu baitzuten, baita AEBtik kanpo kalteturiko emakumeena\* eta 1971tik aurrera kontsumitu zutenena ere, abortu-arriskua edo haurdunaldiko konplikazioak saihesteko errezetatu baitzieten, “such as bleeding, threatened miscarriage, or diabetes”, izan ere “this treatment improved salvage of the fetus” (National Cancer Institute, 1976, 1107. or.).

DESa, hasiera batean, menopausiarako zegoen pentsatuta; dena den, Nancy Langston-ek 1944ko publizitate-iragarkien bitartez erakutsi duenez (2010, 52. or.)<sup>337</sup>, berehala hasi ziren errezetatzen beste kontu batzuetarako, hala nola “bulbobaginitis senila” tratatzeko, haurren “bulbobaginitis gonorreikoa” sendatzeko, edoskitzea kentzeko edo prostata-kartzinomaren gaineko jardunbide antiandrogeniko gisa. Seaman-ek honela azaltzen du menopausiaren eta DESaren arteko harremana, kontuan izanik aurretik ez zegoela halakorik: “Drug manufacturers dreamed about new hormone product lines. They thought menopause. They thought menstruation. They thought beautiful skin, thicker hair, more passionate sex. They thought of

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<sup>336</sup> National Cancer Institute-k (1976, 1108. or.) eta DES Action-ek (2019) DES motako 78 farmako zerrendatu dituzte.

<sup>337</sup> Langston-ek (2010, 46., 50., 52., 66., 74., 76. or.) DESen zenbait iragarki ekarri ditu hizpidera, 1940-1960 bitartekoak, eta horrek berresten du nolako garrantzia duten komunikabideek –korporazio handiekin batera– egiaztatze-aparatu gisa, bestela ez baitago ulertzerik nolako arrakasta duten produktu hormonalek.

curing infertility, preventing miscarriages... Some of the more daring were also thinking birth control” (2003, 13. or.).

Langston-en arabera, zientzialariak hasieratik ohartu ziren DESa eta minbizia lotuta zeudela. 1939rako, haietariko batzuek kezka agertu zuten. *Journal of the American Medical Association* aldizkarian, “Estrogen Therapy-A Warning” editoriala argitaratu zen, eta Dodds-ek eta haren lantaldeak ere zenbait ikerketa argitaratu zituzten DESa minbiziarekin, sexu-garapenaren bariazioekin eta obulutegietako, testikuluetakako, prostatakako eta abarretako atrofiarekin lotuz (Langston, 2010, 31.-34. or.).

1947an, FDAk DESa onartu zuen nahi gabeko abortuak saihesteko. 1953an, Dieckmann, Davis, Rynkiewicz eta Pottinger-ek (Chicagoko Unibertsitatea) ikerketa bat argitaratu zuten *American Journal of Obstetrics and Gynecology* aldizkarian –haurdunaldian DESaren erabilerari buruzko lehendabiziko ikerketa kontrolatu, aleatorio eta itsu bikoitzekoa–, DESaren eraginkortasun eza erakutsiz; hala eta guztiz ere, emakume\* haurdunei errezetatzen jarraitu zuten 1971ra bitartean (DES Action, 2019; Haraway, 2016a, 106. or.). 1971n, beste ikerketa bat argitaratu zen, *New England Journal of Medicine* aldizkarian, “dena aldatu” zuena: jaio aurretik DESarekin kontaktuan egotea baginako zelula argietako adenokartzinoma arraroarekin lotu zuten Herbst, Ulfelder eta Poskanzer-ek, hau da, DESa errezetatua zieten emakumeen\* alabek minbizia izan zuten (DES Action, 2019; Haraway, 2016a, 107. or.). Hala ere, FDAk ez zuen DESa debekatu, eta, beraz, 1980ko hamarkadan ere jarraitu zuten errezetatzen. 1990ean, DESa giza teknogorpuztasunen prostatakako minbiziaren tratamenduan bakarrik erabiltzea onartzen legalki, harik eta 1997an Elli Lily & Co.-k “no longer profitable drug” hura fabrikatzeari utzi zion arte (Haraway, 2016a, 107. or.).

Animalia ez-gizatiarren teknogorpuztasunei dagokienez, FDAk haren erabilera onartu zuen eskorta-hegaztien kasuan, 1947an. 1954an, behi- eta ardi-azienden teknogorpuztetan erabiltzea onartu zen (Ostertag, 2016, 69. or.; DES Action, 2019). Langston-ek honela dio: “[B]y late 1955... fully half the cattle in America were receiving DES. Soon, 80 to 95 percent of cattle received DES” (2010, 75. or.). 1959an, hormonak eskorta-hegaztien hazkuntza bultzatzeko erabiltzea debekatu zuen FDAk, eta, 1979an, lagun egiteko animalien teknogorpuztasunetan elikagai gisa erabiltzea; dena den, 1954tik 1970era bitartean, behi-teknogorpuztasunen hazkuntza bultzatzeko erabili zen (Haraway, 2016a, 109. or.). Nolanahi ere, Haraway-k zera azpimarratu du:

[T]he core story here is not DES as such; the big story is the relentless rise of hormonal growth promoters of the next molecular generations that are integral to the ecosystem-destroying, human and

animal labor-transforming, multispecies soul-mutilating, epidemic-friendly, corn monocrop-promoting, cross-species heartbreaking, feedlot cattle industries. (2016a, 109. or.)

National Women's Health Network-ek bildutako National Cancer Institute-ren datuen arabera (2012), baginako edo zerbixeko zelula argietako adenokartzinoma izateko arriskua 40 aldiz handiagoa da "DES alabengan" DESik hartu ez duten emakumeengan\* baino; jaioberrien heriotza-arriskua, 8 aldiz handiagoa; erditze goiztiarrarena, 4,8 aldiz handiagoa; bigarren hiruhilekoan abortua izateko arriskua, 3,8 aldiz handiagoa, eta, lehenbizikoan, 1,6 aldiz handiagoa; haurdunaldi ektopikorako arriskua –umetokiaz kanpoko–, 3,7 aldiz handiagoa; antzutasun-arriskua, 2,4 aldiz handiagoa; menopausia 45 urteak baino lehenago izateko arriskua, 2,4 aldiz handiagoa; umetoki-lepoko neoplasia intraepitelialerako arriskua –umetoki-lepoan zelula ezkatatsuak hazteko prozesu anormal eta minbizi aurrekoa–, 2,3 aldiz handiagoa. Horretaz gainera, % 80tik gorako aukera dago endometriosisia –gaixotasun kronikoa, endometrioko ehuna pelbisaren barrunbean umetokitik kanpo egotean datzana– izateko, bestelako gaixotasun eta gaitzen artean (DES Action, 2019); eta bularreko minbizia izateko arrisku handiagoa –ia bikoitza 40 urtetik gorakoen artean, eta uste da are handiagoa dela 50 urtetik gorakoen artean–, Palmer-en eta beste egile batzuen arabera (2006, 1509. or.).

Gorago ere aritu gara Premarin®-en jatorriaz. Behorren gernutik erauzten da, eta 1941ean merkaturatu zen, Kanadan. Halaber aipatua dugu nolako arrakasta izan duten Premarin®-ek eta beste zaldi-estrogeno konjugatu batzuek –PremPro®, PremPhase® edo Duavee®– historian zehar –gogoratu dezagun Pfizer, Inc.-ek Grand View Research erakundeari emandako datuen arabera (2016) Premarin®-ek 1.076 milioi dolarreko salmentak izan zituela 2014an–; arrakasta haren atzean, milaka behorren esklabotza, konfinamendua eta tratu txarrak daude, baita milaka behorkumeren hilketa ere. Pfizer, Inc.-ek Wyeth-Ayerst erosi zuen 2009an –Ayerst konpainiak sortu zuen Premarin®, eta, gero, Wyeth-ekin elkartu zen–; berak kontratuak zeuzkan Kanadako 24 PMU (Pregnant Mare Urine) etxalde ingururekin; 2003an, Wyeth-Ayerst-ek 400 ingururekin zituen kontratuak (Haraway, 2016a, 112. or.). Animalien eskubideen aldeko kolektiboen protesta eta salaketei esker –HorseAid edo The Horse Fund, besteak beste–, behorren baldintzak hobetu dira<sup>338</sup>, baina, hala eta guztiz ere, kolektibo horiek lanean segitzen dute etxalde mota horiek desager daitezzen. Harawayk dakarrenez, Horse Aid-ek<sup>339</sup> kalkulatu du

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<sup>338</sup> Ostertag-ek dioenez, protesten beste ondorioetako bat izan da ekoizpena deslokalizatzea eta Txinara bidaltzea, eta, ondorioz, behor kopurua handitzea (2016, 78. or.).

<sup>339</sup> Interneten bilatu dugu Horse Aid-en web-orria, informazio hori egiaztatzeko, baina ez dugu aurkitu. Dirudienez, kolektiboak Horse Aid Live du izena orain, eta, webgunean diotenez, 2009az geroztik zaldiak bezatzeko ekitaldi, ikuskizun eta lehiaketak antolatzen dituzte, zaldi asko baitago abandonatuta, etxerik gabe edo

2002an 15.000 behorkume hil zituztela (2016a, 114. or.). Oraingo kopuruak askoz baxuagoak dira, baina zero ere izan zitekeen, bai baitaude bestelako alternatiba batzuk, hala nola landare-jatorriko estrogeno esterifikatuak (Haraway, 2016a, 114. or.).

Haraway-ren hitzak dira: “It is no longer news that corporations, farms, clinics, labs, homes, sciences, technologies, and multiespecies lives are entangled in multiescalar, multitemporal, multimaterial worlding; but the details matter. The details link actual beings to actual response-abilities” (2016a, 115. or.). Kontziente izan nahi badugu zer produktu hormonal kontsumitzen ditugun eta zer efektu dituzten, ez bakarrik gure giza teknogorputzasetan eta gure sexu-generoen gauzatzean, hala maila subjektiboan nola teknogorputzarenean, baizik eta baita beste animalia batzuen teknogorputzasetan koeraketan eta orobat ingurunean, beharrezkoa da hormonon kutxa beltza irekitzea, industria tekno-bio-farmako-nekazaritzakoaren matazaren hari-zuntzak deskorapiltzeko eta trazatzeko, eta historian zehar errepikatzen diren patroiez ohartzeko.

Giza teknogorputzasetari dagokienez, 60 urte daramatzate Premarin® emakumeei\* errezetatu zientifiko-medikoki kontzeptualizaturiko menopausia tratatzeko. 1975ean, Ziel eta Flinkle-k zera adierazi zuten: “The evidence for a connection between the use of conjugated estrogens and the development of endometrial cancer seems rather persuasive” (1170. or.). Ikerketa horren arabera, arriskua 5,6 aldiz handiagoa zen urte batetik bostera bitartean estronen sodio sulfatoa hartu zuten emakumeen\* artean, eta 13,9 aldiz handiagoa zazpi urtetik gora hartu zuten emakumeen\* artean (1975, 1167. or.). Smith, Prentice, Thompson eta Herrmann-ek beste ikerketa bat argitaratu zuten aldizkari berean, urte berean, eta jakinarazi zuten endometriko minbizia izateko arriskua 4,5 aldiz handiagoa zela estrogeno-terapia hartu zuten emakumeen\* artean (1975, 1164. or.).

Harrezkero, konpainia farmazeutikoek hainbat eta hainbat ikerketa, “kontraikerketa” eta estrategia sustatu dituzte. Konpainia farmazeutikoek progestina gehitzen diete HOT medikamentuen estrogenei, horrek minbizi-arriskua gutxitzen duela argudiatuz, nahiz eta Watkins-ek dioenez ez dagoen hori frogatzen zuen ikerketarik (2010, 150., 155. or.). Aldi berean, konpainia farmazeutikoek kanpaina bat bultzatu zuten, mediku zein emakumeei\* zuzendurik, estrogenoak sustatzeko eta haien publizitatea egiteko, lehenbizi osteoporosia sendatzeko eta gero prebenitzeko (Watkins, 2010, 150., 154. or.). Ostertag-ek dioenez, 1980ko hamarkadara bitartean, osteoporosia ez zen ezaguna (2016, 76. or.); handik aurrera, baina, “80etako gaixotasun” bilakatu zen, osasun-arazo nazionala izateraino (Watkins, 2010,

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baztertuta (Horse Aid Live, 2019). The Horse Fund-en web-orria, berriz, aktibo dago, eta informazioa eskaintzen du behorrei eta produktu estrogenikoei buruz (The Horse Fund, 2019).

155. or.)<sup>340</sup>. Medikuar hormonak errezetatzen hasi ziren, sistematikoki, menopausiadun emakumei\*, osteoporosia prebenitzeko eta sendatzeko<sup>341</sup>: estrogenoek osteoporosia sendatzen eta prebenitzen zuten, eta, progestinarekin batera, bazirudien endometrioko minbizirako arriskua neutralizatzen zutela (Watkins, 2010, 158. or.). Hezurren dentsitatea eta hezur-indarraren arazoak lotuta daudelako ideia gatazka-iturri bilakatu zen. Eztabaida handia piztu zen, ea osteoporosia emakumeen\* zahartze-prozesuaren parte den eta/edo botikekin tratatu behar den. 1991rako, baziren gutxienez HOTari eta bularreko minbiziari buruzko 30 ikerketa (Watkins, 2010, 215. or.). Batez ere National Institutes of Health-en (NIH) zuzendariak 1991an martxan jarritako Women's Health Initiative-k bildutako datu eta ehunka ikerketen ondoren, 2002an, argi zirudien HOTak ez duela gaixotasun kardiobaskularra prebenitzen eta, horretaz gainera, lotuta dagoela bihotzekoekin, odol-koaguluekin, enboliekin eta bularreko minbiziarekin (Watkins, 2010, 264. or.; Haraway, 2016b, 112. or.; Ostertag, 2016, 79. or.)<sup>342</sup>. Estrogenoek, beste ezerekin nahasi gabe, umetokiko minbizia eragin dezakete; progestinak efektu hori ahultzen laguntzen du, baina ez estrogenoak hartzearen ondoriozko gaixotasun kardiobaskularrak eta bularreko minbizia izateko arriskua (Ostertag, 2016, 80. or.). Gainera, produktu estrogeniko batzuk, hala nola Pempro®, ez dira eraginkorrak oroimena galtzearen aurka, eta, areago, dementziarako arriskua handitzen dute (Watkins, 2010, 279. or.).

Pilula antikonzeptiboak, “the most powerful outcome of the introduction of the concept of the hormonal body in the 1920s and 1930s” (Oudshoorn, 1994, 111. or.), zeina estrogenoz eta progestinaz osatua baitago, jatorri eugenesiko eta arrazista dauka<sup>343</sup>. Oudshoorn-ek honela dio: “The first large-scale trials, with all the risks involved, did not take place among the white

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<sup>340</sup> Watkins-ek erantsi du konpainia farmazeutikoen interesari esnekien enpresena gehitu behar zaiela, haiek ere bat egin baitzuten kanpainarekin, kaltzioak hezurra birsendotzeko duen garrantzia argi geratu zenetik (2010, 150. or.).

<sup>341</sup> Watkins-en datuen arabera, 1992an, 36,5 milioi preskripzio egin ziren, eta, 1999an, 89,6 milioi (2010, 246. or.).

<sup>342</sup> NIHren 2013ko ikerketaren azken txostenaren ondorioa nahasia da. Zenbait produktu baztertzen ditu: “[T]he use of either CEE [zaldi-estrogeno konjugatuak] plus MPA [medroxiprogesterona azetatoa] or CEE alone for chronic disease prevention. The risks of CEE plus MPA outweigh the benefits irrespective of a woman's age; however, a more favorable risk-to-benefit ratio was seen in younger women with prior hysterectomy who received CEE alone. *Increased risks of stroke and venous thrombosis, as well as gallstones and urinary incontinence, in both younger and older women remain a concern with both regimens. Even though hormone therapy is a reasonable option for the management of moderate to severe menopausal symptoms among generally healthy women during early menopause*, the risks associated with hormone therapy, in conjunction with the multiple testing limitations attending subgroup analyses, preclude a recommendation in support of its use for disease prevention even among younger women. Current findings also suggest caution when considering hormone therapy treatment in older age groups, even in the presence of persistent vasomotor symptoms, given the high risk of CHD and other outcomes associated with hormone therapy” (Manson et al., 2013, 1366. or.; geuk nabarmendua).

<sup>343</sup> Aho bidezko antikonzeptibo hormonalak hartu dituzten emakume\* osasuntsuengan bularreko, umetokilepoko, obulutegiko edo kolon eta ondesteko minbizi-arriskua handitzeaz, ikus National Cancer Institute (2018).

majority of Americans or Europeans. It was Caribbean women who entered this history as the guinea-pigs of one of the most revolutionary drugs” (1994, 135. or.).

Oudshoorn-ek frogatua du hiru mugimenduk bat egin zutela pilularen sorreran, hirurak ere sexualitatea eta ugalketa bereizteko desesitatearen aldekoak: jaiotze-tasa kontrolatzeko mugimendua, populazioa kontrolatzeko neomalthusianismoan inspiratutako mugimendua eta espeziea “hobetzeko” mugimendu eugenetikoa (1994, 114. or.). Mendebaldeko emakume\* askoren askapena ugalketa eta sexualitatea pilula-formatuan bereiztetik etorri zen, baina horrek praktika arrazista, inperialista eta eugenetikoa dauzka oinarrian<sup>344</sup>. Pincus-ek 1951n sortu zuen progestinadun pilula –geroago, Enovid® izen komertzialarekin, estrogeno eta progesteronaduna atara zuten–, Margaret Sanger-ekin aliantza eginda eta G.D. Searle & Company farmazeutikaren bitartez (Oudshoorn, 1994, 115.-116. or.). Sanger-ek emakumeek\* beren ugalketa kontrolatzeko eta kudeatzeko eskubidearen alde egin zuen, baita populazio beltzaren jaiotze-kontrolaren eta kontrol demografikoaren alde ere; 1921ean, *American Birth Control League* sortu zuen, eta eugenistek askotan idazten zuten haren aldizkarian, *Birth Control Review* delakoan (Fausto-Sterling, 2000, 176. or.).

Pincus Rock ginekologoarekin elkartu zen; Rock hormonekin lanean ari zen emakumeen\* ugalkortasuna areagotzeko proiektu batean, eta, horrenbestez, marko ezin hobea eratu zen pilula ere proiektu berean testatzeko inongo susmorik piztu gabe (Oudshoorn, 117.-118. or.). Arazoa izan zen ikerketaren emaitzak bukatugabeak izan zirela, eta pilula egunero hartzearen albo-ondorio posibleak ere –haietariko batzuk ikerketan parte hartu zuten emakumeek\* deskribatuak– arazo bilakatu ziren. Massachusetts-en, legearen aurkakoa zatekeen eskala handiko saio kliniko bat egitea, jaiotze-tasa kontrolatzeko arauak oso zorrotzak baitziren han; hortaz, Puerto Rico testatzea erabaki zuten, han garai hartan ez baitzegoen halako legerik.

Hala, Puerto Rico uharteko emakumeetan\* testatu zen pilularen eraginkortasun teknikoak, jaiotze-kontrolerako klinika baten bitartez –gainpopulazioa herrialde pobre eta “azpigaratu”etako “arazo”etako bat zen, eta jaiotzak kontrolatuz “sendatu” beharra zegoen–, baita Worcester State Hospital ospitale psikiatrikoko zortzi pazientetan ere, zazpi emakume\* eta gizon bat (Oudshoorn, 1994, 122.-129. or.)<sup>345</sup>. Oudshoorn-en hitzetan:

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<sup>344</sup> Oudshoorn-ek azaldu du pilula sortzeko ikerketarako dirua Katherine Dexter McCormick-ek jarri zuela, Massachusetts Institute of Technology-n graduatua eta Sanger-en adiskidea: “[T]he first step in this recontextualization of hormone research was initiated by feminist birth control activists, rather than by scientists themselves” (1994, 116. or.).

<sup>345</sup> Geroago, beste proba batzuk egin ziren, Puerto Rico eta Haitin; emakumeek\* albo-ondorio kaltegarriak izan zituzten, eta askok antzutzea erabaki zuten (Oudshoorn, 1994, 129.-130. or.).



The choice of Puerto Rico must therefore be understood as a mixture of cultural imperialism and practical testing considerations. Since the contraceptive pill was called into existence mainly because it was considered a technological fix for the population problem in “underdeveloped countries,” its testing required a population that reflected this ideology: poor, illiterate women. Puerto Rico, with its poorly educated and impoverished population, provided such a testing ground. (1994, 135. or.)

Hormonak homosexualitatea “sendatzeko” ere erabili izan dira historian zehar. Hoberman-ek zera dio horren harira: “Medical ambitions to ‘cure’ homosexuals originated in the early endocrinology of a hundred years ago and persisted in various forms throughout the twentieth century” (2005, 92. or.). Forma horietako bat, dirudenez askorik iraun ez zuena, homosexualek gainerako gizonek baino hormona maskulino gutxiago eta femenino gehiago dituztelako ideia izan zen; Hoberman-en arabera, 1935ean sortu zen teoria hori, eta, burmuineko sexu-bereizkuntzaren teoriak ez bezala, ez du gaur eguneraino iraun, aurrerago ikusiko dugun bezala (2005, 98. or.). Organon konpainia farmazeutikoak, adibidez, interesa agertu zuen merkatu horren aldera (Oudshoorn, 1994, 59. or.).

Homosexualitatea sendatzeko hormona bidezko tratamenduak erabili izanaren adibide bat –gorago ere aipatu dugu– “A. D., a male negro of 46”-ren kasua da, *Psychosomatic Medicine* aldizkarian argitaratua 1941ean (Rosenzweig eta Hoskins, 1941, 87. or.). A. D. 1921ean sartu zen Northampton State Hospital-en, eta, handik lau urtera, Worcester State Hospital-era bidali zuten, “constitutional psychopathic personality without psychosis” diagnostikoarekin (1941, 87. or.). Diagnostikoaren oinarria hau zen: nagusia aitatzat zeukan ia –artikuluaren arabera, jan eta lo ere berarekin egiten zuen–, eta, hura hil zenean, zenbait sintoma garatu zituen: “seclusiveness, shyness, pronounced effeminacy, and excessive preoccupation with drawing, painting, designing of women's clothes and similar ‘artistic’ activities” (1941, 87. or.). Rosenzweig eta Hoskins-ek, bestalde, zera dakarte horri buruz: “His speech became disjointed and unresponsive and for two years he refrained from leaving his home. He talked of wearing women's clothes and often went to bed with presumably imaginary ailments” (1941, 87. or.). Worcester State Hospital-en diagnostikoan, A. D. honela deskribatzen da: “[A] short, stocky negro who, except for his large masculine genitals, is in every respect a woman. He shows an exaggerated female gait and speech and all the mannerisms of a clinging-vine type of female, spends hours at his toilette” (1941, 88. or.). Gehitzen dute hainbat aldiz galdetu eta gero subjektuak azkenean onartu zuela jarrera pasiboak izan zituela jarduera homosexualetan, eta, orduan, ospitaleak zera ondorioztatu zuen: “[A] negro of passive homosexual type with feminoid make-up, without evidence of psychosis. Mental deficiency, if present, is of a high grade or

borderline degree” (1941, 88. or.). A. D.-k botikak hartu zituen 1939ko urriaren erdialdetik 1940ko apirilaren erdialdera bitartean; zehazki, Squibb konpainia farmazeutikoaren estilbestrol estrogeno sintetikoa –DESA– hartu zuen, aho bidez, astean hiru aldiz; Schering-en 150 mg-ko testosterona-tableta baten inplantea ipini zioten; behor ernarien serumetik eratorritako gonadotropina-prestakin bat injektatu zioten, astean bi aldiz, hori ere Schering-ena; eta testosterona propionatoa injektatu astean bi aldiz. Martxoan, Ayerst, McKina & Harrison-en Emmenin®-a gehitu zioten tratamenduari –Premarin®-en aitzindaria–, hiru dosi egunean; eta, apirileko aste batean zehar, Eli Lilly & Co.-ren estriola. Hormona-koktel haren eta goragale dosi handi baten ondotik, honako hau da Rosenzweig eta Hoskins-en ondorioa: “No influence upon the behavior or the personality of the patient could be detected” (1941, 89. or.).

Homosexualitatea hormona bidez tratatu izanaren beste kasu bat dugu Alan Turing matematikari britainiarrarena, zeina giltzarri izan baitzen naziek II. Mundu Gerran beren transmisioetan erabiltzen zuten kode sekretua azaleratzeko eta gaur egun konputazioaren eta informatikaren aitzindaritzat hartzen baita (Ostertag, 2016, 59. or.). 1952an, homosexuala izateagatik atxilotu zuten Turing –garai hartan, homosexualitatea kriminalizatuta zegoen Erresuma Batuan–, baita estrogeno-tratamendua hartzera zigortu ere, eta, ondorioz, bularrak hazi zitzaizkion (Hodges, 2014 [1983], 599. or.). 1954an, bere buruaz beste egin zuen (Hodges, 2014 [1983], 614. or.).

Baina hormonak aliatuak ere izan dira, eta esanahi eta erabilera positibo, emantzipatzaile eta askatzailea izan dute teknogorputzasun-subjektibitate trans\* askorentzat. Lehenago ere esan dugunez, Hayward-ek esana du (2014, 256. or.) emakume\* transek\* Premarin® erabili izan dutela *Standards of Care for hormonal transition* zaharkitu baina aski erabiliari jarraituz –World Professional Association for Transgender Health-ek eta haren aurreko Harry Benjamin Gender Dysphoria Association-ek argitaratua– (2014, 256. or.).

Beccalossi-k dio genero-onarpenerako prozesu batean edo jaiotzean esleituriko sexu-generoa aldatzeko hormonaren erabileraren lehendabiziko kasuetako bat 1949an erregistratu zela; hain zuzen, Alfred Kinsey estatubatuar sexologoak Harry Benjamin-engana bidali zuen paziente bat; sexologo eta endokrinologoa zen Benjamin, estatubatuarra baina Alemanian jaioa, eta teknogorputz transekin\* egindako lanarengatik ezaguna (2018, 46. or.)<sup>346</sup>. Beccalossi-ri (2018, 46. or.) eta Schaefer eta Wheeler-i (1995, 79. or.) jarraituz, Barry-k, gerora Sally deitua,

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<sup>346</sup> Hormonak hartuz eta hormonalari hartu gabe egindako genero-onarpenerako lehen ebakuntzei buruz, ikus Meyerowitz (2004, 14.-50. or.).

emakume bihurtzeko gogo bizia adierazi zuen. 1953an, Benjamin hormonak ematen hasi zen<sup>347</sup>, eta, aurrerago, Sally Europara joan zen, genero-onarpenerako operazio kirurgikoak egitera (Beccalossi, 2018, 46. or.; Schaefer eta Wheeler, 1995, 79. or.). Christine Jorgensen-en kasua ere ezaguna izan zen: AEBko egunkarien azalak bete zituen, tartean 1952ko abenduaren 1eko *Daily Newsekoa*, izenburu honekin: “Ex-GI becomes blonde beauty. Operations Transform Bronx Youth”. 1926an jaioa zen, Bronx-en, eta, armadan zerbitzu egin eta gero, genero-onarpenerako prozesu bati ekin zion, hormonak hartuz eta genitaletako kirurgia eginez, Kopenhagen (Meyerowitz, 2004, 51.-98. or.; Stryker, 2008, 62.-63. or.).

Stryker-en arabera, Benjamin-en 1966ko *The Transsexual Phenomenon* lan ospetsua argitaratu (1999) eta hilabete batzuetara, ikerketa zientifikoa eta hormona eta kirurgia bidezko tratamenduei buruz trans\* adituek egindako ebaluazioa uztartzen zituen programa mediko bat zabaldu zuen Johns Hopkins University-k, AEBko lehenengoa (2008, 114. or.). Haren ondotik, antzeko programak garatu zituzten University of Minnesota-n, Stanford University-n eta Galveston-eko University of Texas-ko medikuntza-campusean, besteak beste. Batetik, estatubatuar transek\* oso ongi hartu zuten hori guztia, aukera ematen baitzien beren autodeterminazio sexu-generikorako nahia asetzeko. Nolanahi ere, dio Stryker-ek, zerbitzuetarako sarbidearekin batera etorri zen hau ere: “[A] socially conservative attempt to maintain traditional gender, in which changing sex was grudgingly permitted for the few of those seeking to do so, to the extent that the practice did not trouble the gender binary for the many” (2008, 115. or.).

Stryker (2008, 135. or.) eta Ostertag (2016, 153.-154. or.) bat datoz azpimarratzen dutelarik transexualitatea –“transexualismo” izenez– 1980an sartu zela lehen aldiz American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders-ean (DSM-III)<sup>348</sup>, 1973ko edizioaz geroztiko lehen edizioan, hau da, homosexualitatea gaixotasunen zerrendatik kendu zen edizioaz geroztikoan. Ostertag-ek, bestalde, aipatzen du 1960ko eta 1970eko hamarkadetako gay eta lesbianen askapen-mugimendua estamentu medikotik urundu zela baina sistema medikoaren eskutik helduta etorri zela 1990eko trans\* mugimenduaren

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<sup>347</sup> Deigarria da Beccalossi-k “female hormones” esapidea erabiltzea, kontuan hartuta hormonei buruzko beraren historia laburra *Transitional States* proiektuaren barnean dagoela –bera da proiektuaren burua–; izan ere, proiektu horretan, hormonon erabileraren eta kontsumoaren gaineko begirada kritiko eta analitiko batetik, askotariko testuak eta ikus-entzunezko materialak eskaintzen dira, eta era askotako teknogorputzasun-subjektibitateak aintzat hartzen.

<sup>348</sup> Aurrerago, 1994tik aurrera, “genero-identitatearen nahasmendua” (Gender Identity Disorder) izena eman zitzaion DSM-IV-ean, eta, 2013an, DSM-V-ean, “genero-disforia” (Ostertag, 2016, 153.-154. or.). Bestalde, OMEk “International Statistical Classification of Diseases and Related Health Problems” (DCI-11) gidaren edizio berri bat argitaratu du, “transexual” kategoria buruko gaixotasunen zerrendatik atereaz eta “genero-inkongruentzia” izenarekin sexu-osasuneko arazoan multzoan sartuz (2018b).

gorakada (2016, 153. or.). Dena den, trans\* mugimenduaren barnean, mugimendu askotarikoa eta anizkuna izanik, estrategia eta posizionamendu ezberdinak egon dira eta daude: genero-disforia besarkatzen osasun-sistema publikoko erabiltzaile gisa trans\* teknogorpuztasun-subjektibitateen despatologizazioa eta hormonak hartzeko eskubidea defendatzen dituztenetara (Missé, 2009), zeinak ez baitira nahitaez elkarrekiko jarrera baztertzailerik eta kontrakoak. Espainiako estatuan, salbu Euskal Autonomia Erkidegoan eta Kanarrietan, trans\* teknogorputzek legez erabil ditzakete doako osasun-zerbitzuak, hormona bidezko tratamenduak eta kirurgiak barne, diagnostiko mediko eta psikiatrikoen beharrik gabe. Duela gutxi orpea da hori, trans\* kolektiboaren eta jendearen borroka eskertorria. Nolanahi ere, Chrysalis-eko lehendakari ohi eta Euforia. Familias Trans-Aliadas-eko lehendakari Natalia Aventín Ballarínek<sup>349</sup> azpimarratzen duenez (jakinarazpen pertsonala, 2019ko maiatzaren 21ekoa), egoera hori ez da beti betetzen, bai baitira profesional batzuk araudiak araudi txostenak eskatzen segitzen dutenak. Beraz, autonomia-erkidegoen barnean ere badago tratu-desberdinkeria.

Hormonen esanahia eta efektu positiboak, lehen esan dugun bezala, autodeterminazio-prozesuaz, sexu-generoaren onarpenaz eta gorputza modu kontziente eta desiratuan eraldatzeaz – lotuta dagoena, bestalde, generoaren arau normatiboek eta onarpen sozialaren desesitateak eratutako testuinguruarekin– harago doaz, eta beste elementu batzuekin elkarlotzen dira, efektu, behar eta desiren sare askoz konplexuago batekin, Trans Eskubideen aldeko Plataformaren karteletako –beheko irudian– *#hormonak osasuna dira* hashtag-a osatzen duten hariak deskorapilatuz agerian geratzen den bezala. Hashtag horretan, hain zuzen, trans\* mugimenduaren alderdi baten medikalizazioari besarkada islatzen da, hala Stryker-ek nola Ostertag-ek aipatua –hori ohikoa da, bestalde, zis teknogorpuztasun-subjektibitate gehienetan, edo kopuru handi batean, behintzat Mendebaldean–, eta beren aldarrikapen identitario eta politikoak osasunaren paradigman kokatzen –ez nahitaez osasunarenean bakarrik–, hormonak hartzea eskubidetzat aldarrikatuz.

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<sup>349</sup> Eskerrak eman nahi dizkiot Nataliari bere prestutasun eta adeitasun handiagatik, izan ditugun elkarriketengatik eta eman didan informazio guztiagatik.



Trans Eskubideen aldeko Plataforma

Kartelean irakur dezakegun bezala, Trans Eskubideen aldeko Plataformak kontzentrazio batera deitu zuen 2016ko abenduaren 17an, Madrilan, baita Espainiako estatuko beste hiri batzuetan ere, 250 mgko Testex Prolongatum®-aren<sup>350</sup> eta 1 mg-ko eta 2 mg-ko Meriestra®-ren hornidura etetearen harira. Lehena Desma Healthcare S.p.A. konpainia farmazeutikoaren testosterona injehtagarria da (ziklopentilpropionatoa), eta bigarrena, Novartis AGren estradiol baleratoko pilulak; Espainiako estatuko trans\* teknogorpuztasun-subjektibitateek gehien kontsumituriko bi farmakoak –edo kontsumituenetarikoak– ziren. Meriestra®-ren kasuan, ugalkortasun-tratamendu gisa ere erabiltzen zen. Kartel horretan aldarrikatzen dena hormonak hartzeko eskubidea da; ikusi dugunez, hori oso praktika orokortu eta sustatua izan da historian zehar era askotako talde sexu-generikoetan –are zigor kriminal gisa ezarria ere–, zentzu honetan inolako problematiziterik sorrarazi gabe. Meriestra®-rik ezean, emakumeek\* beste farmako batzuk eskuratu behar izan zituzten, hala nola Bayer AGren Progynova® edo Climen®, eta, finantzatu gabeak zirenez, prezioak nabarmen garestitu ziren<sup>351</sup>. Hornitze-falta horrek, bestalde,

<sup>350</sup> Itnogen® da Espainiako estatuko transek\* erabili duten beste medikamentu bat.

<sup>351</sup> Gaur egun, Meriestra®-k Estradiol Meriestra® izena hartu du, eta Sandoz-ek merkaturatzen du (Novartis AGren dibisio bat da), 2017ko uztailaren 3tik aurrerako merkaturatze-baimenarekin (Medikamentu eta Produktu Sanitarioen Espainiako Agentzia, 2019a). Hala eta guztiz ere, ez da farmazietan saltzen, ez behintzat Nafarroako Foru Erkidegoan, orriok idatzi genituen unean. Testex®-i dagokionez, badu Espainiako estatuan merkaturatzeko

hormonak hartzeari uzteak dakartzan ondorio fisiko, psikologiko eta emozionalak ere ekarri zituen. Ez da halakorik gertatzen den lehen aldia. 2014an, gauza bera gertatu zen Reandron®-ekin, beste testosterona injektagarri mota bat. *Vademecumek* jaso du Reandron® eskuratzeko arazoak egon direla 2019ko martxoaren 4tik maiatzaren 17ra bitartean: “[A]leak mugatuak izanda, merkaturatze-baimenaren titularra banaketa kontrolatua egiten ari da” (Vidal Group, 2019)<sup>352</sup>.

Meriestra®-ren prospektua irakurtzean deigarri gertatzen den lehen gauza zera da: trans\* emakumeek\* gehien erabiltzen duten farmakoa izanik eta ugalkortasun-tratamenduetan ere erabilia izanik, menopausiadun emakumeentzako\* medikamentua dela zehazten da. Eta ez hori bakarrik; izan ere, esaten da “umetokia erauzia duten (histerektomia) emakumeentzat bakarrik” erabiltzen dela (Medikamentu eta Produktu Sanitarioen Espainiako Agentzia, 2016, 1. or.)<sup>353</sup>. Orduan, nola liteke ugalkortasun-tratamendu gisa erabiltzea? Horrekin batera, lehenago ere esan dugunez, endometriko, bularreko eta obulutegietako minbiziaren eta gaixotasun kardiobaskularraren arriskuaz ohartarazten da<sup>354</sup>. Itnogen®-i dagokionez –lehen ere aipatu dugu–, prospektuak dio hipogonadismoa duten gizonei errezetatzen zaiela (Missé eta Fernández, 2018). Zera azpimarratzen du, gainera: “Gizonek bakarrik erabil dezakete Itnogen. Itnogen ez da probatua izan 18 urtetik beherako mutilengan, eta gutxi erabili da 65 urtetik beherako gizonen tratamenduan” (Missé eta Fernández, 2018)<sup>355</sup>. Preciado-k irudikatzen duen 50 mg-ko Testogel®-en prospektuan ere jasotzen da murrizketa teoriko sexu-generiko hori, testosteronaren erabilera gizonetara mugatuz (2008, 52.-53. or.). Kontraesan eta arau sexu-generikoz beterik daude medikamentuen prospektuak.

Hormonek ez dute esanahi eta efektu bera teknogorpuztasun eta identitate guztietan. Esate baterako, zis emakume batek erabaki politiko-bital gisa pilula antikonzeptiboa hartzeari kontzienteki uzteak ez du jokoan jartzen bere identitatea, zenbait trans\* gorpuztasun-

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baimena, eta saltzen da farmazietan, bai behintzat Nafarroako Foru Erkidegokoetan (Medikamentu eta Produktu Sanitarioen Espainiako Agentzia, 2019b).

<sup>352</sup> Jatorrizko testua: “[E]l titular de autorización de comercialización está realizando una distribución controlada al existir unidades limitadas”.

<sup>353</sup> Jatorrizko testua: “Meriestra se utiliza solamente en mujeres que les han extirpado la matriz (histerectomía)”.

<sup>354</sup> Endometriko minbiziari dagokionez, zera esaten du hamaika orriko prospektuak: “Kontuan hartuz oraindik umetokia baduten eta THSrik erabiltzen ez duten emakumeak, batez beste 1.000tik 5i diagnostikatuko zaie endometriko minbizia 50 urtetik 65 urterako tartean. Umetokia baduten eta estrogenodun THS tratamendua hartzen duten 50 urtetik 65erako emakumeen artean, 1.000 emakumetik 10-60ri diagnostikatuko zaie endometriko minbizia (alegia, 5etik 55era kasu gehiago), dosiaren eta tratamenduaren iraupenaren arabera” (Medikamentu eta Produktu Sanitarioen Espainiako Agentzia, 2016, 4. or.). Odolbildei dagokienez, hau dio: “Zainetako odolbildeak izateko arriskua 1,3tik 3ra altuagoa da THS hartzen duten emakumeen artean, THSrik hartzen ez dutenekin alderatuta” (2016, 5. or.).

<sup>355</sup> Jatorrizko testua: “[S]ólo los hombres pueden utilizar Itnogen. Itnogen no ha sido probado en varones menores de 18 años y existe poca experiencia en el tratamiento de hombres menores de 65 años”.

subjektibitatek hormonak hartzeari uzteak haien identitatea jokoan jartzen duen moduan<sup>356</sup>. Askotan, gaur egungo egoera sozialean, hormonak hartzeari uztea ausardiazko eta subertsiozko ekintza bat izan daiteke trans\* teknogorpuztasunentzat. Dena den, trans\* mugimenduaren barnean ere sortu dira hormonon berrikuspen kritiko bat egitea aldarrikatzen duten ahotsak. Paul Galofre-k ohartarazi du “butch” kategoriatik “trans\*” kategoriara iragan dela hein batean hormonazioaren eskutik, genero bitarraren ideologiak inposaturiko koherentziaren nolabaiteko berrespenaren ondorioz:

Uste dut feminismoak eta mugimendu lesbikoak lan handia egin dutela genero maskulinoko adierazpidea izanik emakume gisa identifikatzen diren pertsonak egotea onar dadin, emakume kontzeptuaren barnean maskulinitate-espazio hori egon dadin, eta iruditzen zait espazio horri prestigioa kendu diotela. Baliteke emakumeok lehen ez trantsitatzeko, trantsitatzeko aukerarik ere ez zegoelako (...), baina kontua da orain gero eta mutil trans\* gehiago dagoela, askotan testuinguru lesbiko batetik trantsitatu dutenak. Hemen bada zerbait urduri jartzen nauena. Zerbait gaizki egiten ari al gara, maskulinitate hori bizitzeko beharrezkoa delako norberaren izena eta izenordainak aldatzea? Ez dakit ez ote den maskulinitatearen idealizazio bat... Aldi berean, neuk ere trantsitatu dut, eta ezin biziko nintzateke emakume lesbiana gisa, baina hori beharbada gertatzen zait ez nuelako erreferenterik izan, ez nuelako aurkitu emakumea eta maskulina izateko eta horrekin ongi sentitzeko modurik. Aldi berean, oso interesgarria da hainbeste jendeak trantsitatzeko, une honetan posible baita hori egitea, eta beste aukera batzuk ere sortzen dira. (2015)<sup>357</sup>

Missé-k adierazi zuen trans\* teknogorpuztasun-subjektibitate ugariak hormonak kontsumitzea aspalditik datorren kontua dela eta disposizio handiz eta analisi kritiko handirik egin gabe hartu direla hormonak (Missé eta Fernández, 2018). Hormona sintetikoak erregimen

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<sup>356</sup> Dena den, neurri txikiagoan bada ere, hormona-artefaktuek badute loturaren bat identitate sexu-generikoarekin. Adibide berarekin jarraituz, pilula antikonzeptiboa sortu zenean, emakumeek\* hileko zikloa izaten jarraitzea –hilekoaren eta feminitatearen artean ezarritako loturaren ondorioz– elementu definitzaileetako bat izan zen pilularen kontsumorako egun eta ziklo kopuruak diseinatzeko (Oudshoorn, 1994, 119.-120. or.). Bestalde, Missé-k eta Fernández-ek deskribatzen duten T imajinarioak zis gizonen teknogorputzei ere eragiten die, hormonak hartzen baitituzte gizon arrakastatu ideal horren antza izateko (2018).

<sup>357</sup> Jatorrizko testua: “Creo que el feminismo y el movimiento lésbico han hecho un trabajo muy grande por permitir que haya personas identificadas como mujer con una expresión de género masculina, en dar este espacio de masculinidad dentro del concepto mujer, y tengo la sensación de que este espacio está siendo un poco desprestigiado. No sé si es que antes estas mujeres no transitaban porque la opción de transitar ni siquiera existía (...), pero lo cierto es que ahora cada vez hay más chicos trans, que transitan muchas veces desde un contexto lésbico. Aquí hay algo que a mi me tensiona. ¿Estamos haciendo algo mal porque para vivir esta masculinidad necesitamos cambiar el nombre, cambiar los pronombres? No sé si es que hay una idealización de lo masculino... al mismo tiempo, yo soy el primero que he transitado, y que ahora mismo no podría vivir como mujer lesbiana, pero quizá es porque no tuve los referentes, no encontré las formas de ser mujer y masculina y estar bien con eso. Al mismo tiempo es muy interesante que haya tanta gente que transita, porque estamos en un momento en el que esto es posible y genera otras posibilidades”.

sexu-generiko bitar eta heteronormatiboaren murrizketa, bazterketa eta jazarpenen aurkako panazea eta erabateko salbaziotzat hartzea arazo gisa planteatzen duelarik, zera dio:

[O]inarrian dagoen gaia zera da: ea trans politiketek gorputza aldatzearen alde egin behar duten trans pertsonen gatazka konpontzeko bide gisa, edo ea nabarmendu behar duten ez dela norbanakoaren arazoa baizik eta egiturazko arazo bat. Gorputza aldatuz gero, arazoa gure gorputzetan arintzen da, baina ez du konpontzen zergatik pertsona batzuek uko egiten dioten jaio ziren gorputzetan bizitzeari. Gorputza aldatuz gero, sufrimendua arintzen dugu, eta, askotan, iraupen-kontua da, baina ez diogu horratik zalantzan jartzeari utzi behar. Esleitu zitzaizkien gorputz edo generoak gorrotatzen dituzten pertsonak egote hutsa zinez lazarria da, eta agerian uzten dizkigu gure kultura (mendebaldar)raren genero- eta gorputz-presioak. Trans\* auzia ez da gorputzean konpontzen, baizik eta imaginario kolektiboan, emakume edo gizon zuzen izateari buruzko eredu sozialak malgutuz, posible denaren esparrua zabalduz, generoa ñabardurekin adierazteko askatasun handiagoa lortuz. (Missé, 2018, 69. or.)<sup>358</sup>

Ez gara ari esaten hormona sintetikoak txarrak direnik. Ezta onak direnik ere. Kontua ez da, gainera, onak ala txarrak diren. Agerian utzi nahi duguna da hormonak, artefaktu teknozientifikoak eta merkatuko produktuak diren heinean, testuinguru sozial bati dagozkioa, interes jakin batzuk biltzen dituztela eta haien erauzketak, ekoizpenak eta merkaturatzeak era askotako efektuak dakartzatela, bai hormonak kontsumitzen dituzten teknogorputzetan, baita hormonak erauzten dizkieten teknogorputzetan eta orobat ingurunean. Haien jatorria, efektuak eta interesak zein diren jakitea baliagarria, onuragarria eta emantzipagarria da. Horixe esan nahi dugu “hormonen kutxa beltza irekitzea” aipatzen dugunean: subjektibazio- eta materializazio-artefaktu horietan biltzen diren interesak kritikoki analizatzea eta geure buruari galdetzea zer eragin duten gorputzak eta ingurunea lotzean. Alegia, aztertzea eta zalantzan jartzea nola eta zer neurritan koeritzen dituzten teknogorputzak eta ingurunea, kontuan hartuz aldi berean teknogorputzek eta inguruneak hormonak koeritzen dituztela.

Identitate sexu-generikoek, teknogorputzen morfologia sexu-generizatuek eta/edo teknogorputzek askotariko bizi-, gorputz- eta emozio-prozesuak dituzte, baina horrek ez du esan nahi gaixo daudenik, oker daudenik, edo inkongruenteak, disforikoak edo akastunak direnik.

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<sup>358</sup> Jatorrizko testua: “[L]a cuestión de fondo es si las políticas trans deben apostar por promover la modificación corporal como la solución al conflicto de las personas trans o si deben poner de relevancia que no se trata de un problema individual sino estructural. Modificar el cuerpo solo domestica el problema en nuestros cuerpos pero no resuelve la pregunta sobre porqué alguna gente se niega a vivir en los cuerpos con los que nació. Modificar el cuerpo domestica el sufrimiento y muchas veces es una cuestión de supervivencia pero no podemos no por eso debemos dejar de ponerlo en cuestión. El simple hecho de que haya personas odiando sus cuerpos o los géneros en los que fueron asignados es francamente dramático y nos desvela la fuerza de las presiones de género y corporales en nuestra cultura (occidental). La cuestión trans no se resuelve en el cuerpo, se resuelve en el imaginario colectivo, flexibilizando los modelos sociales sobre lo que es ser un hombre o una mujer correctos, ampliando nuestro espectro de lo posible, conquistando una mayor libertad para expresar género con matices”.



Besterik gabe, gure inguruko eta murgilduta gauden multiplizitate erlazional aldakorraren ondorioak dira. Gorputzak, subjektibitateak, desira, kemena, indarra, emozioak, hormonak, ilea, azala, hezurak, beste elementu asko bezala, aldatu egiten dira denborarekin.

Teknogorputz *guztiek* beren gorputzaren eta identitatearen koeraketa sexu-generikorako artefaktu teknologikoak erabiltzeko eskubideaz harago, ez dugu zertan nahitaez hormonak hartu. Hormonak kontsumitzea aukera bat da, ez betebeharrak bat. Gakoa zera da: hormonak gure identitate sexu-generikoen protagonista bilakatu dira, gure subjektibitate eta gorputzasun sexu-generizatuaren elementu definitzaile nagusi. Eta, beharbada, kolektiboki pentsatu behar genuke ea leku hori betetzea nahi dugun, eta ea zer teknologia sexu-generiko material-semiotiko nahi ditugun eta zertarako. Horren harira, zera dio Oudshoorn-ek:

[B]odies and technologies are not unequivocally determined by nature. Medical technologies do not necessarily have to be the way they actually are. Who knows what might have happened to the hormonally constructed body concept if there had existed an andrological clinic, rather than a gynecological clinic? Imagine what might have happened in a world with different cultural and moral attitudes towards gender and responsibilities for family planning and childcare. It is not beyond imagination that we would have ended up with a male contraceptive pill, a medical treatment of male menopause and a classification system of multiple sexes. Alas, we will never know whether this really would have happened. We know, however, one thing for sure: science and technology can take many shapes. A critical deconstruction of the processes that shape science, technology and bodies might help us to envisage technologies that have a chance of survival (1994, 150. or.).

Hormonak, xenoestrogenizitatea, sexu-generizazioaren prozesu ireki eta aldakorraren baldintza gisa agertzen dira, Kapitalozeno neoliberalen teknogorputzak eta ingurunea koeratzeko elementu nagusietako bat bezala. Baina, prozesu guztiak bezala, etengabe aldatzen eta eboluzionatzen ari da. Teknogorputzen hormona-izaera ez da berezko ezaugarri bat, ezaugarri *natural* eta beharrezko bat, baizik eta Kapitalozeno neoliberalen teknogorputz sexu-generizatuaren eta ingurunearen kondizio bat. Hormonek gure gorputzak zer neurri, maila eta modutan eratzten dituzten eta eratztea nahi dugun pentsatzeak esfortzu kolektibo bat merezi du.

### 3.7. Laburbilduz

Atal honen helburua hormonek teknogorputzen sexu-generoaren koeraketan zer eginkizun duten argitzea izan da.

Horretarako, teknogorputzaren kontzeptua eta hormonena analizatu ditugu haien zabaltasunean, kontuan hartuta biok eskaintzen dituzten aukerak –hau da, gorputzak ingurunera irekita egotea elkarrenganako osaeran– eta teknogorputzetako efektu hormonalak, ez bakarrik produktu hertsiki hormonalek eragindakoak, baizik eta askotariko produktu kimiko xenoestrogenikoen eragindakoak. Produktu edo medikamentu hormonaletan, hormonak – artefaktu teknozientifikoak eta merkatu-produktuak diren heinean– eta xenoestrogenoak edo disruptore endokrinoak elkarrekin korapilatzen dira modu banaezinean.

Giza jarduera eta praktika ugariaren bitartez ingurunera isurtzen diren produktu kimiko xenoestrogeniko kopuru erraldoi eta askotarikoaren zati bat analizatu dugu, pestiziden, arropen, kosmetika- eta higiene-produktuen, edo elikagaien fabrikazio edo erabilera, nola mikroelektronikako osagarriak biltzen dituen. Halako elementu kimiko sintetikoak ingurune osoan zehar hedatzen dira, haien elkarrekiko harreman konstitutiboa dela eta. Bestalde, elementu xenoestrogenikoak agertu dituzten teknogorputzasun ugari ere aztertu ditugu, geografia ugariatukoak. Produktu hertsiki hormonalak animalia-teknogorputz ez-gizatiarrek irentsi izan dituztenez eta irensten dituztenez, animalia-teknogorputz gizatiarrez gainera, eta produktu eta elementu xenoestrogenikoen sortzen dituzten efektuen nonahikotasuna eta garrantzia dela eta, ondorioztatu dugu ingurunea, teknogorputzasunak eta haien sexu-generoak xenoestrogenoz eta hormonaz koeratuta daudela.

Ah-King eta Hayward-en eskutik, elementuon efektu espezifikoak sexu-generikoei edo sexu-generizatutako morfologia eta garapenari eta ugalketa-funtzio eta -gaitasunari egotzitakoei eman zaien gehiegizko garrantzia problematizatu dugu. Alderdi sexu-generikoaren inguruko antsietatea eta tema sexu-generoaren eta sexualitatearen gaineko begirada heteronormatibo, dimorfiko eta antropomorfiko batetik eratorriak dira. Horren aurrean, proposatzen dugu xenoestrogenoak eta produktu hormonalak kontzeptualizatzea teknogorputzen sexu-generizazioaren prozesuan parte hartzen duten elementuetako *bat* bezala, aldakor eta ingurunera ireki gisa ezaugarritu dugun prozesua.

Hormonen eta xenoestrogenoen nonahikotasunaren eta garrantziaren analisiak agerian uzten du politikak eta botereak bilakaera molekularra izan dutela, eta horrek, Haraway-ren eta Preciado-ren eskutik, Kapitalozeno neoliberalen teknobiopolitikaren bilakaera molekularra kontzeptualizatzea eraman gaitu. Artikulu kimiko hormonal eta xenoestrogenikoen

ekoizpenaren tentakulu-sareak –zeinak artikulu horien beren bitartez teknogorputz eta identitate sexu-generizatu anizkoitzen kudeaketa, ekoizpena eta eraketa implikatzen baititu– efektu eta botere-harreman ugari sortzen ditu, eta gaur egungo industria-ekoizpenaren zati handi bat hartzen du, hala nola industria farmakologikoa, kimikoa, agroindustria, bioteknologikoa, elikagaiena eta militarra. Teknobiopolitikaren bilakaera molekular horretan, erakutsi dugu zientziaren eta medikuntzaren balioa, egiaren ekoizle gisa, txikiagotu dela hedabideen eta merkatuaren mesedetan.

Politikaren molekularizazioaren parte diren heinean, hormonon sorreraren jatorrian arakatu dugu, bai merkatuko produktu gisa, bai artefaktu teknozientifiko gisa, eta horrek Dreger-ek deskribaturiko Gonaden Arotik hemen “Hormonen Aro” deitu dugunerako iragatea kontzeptualizatzerara eraman gaitu. Hormonen Aroan, identitate sexu-generikoak eta gorputz-prozesuak funtsezko kontzeptu baten inguruan eraikitzen dira: hormonak. Politikaren molekularizazioak badu bere analogoa zientzian ere, eta horrek “sexu-hormona” deritzenak sexu-generoak azaltzeko, eratzeko eta sailkatzeko elementu nagusi –baina ez bakar– bihurtzea dakar, feminitatearen eta maskulinitatearen *esentziaren* eramaile bihurtzea. Oudshoorn-i segituz, ohartarazi dugu iragate hori ez zatekeela posible izango konpainia farmazeutikoen, estamentu medikoaren eta zientziaren arteko *ménage à trois* gabe, hau da, haien lankidetzaren esturik gabe. Azaldu dugunez, Preciado-ren bikotea guztiz bateragarria da Oudshoorn-en hirukotearekin; izan ere, egin dugun hormonon genealogian, agerian geratu da merkatuak bultzatzen duela prozesu zientifiko-medikoa eta aldi berean publizitateak ere funtsezko garrantzia duela produktu hormonalen arrakastari dagokionez. Hirukote horrek agerian uzten du Kapitalozeno neoliberallean behin eta berriz errepikatzen den patroietako bat.

Haraway-ren proposamenari jarraituz, hots, patroiz zaharren hari-zuntzak deskorapilatzea patroiz berriak sortzeko, “sexu-hormona” deritzenen izaera sexu-generikoa deskorapilatu eta problematizatu dugu, hala nola sexu-generoaren *esentzia kimikoaren* eramaile gisa haien kontzeptualizazioa, eta beste elementu bat gehiago balira bezala interpretatu, sexu-generoen koeraketan eta teknogorputzen beste askotariko prozesu eta funtzioetan parte hartzen duten askotariko elementu organiko-teknologiko-diskurtsibo-material ugariaren artean, betiere ingurunera irekitako prozesu baten barnean. Horrek ez du kontraesanik sortzen hormona esteroide eta ez-esteroideek Kapitalozeno neoliberalerako teknogorputzen sexu-generoen koeraketan izan duten eta duten garrantziarekin. Baina zalantzan jarri eta problematizatu dugu haien izaera eksklusibo eta espezifikoki sexu-generizatu, dimorfiko, sexu-generikoki antagoniko eta heteronormatiboa, zeinak gailentasun heteropatriarkala legitimatzen eta erreproduzitzen jarraitzen baitu.

Azkenik, hormonon kutxa beltza ireki dugu, kritikoki analizatzeko zer interes pilatzen diren “sexu-hormonak” merkaturatzean, merkatuko produktu bilakatzean, eta gorputz, bizi-prozesu eta identitate sexu-generiko eta sexualitate anitzak patologizatzean, aurretik deskribaturiko ereduak haien bitartez gertatzen eta gauzatzen baita. Halako interesez gainera, artikuluen hormonalen ekoizpenaren efektuak analizatu ditugu, ez bakarrik artikuluen kontsumitzean dituzten teknogorputzetan, baizik eta baita erazten diren teknogorputzetan eta ingurunean ere. Hormonak, bai artefaktu teknozientifiko gisa, bai merkatuko produktu gisa, animalia-teknogorputz gizatiar zein ez-gizatiarrak eta haien sexu-generoak koerazten dituzten elementu *teknologiko* nagusietako bat dira Kapitalozeno neoliberalen. Baina, kolektiboki pentsatzekoa izan daiteke eta beharbada merezi du kolektiboan birpentsatzea zer neurritan eta nola nahi dugun hori horrela izatea aurrerantzean ere.

## 4. Trans\* bilakaerak: trans\* anizkoitz eta erlazional gisa

### 4.1. Sarrera

Multiplizitatearen plazera (...) Elkarrekin nahasiz. Zentzua aurkituz nahasketa horretan bakarrik.

P. B. Preciado, *Testo Yonki*, 2008, 103. or.<sup>359</sup>.

It's relationalities all the way down.

N. Gane, "When We Have Never Been Human What Is to Be Done? Interview with Donna Haraway", 2006, 141. or.

Zergatik ezarri begirada kritiko eta analitikoa "trans\*" kategoriaren gainean? Zergatik ahalegindu hurbiltzen trans\* gorpuztasun-subjektibitateen –kolektibitate ikaragarri anitza– materialtasun sexu-generizatuaren koeraketara, emakume gisa sozializatua eta kontzeptualizatua izanik, emakume gisa borrokarako posizionamendu batetik?

Erabaki horren atzean dauden arrazoiak kezka/egiteko onto-politiko-epistemiko batetik datoz. Alde batetik, garrantzi eta esangura ontologiko handiko esanahi ugari daude momentu honetan lehian transaren\* gudu-zelaian. Transak\* halako "gorakada" bat izan du<sup>360</sup>. Horren adibide dira 2014ko ekaineko *Time* aldizkariaren azala, zeinean Laverne Cox aktorea –*Orange Is The New Black* (2013-2019) telesaileko protagonistetako bat– agertzen baita *The transgender tipping point. America's next civil rights frontier* titularraren ondoan (Steinmetz, 2014); 2015eko ekaineko *Vanity Fair*-en azala, Caitlyn Jenner-en argazki sensual eta txundigarri bat dakarrena (Bissinger, 2015) –Jenner *I am Cait* telesail dokumentaleko (2015-2016) protagonista ere izan zen–; edo 2017ko *Vogue*-ren azala, zeinean lehen aldiz agertzen baita trans\* modelo bat,

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<sup>359</sup> Jatorrizko testua: "El placer de la multiplicidad (...) Mezclándose. Encontrando sentido solo en esta mezcla".

<sup>360</sup> Hala ere, transek\* ikusgaitasun handiago lortu badute ere –ez homogeneoki Mendebalde guztian–, trans\* gorputz askok sufritzen duten bazterkeria, prekarizazioa eta indarkeria, sarrean erakusten genuen bezala, kezkarriak dira oraindik ere. Espainiako estatua, Fátima Elidrissi-k dioen bezala, urruti dago oraindik itxurazko normalizaziotik (2018). Trans\* gorputzen ikusgaitasunari dagokionez, zera dio: "[P]antailan ikusten diren pertsonaia transexual apurra aktore zisek interpretatzen dituzte gehienetan (...), eta horrek pertsona transen estereotipazioa eta lan-bazterkeria larritzen du" (Elidrissi, 2018).

Valentina Sambaio, *La beauté transgenre. Comment elles bouleversent le MONDE*<sup>361</sup> titularraren ondoan. “Gorakada” edo ikusgaitasun handiago horren lekuko diren beste kultura-produktu batzuk dira, batetik, 2015ean estreinaturiko bi film: *The Danish Girl*, Lili Elbe genero-onarpenerako prozesu kirurgiko batetik igaro zen lehen pertsonetako baten bizitza kontatzen duena<sup>362</sup>; eta *Tangerine*, Sin Dee-Rella eta Alexandra trans\* prostituten bizipenei buruzkoa. Bestetik, bi telesail: *Transparent*, 2014tik 2017ra bitartean emititu zena, zeinean transexual bat baitzen protagonista<sup>363</sup>; eta *Pose* (2018-2019), 1980ko hamarkadaren amaierako LGTB komunitatearen erretratu bat, zeinean aktore protagonistetatik bost transak\* baitira eta kapituluetakoa bat Janet Mock telebista-aurkezle, zuzendari eta ekoizle transak\* zuzendu baitzuen.

Euskal Herriari dagokionez, trans\* gaia tokia betetzen hasia da egunkarietan eta telebistako programetan. Adibide gisa, 2017aren hasieran, Xabier Madariagak elkarrizketa bat egin zien Mikele Grande, Aitzole Araneta, Ixotz Louyest eta Ainara Ruiz-i, EITBko *Ur handitan* programan; 2016an, Julian Iantzik Nora Gómez Carrión elkarrizketatu zuen *Nafar Telebistan*; 2015eko ekainean, Ixotz Louyest-en lekukotasuna bildu zuten *Berrian* (Ares Amaya, 2015), eta, 2012an, *Maskarak* dokumentala egin zen, Ixotz Louyest eta Ainara Ruiz-ekin.

Zenbait egilek, hala nola Stryker-ek (2015, 15. or.) eta Galofre eta Missé-k (2015, 25.-26. or.), aipatu dute trans\* mugimendua instituzionalizatu egin dela nolabait –aurretik feminismoarekin eta gay-lesbianen askapen-mugimenduekin gertatu zen gisa berean– eta batez ere despatologizazioaren arloan aurrera egin den arren beharrezkoa dela gogoeta kritiko bat egitea.

“Emakumeak\*” terminoak biltzen dituen teknogorpuztasun-subjektibitateen multiplizitatearen kasuan bezala, baina maizago eta neurri handiagoan ikusezintasunezko, bazterkeriazko eta prekaritatezko esparruak habitatuz (Stryker, 2015, 11. or.), trans\* multiplizitatea normatiboki eta teknodiskurtsiboki murrizten, bideratzen eta moldatzen da edertasun tiranikoaren eredu heteronormatibo batera egokitzeko, ondorio askotan mingarriak eraginez, eta, era horretan, erregimen sexu-generiko oraindik bitar baten aginduak betetzen dira, nahiz eta badiren joera eta borroka ugari, beste leku batzuk bizitzeko aukera gauzatu aniztun eta askotarikoak.

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<sup>361</sup> “Edertasun transgeneroa: nola eraldatzen ari diren haiek mundua”.

<sup>362</sup> Lili Elbe-ri buruz, ikus Meyerowitz (2004, 20. or.). Genero-onarpenerako lehen ebakuntzei buruz, ikus Meyerowitz (2004, 14.-48. or.).

<sup>363</sup> Amazon-ek telesailetik bota zuen Jeffrey Tambor, Maura protagonistaren papera interpretatzen zuena, sexu-abusuen salaketan ondorioz. Bestalde, Lili Elberena egiten duen aktorea eta Maurarena egiten duena ez dira transak\*.

Arazoa zera da: prekaritatea areagotzen ari den garaiotan, egitura sexu-generiko heteronormatiboaren eta egitura horren desberdinkeria beste batzuekin uztartzearen ondorioz – arraza-, klase-, gaitasun- eta adin-desberdinkeriarekin, besteak beste–, prekaritatea ez da berdin banatzen gorputzen artean, eta, horretaz gainera, erregimen sexu-generikoa multiplizitaterantz irekitzen edo demokratizatzen ari da, baina irekitasun hori ez dago eskuragarri mundu guztiarentzat<sup>364</sup>, eta ez dago ekitatiboki banatuta, lehen aipaturiko desberdintasun sistemikoak intersektatzen direlako. Era berean, irekitasun hori baliatzen da “beste” “hezigabe”, “antidemokratiko”, “estremista”, “intolerante”, “totalitario”, migratzaile, musulman, “ezjakin”en aurka, eta Latinoamerikako, Asiako eta Afrikako herritar eta herrialde pobretuen aurka, Mendebaldearen klase ertain-altuko botere eta gailentasun zuria legitimatzeko. Genero-islamofobiaren kasuan (Goikole, 2013; Vasallo, 2016) edo emakumeen\* aurkako tratu txarrak aitzakiatzat hartuta arabiar herrialdeak militarri eta ekonomikoki konkistatzearen eta mendean hartzearen kasuan gertatzen den bezala (Khan, 2001; Atabile eta Kumar, 2005; Fernandes, 2017), eskubideen diskurtso (neo)liberalaren eskutik doan irekitasun horrekin loturiko fenomenoetariko bat *pinkwashing*-a da (Pinkwatching Israel, 2012; Spade, 2014; Maykey, 2016; Palestinian Queers for BDS, 2018). Alde horretatik, AEBk eta Europako estatuak besteen aurka jotzeko modernotasun progresiboaren zeinu gisa hartu dute trans\* eskubideen aldarrikapena, eta, horren harira, zera dio Stryker-ek: “Garbi dago, denoi dagokigu, eta ez bakarrik transgeneroii, ulertzea ‘transgeneroa’ bere horretan bereganatzen ari direla ez bakarrik gutxiengoen askapenerako proiektuetarako, baizik eta baita estatu-mailako mendekotasun- eta kontrol-proiektuetarako ere” (2015, 15. or.)<sup>365</sup>.

Hari-zuntz horretatik tiraka, eta Stryker-en proposamen edo gonbita geure eginez baina estatuetatik gorputzetara lekualdatuz, kapitulu honetan, zenbait diskurtso problematizatuko ditugu; izan ere, diskurtsook, gutxiengoentzako efektu askatzaileak baino gehiago, efektu kontrolatzaile, erredukzionista eta blokeatzaileak dakartzate teknogorputzetara, eta, horretaz gainera, erraz barneratzen dira zapalkuntzazko, bazterkeriazko eta gutxieskeriazko helburuak lortzeko.

Horretarako, oinarri edo premisa gisa hartuko dugu “emakumeak\*” eta “trans\*” kategorien artean badagoela halako analogia historiko bat eta analogia hori beste hiru auzik osatzen dutela, aipatuak ditugun elementu komunetatik harago. Lehenik, “emakume”

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<sup>364</sup> Irekitasun hori eskuragarri duten teknogorputzasun-subjektibitateen kasuan ere, beste gorputz, identitate eta desira batzuk onartzeak ez du esan nahi gizartean simetrikoki eta proportzionalki areagotzen denik haienganako desiragarritasuna.

<sup>365</sup> Jatorrizko testua: “Claramente, nos corresponde a todas, y no solamente a aquellas personas que somos transgénero, entender cómo lo “transgénero” en sí está siendo apropiado para proyectos no solo de liberación de minorías, sino también para proyectos estatales (...) de dominación y control”.

kategoriatik –hau da, batik bat klase ertain-altuko emakume zuri eta heterosexualei erreferentzia egiten dien kategoria, sexu *naturalaren* nozioak eta genero *kulturalaren* ideiak osaturiko dikotomia kontzeptual batean oinarritua eta horrenbestez homogenea eta homogeneizatzaila, itxia, hiperidentitarioa, naturalizatua, esentzializatua eta esentzializatzaila, baztertzaila eta zapaltzaila– “emakumeak” kategoriara igaro gara. Aurrerapauso hori feminismoek eta emakume\* lesbiana, txikano, beltz, asiarrak, pobretu, queer, prostituta, bisexual, pansexual, funtzionalki anizkun, trans\* eta beste hainbatek –ezin ditugu hemen denak aipatu<sup>366</sup> eginiko kritikei esker gauzatu zen. Gaur egun, desberdintasunak eta multiplizitatea sinbolo edo grafia berrietan biltzen dira, 2018an eta 2019an Euskal Herrian martxoaren 8an antolatutako greba feministan ikusi genuen bezala, “emakumeak\*” kategoriaren bitartez (Euskal Herriko Greba Feminista, 2019). Bat-bakarretik multiplizitatera eta homogeneotik anizkoitzera egindako aldaketa hori bera “trans\*” kontzeptuaren kasuan ere gertatu da, baina badaude korrante hegemoniko indartsuak, bai kontrako noranzkoan, bai multiplizitate horri etekin ekonomikoa ateratzeko, eta, ondorioz, trans\* kontzeptua transexualitatera murrizten da sarritan, eta haren multiplizitatea, berriz, hura osatzen duten elementu biologiko eta teknologiko jakin batzuetara.

Bigarrenik, aurrekoarekin loturik, diagnostiko medikoa eta haren ondoriozko teknologien erabilera historikoa aipatu behar dira, bai teknologia prostetikoak, histeriaren kasuan bezala (Laqueur, 1990; Gilman et al., 1993; Devereux, 2014), bai modu zabalago eta garaikideago batean teknologia farmakologikoak eta bioteknologiak, prozesu fisiologiko, psikologiko, bital eta emozionalak –besteak beste, menopausia, haurdunaldia, haien prebentzioa eta genero-onarpena– “tratatzeko” erabiltzen direnak (Preciado, 2008; Ostertag, 2016; Haraway, 2016a; Centers for Disease Control and Prevention. U. S. Department of Health and Human Services, 2019b), zeren horiek guztiak ez daude lotuta soilik norbanakoaren gorputzarekin eta identitate pertsonalarekin, baizik eta neurri handi batean sozialki eta politikoki eraikiak, kodetuak eta interpretatuak dira, eta teknogorputzasun-subjektibitateen ekoizpenaren, korritu ekonomikoaren eta kontrolaren esparruan kokatzen dira, Kapitalozeno neoliberalako teknobiopolitika molekularrean. Alegia, identitate sexu-generizatuak, desirak, libidoa, heterossexualitatea, homossexualitatea, transexualitatea, intersexualitatea, feminitatea, maskulinitatea eta kontzientzia kapital bihurtzea, ondasun ukigarri bihurtzea, substantzia kimiko material eta molekula merkaturagarri bihurtzea.

Hirugarren kapituluaren genioenez, zenbait farmako hormonal –besteak beste, Meriestra®, zeina medikamentuaren beraren informazioaren arabera estradiol “sexu-hormona

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<sup>366</sup> Bigarren kapituluaren sarreran zerrendatu ditugu kritika hori egin zuten kolektibo, egile eta lan batzuk.



femenino”az osatua baitago– orotariko emakumeek\*, trans\* eta zisek kontsumitzen dituzte, nahiz honako hau ipintzen duen medikamentuaren prospektuan: “Meriestra erabiltzen da hormona-galera ordezkatzuz menopausiaren sintomak arintzeko (...) Meriestra erabiltzen da soilik umetokia erauzia (histerektomia) duten emakumeetan” (Medikamentu eta Produktu Sanitarioen Espainiako Agentzia, 2016, 1. or.)<sup>367</sup>. Meriestra® ugalkortasunerako tratamendu gisa ere erabiltzen dute zenbait emakumeek\*, eta horrek agerian uzten ditu erregimen sexu-generikoaren inkongruentziak. Hayward-ek ere hizpidera ekarri du trans\* emakumeek\* eta zis emakumeek\* erabiltzen dituztela HOTerako farmakoak (2014, 256. or.); zehazki, azaltzen du emakume\* transek\* Premarin® –batez ere menopausiadun emakumeei\* errezetatzen zaien farmako arrakastatsua– hartu izan dutela World Professional Association for Transgender Health-en –Harry Benjamin Gender Dysphoria Association-en ondorengoaren– *Standards of Care for hormonal transition* zaharkitu baina oraindik ere erabiliari jarraituz.

Geometria transfeminista zirkulari ehotzen duen hirugarren elementua diskurtso biologizista eta deterministak dira, hau da, elementu biologikoen bitartez trans\*aren auzi aberats, zabal eta erlazionala murriztea eta mugatzea bilatzen duten diskurtsoak. Halako ikuspuntuek oraindik ere *berezko* eta jaiotzezko desberdintasunak baieztatzen dituzte gizon eta emakumeen\* artean; horren ondorioztat hartzen dute emakume\* gutxiago egotea zientzietan edo ingeniariartzetan, eta emakumeen\* joera *natural* gisa kontzeptualizatzen dituzte enpatia, zaintza eta sentiberatasuna, eta gizonen joera *natural* gisa, aldiz, lidergoa eta boterea; hala, hainbat eta hainbat desberdinkeria justifikatzen dituzte, denak ere gizonak gorpuztasun-subjektibitate ez-hegemoniko guztien gaineratik jartzen dituztenak (Pinker, 2003, 220.-230. or.; 2005; Knickmeyer et al., 2005; Baron-Cohen, 2005; Auyeung eta Baron-Cohen, 2008; Jones et al., 2011).

Steven Pinker-ek Lawrence H. Summers Harvardeko Unibertsitateko zuzendari ohiaren diskurtsoaren “anekdota” bat ekarri du hizpidera: 2005ean, zientziako eta teknologiko genero-eta arraza-desberdintasunei buruzko konferentzia batean –“Women’s representation in tenured positions in science and engineering at top universities and research institutions” (Summers, 2005)–, National Bureau of Economic Research-en, adierazi zuen desberdintasun biologikoei eta bereziki genetikoei zor zaiela gizonak emakumeek\* baino emaitza hobek erdiestea zientzian eta matematikan (Pinker, 2005; Goldenberg, 2005; Summers, 2005). Summers-ek hiru argudio edo hipotesi aurkeztu zituen emakume\* eta gizonak esparru zientifiko-teknologikoetan duten presentzia desorekatua azaltzeko, eta, ikusiko dugunez, bakar batean laburbil litezke hirurak: haien arteko desberdintasun genetikoa. Lehen hipotesia genero-diskriminazioa edo -mugak dira.

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<sup>367</sup> Jatorrizko testua: “Meriestra se utiliza para aliviar los síntomas de la menopausia reemplazando la pérdida hormonal (...) Meriestra se utiliza solamente en mujeres que les han extirpado la matriz (histerectomía)”.

Bigarrena, diskriminaziorik ez dagoenean ere genero-desberdinkeriak azaleratu daitezkeela. Izan ere: “[M]en and women differ, on average, in their mixture of talents, temperaments, and interests—whether this difference is the result of biology, socialization, or an interaction of the two” (Pinker, 2005). Hirugarrena, emakumeentzat\* zaila dela zaintza-lanak zenbait karrera profesionalen eskakizunekin uztartzea, zaintza emakumeen\* kontua izaten baita gehienetan (Summers, 2005). Galdetu genezake zer dela-eta gertatzen den hori, ez ote den diskriminaziozko genero-ideologia baten ondorio, baina argudio zirkular baten ondoriozko erantzun bat aurreikus liteke determinista biologikoen aldetik: emakumeek\* badute *berezko* jaidura bat zaintzarako, biologikoa, jaiotzekoa<sup>368</sup>.

Ingeniaritza emakume\* gutxiagok aukeratzeari dagokionez, Pinker-ek zera dio: “[T]o what degree these and other differences originate in biology must be determined by research, not fatwa” (2005). Nolanahi ere, Fausto-Sterling-ek honako hau iradokitzen du: “[P]erhaps there are things about sex and gender that we can never know” (2014, 2. or.). Izan ere: “[L]abeling someone a man or a woman is a social decision. We may use scientific knowledge to help us make the decision, but only our beliefs about gender—not science—can define our sex” (2000, 3. or.).

Pinker-ek emakumeen\* diskriminazioaren gaiari gizartean ematen zaion garrantzi gehiegizkoa kritikatu amaitzen du *The New Republic*eko artikulua. Erakunde publiko eta pribatuek diskriminazio hori arintzeko edo ahultzeko garaturiko neurriak problematizatzen ditu; izan ere, haren iritziz, efektu kaltegarriak dituzte are emakume\* direnentzat ere. Hortik abiatuta, Pinker-ek zera defendatzen du esparru batzuetako emakumeen\* proportzio baxuari buruz: “[T]enured job offers from Harvard during Summers's presidency may be an unintended consequence of his policy of granting tenure to scholars early in their careers, when women are more likely to be bearing the full burdens of parenthood” (Pinker, 2005)<sup>369</sup>. Pinker-en iradokizun

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<sup>368</sup> Gizon eta emakumeen\* *berezko* jaidurei dagokienez, Pinker-ek, onartzen badu ere emakumeek\* legearen aldetik diskriminatuta egon direla historikoki behin eta berriz, zeren eta askoz ere zigor gogorragoak jaso dituzte gizonen baino desleialtasunagatik, eta onartzen badu ere gizonen bortxaketak barkatu zaizkiela eta emakumeek\* sexu-errepresioa jasan dutela, zera adierazten du: “[a] hostility to the idea that *selfish sexual urges* might be rooted in our nature comes from feminism. For millennia women have suffered under a double standard based on assumptions about differences between the sexes... Because of a fear of accepting any idea that would seem to make these outrages "natural" or unavoidable some schools of feminism have rejected any suggestion that men are born with greater sexual desire or jealousy... Even heavier bipartisan fire has recently been aimed at Randy Thornhill and Craig Palmer for suggesting in their book *A Natural History of Rape* that rape is a consequence of men's sexuality” (Pinker, 2002, 160.-161. or.; geuk nabarmendua). Liburuaren izenburu osoa *A Natural History of Rape: Biological Bases of Sexual Coercion* da. Sexualitatea, bestalde, fenomeno sozial konplexua da, eta ezin da auzi biologiko hutsera mugatu. Bortxaketaren kultura maskulinitate eta heterosexualitate mota baten, haiei buruzko ikuspuntu hegemoniko eta menderatzaile zehatz baten emaitza da, ez sexualitate maskulinoarena *per se*, sexualitate maskulinoa ez baita bakarra eta jaiotzekoa, oinarritzkoa –eta, era berean, ez dago sexualitate femenino *per se* bat, esleitua eta unibertuala–.

<sup>369</sup> Goldenberg-en arabera, Summers-en agintaldian, % 36tik % 13ra jaitsi zen kopuru hori (2005).

edo irizpideari jarraituz, hipotesi horrek ere egiaztapen eta frogapen zientifikoa behar luke izan. Aurrerago aletuko ditugu Samuel Baron-Cohen Cambridgeko Unibertsitateko psikologiako irakasle eta Cambridge Neuroscience diziplinarteko ikerketako zentroko kide ikaragarri emankorraren postulatuak; bakarkako edo taldekako argitalpenetan defendatu izan duenez –“The Essential Difference: the male and female brain” (2005), “Gender-Typed Play and Amniotic Testosterone” (2005) eta “A Role for Fetal Testosterone in Human Sex Differences” (2008)–, gizon eta emakumeen\* burmuinek badituzte desberdintasun natural eta esentzialak, eta azpimarratzen du hormonek zeregin garrantzitsua dutela giza burmuinaren konfigurazioa sexualki dimorfikoa izan dadin jaiotze aurreko aldietan.

Paradigma sexu-generiko heteronormatiboa trans\* esparruan birdefinitzen, sendotzen eta eztabaidatzen ari da. Trans\* subjektibitate-teknogorpuztasunen fenomeno anizkoitz, aberats eta konplexua azaltzen, kateatzen, murrizten eta are patologizatzen duten teoria biologiko deterministak eztabaidatzea, era berean, erregimen sexu-generikoaren esanahi eta diskurtsoak eztabaidatzea da, kontuan izanik denoi dagozkgigula. Injerentzia kolonialistak saihesten ahaleginduz, kapitulu honetan, kategoria, gorputz eta identitateen irekitasunaren eta multiplizitatearen aldeko argudioak eman nahi ditugu, gorputz *guztien* duintasuna eta desiragarritasuna, eta subjektibitate guztien adierazpide aske, ez-baztergarri eta ez-zapaltzailea aldarrikatzeko. Aldarri horren abiapuntua Cressida Heyes-ek aipatzen duen leku hori da, kontzientzia bat non “non-trans feminists’ failure to interrogate our own identities, and our comfort with our own gender, than they [trans\*] do about the realities of trans communities or political movements... leds us toward the recognition of political common ground and thus to the question of how feminist alliances can be formed” (2003, 1117. or.).

Horretarako, “emakume\* trans\*” kategorien analogia historiko hirukoitzetik abiatu –bi kategoria horiek lotura estua dute, korapilatuta daude, elkarrenganako inplikazioak dituzte, eta, askotan, gauza bera dira: trans\* asko emakume\* dira, eta emakume\* asko trans\* dira–, bigarren atalean, “trans\*” terminoaren genealogia labur bat egingo dugu, termino zabal, askotariko eta anizkoitz gisa kontzeptualizaturik, Feinberg-ek sortu zueneko multiplizitatearen adiera azaleratuz eta oraingoan izartxoaren bidez nabarmenduz. Izartxoak kategoria, filosofia, identitate eta gorputzen arteko irekitasunak eta senidetasunak sortzen ditu, intersex, emakume\* eta trans\* kolektibitateetan bat egiten dutenak bezala.

Hirugarren atalean, bi agerpen kultural eta politiko edo asoziatiboren bitartez deskribatuko dugu nola erreproduzitzen dituzten transen\* aitorenaren, autodeterminazioaren, eskubideen eta aniztasunaren alde diharduten gorputz eta kolektiboek trans\* teknogorpuztasun-subjektibitateei buruzko diskurtso naturalizatzaile, esentzialista, erredukzionista eta

deterministak, nahiz eta agerpen eta elkarteon helburuak itxuraz urruti egon ikuspuntuon ondorio potentzial eta materialetatik. Missé-k zera dio horri buruz: “[G]arrantzitsua da jakitea gizarte-mugimenduaren zati batek ere onartzen duela logika biologizista hori trans pertsonen eskubideak argudiatzeko eta defendatzeko erabiltzen duen diskurtsoan” (2009, 5. or.)<sup>370</sup>.

Laugarren atalean, diskurtso horietako batzuk aztertu eta problematizatuko ditugu; zehazki, “Brain Sex Theory” deritzenak, Rebecca Jordan-Young-ek “Brain Organization Research” deritzonaren parte direnak (2010). Kontakizun neurozientifiko horien arabera, giza burmuina sexualki dimorfikoa da, eta identitate sexu-generizatuak burmuinean jaio aurretiko eta jaio berriak eragin hormonalaren bitartez finkatzen eta programatzen dira. Oinarri horretatik abiatuz, transexualitatea anomalia, arazo edo nahasmendu gisa kontzeptualizatzen dute, eta, hura azaltzeko, maila hormonalen asalduren ondoriozko burmuin-atal jakin batzuen tamainaren eta/edo neurona kopuruaren alderantzizkizunak abiatzen dira, baita jaio aurreko genitalen eta burmuinaren sexuazio hormonalen arteko inkoherentziatik ere.

Jordan-Young-en arabera, gaur egun halako diskurtsoak zalantzan jartzea aniztasuna bera zalantzan jartzea da, edo hala uler daiteke, eta multiplizitate horren aurka egitea leporatzea ekar dezake:

In an era where diversity is celebrated, the idea of “sex in the brain” no longer equals an endorsement of male superiority, and critics of the idea are increasingly cast as not only antiscience, but antidiversity.... The gist... is that gay men, lesbians, and transgender people... have brains that are “wired” different from most people, and that accepting this is an important component combating anti-gay prejudice. And while the notion of innately different preferences in men and women was once politically suspect, it is now often suggested that accepting these innate differences will encourage a more rational approach to equality. (2010, 5. or.)

Nolanahi ere, identitate sexu-generizatuen gaineko halako azalpen biologizista, determinista eta erredukzionisten aurrean, bosgarren atalean, sexu-generoa eta hezur-osaera, kolore-lehenespena eta trebetasun kognitiboak –determinismo biologikoaren babesguneak denak ere– jorratzen dituzten kontakizunak azaldu eta aztertuko ditugu, erreakzio-arau diren aldetik, testuinguruaren eta prozesuen arabekoak diren aldetik, askotariko elementu eta dimentsioen interakzioaren ondoriozkoak eta garapenaren sistema dinamikoaren teoriaren ikuspuntutik. Bestalde, identitate sexu-generizatuak ere aztertuko ditugu, fokua identitate trans\*, anizkoitz, ez-bitarretan ipinita, garapenaren sistema dinamikoaren teoria eta genero-performatibitatea lotzen

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<sup>370</sup> Jatorrizko testua: “[E]s importante saber que incluso una parte del movimiento social asume esta lógica biologicista en su discurso para argumentar y defender los derechos de las personas trans”.

dituen begirada batez. Begirada honek identitateen garapen eta eraketaren berri ematen du jaiotzatik hasita eta kontuan hartuz zaintzailearen eta hauraren arteko erlazio diadikoa, testuinguru sozial zabalagoa eta eragin sozialaren, hormonien eta konexio neuronalen arteko lotura. Modu berean, bilakaeran dauden eta ingurunera irekita dauden prozesu dinamiko anitzkoitz eta erlazional gisa kontzeptualizatzen ditu identitate sexu-generizatuak.

#### 4.2. Trans\*genealogia: multiplizitate izartsuak besarkatzen

Sexu-genero ez-bitarreko pertsonak munduko toki askotan daude eta egon dira historian zehar. Besteak beste, aipa ditzagun Indiako, Pakistango eta Bangladesheko *hijrak*; Tailandiako *kathoeyak*; Hawaiiiko *Māhūak*; Polinesiako Samoako *fa'fafineak*; edo Ipar Amerikako kulturetako bi-espirituak, zeinak 155 leinutan dokumentatu baitira (Roscoe, 2011). Leinu horietako batzuetan, termino bera erabiltzen da bi-espiritu maskulino eta femeninoak izendatzeko, hau da, hirugarren genero bat ordezkatzeko dutenak izendatzeko. Beste batzuetan, izen desberdinak erabiltzen dira bi-espiritu maskulino eta femeninoetarako, eta lau genero dituzte<sup>371</sup>. Indonesiako Sulawesi uhartean, bugien leinuan, *bissuak* ditugu. Davis-en arabera, haien hizkuntzan bost termino dituzte sexuaren, generoaren eta sexualitatearen zenbait konbinazio adierazteko: *makkunrai* (emakume femeninoa edo zis emakumea), *oroani* (gizon maskulinoa edo zis gizona), *calalai* (gizon femeninoa), *calabai* (emakume maskulinoa) eta *bissu* (trans apaiza) (2016). Davis-ek dio definiziook ez direla zehatzak, baina bai nahikoak<sup>372</sup>.

Afrikako ekialdeko gizarteetan, swahiliz mintzo diren herrietan, Keniaren eta Tanzaniaren kostaldearen zati bat barne, *mashogak* bizi dira. Batzuetan emakume gisa jantzen diren, eta emakume-izenak erabiltzen eta emakume-lanak egiten dituzten gizonak dira (Amory eta Gevisser, 2005, 227. or.). Amory eta Gevisser-ek azaldu dutenez (2005, 227. or.), Afrikako jendeak ez ditu erabiltzen “gay” edo “lesbiana” terminoak bere buruaz ari denean. Tokiko terminoak erabiltzen dituzte identitate zehatzak izendatzeko, sexu berekoen arteko harremanak, trabestismoa eta lan motak barnebil ditzazketenak. Kongoko Errepublika Demokratikoko Mbo leinuetan, hirugarren sexu-genero bat osatzen dute *mangaikoek* (Harrington, 2016, 38. or.).

Europari dagokionez, Antzinarotik Aro Modernora bitartean dokumentatu dira bai trabestismo-kasuak, bai “emakume\* oso maskulino” eta “gizon oso femenino”en kasuak. Greziar mitologian, badaude generoa aldatzen duten pertsonaien adibide ugari. Zeneok, zeina hasieran Zenis izeneko emakume bat baitzen, bere Poseidon maiteari eskatzen dio gizon bihurtzeko, eta

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<sup>371</sup> Ikus Roscoe (1998).

<sup>372</sup> Ikus Davis (2010).

hark jaramon egiten dio. Gizon bihurturik, Zentauroen gerran borrokatu zen, eta, esaten dutenez, hil ondoren, berriz bihurtu zen emakume (Grimal, 1981, 95. or.)<sup>373</sup>. Tiresias pertsonaia mitologikoari buruzko elezaharretako batean kontatzen denez, egun batean, Tiresias paseatzen ari zelarik, bi suge ikusi zituen kopulatzen, eta, sugeak bereizi, edo zauritu, edo emea hil ondoren –bertsio bat baino gehiago baitago–, emakume bihurtu zen. Handik zazpi urtera, gauza bera gertatu zen toki berean, eta aurreko sexu-generoa berreskuratu zuen<sup>374</sup> (Grimal, 1981, 518. or.). Herkules edo Heraklesen eta Onfalia erreginaren arteko maitasunari buruzko kontakizunean –Herkules Onfaliaren zerbitzaria izan zen–, Herkules gisa honetan ageri da jantzita: “[A]rropa femenino luzeekin; erregina, berriz, bere atributuen jabe egina zen: mazoa eta lehoi-larrua. Herakles, haren oinetan eserita, ehuntzen ikasten ari zen” (1981, 255. or.)<sup>375</sup>. Blázquez Nuño-k ere aipatu zuen Herkulesen trabestismoa, Lidia Onfalia erreginaren maitale gisa zein esklabo gisa jardun baitzuen, baina “trabestitze burlesko” deitu zion (2017, 89., 92. or.).

Kristautasunaren barnean, I. mendetik V. mendera bitartean, kristau-ideal aszetari jarraituz birjintasunari bizitza guztian eutsi eta gizon gisa jantzi eta bizi izan ziren emakume\* tradizio bat dago. Emakumeon\* artean daude Santa Tekla, Santa Margarita/Pelagio, Santa Pelagia/Pelagius, Santa Teodora/Teodoro, Santa Eugenia/Eugenio, eta Santa Marina/Marino; Aita Ribadeneira-k haien bizitzak jaso zituen 1599ko *Flos Sanctorum* bilduman (1675) (Monsalve, 2003, 5. or.). San Jeronimok emakume\* trabestiak deskribatu zituen. 78. gutunean (*A Eustoquia*, 384. urtekoa), zera dio: “Beste batzuk, gizon-eitekoak eta janzkera permutatukoak, lotsatu egiten dira jaiotzez diren horregatik, hau da, emakume izateagatik. Ilea moztu, eta burua altxatzen dute eunukoen lizunkeriaz” (Valero, 1992, 238.-239. or.)<sup>376</sup>. Badira beren maskulinitatea azaleratu zuten beste emakume\* ospetsu batzuk, hala nola Joana Arc-ekoa (XV. mendean) eta Katalina Erauso (XVII. mendean). Joana Arc-ekoa deskribatzean, aipatu izan da

<sup>373</sup> Rodaseko Apoloniok, *Argonautikoak* poesia-lanean, Zeneok zentauroen aurkako gerran parte hartu zueneko kontakatu zuen (1996, 96. or.). Valverde Sánchez-ek, lan horren gaztelaniazko itzultzaileak, Ovidioren erreferentzia bat gehitu zuen oin-ohar batean: “Zeneo lapita, zeina Poseidonek gizon soraio eraldarazi baitzuen, bizirik ehortzi zuten zentauroek, izei-kolpekadaka” (1996, 96. or.).

<sup>374</sup> Publio Ovidio Nasón-en *Metamorfosiaren* hirugarren liburuan, 314-336 bertsoetan, istorio hau kontatzen da: “Freely the god began; ‘Who doubts the truth? The female's pleasure is a great delight, much greater than the pleasure of a male.’ Juno denied it; wherefore ‘twas agreed to ask Tiresias to declare the truth, than whom none knew both male and female joys: for wandering in a green wood he had seen two serpents coupling; and he took his staff and sharply struck them, till they broke and fled. 'Tis marvelous, that instant he became a woman from a man, and so remained while seven autumns passed. When eight were told, again he saw them in their former plight, and thus he spoke; ‘Since such a power was wrought, by one stroke of a staff my sex was changed—again I strike!’ And even as he struck the same two snakes, his former sex returned; his manhood was restored.—” (2019) (1922).

<sup>375</sup> Jatorrizko testua: “[C]on largos ropajes femeninos, mientras la soberana había adoptado sus atributos: la maza y la piel de león. Heracles, sentado a sus pies, aprendía a hilar”.

<sup>376</sup> Jatorrizko testua: “Otras, con aire viril, y permutada indumentaria, se avergüenzan de ser lo que nacieron, es decir, mujeres. Se cortan el cabello y levantan la cabeza con impudor de eunucos”.

generoak txandakatzen zituela, edo genero ez-bitarrekoa, edo *cross-dresser*, *cross gender* edo androginoa zela, egile guztiak ez baitatoz bat (Crane, 1996, 310.-313. or.). Katalina Erausori dagokionez, “moja alfereza” ere izendatu izan dute<sup>377</sup>, eta ez dakigu emakume maskulino bat izan zen, gaur egun, *butch* edo trans\* esango genukeena, ezta esleitu zioten sexu-generoak inposaturiko muga eta betebeharretatik ihes egiteaz haragoko motibaziorik ba ote zeukan ere, baina garbi dagoena da sexu-genero bitarra gainditu eta hartatik ihes egin zuela, eta garai hartako feminitatearen konbentzionalismoei aurre egin ziela (Pérez Villanueva, 2004, 1449. or.; Monsalve, 2003, 1. or.).

Norton-ek luze eta zabal dokumentatu zuen XVIII. mendeko Londresko *molly* delakoen bizitza; beste gizon batzuekin sexu-harremanak zituzten gizonak ziren, izen femeninoak erabiltzen zituztenak eta askotan trabestiak ere bazirenak. *Molly houses* delakoetan bildu ohi ziren –Norton-ek hogeita hamarren baten berri dakar–, hau da, sexua praktikatzeko eta “Festival Nights” izendatzen zituzten *drag balls*-ak antolatzeke pub edo tabernetan (2008, 2012a). Haietariko bat “Princess Seraphina” zen, jatorrizko izenez Cooper, trabesti erregular bat, zeina Nortonen arabera Ingalaterrako historiako lehen *drag queen* errekonozitua izan baitzen, trabestismoa bere bizimoduan txertatu zuen lehen gizon “homosexuala”, nahiz eta kategoria hori ez zen artean ere existitzen (2006). Norton-ek “Eliza” Edwards-en bizitza ere jaso zuen; antzezlea izan zen, eta 1833an hil zen, Londresen, 24 urte zituela, birrikako infekzio baten ondorioz (2012b). Autopsia egin ziotenean aurkitu zuten haren sexu-anatomia maskulinoa. “Miss Edwards” 14 urte zituenetik zebilen agertokietan, eta, batzuetan, “Lavinia Walstein” izena erabiltzen zuen<sup>378</sup>. Hil zenean, berarekin hitzorduak egiten zituzten gizon batzuen gutunak aurkitu zituzten. Bi gizonek berretsi zuten urte batzuk lehenago Mister Edwards ezagutua zutela Dublinen, aktorea zela eta emakume zein gizon gisa jarduten zuela, txandaka.

XIX. mendearen erdialdetik XX. mendearen hasierara bitartean, emakume\* asko ibili ziren gizon jantzita. N. P. Willis-ek bildu zuen nola 1821ean poloniar emakume bat Poloniako uniforme militarra soinean agertu ohi zen egunero Parisko Tuilerien Jauregian (1844, 24. or.). Willis-en arabera, gizon trabestitzea ez zen ezohikoa hiri hartako emakumeen\* artean, berak gizon jantzitako emakumeak\* ikusiak baitzituen jatetxe, antzoki, kafetegi, dantzaldi publiko, kale, goi-klaseko damen ekitaldi pribatu eta abarretan. Allan Bérubé-k ere gizon gisa agertu eta

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<sup>377</sup> Ikus De Erauso, C. (1988).

<sup>378</sup> 1833ko urtarrilaren 29ko (asteartea) *Southern Reporter and Cork Commercial Courier*en bildu zuten informazio hori. Eliza Edwards-en gorputzari dagokionez, zera diote: “[T]here being no one to claim the body, it was sent to Guy’s Hospital for dissection, when it was discovered, to the surprise to every one, that the deceased was a perfect man”. Egunkari askotan argitaratu zuten albistea, hala nola *Norfolk Chronicle*n, *Oxford Journal*en edo *Western Times*en.

emakumeekin\* ezkontzen ziren emakumeen\* kasuen berri eman zuen. Haien artean daude Lucy Ann Lobdell eta Charles Warner; azken horrek gizon gisa bizitzea erabaki zuen 1860an, eta hala bizi izan zen 60 urtean, Saratoga Springs-en, New Yorken (Bérubé, 1979, 8. or.; 2011, 44. or.). Murray Hall-ek 25 urte eman zituen gizon gisa bizitzen; bi aldiz ezkondu zen emakume batekin, eta New Yorkeko politikari garrantzitsua izan zen 1880ko eta 1890eko hamarkadetan (Bérubé, 1979, p. 8; 2011, p. 44). Jeanne Bonnet, San Frantziskon jaioa, gizon janzteagatik atxilotu zuten behin baino gehiagotan. Prostitutei lagundu zien beren txuloengandik bereizi eta San Frantziskoko dendetan lapurretak egiteko talde bat sortzen. 1876an hil zuten, prostitutei laguntzen izandako arrakastarengatik. Luisa Mantson-ek Milton B. Matson ezizena erabiltzen zuen, eta Gatos-en atxilotu zuten (Kalifornia), txeke faltsuak pasatzeagatik (Bérubé, 1979, 9. or.; 2011, 46. or.). Berrogei urte zituen, eta gizontzat hartua izan zen beraren helduaro osoan (Bérubé, 1979, 9. or.; 2011, 47.-48. or.). 1929ko maiatzaren 4an, *The New York Times*ek albiste hau argitaratu zuen: “Woman Lived as Man, Wed to One of Her Sex”. Albistean, Peter Stratford, zeina Beth Rowland-ekin ezkondu eta egon baitzen, gizon gisa agertzen da bere heriotzaren unean, Oakland-en (Kalifornia)<sup>379</sup>.

D’Emilio eta Freedman-ek honela diote: “Although very much construed as a discovery of hidden lesbian lives, the showings of ‘Lesbian Masquerade’ also inspired some of the first explorations of transgender history” (Bérubé, 2011, 41. or.).

Nolanahi ere, sexu-genero ez-bitarreko subjektibitate-gorpuztasunon agerraldiak agerraldi, nahiz haietariko batzuk gaur egun “trans\*” kategorian sartuko genituzkeen, une historiko jakin batean azaleratu eta garatu da kategoria hori, gizarte mota jakin batean edo batzuetan, arraza-, sexu-genero, klase- edo gaitasun-erregimenen konfigurazio berezi batekin eta garapen teknologiko zehatz batekin, Kapitalozeno neoliberalerako teknobiopolitika heteropatriarkal inperialistan.

Atal honen helburua ez da trans\* historia bat edo trans\* mugimenduaren historia bat egitea. Areago, “trans\*” kategoriaren genealogia labur bat egin nahi dugu, eta horrek kontzeptu zabal eta aniztun horretan biltzen diren beste kategoria batzuk aztertzea ere ekarriko du.

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<sup>379</sup> San Frantziskoko GLBT Historical Society-aren *The Bérubé Papers*. Albiste horrez gainera, Bérubé-ren jatorrizko beste material batzuk kontsultatu ditugu, *The Bérubé Papers* bildumaren bitartez; besteak beste, 1979an *Gay Community News*en argitaraturiko artikulua, edo urte berean *The Centinelen* argitaraturikoa; zenbait eskuizkribu, hala nola “Lesbian Masquerade” eta “Lesbians and Gay Men in Early San Francisco: Notes Toward a Social History of Lesbians and Gay Men in America. San Francisco Gay History Project”, edo konferentziak iragartzeko kartelak eta diapositiba-bildumak.



#### 4.2.1. Trans\* genealogia labur bat

Stryker-ek dioenez, “transgender” terminoa 1990eko hamarkadako trans\* komunitateen hedapenarekin batera agertu zen, transexual, trabesti, drag queen, gay, lesbian, eta abarrez osatua, gorpuztasun-subjektibitate sexu-generikoki ez-normatibo horiek guztiak izendatzeko (2008, 149. or.). Aurretik, 1960ko hamarkadaren bukaeran, Ari Kane-k, Virginia Prince-k eta beste aktibista batzuek antzeko beste termino batzuk erabili zituzten gizonen komunitate trabestietan beren burua izendatzeko eta berek bezala beren burua ez trabesti ez transexualtzat zeukatenak izendatzeko: “transgenderal”, “transgenderist” edo “transgenderism”. Halako terminoek egokitzapen genitalen beharrik gabe genero-rol sozialak etengabe eta iraunkortasunez aldatzeari egiten zioten erreferentzia. Stryker-ek dioen moduan, 1970eko eta 1980ko hamarkadetan, “transgenderist” esaten zitzaaien zakila izanik emakume\* gisa bizi zirenei.

Hoolly Boswell trans\* sinboloaren asmatzaileak aniztasunaren adieran erabili zuen “transgender”<sup>380</sup> hitza *Chrysalis Quarterly* aldizkarian argitaraturiko “The Transgender Alternative” artikuluan. Boswell-ek *cross dressing*aren eta transexualismoaren arteko aukera bideragarri gisa eta androginiaren tradizio zaharrearaino sendo oinarrituriko aukera gisa definitzen du “transgender” terminoa: “The prefix ‘-trans’ means: across, beyond, through, or so as to change. Words like transition, transformation, transparent, transpersonal, transcend –all are relevant to travestism (cross dressing), transgenderism (identifying oneself across gender lines) and transsexualism (realigning biology with dominant gender)” (1991, 29. or.). Kontzeptua argitzeko lehen ahalegin horretan, Boswell-ek esplizituki aipatzen du aniztasuna, eta zera dio: “[W]e are all in transition, in that broad evolutionary sense” (1991, 30. or.)<sup>381</sup>.

“Transgender” nozioa hedatu, eta gaur egun duen indar politikoa erdietsi zuen Leslie Feinberg-ek *Transgender Liberation: A Movement Whose Time Has Come* panfleto ezagunean<sup>382</sup>, zeinean multiplizitate sexu-generikoari egiten baitzaio erreferentzia. Feinberg-ek baietsi zuen *gender outlaws* delakoak izendatzeko moduen ugaritasuna –“gender outlaws”: transvestites, transsexuals, drag queens and drag kings, cross dressers, bull-daggers, stone

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<sup>380</sup> Galofre eta Missé-ren irizpideari jarraituz (2015, 21. or.), hizkuntza-zorroztasunagatik eta nozioen eta haien esanahien sorrerako eta eboluzioko ezaugarri kultural eta politiko zehatzekiko errespetuagatik, nahiago izan dugu ingelesezko terminoa erabili hala ageri den testuetan, nahiz eta batzuetan euskaratu egin dugun “trans” termino orokorra erabiliz, eta, kategoria espezifikoki aipatu gabe, “trans\*” erabili dugu.

<sup>381</sup> Hala ere, kultura-inposaketak eta genero-arauek inposaturiko koherentzia kritikatzeko eta trans\* subjektibitate-gorpuztasunen existentziaren berri emateko, sexu-genero dikotomia onartzen du: “Many people confuse sex with gender. Sex is biological, whereas gender is psychosocial” (Boswell, 1991, 29. or.). “True selves”en ideia ere aurkitzen dugu Boswell-en testuan (1991, 30. or.).

<sup>382</sup> “Transgender” definitzeko beste ekarpen bat izan zen Sandy Stone-ren “The ‘Empire’ Strikes Back: A Posttranssexual Manifesto” artikulua (1992).

butches, androgynes, diesel dykes or berdache”<sup>383</sup>– ez dela haiek aukeratua, eta aldarrikatzen du beharrezkoa dela harrotasuna adierazteko eta multiplizitate horri ohore egiteko hizkera bat aurkitzea (1992, 5. or.). Autoizendapenerako, autodeterminazio sexu-generikorarako eskubidearen aldarrikapen horretatik, trans komunitatearen agerpena azaltzen du (“transgender community”), zeina bere burua era desberdin batean definitzen duen eta autodefinitzeko eskubidearen alde borrokatzen den askotariko jendeak osatua baita.

Kapitalismo patriarkala eta kolonialismoa kritikatzeko tonu nabarmen sozialista batekin, Feinberg-ek azpimarratzen du kategoria identitarioek izaera politikoa dutela, eta hizkuntza komun baten bila dihardu sufritzen duten zapalkuntzak batzen dituztenentzat (1992, 6. or.).

Ildo horretan, Missé-k dio “trans” edo “transgender” terminoak “transexual” kategoria medikoaren aurreko erantzun politiko gisa sortu direla, kategoria horren arabera modu biologizista eta patologizatzaile batean ulertzen baitira gorputza eta identitatea (2009, 1. or.). 1949an agertu zen lehen aldiz, David Oliver Cauldwell-en “Psychopathia Transsexualis” artikuluan, non transexualitatea patologia gisa definitzen baita<sup>384</sup>.

When an individual who is unfavourably affected psychologically determines to live and appear as a member of the sex to which he or she does not belong, such an individual is what may be called a *psychopathic transsexual*. This means, simply, that one is mentally unhealthy and because of this the person desires to live as a member of the opposite sex. (2001 [1949])

Testu horretan, Cauldwell-ek transexualitatea homosexualismotik eta trabestismotik bereizten du –azken kontzeptu hori Magnus Hirschfeld sexologo eta gayen eskubideen aldeko aktibistak sortu zuen, 1910ean, *Die Transvestiten: eine Untersuchung über den erotischen Verkleidungstrieb* (*The Transvestites: The Erotic Drive to Cross-Dress*) lanean–; izan ere, transexualitatean, esplizituki adierazten da kirurgia eta hormona bidez beste sexu bat izateko nahia. Honi Cauldwell-ek ustezko jokabide “psikopatikoak” eransten dizkio, hala nola sedukzioa, parasitismoa, kode sozialak behin eta berriz urratzea, kleptomania, lapurreta eta beste joera kriminal eta antisozial batzuk. “Transexual” kategoriaren deskribapen honen helburua ez

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<sup>383</sup> “Bull-dagger” konnotazio peioratiboko termino bat da, lesbiana oso maskulinoei erreferentzia egiten diena, zeinak askotan arrazializatuagoak baitira “diesel dyke” sinonimoaren bitartez izendatzen direnak baino. Indar fisikoarekin eta bikaintasun sexualarekin lotu ohi dira. “Stone butch” lesbiana maskulinoetan maskulinoena da, nahi gabe ere gizontzat har daitekeena, trans\* izan zein ez, edo bere gorputz-atal femeninoekin eroso ez dagoena. Ukiezintasun emozional edo sexuala ere bil dezake. “Berdache” izena konkistatzaileek erabili zuten Ipar Amerikako gizarte natiboetako genero ez-bitarretako gorputzak izendatzeko.

<sup>384</sup> Ohartarazi nahi genuke “transexual” kategoria “Hormonen Aro” izendatu dugun garai historikoan agertu zela, Kapitalozeno neoliberaletako teknobiopolitikaren eta zientziaren bilakaera molekularren garai berean. Garapen kapitalista, teknologiko –kirurgiko eta hormonal– eta zientifiko zehatz hau gabe, zailki azaleratuko zatekeen kategoria hori.

da zalantzan jartzea baliozkoa eta egokia den ala ez, eta are gutxiago norberak nahi duen bezala autodeterminatzeko eta autoizendatzeko duen eskubidea zilegi den ala ez. Helburua terminoaren jatorria agerian jartzea da, eta, orobat, zer substratu medikotatik datorren azaltzea eta haren sorrerako konnotazio eta zama patologizatzailearen berri ematea.

“Transsexual” hitza Harry Benjamin “transsexualismoaren aita”ren lanari esker ezagutarazi zen, 1950ko eta 1960ko hamarkadetan, bereziki *The Transsexual Phenomenon* lanean (1966)<sup>385</sup>. Leah Cahan Schaefer eta Connie Christine Wheeler-ek, zeinak Benjamin-en lankide eta lagun min izan baitziren hamar urtean baino gehiagoan, Benjamin-en lehen hamar “kasuak” bildu zituzten –egozten zaizkion 1.500etik–, 1938tik 1953ra bitarteakoak<sup>386</sup>. Egileok diote “paziente\*” haiek “autodiagnostikatuta” joan zirela Benjamin-engana, bibliografiarik eta aurrekaririk ezean: “[E]ven before the phrase ‘trapped in the wrong body’ was coined” (1995, 75. or.). Benjamin-en *Sex(Gender) Orientation Scale (SOS)* ospetsuaren arabera (1967)<sup>387</sup>, hamar paziente haiek honela sailkatuak izan ziren: benetako trabesti bat; V. eta VI. kategorietako sei transexual; eta IV. kategoriako hiru transexual edo “genuine transsexual who does not require genital reassignment surgery” (Schaefer eta Wheeler, 1995, 76. or.). 1995ean, sailkapen eta kategoria horien balioa berretsi zuten.

Zazpi pazientek hormonazioa jaso zuten; zehazki, Premarin®-en eta progesteronaren ahoko dosiak, eta estrogeno-injekzioak (Enovid®). Haietariko batek testosterona-injekzioak hartu zituen; beste batek, pisua hartzeko hormonak; eta beste batek ez zuen hormonarik hartu. Hamarretatik seik genero-onarpenerako genitaletako operazio kirurgikoak egin zituzten. “Transsexualism and Transvestism—A Symposium” artikuluan, Benjamin-ek “*sindrome psikosomatiko eta somatopsikiko*”tzat hartu zituen trabestismoa eta transexualismoa, eta halako operazioak “kastrazio” eta “zakil-anputazio edo peotomia” izendatu (1954, 228.-229. or.). Schaefer eta Wheeler-ek diote aurrerago ere beste kirurgia batzuk egin zizkietela gorputz haiei, 1945etik 1960ra bitartean (1995, 77. or.). Seigarren pazientea Christine Jorgensen izan zen. Bere 1952ko genero-onarpenerako kirurgia oso zabaldua izan zen AEBn, lehenago azaldu dugun

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<sup>385</sup> Benjamin-ek “genero-disforia” espezialitate mediko sortu berriaren arloan lan egin zuen bere bizitza profesionaleko azken 30 urteetan, 1948tik 1978ra, eta arlo horretako lan guztiak burutzen zituen, psikiatriakoetatik hormona-banaketaraino (Schaefer eta Wheeler, 1995, 74. or.).

<sup>386</sup> Psikoterapeutak ziren lanbidez; Benjamin-en pazienteekin lan egin zuten, eta, guztira, “genero-disforia”ko 800 paziente artatu zituzten –terminologia hori darabilte haiek–, haietariko asko Benjamin-en paziente izanak. Horretaz gainera, Benjamin-en artxibo mediko guztiak zaintzeko ardura izan dute (Schaefer eta Wheeler, 1995, 74. or.).

<sup>387</sup> Benetako trabestia II. motako trabesti gisa sailkatu zen, intentsitate apal eta zalantzakorekin. SOS agertu aurretik, Benjamin-en “Transvestite I, II, III” izendapenetan –1950aren hasieran–, III. motak “transsexual” esan nahi zuen literalki (Schaefer eta Wheeler, 1995, 83. or.).

bezala<sup>388</sup>.

Schaefer eta Wheeler-ek beren ondorioetan dakarten begirada normaltasun-irizpideetan harrapatuta dago oraindik ere, baina, nolana ere, badago irekitasuneranzko, multiplizitateranzko eta aniztasuneranzko joera bat:

Perhaps we can consider that there is one other answer to the question, "Is it a boy or a girl?" Perhaps on rare occasions, the answer might more accurately be neither, but instead, a rare and beautiful *combination* of boy *and* girl – another color on the gender rainbow... Listening to these early historical voices that inspired the development of a discipline in modern medical science, broadens and expands our considerations of the most basic aspect of the human personality – gender. Compassion and acceptance in creative conjecture of gender mosaics can reward us with enriched understanding and expanded life-choices. (1995, 91. or.)

Benjamin-ek, 1967ko artikuluan, "The transexual Phenomenon", homosexualitatea "sex problem" gisa definitzen du; trabestismoa, "social problem" gisa; eta transexualismoa, "gender problem" gisa (1967, 430. or.). Transexualitatearen gaia oraindik ere eztabaidagarria eta iluna izanik, haren izaera neuroendokrinoa azpimarratzen duten azalpenak dira asebetegarrienak Benjamin-entzat, zeinak "physiologists and psychobiologists such as Seymour Levine, Roger Gorski, and others"-ek garatu baitzituzten; Benjamin-en arabera, esperimentuak egin zituzten animaliekin, eta, hala, ikusi zuten jaio aurretiko hormonekiko esposizioak eragina zuela "hypothalamic brain center controlling sex behavior" delakoaren sexu-garapenean (Benjamin, 1967, 430. or.). Benjamin-i jarraituz, autore haiek ondorioztatu zuten hipotalamoaren erdigunea femeninoa zela fetu guztietan, genetikoki maskulinoak izan zein femeninoak izan. Haien iritziz, badago aldi kritiko bat zeinean burmuineko atal horren maskulinizazioa beren testikulu ñimiñoen eragin hormonal androgenikoaren bitartez gertatzen baita fetu genetikoki maskulinoetan. Interferentziaren bat izanez gero –esate baterako, haurdunak estrogeno ugari izatea edo organo neuronal hartzailearen erantzunik eza–, erdigune hori femeninoa izango da: "[D]etermining the later sexual behavior and possibly causing gender role disorientation" (Benjamin, 1967, 430. or.). Alegia, sexu genitalaren eta burmuineko sexuaren arteko inkoherentzia gisa azaltzen da transexualitatea, eta hori, burmuineko sexuaren osaera bezala, hormonon eraginez gertatzen da<sup>389</sup>. Azalpen horrek, aldaerak aldaera eta ñabardurak ñabardura, gaur eguneraino iraun du;

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<sup>388</sup> Ikus 1952ko abenduaren 1eko *New York Daily News*en azala.

<sup>389</sup> Benjamin-ek beste faktore batzuk ere aipatu ditu hori azaltzeko, hala nola nahasmendu genetikoak, haurtzaroko kondizioak edo guraso okerrekiko identifikazioa, baina: "[P]erhaps only if a prenatal predisposition exists" (1967, 430. or.). Hortaz, ideia hauek argi daude: transexualitatearen fenomenoak jaio aurretik gertatzen edo sortzen da; jaio aurreko baldintza biologiko batzuk beharrezkoak ditu, eta hormonon eragina gakoak da baldintza horiek sortzeko.

onarpen zabala du, eta “Brain Organization Research” deritzonaren parte da. Deskribapen horretan, garrantzitsuena eta arazotsuena –eta Benjamin-ek honekin bat egiten du– zera da: transexualitatea burmuin- eta hormona-garapen “normal”aren “akats”, “interferentzia” eta “inkongruentzia”tzat hartzen dela.

“Trans” edo “transgender” terminora itzuliz, zeina testuinguru espezifikoki mediko batetik baino gehiago sustrai politiko batetik baitator, hasieratik, bi alderdi nagusi nabarmendu dira: multiplizitatearen erreferentzia eta izaera politikoa. Nolanahi ere, duela gutxi agertu eta hedatu denez, bere esanahiak eraikitzen ari dira oraindik ere. Hala, definizio ugari aurkitu daitezke, eta, batzuetan, definiziook eztabaidak eta liskarrak eragiten dituzte. Stryker-ek zera dio: “[I]t is the movement across a socially imposed boundary away from an unchosen starting place—rather than any particular destination or mode of transition” (2008, 11. or.). Missé-k honela definitzen du “transgeneroa”: “Jaiotzean esleitu zitzaion generoaren aurkakoan bizi den baina gorputza aldatzea beharrezkotzat jotzen ez duen pertsona” (2009, 1. or.)<sup>390</sup>. “Trans”, berriz, termino orokortzat dauka, identitate transexual, trabesti eta transgeneroak biltzen dituen (2009, 1. or.). Ostertag-en aburuz: “[T]ransgender refers to people who have taken hormones as a means of ‘transitioning’ from one gender to another, possibly along with ‘top surgery’ for female-to-males, and to all who claim that identity for themselves” (2016, xi). Bestalde, “transgender” eta “transsexual” terminoak biltzen dituen termino orokortzat hartzen du “trans” (2016, xi).

Oro har, esan dezakegu “trans” terminoa erabiltzen dela batik bat gaur egun eta termino orokortzat hartzen dela subjektibitate-gorputzasunen multiplizitatea biltzeko.

#### 4.2.2. Irekitasun eta korapilatze izartsuak<sup>391</sup>

Beraz, subjektibitate-gorputzasunen multiplizitatea izendatzeko, “transgender” terminotik “trans” terminora iragan da, eta, berrikiago, “trans\*” erabiltzen hasi da. Avery Tompkins-ek dio iragate hori erregularra bihurtu dela eta izartxoaren bidez trans\* identitatearen irekitasun handiagoa islatzea lortu dela 2010etik aurrera (2014, 26. or.).

Izartxoaren genealogiari dagokionez, Mauro Cabral-en *Interdicciones* lanera jo genezake; berak Argentinako intersexualen testuingurutik abiatuta azaltzen du haren erabilera,

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<sup>390</sup> Jatorrizko testua: “Aquella persona que vive en el género contrario al que le fue asignado al nacer pero no considera necesaria una modificación del cuerpo”.

<sup>391</sup> Eskerrak eman nahi dizkiot nire lagun Brooke Lober-i, bestek beste kategoria identitario eta politikoei buruz, “emakume\*-trans\*”, adibidez, elkarrekin egin dugun lanagatik.

eta, ordezkotzat baino gehiago, laguntzailatzat hartzen du kasu honetan<sup>392</sup>. Poetikoki kontatzen duenez, nahiago du izartxoak erabili maskulino generikoa, maskulinoa eta femeninoa batera, biok “e”-rekin batera edo “x” erabili baino, ez duelako hizkuntza bitan edo hirutan zatitzen; ezta hizkuntza batekin biderkatzen ere, eta ez delako zirrimarratze, zirriborratze edo ezabatze gisa irakurtzen ere. Zera gehitzen du: “Ez delako ahoskatzen, [e]saldia lerrotik aterarazten duelako, [a]rmiarma-sare bat delako, zulo bat, izar bat” (2009, 14. or.)<sup>393</sup>. Izartxoaren balioa eta erakargarritasuna, Cabral-en ustez, homogeneousazioa eta unibertsalismoak saihestetik dator, denek ez baitute beti erabiltzen denetarako. Bakoitzak nahi duen eta ahal duen bezala idazten du. Eta, batez ere, inoiz ez da inposatzen.

Asteriskoaren erabilera 2018an eta 2019an mundu osoan egin zen greba feministaren testuinguruan ere topatzen dugu. Zaintza-greba izan zen batik bat, baina baita bestelako lan-, kontsumo- eta ikasleen greba ere, eta sexu-generoa eta sexualitateaz gain, klase eta arraza osagai garrantzitsua izan zuen –hori izan zen, behintzat, asmoa–. Euskal Herriko greba feministako subjektua “emakumeak\*” izan zen. 2018ko manifestuan, deialdi esplizitua egin zitzaion emakume\*, lesbiana, trans\* eta migratzaileei, grebarekin bat egin zezaten, eta honela azaldu zen “emakumeak\*” kategoriaren erabilera: “Emakume\* izendapena erabiliko dugu, martxoaren 8ko greba feministan artikulazio politikorako baliagarria delakoan, nahiz eta genero sistema bitarraz gaindi askotariko gorputz, ibilbide, bizipen, ahalmen eta identitateak bagaren (bollerak, transak...)” (Euskal Herriko Greba Feminista, 2018).

Hala, greban antolatu, batu eta borrokatu ziren teknogorputzasun-subjektibitateen multiplizitatea eta aliantzak “emakumeak\*” kategoriaren bidez eta kategorian adierazten eta kondentsatzen dira, berau gainditzen eta gainezkatzen duten bitartean, hedabideetako, plataformetako, agerkari digitaletako, prentsa idatziko, panfletoetako, karteletako eta pankartetako agerpen askotarikoetan.

Erdigunea “lesbiana” kategorian ezartzen duen arren, Judith Butler-ek kategoria identitarioen izaera arazotsua aipatzen du:

I’m permanently troubled by identity categories, consider them to be invariable stumbling-blocks, and understand them, even promote them, as sites of necessary trouble. In fact, if the category were to offer no trouble, it would cease to be interesting to me: it is precisely the *pleasure* produced by the instability of those categories ... that make me a candidate for the category to begin with.

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<sup>392</sup> Genealogia honen beste geltoki batzuk: *Trans\*exualidades. Acompañamiento, factores de salud y recursos educativos* (Platero, 2014); “Una genealogía trans\*. Siglo XX” (Platero eta Rosón, 2017).

<sup>393</sup> Jatorrizko testua: “Porque no se pronuncia, [p]orque hace saltar la frase fuera del reglón, [p]orque es una tela de araña, un agujero, una estrella”.

...

How do I relate the paradoxical situation of this dependency and refusal? (1993b, 308. or.)

Kontziente izanik kategorien botere sahiestezin murriztatzaileaz eta aldi berean beharrezkoak direla gaur egun bai maila politikoan bai maila identitarioan, izartxoa erabiltzea emankorra eta gozagarria izan daiteke, ez hizkuntzaren botere murriztailea neutralizatzeko, baina bai beharbada hari iskin egiteko, grafikoki eta noizbehinka izan arren, bi ezaugarriren bitartez: batetik, multiplizitatea ikusgai eginez, beti egongo baita kategoriaz harago. Izartxoa pluralaz harago agertzen da –pluralak biderkatu eta pluraltasuna ikusgai egiten du–, multiplizitatea eta anizkoitzaren desberdintasunak ikusgai egiteko beste modu bat bezala<sup>394</sup>. Bigarren elementua aliantzak eta senidetasunak sortzea da. Izartxoaren tentakularitateak aliantzak, elkartzeak eta senidetzeak iradokitzen ditu.

Izartxoa kategoria identitarioen problematizitatetik eta egonkortasun ezetik azaleraturiko zeinu bat da. Kategoria irekitzen du, gainditzen, gainezkatzen. Finkatze nominalaz kanpo dagoena hartzen du kontuan eta egiten du ikusgai. Izartxoak gehiago esaten du hura daraman hitzak baino. Izartxoak adierazten duen multiplizitate eta erlazonaltasun mugaezinaren oihartzuna dakarte Eva Hayward eta Jami Weinstein-ek ere:

Trans\* is meant, in part, to break open the category of transgender, transwoman, or transman. It is recognized as “an effort” (...which is perhaps also affective) to include all noncisgender identities... The multipointed asterisk is fingery; it both points and touches. If trans was not understood, in at least one of its modes, as “always already” relational... then the \* repurposes, displaces, renames, replicates, and intensifies terms, adding yet more texture, increased vitalization. (2015, 198. or.)

Izartxoa goian dago; gidari gisa funtzionatzen du, adierazten baitu lehenbizi multiplizitatea dagoela eta ondoren sailkapena eta kategorizazioa. Izartxoak dei egiten du, besarkatzen du, eta trantsitibotasunak, alboko senidetasunak eta topaketa horizontalak sortzen ditu. Kategoria baten edo zenbaiten bidez adierazitako gorpuztasun-subjektibitate anitzkoitzen arteko aliantzak sustatzen ditu. Aldez aurretik ezagutzeko eta finkatzeko ezintasuna enfatizatuz, Halberstam-ek izartxoaren indarra zabaltzen du, zenbait absentsia baitakartza:

[F]inal form, a specific shape, or an established configuration of desire and identity. The asterisk... keeps at bay any sense of knowing in advance what the meaning of this or that gender variant

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<sup>394</sup> Annemarie Mol-ek dioenez, pluraltasuna eta multiplizitatea ez dira gauza bera. Bigarrenak desberdintasuna dakar berekin; lehenak, berriz, gauza beraren errepikapena, ikuspegi desberdinen bitartez bada ere (1999, 76. or.).

form might be ... trans\* can be a name for expansive forms of difference ... uncertain modes of being, and the disaggregation of identity politics predicated upon the separating out of many kinds of experience that actually blend together, intersect and mix. (2018, 4.-5. or.)

“Trans\*” izendapenaren kasuan, izartxoaren grafiak ikusgai egiten du kategoría anizkoitz eta erlazional gisa ulertzea, dimentsio, teknogorputzasun-subjektibitate, kategoría, estrategia, aliantza, geografia, forma, geometria, testuinguru, sentipen, desesitate, pentsaera eta ikusmoldeen multiplizitateak osatua, koeraturua eta performatua, horiek guztiak ez baitira identifikatzen erregimen sexu-generiko bitar batean jaiotzean esleitu zitzaizen sexu-generoarekin eta/edo kategoría horrekin identifikatzen baitira, hormonak hartuta edo hartu gabe, kirurgiak eginda edo egin gabe. Multiplizitateari eman diogun garrantzitik, hemen izartxoa beste proposamen *bat* bezala ikusten da. Definizio itxi eta unibokoak baino interesgarriago deritzogu multiplizitate ez-hierarkikoak kontuan hartzen saiatzen diren kategoría irekiak baliatzeari<sup>395</sup>.

Multiplizitatearen eta homogeneousaren normatiboaren arteko liskarrek lur emankorra bilatzen dute hizkuntzan. Hizkuntzak ondorio semiotiko-material garrantzitsuak dakartzan arren –aski da generoaren performatibitatea adibide gisa hartzea–, hizkuntzak bakarrik ez ditu teknogorputzak eta subjektibitateak askatzen arraza-, sexu-genero edo gaitasun-zapalkuntzarako egitura ekonomiko eta materialetatik, baina, Haraway-k honela dio: “It matters what thoughts think thoughts. It matters what knowledges know knowledges. It matters what relations relate relations. It matter what stories tell stories” (2016a, 35. or.). Axola du eta berebiziko garrantzia dauka zer terminok izendatzen eta performatzen dituzten gorputz eta identitateak, zer hizkuntzak eta diskurtsok koeraten dituzten gorputzasun-subjektibitateak. Izartxoak antidoto gisa funtzionatzen du ikuspegi naturalizataile eta esentzialisten aurka. “Trans\*” hitza irakurtzen dugun aldiro, izartxoa aldean duela, gure begiradak ezinbestean topo egiten du izar-formako

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<sup>395</sup> Kontraesana irudi lezake, Doktorego-tesi honetan kapitulu oso bat eman baitugu teknogorputzaren kontzeptua definitzen eta defendatzen, eta beste kontzeptu batzuetatik xeheki bereizten. Hala eta guztiz ere, uzteko kontraesan hori baliogabetuko luketen hiru arrazoi emango ditugu. “Teknogorputz”aren proposamenaren xedea gorputzen konfigurazio jakin baten berri ematea da, gaur egungo eraketa-elementu eta eratzeke modu jakin batzuen berri ematea. Egon litezke beste kategoría egoki edo are egokiago batzuk ere, Doktorego-tesi honen azpian dagoen pentsamoldea multiplizitatearen aldekoa eta multiplizitatean oinarritua den aldetik. Hori kontuan hartuta, argudiatu dugu zergatik den “teknogorputz” kontzeptua egokia gaur egungo prozesu politiko, zientifiko eta gorputz jakin batzuetara hurbiltzeko, eta zergatik, auzi hauei dagokienez, beste batzuk ez diren gure uestez hain egokiak. Kontzeptu baten egokitasunaren alde argudiatzea ez da nahasi behar hierarkia politiko-ontologikoak sortzearekin. Modu honetan, “teknogorputz”az eman dugun definizioan, halakotzat hartu dugu gorputz multiplizitate bat, ikuspegi ez-antropozentriko eta ez-espezista batetik. Azkenik, giza teknogorputzez denaz bezainbatean, identitate-autodeterminazioaren eskubidearen alde gaude, eta horrek definizioaren edo kategoriaren esanahiaren atea zabalik uzten du nahitaez, eta enuntziarioaren esparrua lekualdatzen. Ez dugu besteok erabaki behar nor den transa\* edo emakumea\* eta nor ez. Beste kontu bat da irekitasun hori erabatekoa izatea (adarkar bat naizela esateak ere ez nau adarkar bilakatzen).



multiplizitatearekin. Izartxoak munduak irekitzen eta senidetzen ditu izenetan, hori ez baitator emana, *besteekin-ekitearen, egitearen* bitartez azaleratzen baita.

### **4.3. Gizarteko kolektiboek determinismo (biologiko)aren *egiak* erreproduzitzen dituztenean**

Fausto-Sterling-ek tesi nagusi hau plazaratu zuen *Sexing the Body. Gender Politics and the Construction of Sexuality* lanean:

[T]ruths about human sexuality created by scholars in general and by biologists in particular are one component of political, social, and moral struggles about our cultures and economies. At the same time, components of our political, social, and moral struggles become, quite literally, embodied, incorporated into our very physiological being. (2000, 5. or.)

Idea horri jarraituz, bi adibide analizatuko ditugu, erakusten dutenak nola txertatu diren zientziak giza sexualitateaz sorturiko egiak ikuspegi sexu-generikoan eta nola erreproduzitzen dituzten egiok kolektibo sozialek, nahiz eta haien helburu itxuraz eta/edo espresuki emantzipatzaile eta solidarioen aurkakoak izan. Hurrengo atalean, xeheago aztertuko dugu Fausto-Sterling-en tesiaren bigarren zatia.

Lehendabiziko adibidea “genero-identitatea ez da aukeratzen” esaldian datza, *El Intermedio* programak trans\* kolektiboa babesteko eta HazteOir elkarte ultrakatolikoaren kanpaina transfobikoari aurre egiteko atera zuen autobusean agertua. Elkarte horrek autobus laranja bat erabilia zuen bere kanpainarako; 2017ko martxoan, Espainiako estatuko zenbait hiritan barrena ibili zen, lelo iraingarri, baztertzaila eta diskriminatzaileak zabaltzeko. Hona leloetako bat: “Mutikoez zakila dute. Neskatoek bulba dute. Ez zaitzatela engaina. Gizon jaiotzen bazara, gizona zara. Emakumea bazara, hala izaten segituko duzu”<sup>396</sup>. Agindu judizialak, atxikitzeak eta isunak<sup>397</sup> izan zituzten, eta hara-hona ibili ziren AEBko ekialdeko kostaldean; azkenean, urte bereko ekainean, berriz zirkulatzea lortu zuten, honelako leloekin: “Biologiak dio:

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<sup>396</sup> Jatorrizko testua: “Los niños tienen pene. Las niñas tienen vulva. Que no te engañen. Si naces hombre, eres hombre. Si eres mujer, seguirás siéndolo”.

<sup>397</sup> Madrilen egon eta zenbait ibilgailu eta lelo erabili eta gero, Bartzelonara iristen saiatu ziren; Iruñera errotulaziorik gabe iritsi zen autobusa, non LGTBIQ erresistentzia eta mobilizazio indartsua topatu baitzituen (eldiario.es, 2017; *Naiz*, 2017).

mutikoez zakila dute. Neskatoek bulba dute. Genero-doktrinamenduari ez<sup>398</sup>. Deigarria da erakunde ultrakatoliko batek zientziaren autoritate epistemikoa aipatzea –kasu honetan, biologiarena– *doktrinamendua* salatzen; generoarena, kasu honetan.

Ekintza eta haren helburuak laudagarriak izan arren, are eraginkorrak ere, genero-identitatea aukeratzen ez delako ideiak ondorio arazotsuak dakartza, zalantzan geratzen baita ea bateragarria den autodeterminazio sexu-generikoaren defentsarekin, sexu-multiplizitatearekin eta bazterkeriarik edo diskriminaziorik ezarekin. Izan ere, ondorioetako bat izango litzateke identitate sexu-generikoaren izaera natural, esentzial eta jaiotzetikoa, teorizazio feministaren parte handi bat eraisten saiatu den ideia. Ideia horren sorkuntzak, lehen eta bigarren kapituluan azaldu dugun bezala, Ilustraziora eta haren ondoko mendera eramango gintuzke; garai hartan, berezko *egiak* erabiltzen ziren *egia* transzendentalak legitimatzeko –kasu honetan, genero-hierarkia–, eta halaber garai hartakoak dira sexuaren sorkuntza –aurkikuntza baino–, entitate biologiko gisa eta sexu-dimorfismoa (Laqueur, 1990, 149.-156. or.)<sup>399</sup>. Esentzialismoaren eta naturalismoaren arrasto hori nabaria da, esate baterako, Stryker-en ikuspegiari:

[O]ur sense of being a man or a woman or something that resists those terms—really is a very idiosyncratic *personal matter*. It is something prior to, or underlying, our political actions in the world and not in itself a reflection of our political beliefs. Nontransgender people, after all, think of themselves as having a gender, or being a gender, and nobody asks them to defend the political correctness of their “choice”... or thinks that their having a sense of being gendered somehow compromises or invalidates their other values and commitments. Being transgendered is like being gay—*some people are just “that way,”* though most people aren’t. (2008, 14. or.; geuk nabarmendua)

Baina, eskusiboki pertsonala den horretatik harago, identitate eta kategoria sexu-generikoak eraikuntza sozialak dira, hots, historizitatearekin loturik daude, eta testuinguru

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<sup>398</sup> Fiskaltzak 2017ko irailean artxibatu zuen salaketa, adierazpen-askatasunerako eskubidea eta gorrotozko deliturik eza alegatuz; horren ondotik, LGTBIQ+-en aurkako autobusak honelako mezuak zabaldu zituen: “Podemos eta haren LGTBI Mozal Legea: zure seme-alabak atxikitzen doaz!”. Jatorrizko testua: “Lo dice la biología: los niños tienen pene. Las niñas tienen vulva. No al adoctrinamiento de género”.

<sup>399</sup> Ez dugu aditzera eman nahi Ilustrazio deritzona mugimendu homogeneo bat izan zenik, ezta ikuspegi hori guztiz nagusitu zenik edo prozesu azkar eta aldibereko bat izan zenik ere. Laqueur-ek dioenari jarraituz, erregimen sexu-generikoari dagokionez baziren ikuspegi desberdinak eta askotarikoak, are kontraesankorrak ere, eta haietariko batzuek eredu monosexuala berresten zuten. John Stuart Mill-ek, adibidez, *The Subjection of Women* liburuaren hirugarren kapituluan (1869), gizon eta emakumeen\* arteko gizarte-desberdintasunak justifikatzeko erabiltzen zen nozioa kritikatu zuen, burmuineko desberdintasun anatomikoetan oinarritzen baitzen, hau da, emakumeek\* gizonen baino burmuin txikiagoa dutela (1879, 120.-121. or.). Bestalde, desberdintasun estatiko hipotetikoaren (burmuinaren tamaina edo pisua) eta zenbait funtzio edo gaitasunen arteko ustezko lotura kausala problematizatu zuen, eta jarduerari garrantzia eman (1879, 121. or.). Mill-ek nortasunaren determinazio kausal askotarikoa defendatu zuen, faktore sozial zein fisiologikoak kontuan hartuz. Horra burmuinaren sexu-dimorfismoaren bertsio “zahar” bat, Mill-ek problematizatu. Eskerrak eman nahi dizkiot Agustin Arrieta Urtizbereari testu-trukeagatik eta Mill-en kritika hori gogorarazteagatik. Ikus Arrieta Urtizberea (2019, 237.-254. or.).

sozialaren arabera aldatzen eta bestelakotzen dira. Norbera une historiko jakin batean gizarte jakin batean eskura dituen kategoriekin identifikatzen da, edo, bestela, berriak sortzen ditu, kolektiboki, ekintza subertsibo eta sortzaileen bitartez. Horren harira, zera diote Galofre eta Missé-k:

[T]rans auziaren gaineko imaginario kolektiboa zabalduz, trans pertsonak beren bizi-ibilbideak marrazteko egiten dituzten buru-mapak ere zabaltzen ditugu (...) zenbat eta gorputz gehiago posible, bizigarri eta desiragarri izan, orduan eta txikiagoa izango da pertsona askok gorputzok aldatzeko daukaten premia erradikala (...) bada esaten duenik gizakiak berezkoa duela transexualitatea eta haren ingurunean ez dagoela ezer bizipen hori aldatuko duenik. Guk, aldiz, uste dugu gure kulturaren gizon eta emakumeen arteko desberdintasunak, rolak (...) eta genero-desparekotasunak ulertzeko modua elementu gakoak dela trans bizipenerako (...) agertoki hori eraldatzen badugu, transaren bizimodua eta pentsamoldea ere aldatuko ditugu. (2015, 27. or.)<sup>400</sup>

Norberaren sentipen edo zentzu hori, Stryker-ek aipatua, ekintza politikoaren *ostekoa* da, baita identitatea aukeratzeko ekintza politiko kontzienterik egiten ez duenaren kasuan ere; izan ere, sentipen hori adierazteko aukeratzen dituen kategoriak, denak ere sentipen horren aurrekoak, halaber politikoak dira, askotariko ekintza politiko ugariaren emaitzak. Sentipen horrek garrantzi handiagoa hartzen du norberaren bizi- eta existentzia-posibilitateak sentipen hori aldarrikatzearen menpe daudenean. Ildo horretan, “it is essential to acknowledge... how each of us experiences and understands our gender identity” (Stryker, 2008, 14. or.); alegia, gure kontakizun eta teoria sexu-generikoei gai izan behar dute kontuan hartzeko badirela kategoria identitarioen eta bilakaera identitarioaren erabileran mugikortasun txikia edo ia ezdeusa adierazten duten esperientziak, bizikizunak eta ikuspegiak ere<sup>401</sup>.

Baina identitate sexu-generizatuak ez dira aldatzen testuinguru historiko eta sozialaren arabera bakarrik, teknogorputzasun-subjektibitateen bizitzan zehar ere aldatzen baitira. Fausto-Sterling-ek (2000, 25.-27. or.; 2012a, 119.-120. or.), eta Ah-King eta Nilyn-ek (2010) eta Ah-King eta Hayward-ek (2014) diote, azken hauek oro har animalia-teknogorputzez ari direla,

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<sup>400</sup> Jatorrizko testua: “[A]mpliando el imaginario colectivo sobre la cuestión trans, también ampliamos los mapas mentales que las personas trans trazan para dibujar sus trayectorias vitales (...) cuantos más cuerpos sean posibles, habitables y deseables, menor será la necesidad radical de modificarlos que sienten muchas personas (...) hay quien sostiene que la transexualidad es algo intrínseco al ser humano y que nada en su entorno podrá modificar esa vivencia. Nosotros pensamos que, al contrario, la forma en la que nuestra cultura entiende las diferencias entre hombres y mujeres, los roles y (...) las desigualdades de género, son elementos claves para la vivencia trans (...) si transformamos ese escenario, alteraremos también la forma de vivir y de pensar lo trans”.

<sup>401</sup> Bonnie Morris historialari lesbiana (jakinarazpen pertsonala, 2017ko abenduaren 7an), adibidez, “ez dago ados sexualitate oro jariakorra delako argudioarekin”, eta kontatzen du nola 5 urte zituenean amodiozko gutun bat idatzi zion bere haurtzainari. Hala eta guztiz ere, halako kasuetan ere, aldaketa fisiologiko eta arau sexu-generikoen aldaketa ugari gertatzen dira, guztiak ere adinaren araberrakoak, adinarekin gurutzatuak, adinarekin eta adinaren arabera barneratuak, eta abar.

eboluzioaren historian zehar ere sexua eta sexualitatea fluxu- eta materializazio-prozesu kontingente eta aldakorak direla, ingurunera irekiak, eta prozesu horietan askotariko elementuek parte hartzen dutela; besteak beste, ingurumen-toxikotasunak. Gorputza eta portaera garapen-sistema interkonektatu konplexu baten parte dira, arlo zelularretik hasi eta arlo sozial eta historikoraino (Fausto-Sterling, 2000, 29. or.). Kategoriak, gainera, irekiak eta irazkorak dira, eta elkarrekin korapilatzen eta gurutzatzen dira. Hori dela eta, pertsona bat kategoria batean baino gehiagotan bizi daiteke bizitzan zehar, are une berean ere; kategoriaz alda daiteke, intentsitate eta maiztasun desberdinekin, aldaketa- edo egonkortze-aldiak txandakatuta.

Kategoria sexu-generikoen izaera sozialak berekin dakar *El Intermedioren* autobuseko ideiarekin bigarren ondorio arazotsuaren eztabaida: identitate sexu-generikoaren izaera eskusiboki indibidual, pertsonal eta pribatua. Feinberg-ek, genero-arauak sozial eta aldakor gisa deskribatu arren, norberaren *autoadierazpen* gisa ere definitzen du generoa, hura bere dimentsio indibidualera murriztuz: “Gender: self-expression; not anatomy” (1992, 5. or.). Generoa anatomiatik bereizi eta hartara genero-koherentzia deseraikitzean, nahiz eta continuumaren ideia baietsi, barne-egia gisa aldarrikatzen du generoa. “Egiazko nia” “transgender” terminoari loturik egon da hasieratik Boswell-en definizioan (1991, 30. or.). Hala eta guztiz ere, gure ustez, garai hartan aintzat hartzen ez ziren existentzia, sentipen, pentsamendu eta teknogorputzasun-subjektibitate horiek guztiak kontuan hartzeko behar premiazko eta ezinbestekoari zor zaio generoaren dimentsio indibidualari gehiegizko garrantzia ematea eta halako hizkuntza erabiltzea. Horrenbestez, alde zuzenetik pentsatu eta nahita egindako zerbait baino gehiago, baliteke halako gehiegikeriak zapalkuntzaren, ikusezintasunaren, ukapenaren eta bazterkeriaren aurrean nor bere burua baiesteko eta determinatzeko beharraren ondorio izatea.

Dena den, Preciado-k zera dio: “[E]z dago generorik (...) jendaurrean baino, hau da, izaera kolektiboko eraikuntza somato-diskurtsibo gisa” (2008, 91. or.)<sup>402</sup>. Hortik teknogorputz garen heinean gure ulergarritasuna eta onarpen soziala jokoan jartzea genero-arauen bitartez. Sexu-generoa bi norabidekoa da, edo, hobeki esanda, norabide eta dimentsio askokoa, eta dimentsio horietakoren bat ukatzeak mina eta zapalkuntza dakartza. Har dezagun “John/Joan” bikien kasu ospetsua. Haren bitartez, plastikotasun sexu-generikoaren teoria frogatu nahi izan zuen Money-k<sup>403</sup>, haietako bati zirkunzizio bat egin eta zakila suntsitua ziotela baliatuz.

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<sup>402</sup> Jatorrizko testua: “[N]o hay género (...) más que frente a un público, es decir, como construcción somato-discursiva de carácter colectivo”.

<sup>403</sup> Money-k zioen generoa modu aske batean esleiri daitekeela 2 urteak arte; horretarako elementu nuklearra esleipen- eta zaintza-sexua zen, zeina berreraikitze genitalaren bideragarritasun teknologikoaren mende baitzegoen nagusiki eta gorputzeko edozein osagai sexuatu baino fidagarriagoa baitzen. Generoa, sexu psikologiko gisa ulertuta, morfologia genitalarekin, berreraikitze teknologikoarekin eta hazkuntzarekin loturiko kontu bat zen.

Orkidektomia bat egin, estrogenu-tratamendu bat eman, eta Brenda izena eman zioten (Colapinto, 2006, 53. or.). David-ek ez zuen inoiz onartu sexu-genero femeninoa, eta, 14 urterekin, depresio bat izan eta gero, bere rol maskulinora itzultzea erabaki zuen (2006, 181. or.). 1980an, esleipena lehengoratzeko tratamendu bat hartu zuen: testosterona-injekzioak, mastektomia bikoitz bat eta bi faloplastia-operazio (2006, 183. or.). David Reimer-ek oinazealdi fisiologiko eta bital bat sufritu zuen, eta, azkenean, bere buruaz beste egin zuen, 2004an (Colapinto, 2006, 10. or., eranskina)<sup>404</sup>. Kasu horrek agerian uzten du ikuspegi identitarioak ezin daitezkeela guztiz konstruktibista izan.

Bai teoria biologizisten erredukzionismoaren eta determinismoaren, bai teoria guztiz konstruktibisten ukoaren eta inposaketaren (arestiko kasuan bezala) alternatiba gisa, multiplizitatea modu ez-hierarkiko eta ez-zapaltzaile batean kontuan hartzeko –eta, hartara, mina eta injustizia saihestu eta zorientasuna areagotze bidean–, sexu-generoaren eta sexualitatearen multidimentsionalitate erlazionala aintzat hartzeko gai diren teoriak formulatu behar ditugu, nagusiki erlazional gisa agertzen baita. Ildo horretan, zera dio Heyes-ek: “Although gender is often experienced as a deeply authentic aspect of the individual self, many theorists have persuasively argued that gender identities must be understood as *relationally* formed” (2003, 1094. or.). Proposamen erlazionalak defenditzen dituzten egileen artean, lehen eta bigarren kapituluetan azaldu dugun bezala, Fausto-Sterling (2003, 123. or.) eta Haraway daude, biak ere barne-ni aldaezinaren ideiarekin aurkakoak, baita hauen aurkakoak ere: “binary dualisms, and both relativisms and universalisms of many flavors, contribut[ing] a rich array of approaches to emergence, process, historicity, difference, specificity, co-habitation, co-constitution, and contingency... Subjects, objects, kinds, races, especies, genres, and genders are the products of their relating” (Haraway, 2003, 6.-7. or.). Haiekin batera, postulatu dugu desberdintasun sexu-generikoak, arrazazkoak, gaitasunezkoak, edo klaseari eta sexualitateari dagozkionak elementu organiko-teknologiko-diskurtsibo-materialen arteko koeraketa-harremanen efektuak direla.

Bigarren adibidean, Fausto-Sterling-en tesiari jarraituz, ikusten da nola zientziak giza sexualitatearen inguruan sorturiko egiak ikusmolde sexu-generikoan txertatzen diren eta kolektibo sozialek erreproduzitzen dituzten, batzuetan, beren helburu emantzipatzaile eta solidarioak mugatu edo oztopatu arren, Chrysallis adin txikiko transen\* familien elkarteari kasuan bezala, zeina kolektibo aitzindaria baita eta lan laudagarria eta miresgarria egiten baitu trans\* haurren eskubideen, duintasunaren eta zorientasunaren alde. Bada, 2017an, Chrysallis

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<sup>404</sup> Bi urte lehenago, gauza bera egin zuen haren anaia Brian Reimer-ek.

Euskal Herria elkarteak<sup>405</sup> “Badaude zakila duten neskak eta bulba duten mutilak” izenburuko esku-orri bat banatu zuen, Universidad del País Vasco/Euskal Herriko Unibertsitateko Psikologia Fakultatean, eta zera irakur daiteke:

Guztiok ditugu sexu bien ezaugarriak. Ohikoena ez bada ere, garuneko sexuazioak alde batera egin dezake eta genitalen sexuazioak bestera. Hori da, hain zuzen ere, zakila duten nesken eta bulba duten mutilen kasua.

(...) Badakigu jakin gizon edo emakume garela, mutil edo neska, eta ez genitalengatik preseski. Identitatea ez dago hankartean, buruan baizik. Badaude, egiazki, zantzu zientifikoak ondorioztatzeko identitatea estria terminalis izeneko nukleo linbiko batean egon daitekeela, jaio baino lehen ezarrita gelditzen dena. (Chrysallis, 2017)

Pasarte horretan badira zenbait ideia oso arazotsuak direnak eta determinismo biologikoaren postulatu nagusiak erreproduzitzen dituztenak: burmuinaren sexuazioaren nozioa; burmuineko sexu-dimorfismoa; burmuinaren sexuazioa edo identitate sexu-generikoa jaio aurretik determinatzen eta finkatzen delako ideia; eta, zehatzago, identitate sexu-generikoa “ildaska terminaleko nukleo linbikoa” deritzon eremuan egon daitekeelako edo dagoelako nozioa. Aurreko adibidean adierazi dugunez, horren ondorioa da ez dagoela inongo zati, dimentsio eta aderdirik –ez bereziak, baizik eta modu banaezinean lotuak– agentziari edo hautuari, kontingentzia ebolutiboari eta historiko-sozialari dagokionik, eta, horrenbestez, gorputzen arteko eta gorputzen eta ingurunearen arteko interakzioaren eraginez aldatu eta eralda daitekeenik<sup>406</sup>. Butler-ek *zer da sexua?* galdetzen duen modu berean (1990, 6.-7. or.), hemen, hauxe da galdera: *Non dago sexu-(genero)a?*

Missé-k eta Fernández-ek *Transitional Statesen* markoan ikus-entzunezko pilula txiki batzuk trukatzuz izandako elkarrizketan<sup>407</sup>, Missé-k Chrysallis-en autobus arrosa erakusten dio Fernández-i –HazteOír-en autobusaren aurrean sorturiko beste erantzun bat izan zen–, eta zera irakurtzen da: “Badira neska zakildunak eta badira mutil bulbadunak. Zer axola du? Generoa

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<sup>405</sup> Chrysallis Euskal Herriak, Espainiako estatuko Chrysallis elkartetik atera, eta bere kolektibo propioa sortu zuen, “Naizen. Adingabe Transexualen Familien Elkarte”, zeina 2019ko urtarrilaren 26an aurkeztu baitzuten jendaurrean. 2019an, beste zatiketa bat gertatu zen Chrysallisen barnean, eta hala sortu zen “Euforia. Familias Trans-Aliadas” estatu-mailako kolektiboa.

<sup>406</sup> Chrysallis kolektibo zabal eta askotarikoa da. Ez gara ari esaten kolektiboko kide guztiak ados daudenik diskurtso horrekin, baina bai kolektiboak onesten eta zabalitzen duela adierazpen publiko ofizial batzuetan. Missé-k ere aipatu du Chrysallis-ek determinismo biologikoa baliatu izan duela jendaurrean transexualitatea justifikatzeko eta azaltzeko (2018).

<sup>407</sup> Elkarrizketa hori UPV/EHUko 2017ko maiatzean Filosofiako Mintegi Irekian analisi hau aurkeztu ondokoa da.

burmuinean dago, ez genitaletan” (2018)<sup>408</sup>. Fernández-ek kritika positiboa egiten du kolektiboari buruz, mezu aldarrikatzaile eta aldi berean gizarte gehienak ulertzeko modukoa sortzeko gai izateagatik, are haurrek ulertzeko modukoa ere, eta nabarmentzen du ere hartzen ditugun erabakiak zuzenak direlakoaren berme edo ziurtasun gisa aukeratzen ditugun tokien lekualdaketa gertatu dela kasu honetan (2018). Hori ulergarria izan liteke, Chrysallis-ek aldaketa sozial esanguratsuak transfobia-testuinguru batean ekartzeko duen beharra ikusita. Problematizitatea, aldiz, beste kontu batzuen artean, transexualitatea eta, orokorrago, trans\* identitateak zer diren azaltzeko diskurtso horrek sozialki hartu duen hegemonia da.

Ostertag-en (2016) eta Jordan-Young-en (2010) ildotik, Missé-k Fernández-ekiko elkarrizketan dio konstrukzionismoak tokia libre utzi zuela diskurtso biologizistei, eta, are, gaur egun, determinismo biologikoa kritikatzeko duten diskurtsoak gaizki ikusiak direla eta trans\*aren edo aniztasunaren aurkakotzat hartzen direla (2018). Sexu-generoaren jatorri edo *locus* hormogenikoa genitaletatik burmuinera aldatzeak ez du esan nahi diskurtso biologizista eta deterministarik egiten ez denik. Sexu-generoa izaera biologikoko leku batean kokatzen da. Halako diskurtso biologizisten problematizitatea inkoherentziaz, akatsaz, interferentziaz, arazoaz eta/edo anomaliaz hitz egitea da, eta hori lur emankorregia da biologiarri helduz gizarte-hierarkiak justifikatu nahi dituztenentzat. Beharbada, biologia ez da beti eta une oro tokirik egokiena kolektiboki sostengatzeko. Beharbada, multiplizitatea besarkatzen duten helburu emantzipatzaileak izanik, erlazonaltasun multidimentsional organiko-teknologiko-diskurtsibo-materialetik sexu-generoaren alderdi biologikoak ere kontuan hartzeko gai diren diskurtsoak landu behar genituzke. Elkarloturiko dimentsioen multiplizitatea kontuan hartzen duen ikuspegi sexu-generiko koeratzailetatik abiatzeak zientziaren parte hartzea dakar, baina horrek ez du esan nahi azalpenak diskurtso zientifikora *murritz* behar direnik, ezta azken autoritatea eta justifikazioa zientziari dagozkionik ere.

Missé-k Fernández-ekiko elkarrizketan iradokitzen du gaiari heldu eta kolektiboki elkarri galdetu beharko geniokeela zein den transexualitatearen jatorria, eta horrek utopiez eta beste mundu posible eta bizigarri batzuek hitz egitea dakarrela (2018). Benjamin-ek, aldiz, transexualitatearen jatorriari buruzko galdera bat eginez amaitzen du “The Transsexual Phenomenon” artikulua, baina beste ikuspegi batekin:

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<sup>408</sup> 2019ko martxoaren 29an, Missé-k, Universidad del País Vasco/Euskal Herriko Unibertsitateko (UPV/EHU) “Genero-aniztasuna haurtzaroan” konferentzian, modu berean kritikatu zuen Chrysallis-en leloaren atzean dagoen determinismo biologikoa. Jatorrizko testua: “Hay niñas con pene y niños con vulva. ¿Qué más da? El género está en el cerebro, no en los genitales”.

Could it be that the aforementioned female hypothalamic center, if insufficiently masculinized, may constitute such a predisposition? Or, in female transsexuals, was this center somehow masculinized by an endocrine abnormality of the mother during her pregnancy?

I must leave these questions open. Perhaps, in the future, someone else may supply the answers. (1967, 430. or.)

Ez dago oso urruti joan beharrik jatorri edo iturburu sexu-generiko hormogenikoa burmuinean kokatzen duten “someone else” horiek nor diren bilatzeko. Chrysalis Euskal Herria elkartearen esku-orrian bertan –arestian aipatu dugu–, oin-ohar bat ageri da “daitekeela” hitzaren ondoan: “‘Male-to-female transsexuals have female neuron numbers in a limbic nucleus’, Kruijver et al., 2000”<sup>409</sup>.

#### **4.4. Jatorri sexu-generizatuaren ehiztariak. Transexualitateari buruzko teoria determinista biologikoak: *Brain Sex Theory* eta *Brain Organization Research***

Transaren\* jatorri soziala nabarmentzen duten ikuspegiaren aurrean –zeinetan elementu soziokultural eta diskurtsiboak biologikotasunarekin eta ingurunera irekitako teknogorputz-materialtasunarekin urtzen diren, Doktorego-tesi honetan argudiatzen ari garen bezala–, badira beste ikusmolde batzuk trans\* multiplizitate subjektibo-korporala eta konfigurazio sexu-generikoa burmuinean kokatzen, finkatzen eta ezartzen dutenak modu aldaezin eta estatiko batean, jaio aurreko eta jaioberritako faseetatik hasita. Bilaketa baten antzekoa da, zeinean bilatzen den xedea aurkitu orduko ehizatu eta finkatuta, atzemanda, harrapatuta geratzen baita. Atal honetan, identitate eta materialtasun sexu-generizatuari buruzko postulatu deterministak eta biologizistak defendatzen dituen literatura zientifikoa aztertuko dugu. Halako lanetan, transa\* anomalia, alderantzizkatze, arazo edo nahasmendu gisa kontzeptualizatzen da, ikuspegi

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<sup>409</sup> Identitatea genitalean ez baizik eta burmuinean dagoelako ideia errepikatzen dute *Maskarak* dokumentaleko protagonistek –sarreran aipatu dugu– eta *Ur handitan* programako elkarrizketatuetako batek ere. Xehetasun, espezifikotasun eta irudi gehiagorekin, batetik, Zhou eta beste egile batzuek (2000) eta Kruijver eta beste egile batzuek (2000) BSTc-ari edo ildaska terminalaren nukleoaren oharburuzko deskribaturiko teoriak biltzen eta azaltzen dira, transexualitatearekin loturik, Madrigo “Golfx con principios” kolektiboaren blogeko “La base biológica de la identidad y la orientación sexual: INAH3 y BSTC” sarreran (2015). Bestetik, Simon LeVay-k hipotalamoko INAH3 eremuari buruz defendatutako teoriak ere azaltzen dira, zeinek homosexualitatea azaltzen baitute; Jordan-Young-ek problematizatu egin ditu teoriok (2010, ix.-xi. or., 102., 105.-106., 160.-161., 171. or.). Nolanahi ere, LeVay-ren teoriak gure analisiaren irismenetik kanpo daude, batez ere ez direlako zehazki transexualitateari buruzkoak eta denbora-toki mugengatik. Halako adibideek berresten dute Fausto-Sterling-en tesia, hots, zientziak sexu-generoaz sortzen dituen egiak erreproduzitzen dituztela kolektibo sozialek –baita itxuraz eraldatzaile eta alternatiboek ere– eta, aldi berean, zientzia bera ere sexu-generoari buruzko ikuspegi sozialetatik elikatzen dela eta halakoak erreproduzitzen dituela.



patologizatzaile bat zabalduz. Ondoren, aztertutako transexualitateari buruzko artikulua eta/edo ikerketa neurozientifikoak problematizatuko ditugu, bai akats metodologikoei eta/edo diseinuzkoei begira, bai justifikaziorik gabeko inferentzia eta ondorioei begira, bai genero-isuriei begira, bai nahasmen kontzeptualei begira, bai oinarri teoriko determinista biologikoei begira, sozialki ondorio arriskutsuak dakartzatenez gero.

#### **4.4.1. Burmuineko sexu-dimorfismoa eta hormonon eragina: transexualitatea nahasmendu, anomalia, arazo eta alderantzizkatze gisa**

Sexu-generoa burmuinean dagoelako ideia, zehazki, ildaska terminaleko ohantzeko nukleoaren erdiguneko subdibisioan (BSTc), hau da, burmuineko amigdalatik hipotalamorainoko zatian, “Brain Sex Theory” izenez da ezaguna, eta, besteak beste, lau artikulutan du oinarria, atal honetan aztertuko ditugunak. Lau artikulutan, zeinak hainbat egilek idatziak baitira azkena ez beste guztiak, Dick F. Swaab ekinak parte hartzen du, Netherlands Institute for Brain Research-en zuzendaria 2005era bitartean –handik aurrera The Netherlands Institute for Neuroscience izena hartu zuen erakundeak<sup>410</sup>–. Lehen bi artikuluetan, “A Sex Difference in the Human Brain and its Relation to Transsexuality” (Zhou et al., 1995, *Nature* aldizkarian argitaratua), eta “Male-to-Female Transsexuals Have Female Neuron Numbers in a Limbic Nucleus” (Kruijver et al., 2000)<sup>411</sup>, *postmortem* ikerketetan oinarrituta, sei trans\* teknogorputz aski izan ziren transexualitateari eta orobat trans\* subjektibitate-gorputzasunei buruz dagoeneko hegemoniko bilakaturik den teoria bat sortzeko.

Haietariko lehenbizikoan, Zhou-k eta beste egile batzuek ondorioztatu zuten *postmortem* aztertutako 42 burmuinetan BSTc-aren bolumena % 44 handiagoa zela gizonetan emakumeetan\* baino. Hormona bidezko terapia hartua zuten 6 *male-to-female* (MtF) transexualen artean, BSTc-aren batez besteko tamaina batezbesteko femeninoaren barnean zegoen; zehazki: “Although the mean BSTc volume in the transsexuals was even smaller than that in the female group, the difference did not reach statistical significance” (Zhou et al., 1995, 69. or.). Pertsona horiek, gainera, sexu-orientazio desberdinak zituzten; hortaz, Zhou-k eta beste

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<sup>410</sup> Gaur egun, Netherlands Institute for Neuroscience-ko “nahasmendu neuropsikiatriko”en gainean diharduen ikerketa-taldearen zuzendaria da Swaab. Swaab Group-ek bi ikerketa-lerro ditu. Lehen lerroaren hipotesiaren arabera, giza burmuineko jardueraren asaldurek nahasmendu neurologiko, psikiatriko eta neuroendokrinoak ekar ditzakete. Burmuineko “sexu-diferentziazioa” eta “sexu-hormonen” eta burmuin helduaren arteko interakzioak ikertzen dituzte, beste nahasmendu edota arazo batzuekin lotuta, hala nola hipertentsioa, depresioa, esklerosi anizkoitza, alzheimerra, anorexia, eskizofrenia, tiroide-arazoak eta transexualitatea. Bigarren lerroari dagokionez, Alzheimer-en gaixotasunean neuronak berraktibatzearekin du zerikusia (Netherlands Institute for Neuroscience, 2020).

<sup>411</sup> Aurreko ikerketaren lau egileek ere sinatu dute artikulua hori.

egile batzuek ondorioztatu zuten ez zegoela loturarik sexu-orientazioaren eta BSTc-aren tamainaren artean.

Ikertzaileek diotenez, arratoiekin eginiko zenbait esperimentuk proposatu zuten haien BSTko sexu-desberdintasun neurokimikoak “sexu-hormonek” garapenean eta helduaroan eragindako efektuek sortuak zirela (1995, 69. or.). Nola baztertu zuten Zhou-k eta beste egileek halako desberdintasunak –alegia, sexu-dimorfismoa– helduaroan garatzea gizakietan? Bada, burmuinen *postmortem* azterketa gehigarriak erabiliz. Kasu horretan, 5 teknogorputz aski izan ziren. Haietariko bat 46 urteko emakume batena zen; kortex suprarrenaleko tumore bat izan zuen gutxienez urtebetean, eta, ikertzaileen arabera, horrek odoleko androstenediona- eta testosterona-maila oso altuak eragin zizkion. Hala ere, emakume haren BSTc-aren tamaina haiek femeninotzat hartua zuten tartean sartzen zen. Hormona-maila “anormalak” zituzten 70 urtetik gorako beste bi emakume\* postmenopausiadunek “showed a completely *normal female-sized BSTc*” (Zhou et al., 1995, 69. or.; geuk nabarmendua). Azkenik, bazen 31 urteko mutil bat tumore suprarrenal baten eraginez odoleko estrogeno kantitate altuak zituena; haren BSTc-aren tamaina “normala” zen gizon batentzat. Azken froga sei transexualetako bik eman zuten: hil baino 3 eta 15 hilabete lehenago utzia zioten hormonak hartzeari, eta horrek ez zuen haien BSTc-aren tamaina aldatu.

Baina oraindik bazen beste aukera bat: transexualen BSTc-a hain txikia izatearen arrazoa helduaroan androgeno-falta izatea; izan ere, bat ez beste guztiei egina zieten orkiektomia bat. Hipotesi hori baztertzeko, prostatako minbiziaren ondorioz hil baino 2 eta 3 hilabete lehenago orkiektomia egina zieten bi gizonen BSTc-a analizatu zuten. Ez zen ezustekorik izan. Hona ikertzaileen ondorioa: “[T]he small size of the BSTc in male-to-female transsexuals cannot be explained by differences in adult sex hormone levels, but is established during development by an organizing action of sex hormones” (1995, 70. or.). Eta zera gehitu zuten: “[A]n idea supported by the fact that neonatal gonadectomy of male rats and androgenization of the female rats indeed induced significant changes in the number of neurons of the BST and suppressed its sexual dimorphism” (1995, 70. or.).

Neuroanatomiar buruzko Zhou eta beste egileen artikuluaen abiapuntua honako ideia hau da: “Transsexuals have the strong feeling, often from childhood onwards, of having been born the wrong sex”<sup>412</sup> (1995, 68. or.). Hormonak agertokira itzuli ziren, berriz ere, burmuineko sexu-dimorfismoa finkatzeko elementu garrantzitsu gisa edo, bestela, haren *asalduren* erantzule

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<sup>412</sup> Ostertag-en arabera, XIX. mendearen amaieran, Mendebaldean bazegoen “female soul in a male body” delako ideia (2016, 37. or.). Karl Heinrich Ulrichs homosexualen eskubideen aldeko ekintzaileak era horretan azaltzen zuen homosexualitatea.

gisa. Hala, transexualitatea BSTc-aren tamainaren *alderantzikatz*<sup>413</sup> gisa azaldu zuten, hau da, jaiotzean gizon esleituriko transexualen BSTc-aren tamaina batezbesteko femeninoei zegokien. Hortaz, transexualitatea ere BSTc-aren garapen *normalaren asaldura* gisa aurkeztu zuten.

### Hallan una enzima clave en el desarrollo del cáncer de colon

Washington. Agencias

La elevada actividad de la enzima NMT podría estar relacionada con el cáncer de colon, según un informe que publicó ayer el diario del Instituto americano del Cáncer. Para los autores de este estudio, los resultados podrían tener un valor incalculable en el diagnóstico temprano de este carcinoma, y en el estudio de posibles inhibidores de esta enzima para diseñar nuevos tratamientos terapéuticos.

La doctora Bernadene Magnuson, del Centro del Cáncer de Saskatoon, en la Universidad canadiense de Saskatchewan, que dirigió este estudio, observó la actividad de la enzima NMT (N-miristoyl-transferasa) en los tumores de colon de ratas de laboratorio y en la mucosa adyacente, de apariencia normal.

Los animales habían desarrollado el cáncer mediante inyecciones de una sustancia cancerígena disuelta en una solución salina, solución que recibió también, pero sin esa sustancia, otro grupo de roedores.

Además, la actividad de la enzima se evaluó en muestras de tejido de colon procedente de cinco personas, tres de ellas con cáncer de colon y dos con lesiones no cancerosas.

Los investigadores hallaron un aumento significativo de la actividad de la enzima NMT en los tumores de colon de las ratas, en los pólipos precancerosos o adenomas y en los tumores incipientes.

Los niveles de actividad eran mayores en el colon descendente, más cercano al recto, y menores en el ascendente. En las muestras humanas, la actividad de la enzima era mayor en los tejidos con cáncer de colon que en el tejido circundante aparentemente normal.

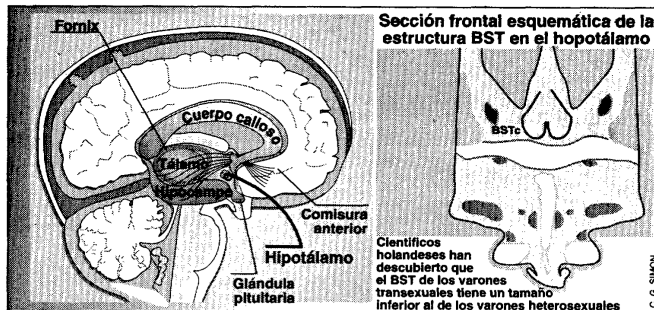
Sobre los resultados del estudio en ratas, los autores se han mostrado cautos al advertir de que debe esperarse la confirmación de los hallazgos en estudios sobre seres humanos.

• Los astronautas del transbordador «Columbia», entre los que figura Miguel López Alegria, realizaron ayer un experimento para investigar cómo los planetas pueden formarse en el Universo a partir de nubes de polvo interplanetario.

## Descubren la primera diferencia biológica en el cerebro de los varones transexuales

Una estructura del hipotálamo es más pequeña que en los heterosexuales

Madrid. J. M. Fernández-Rúa/A. Aguirre de Cárcer. La primera diferencia biológica detectada en el cerebro de los transexuales ha sido descubierta por científicos del Instituto holandés para la Investigación del Cerebro. En un estudio que publica hoy la revista «Nature», Dick Swaab y sus colaboradores afirman haber comprobado que los varones que cambian de sexo tienen una pequeña estructura del hipotálamo, cuyo tamaño es inferior al de los hombres heterosexuales y similar al de las mujeres.



El autor principal de este trabajo, Dick Swaab, fue el primer investigador que comunicó haber detectado una diferencia estructural en el cerebro de los homosexuales, tras comprobar que el núcleo supraquiasmático de éstos es dos veces mayor que el de los heterosexuales. Ahora su investigación se ha centrado en la transexualidad, cuyo posible origen ha sido debatido durante años aunque nunca se habían descubierto anomalías genéticas u hormonales en estas personas.

Su estudio, al que ha tenido acceso ABC, fue realizado durante los últimos once años mediante análisis post-mortem de seis transexuales varones. Para averiguar la existencia de diferencias anatómicas en sus cerebros, Swaab y sus colaboradores centraron sus análisis en una estructura del cerebro que es sexualmente dimórfica, esto es, diferente en tamaño en hombres y mujeres. Se trata del núcleo base de la estría terminalis (BSTc), una estructura cerebral de mayor tamaño en los varones que en las mujeres.

Tras llevar a cabo los análisis, descubrieron que el BSTc de los seis transexuales tenía un tamaño inferior al de los hombres y similar al de las mujeres. Los científicos del Instituto holandés para la Investigación del Cerebro creen que esta diferencia aparece en los transexuales antes de que decidan cambiar de sexo, y

más concretamente antes de la edad adulta. Incluso apuntan que probablemente sea resultado de una interacción entre las hormonas sexuales y el cerebro durante su desarrollo en el feto. Esta conclusión encenderá de nuevo la polémica sobre el posible origen biológico de la orientación sexual, según afirma el investigador de UCLA Marc Breedlove, en un artículo que también publica hoy «Nature».

### Tratamientos con hormonas

Este especialista en Psicología y Neurobiología precisa que el tamaño del BSTc no puede ser claramente relacionado con la orientación sexual porque, en su opinión, los hombres que desean convertirse en mujeres constituyen un grupo poco homogéneo. Algunos se sienten atraídos por los hombres, otros por las mujeres, también los hay bisexuales e incluso quien no muestra interés en las relaciones sexuales.

Puntualiza además que el tamaño de esta estructura estaría determinado por posibles alteraciones en el neurotransmisor VIP, originadas por tratamientos hormonales con estrógenos que recibieron los seis transexuales, de los que cinco se sometieron a operaciones para eliminar los genitales. En su opinión, estas dudas podrían despejarse si los análisis de estas personas no fueran post-mortem.

“Gizon transexualen burmuineko lehen desberdintasun biologikoa aurkitu dute”,

ABC, 1995eko azaroaren 2a

<sup>413</sup> Alderantzikatzearen ideia ez da berria. Historian zehar erabili izan da lesbianez eta gayez hitz egiteko. XIX. mendearen amaierako eta XX. mendearen hasierako erabileraz jakiteko, ikus Meyerowitz (2004, 14.-49. or.), Fausto-Sterling (2012a, 73.-74. or.) eta Ostertag (2016, 45. or.).

Irudian ikusten den bezala, 1995ean, *ABC* egunkariak argitaratu zuen Swaab-en lantaldeak ustezko desberdintasun biologikoa aurkitua zuela transexualen burmuinean. Baina ez zen izan ikerketaren ondorioak –eta/edo auresuposizioak– jaso eta bere egin zituen bakarra. Transexualen burmuinetan desberdintasun biologikoak badaudela defenditzen duen bigarren artikulua Kruijver-ek eta beste egile batzuek idatzia da (2000), Chrysallis-en esku-orrian bertan aipatzen dena. Azterketa berri bat baino gehiago, Zhou-k eta beste egileek 1995ean eginiko ikerketaren lanketa da, lantalde berak egin; izan ere, analisi nagusian erabili zituzten 34 teknogorputzetatik 26 aurreko ikerketako berak izan ziren (Jordan-Young, 2010, 105. or.). Hala, Kruijver-ek eta beste egile batzuek (2000) BSTc-ko neurona kopurua analizatu zuten, eta ez haren tamaina; zehazki, somatostatina interneuronen kopurua (*somatostatin (SOM)-expressing neurons*). Horretarako, aurretik ikertuak zituzten 6 MtF transexualen ehunak baliatu zituzten, eta, horretaz gainera, baita FtM<sup>414</sup> transexual batenak eta sekula hormonarik hartu gabea zen 84 urteko trabesti batenak ere. Hala, neurona kopurua tamaina baino are dimorfikoagoa zela aurkitu zuten: % 71 handiagoa gizon heterosuxaletan emakume\* heterosuxaletan baino, eta % 81 handiagoa gizon homosuxaletan emakume\* heterosuxaletan baino. Beste behin ere, MtF transexualek alderantzizko patroia agertu zuten, batezbesteko femeninoaren barnean baitzegoen haien neurona kopurua. Halaber, batezbesteko femeninoaren barnean zegoen trabestiaren BSTc-ko neuronen kopurua, eta maskulinoaren barnean, berriz, FtM transexualarena, eta hori guztiz bateragarria da “the sexual brain paradigm” delakoarekin (Kruijver et al., 2000, 2041. or.).

Ikertzaileek ondorioztatu zuten BSTc-ko neuronen kopuruak ez duela harremanik helduen hormona-aldaketekin: “Instead, the neuronal differences are likely to have been established earlier during development” (2000, 2039. or.). Helduaroko hormonon eragina baztertzeko, aurreko ikerketaren argudio berak erabili zituzten. Transexualen burmuineko neurona-desberdintasunak –hots, burmuineko hormonon antolaketa– betiko finkatuta geratzen dira burmuinean: “Apart from such well known irreversible “organizing” effects of sex hormones on the developing brain, the possibility of a direct action of genetic factors on sexual differentiation of the brain should not be ruled out” (2000, 2039. or.). Berriz ere, *alderantzikatze* gisa azaldu zuten transexualitatea, biologikoki, eta hori bateragarria da eta ongi ahokutzen da transexualitatea *nahasmendu* gisa kontzeptualizatzearekin:

The present findings of somatostatin neuronal sex differences in the BSTc and its sex *reversal* in the transsexual brain clearly support the paradigm that in transsexuals sexual differentiation of the

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<sup>414</sup> Zera diote horri dagokionez: “[W]e had the exceptional opportunity to be able to study the first collected brain ever of a female-to-male transsexual (FMT)” (Kruijver et. al, 2000, 2034. or.).

brain and genitals may go into opposite directions and point to a neurobiological basis of gender identity disorder. (Kruijver et al., 2000, 2034. or.)

Bi artikulu horiek, aldi berean, Jordan-Young-ek “Brain Organization Research” deritzonaren barnean biltzen dira. 300 artikulutik gorako bilduma bat da, 1960tik gaur egunera artekoak, eta identitate sexu-generikoa eta sexu-orientazioa burmuinean kokatzen dute guztiek ere (2010, xi). Teoria horren arabera, jaio aurretik hormonekiko esposizioak eragiten du burmuineko sexu-diferentziazioa edo, hobeki esanda, haren sexu-dimorfismoa edo dimorfismo sexu-generizatua, hau da, desira-, nortasun-, aldarte- eta kognizio-eredu iraunkorrek sortzen ditu. Gero, bizitzan zehar, hormonek predisposizio horiek aktiba ditzakete, baina joerok antolatuta, programatuta eta grabatuta geratzen dira hormonon bidez hasieratik fetuko burmuinean. Jordan-Young-ek analizaturiko 300 ikerketen artean, bakar batean –baita Kruijver eta beste egile batzuen luzapenean ere– aipatzen da transexualitatea<sup>415</sup>: Zhou eta beste egileen artikuluan –gorago aletu dugu–. Gainera, Jordan-Young-ek ikerketa horri buruz egindako iruzkin eta kritikek, baita aipatzen dituen beste ikertzaile batzuenak ere, sexu-orientazioa dute ardatz nagusi<sup>416</sup>. Transexualitatearen gaia oharkabean geratzen da; salbuespen bakarra da transexualen sexu-orientazioaren aldakortasuna aipatzen dela, ordura arte ez baitzen halakorik aintzat hartzen, eta, beraz, ikerketaren elementu positibotzat hartu behar da.

Lehenago Missé-k adierazitako hildotik, baita Fausto-Sterling-ek ere (2012a, 44. or.), kontruktibismoak atek zabaldu zizkiola determinismo biologikoari, Jordan-Young-ek dio Milton Diamond-ek onura atera zuela Money-k David Reimer-ekin izandako porrotetik –etsaietan etsaiena zuen Money–, erabili baitzuen baieztatzeko Reimer-i identitate maskulinoa burmuinean “finkatuta” geratu zitzaioala fetu “normal maskulino” bat zelarrik ekoitzi zuen testosteronaren bitartez<sup>417</sup>. Ironikoki dio: “[I]t is particularly fascinating that... Money, who is presented in the popular version of that story as the absolute embodiment of ‘blank-slate thinking’ about gender, was in fact the very first scientist to extend brain organization theory to humans” (Jordan-Young, 2010, 6. or.). Izan ere, Jordan-Young-ek adierazten duenez, Money –baina ez “lehenbiziko Money” hura, baizik eta geroagokoa, bereziki Anke Ehrhardt-ekin batera

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<sup>415</sup> Bakar batean ere ez da aztertzen lesbianen burmuinik.

<sup>416</sup> Kritiketako batek dio beren burmuina *postmortem* erabilitako teknogorputzetako asko VIHak jota hil zirela eta horrek eragina izan zezakeela beren burmuinean (Jordan-Young, 2010, 105. or.). Zera diote Kruijver eta beste egile batzuek: “We are aware of the fact that our data are based on postmortem brain material derived from a heterogeneous patient population of which each individual’s clinical status might have had an impact on the brain” (2000, 2041. or.). Hala ere, irmoki aipatu zituzten aurkituriko “striking sexual dimorphic differences” delakoak. Horretaz gainera, hildako pertsonen sexualitateari eta desireri buruzko informazio urria aurkeztea da ikerketa/artikulu hauei egindako beste kritiketako bat (Jordan-Young, 2010, 105. or.). Problematizatzen da halaber aztertutako burmuinen egituren garapenearen denborei buruzko informazio falta.

<sup>417</sup> Hori bera jaso zuen Colapinto-k (2006, 209.-210., 270.-271. or.).

lan egin ondokoa–, egile oparoenetako bat izan da hormonek portaeran duten eragina aztertzeke ikerketak sortzeari dagokionez. Baina hori beste historia bat da.

Aipatu ditugun bi artikulu horiez gainera, beste bi lan aztertuko ditugu. Oro har beste bien tesi nagusiei eusten badiete ere, badira zenbait desberdintasun. Ezer baino lehen, har ditzagun berriz emakumeak\*trans\* analogia eta jaio aurretiko hormonekiko esposizioak burmuinean sorturiko sexu-dimorfismoa defendatzen duen determinismo biologikoaren teoria, Baron-Cohen ekinaren eskutik.

Baron-Cohen-en eta haren enpatia-sistematizazioaren (*empathizing-systemizing theory*) (E-S) teoriaren arabera, burmuin femeninoa enpatiarako programatuta dago, hau da, pertsonen pentsamendu eta sentimenduak identifikatzeko eta haien aurrean emozio egokiaz erantzuteko: “The empathizer intuitively figures out how people are feeling, and how to treat people with care and sensitivity” (2005, 23. or.). Burmuin maskulinoa, berriz, sistematizatorako dago programatuta, sistemak ulertzeko eta eraikitzeke: “The systemizer intuitively figures out how things work, or what the underlying rules are controlling a system. Systems can be as varied as a pond, a vehicle, a computer, a plant, a library catalogue, a musical instrument, a math equation, or even an army unit” (2005, 23. or.). Egiatzki, badira hiru burmuin mota: femeninoa edo nagusiki enpatikoa/enpatizatzailea (E mota), maskulinoa edo nagusiki sistematikoa/sistematizatzailea (S mota) eta bion arteko oreka daukatenak edo “balanced brain” deritzenak (B mota). Dena den, gehienetan, bitan laburbil daitezke. Baron-Cohen-en teoria sexu-desberdintasun psikologikoei buruzko aurreko teorien birformulazio bat da; teoria haien ardatza “the holy trinity” deritzona zen: “Spatial ability, mathematical ability, and verbal ability. The first two of these are areas where males perform at a higher level, and the last of these typically shows a female advantage” (2005, 26. or.).

Baron-Cohen-en aburuz, 12 hilabete betetzerako, argiak dira burmuineko sexu-dimorfismoaren ebidentziak, eta esparru anitzetan azaleratzen dira, hala nola haurtzaroko jolasetan<sup>418</sup>. Cambridgeko Unibertsitatearen ikerketa bat aipatzen du<sup>419</sup>, zeinak, Baron-Cohen-en

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<sup>418</sup> Beste desberdintasun batzuk ere aipatzen ditu, hala nola oldarkortasun fisikoa. Haren teoriaren arabera, hori ere gizon eta emakumeen\* burmuinen artean jaio aurretik hormonon eraginez sorturiko desberdintasunei zor zaie: “Gender differences also appear in aggression. Males tend to show far more direct aggression (pushing, hitting, punching). Females tend to show more indirect (relational, covert) aggression, which includes gossip, exclusion, and cutting remarks” (Baron-Cohen, 2005, 24. or.). Geuk aurkituriko jatorrizko testuan, “sex differences” erabiltzen zuen, eta ez “gender differences”, baita “bitchy remarks” ere, eta ez “cutting remarks”. Ez dugu berriz bertsi hori aurkitzerik izan, eta aipatu duguna egileak berak Academia.edu-ko bere orrian argitaraturikoa da. Haren erabakia errespetatu dugu, beraz. Nolanahi ere, garrantzitsua deritzogu haren hasierako adierazpideak ere aipatzeari.

<sup>419</sup> Baron-Cohen-ek bi bertsiotan aipatzen du ikerketa hori, baina ez dakar testu barruan ez erreferentziarik, ez aipurik. Amaieran, bi erreferentzia bibliografiko ematen ditu, bata berea eta bestea hauxe: “Kimura, D. *Sex and*

esanetan, frogatzen baitu neskek denbora gehiago ematen dutela aurpegiei begira eta mutilek aldiz altzari zintzilikatuei begira. Horretaz gainera, azaltzen du nola Cambridgeko lantaldeak ondorioztatu zuen haurren arteko begi-kontaktua faktore biologiko batek determinatzen zuela, jaio aurreko testosteronak, likido amniotikoa neurtuz frogatu den bezala.

Beste ebidentzia batzuk dira mutilek jostailu batzuk nahiago izatea beste batzuk baino: autoak, kamioiak, hegazkinak, ezpatak, pistolak, eraikuntzako jostailuak eta jostailu mekanikoak. Edo lanbide maskulinizatuak, hala nola metalaren sektorea, armen sektorea, eraikuntza-industriak, matematika, fisika eta ingeniartzak. Baron-Cohen-ek tarte bat uzten die kulturari eta sozializazioari, baina predisposizioak biologikoki eta hormonalki ezartzen dira (2005, 24.-25. or.). Hormonen eraginaren teoria berresteko, beste bi adibide aipatzen ditu: batetik, DESa errezetatu zitzairen amengandik jaiotako haurren jolas motetan efektu feminizatzaileak. Bestetik, arratoiekin eginiko esperimentu bat; jaiotzean, testosterona injektatu zitzairen, eta, “maskulinizazio” horri esker, ustez sistematizaziorako gaitasunak hobetu zituzten (2005, 26. or.).

Psikologoak autismoaren ikerketan aplikatu zuen E-S teoria, arlo horretan egin baitu lan gehien. Autismoa burmuin hipermaskulino gisa edo “burmuin maskulino muturreko” gisa kontzeptualizatzen du, eta, haren arabera, fetuan testosteronaren eraginez sortzen da (Baron-Cohen, 2005, 26. or.; Auyeung eta Baron-Cohen, 2008, 185., 200.-201. or.). 2011ko “Brief Report: Female-To-Male Transsexual People and Autistic Traits” artikuluan, Jones-ek eta beste egile batzuek –tarteaz, Baron-Cohen-ek berak– autismoaren espektroaren ezaugarriak zituzten emakumeak\* –zeinek, “burmuin maskulino muturreko”aren teoriaren arabera, portaeraren alderdi batzuk hipermaskulinizatuta baitzeuzkaten– eta “Genero Identitatearen Nahasmendua zuten emakume maskulinizatuak” edo “female-to-male transexualak” edo “transmen” delakoak – ikerketaren terminologia bera erabiliz– lotu zituzten. Zehazki, aurreikusi zuten azken horiek Autismoaren Espektroko Koefiziente (AQ) altua izango zutela.

Hori frogatzeko, 5 taldetako emaitzak alderatu zituzten: (1)  $n = 61$  trans gizon (FtM transexualak); (2)  $n = 198$  trans emakume (MtF transexualak); (3)  $n = 76$  gizon tipiko; (4)  $n = 98$  emakume tipiko; (5)  $n = 125$  pertsona (69 gizon eta 56 emakume) Asperger sindromedun. Trans gizonak AQ altuagoa zuten emakume tipikoek, gizon tipikoek eta emakume transek baino, baina Asperger sindromedunek baino baxuagoa. Hona ikerketaren ondorioa: “[T]ransmen have an elevated number of autistic traits” (Jones et al. 2011, 306. or.). Baliteke hori fetuko testosteronamaila altuaren efektuz gertatzea:

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*Cognition*. Cambridge, MA: MIT Press, 1997” (Baron-Cohen, 2005, 26. or.). Baina, MITen orrira joanez gero, lan horrek 1999ko data du. Ez dugu beste ediziorik aurkitu beste inon.

[S]ince both normative amniotic testosterone studies... and studies of rare genetic conditions in which FT levels are abnormally high (such as in females with Congenital Adrenal Hyperplasia)... indicate that higher FT is correlated with reduced empathy, reduced social interest, reduced social skills, and higher AQ scores. (Jones et al. 2011, 306. or.)

Transexualitateari buruzko Brain Sex Theoryko beste bi artikulu geratzen zaizkigu aztertzeko; zehazki, ikerketa bat eta bilduma-artikulu bat, eta ez Jordan-Young-ek (2010), ez Fausto-Sterling-ek (2012)<sup>420</sup> ez dituzte analizatu. Lehenbizikoa: “Sexual Differentiation of the Bed Nucleus of the Stria Terminalis in Humans May Extend into Adulthood” (Chung et al. 2002). Ikerketa horrek burmuineko zenbait eremutako sexu-dimorfismoaren baieztapena berretsi egiten du, zehazki, hipotalamoko eremu preoptikoko eta aurreko eremuko zelulen zenbait taldetakoa, nukleo suprakiasmatikokoa, BST-dspm-koa eta BSTc-koa, zeina hainbat ikerketa edo artikulutan aipatzen baita, hala nola Zhou eta beste egile batzuen lanean (1997) eta Kruijver eta beste batzuenan (2000). Hala ere, azken horiek ez bezala, BSTc-ko sexu-dimorfismoa helduaroan bihurtzen dela esanguratsu baieztatzen dute.

Chung eta beste egile batzuek 50 burmuin analizatu zituzten *postmortem*, adinaren arabera hiru taldetan sailkatuta: fetu/jaioberriaren aldia –haurdunaldiaren 25. astetik 41. astera–, haurtzaroa/pubertaroa –3 hilabetetik 16 urtera bitartean– eta helduaroa –22 urtetik 49 urtera– (2002). Zhou eta beste egile batzuen (1995) eta Kruijver eta beste egile batzuen (2000) oso antzeko emaitzak lortu zituzten: gizon helduen BSTc-aren tamaina eta neurona kopurua handiagoa zen emakume\* helduena baino. Hala ere, lehen ikerketa horrekiko eta bere luzapenarekiko desberdintasun nagusia zera da: adinean aurrera egin ahala BSTc-aren bolumenean aldaketak topatzen dituztela. Gizonen kasuan, BSTc-aren bolumena nabarmen handitzen zen, eta aldea zegoen aldi guztien artean. Emakumeen\* artean ere, BSTc-aren tamaina handitzen zen adinean aurrera egin ahala, baina aldi guztiak ez ziren desberdinak elkarren artean: baziren desberdintasunak fetu/jaioberriaren aldiaren eta haurtzaroa/pubertaroaren artean, eta fetu/jaioberriaren aldiaren eta helduaroaren artean. Alegia, ez zuten desberdintasun esanguratsurik aurkitu haurtzaroa/pubertaroaren eta helduaroaren artean. Chung eta beste egile batzuen arabera, gainera, helduaroan bakarrik zen gizonen BSTc-a handiagoa emakumeena\* baino, eta helduaroan bakarrik zituen neurona gehiago (2002, 1031. or.).

Aurreko ikerketaren eta haren birlanketaren aldean, desberdintasun nagusia zera da: burmuineko, bereziki BSTc-ko, sexu-dimorfismoaren agerpena ez da jaiotze aurretiko edo

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<sup>420</sup> Fausto-Sterling-ek hemen aztertutako lehen bi artikuluak eta beste bi jaso zituen (2012a, 59.-62. or.), hormona-tratamendurik jaso ez zuten teknogorputzei buruzkoak. Artikulu horiek, Rametti et al. (2011a) eta Rametti et al. (2011b), ez dira burmuinaren *postmortem* ikerketak, baizik eta burmuin bizidunen ikerketak, difusio-tenkagailuen bidezko (DTI) erresonantzia magnetiko bidezko irudiekin eginak.



jaioberriko aldira mugatzen, ezta haurtzarora mugatzen ere, baizik eta helduaroan ere gerta daiteke. Hona haien ondorioa: “[O]ur finding of a sex difference in BSTc volume only in adulthood suggests that marked sex-dependent organizational changes in brain structure are not limited to early development but may extend into adulthood” (2002, 1032. or.)<sup>421</sup>. Egileek sexu-dimorfismoaren agerpen berantiar hori azaltzeko ematen duten azalpen posibleetako baten arabera, “organizational effects of testosterone on sexual differentiation may become clear much later in life” (2002, 1031. or.). Modu berean, baieztatzen dute “although sex differences in gonadal steroids are the most likely factor to cause sexual differentiation of the BSTc and the areas that innervate the BSTc”, ezin dira beste mekanismo batzuk baztertu, hala nola sexu-kromosomen geneen adierazpen lokala: “A candidate gene for such an effect is the *SRY* gene, which was shown to be transcribed in the adult human hypothalamus and cortex of males but not in females” (2002, 1032. or.).

Transexualitateari dagokionez, egileek diote transexualek 20 urtetik 45 urtera bitartean izan zutela lehen kontsulta medikoa, eta hori bat letorke ustezko BSTc-aren tamainaren araberrako sexu-dimorfismoaren agerpen berantiarrekin. Baina bazen arazo bat, hori ez baitzen oso bateragarria transexualitateaz esku artean zeuzkaten datuekin: “67–78% of transsexuals in adulthood report having strong feelings of being born in the wrong body from childhood onward..., supporting the idea that disturbances in fetal or neonatal gonadal steroid levels underlie the development of transsexuality” (Chung et al., 2000, 1032. or.)<sup>422</sup> –ohartu gaitzen transexualitatearen nozioa asaldurekin lotzen dela hemen–. Nola konpondu zuten arazo hori? Bada, artikulua azken paragrafoan nozio berri eta ordura arte agertu gabeko bat txertatuz: “funtzioa”. Hala, BSTc-aren tamainaren araberrako sexu-dimorfismoaren agerpen berantiarrak ez du neutralizatzen, baliogabetzen edo ukatzen gonadetako esteroideak eragina izatea jaio aurretik eta haurtzarora haren funtzioetan. Beraz, gerta liteke fetuen edo jaioberrien testosterona-mailan izandako aldaketek eragina izatea genero-identitatearen garapenean, baina aldaketok ez lukete eragingo BSTc-aren bolumenaren eta neurona kopuruaren berehalako aldaketarik (Chung et al., 2002, 1032. or.).

Horren azpian, transexualitatearen azalpen hau dago: jaio aurretik edo jaiotzean, testosterona-mailan asaldurak gertatzen dira, eta horrek eragin negatiboa dauka BSTc-aren funtzioetan, edo asaldatu egiten ditu, zeinak genero-identitatearen nahasmendua sorrarazten duen

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<sup>421</sup> Hipotesi hori sakonago formulatzen da aurretik: “Therefore, marked morphological changes in the human brain, including sexual differentiation, may not be limited to childhood but may extend into adulthood” (2002, 1031. or.).

<sup>422</sup> Horri beste ebidentzia batzuk gehitzen dizkiote: adibidez, haurdunaldian fenobarbitala edo diphantoina hartzeak jaioberrien transexualitatearen prebalentzia areagotzea dakarrela (Dessens et al., 1999; Chung et al., 2000, 1032. or.-an aipatua).

eta, geroago, zonalde horretako sexu-dimorfismoaren alderantzizkatzea, helduaroan agertu edo ageriko bihurtzen dena. Hori hala azalduz ere, ez dute zehazten ezta azaltzen ere ea loturarik badagoen eta, baldin badago, zer lotura dagoen BSTc-aren tamainaren eta/edo neuronen kopuruaren eta beren funtzioen artean. Halaber, zehaztu gabe uzten dute ea, nahiz eta BSTc-aren aldaketa sexualki dimorfikoak geroago agertzen diren edo ager daitezkeen –horrek ez luke baliogabetuko BSTc-aren funtzioa eta jaio aurretiko edo jaiotzetiko hormonon eragina beronetan–, transexualitateak zerikusirik ba ote duen BSTc-ko sexu-dimorfismoaren alderantzizkatzearekin, bai bolumenari dagokionez, bai neuronei dagokienez, Zhou eta beste egile batzuek (1995) eta Kruijver eta beste egile batzuek (2000) dioten bezala, ala ez. Edo ea transexualitateak funtzioarekin soilik daukan zerikusia, BSTc-aren tamainatik eta neurona kopurutik at, eta ea funtzio hori sexualki dimorfikoa den. Alde horretatik, adierazpen lauso samar bat dakarte: “Alternatively, it must also be taken into consideration that changes in BSTc volume in male-to-female transsexuals may be the result of a failure to develop a male-like gender identity” (Chung et al., 2002, 1032. or.).

Laburbilduz, Zhou eta beste egile batzuen (1997) eta Kruijver eta beste egile batzuen (2000) lanean funtsatu arren, transexualitateaz ematen duten azalpena ez dago zuzenki oinarrituta jaiotzeko edo garapenaren aro goiztarretako BSTc-aren tamainan eta neurona kopuruan, baizik eta jaio aurreko edo jaiotzeko gonadetako esteroideen mailaren nahasmenduetan; nahasmenduok BSTc-aren *funtzioak* ere asalda ditzakete, eta horrek helduaroan BSTc-aren tamainaren eta neurona kopuruaren sexu-dimorfismoa alderantzizkatzea ekarriko luke, eta, horrenbestez, eragina izanez genero-identitatearen garapen *normalean*.

Laugarren artikulua, “Sexual differentiation of the brain and behavior”, hainbat egileren artikulua eta azterketen bilduma zabal bat da. Hala, Swaab-ek azalpen neurobiologiko bat ematen du transexualitateari buruz, zeina giza burmuinaren antolaketaren teoriaren barnean txertatzen baitu. Burmuin-egituren alderantzizkatzearen eta jaio aurreko eta jaiotzeko hormonon eraginen bitartez azaltzen du transexualitatea<sup>423</sup>. Swaab Brain Organization Researcharen funtsezko egileetako bat da –beste izen batzuk: LeVay, eta Laura Allen, baita haren mentore Roger Gorski ere, zeina Benjamin-ek aipatzen baitu 1967ko artikuluan–, eta Jordan-Young-ek azaldu ditu haren tesiak. Artikulu horren aipamena behin ageri da *Brain Stormen* (Jordan-Young, 2010, 166. or.), baina ez da xeheki analizatzen.

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<sup>423</sup> Artikuluan lantzen den beste gai bat sexu-orientazioa da, baina ez dugu aztertuko, ez baita gure gai nagusia.

Swaab-en teoriaren arabera –zeinari Aristotelesen metafora baitario maiz, hau da, maskulinoa presentzia gisa eta femeninoa absentsia gisa ulertzea<sup>424</sup>, zeinari femeninoaren agerpen eza gehitu behar zaion–, genitalak, obulutegiak edo testikuluak haurdunaldiaren lehen sei asteetan garatzen dira. Gene sail baten eraginez gertatzen da hori, besteak beste, “sex-determining gene on the Y chromosome (the SRY)” delakoaren eraginez<sup>425</sup>, baina badira beste faktore batzuk ere (2007, 431. or.). Femeninotzat hartzen diren sexu-organoen –sexu-generizatuena– umetoki barneko garapena androgenoen absentsian oinarritzen da nagusiki, eta maskulinoena, berriz, haien presentzian (2007, 432. or.).

Burmuina da umetoki barnean “bereizten” hurrengoa –beharbada, egokiagoa litzateke “dimorfizatu” forma–, Swaab-ek dioenez. Burmuina “norabide maskulino”an garatzen da testosteronak nerbio-sisteman garatzen ari diren zelulen gainean duen ekintza zuzenaren bitartez; “norabide femenino”an garatzen da, berriz, nesken kasuan, testosteronarik ez dagoenean. Swaab-en aburuz, badira bi testosterona-gailur. Lehena jaio aurreko estadioetan gertatzen da: “[T]estosterone levels peak in the fetal serum between weeks 12 and 18 of pregnancy. In weeks 34–41 of pregnancy the testosterone levels of boys are 10 times higher than those of girls” (2007, 432. or.). Bigarrena, bizitzako lehen hiru hilabeetan, eta orduan erdiesten dira, Swaab-en arabera, helduaroko testosterona-mailak: “[t]his two peaks of testosterone are said to fix the development of structures and circuits in the brain for the rest of a person’s life (= programming, organizing)”, hots, modu iraunkor batean (2007, 432.-433. or.). Modu honetan, “gender identity (the feeling of being a man or a woman) and our sexual orientation are programmed into our brain structures when we are still in the womb” (2007, 442. or.). Pubertaroan, neurobiologoak dioenez, “sexu-hormonek” umetokian garaturiko burmuin-zirkuituak aktibatzen dituzte (2007, 432. or.).

Swaab-ek David Reimer-en kasua ere jaso du, eta Money-ren 1950eko hamarkadako teoriak kritikatu, argi eta garbi Diamond-en korrante deterministarekin bat eginik. Baron-Cohen-

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<sup>424</sup> Femeninoa zientzian –zehazki, garapenaren biologian– absentsia gisa analizatzeko eta kritikatzeko, ikus Fausto-Sterling (1989). Honen aburuz, “the generally accepted theory of sex determination claims that female differentiation is determined by the *absence* of something, that a female develops when something is lacking” (1989, 327. or.).

<sup>425</sup> Maskulinoa presentzia gisa eta femeninoa absentsia gisa ulertzen dituen logika aristotelikoa argi ikusten da SRY geneari dagokionez. Y kromosomako SRY geneak determinatzen du *maskulinoaren* sexu-garapena, baina sexu-garapenaz oro har hitz egiteko erabiltzen da: “In many research papers the genetic factor on the mammalian Y chromosome is called the “sex determining factor” rather than the “male determining factor... Femaleness then becomes an absence, something that happens by default, something that does not merit the same level of scientific investigation as the more active male process...” (Fausto-Sterling, 2012a, 16. or.). Tradizio hori gutxienez Aristotelesen garaitik datorrela azaldu ondoren, Fausto-Sterling-ek zera dio: “Given our rich past of conceptualizing the female as a lack or absence, it is probably more than an accident, although less than a conspiracy, that, when writing about sex determination, scientists slip without noticing into linguistic muddiness” (2012a, 17. or.). Horren aurrean, berak aldarrikatzen du badela garaia metafora berriak asmatzeko. SRY geneari buruz, ikus Fausto-Sterling (2012a, 19. or.).

en gisara, Swaab-ek defendatzen du neskato eta mutikoen portaera eta lehentasunen arteko desberdintasunak, oldarkortasunetik jokorainokoak, ez direla sortzen haurzaintzaren eta sozializazioaren kausaz, berezkoak baitira. Neskek mutilek baino joera handiagoa dute giza irudiak, loreak edo tximeletak marrazteko, horretarako gorria, laranja eta horia erabiliz, eta oro har gai baketsuak aukeratzen dituzte; mutilek, aldiz, nahiago dute objektu teknikoak, armak, autoak, trenak edo hegazkinak marraztu, kolore ilun eta hotzetan, hala nola urdinez; eta hori guztia jaiotze aurreko eta jaiotzeko hormonek burmuinean duten eraginagatik gertatzen da, burmuina sexu-generikoki programatuta geratzen baita betiko (2007, 434. or.). Primateekin eginiko azterketa batean oinarrituta, zera baieztatzen du neurobiologoak: “It thus seems as if the sexual differences in play behavior originated early on in our evolution, before the hominids, and that they are imprinted during intrauterine development under the influence of sex hormones” (2007, 433. or.).

Hortik abiatuta, Swaab-ek “genero-arazo” gisa kontzeptualizatzen du transexualitatea – “genero-disforia” ere aipatzen du, behin–, eta zera dio: “Transsexuality is characterized by a conviction of having been born in the wrong body” (2007, 435. or.). Hori sexu genitalaren eta burmuineko sexuaren arteko inkoherentziaren bitartez azalduko litzateke. Gogoratu dezagun genitalen sexu-diferentziazioa haurdunaldiaren lehen bi hilabeteetan gertatzen dela; burmuinarena, berriz, neurobiologoaren arabera, haurdunaldiaren bigarren erdian hasten da, eta helduaroraino luza daiteke bere ageriko agerpena. Bi prozesuok elkarrengandik bereiz gerta daitezke, eta horren ondoriozkoa da transexualitatea: “[P]eople with male sexual organs who feel female and viceversa” (Swaab, 2007, 442. or.). Jaiotzean sexu anbigua izanez gero ere gerta daiteke hori; izan ere, gerta daiteke genitalen eta burmuinaren maskulinitate-mailak bat ez etortzea. Swaab-ek Chung eta beste egile batzuen (2002) adierazpenak ere jaso ditu; esan nahi baita, haurdunaldian fenobarbitala edo diphantoin-a hartu duten emakume\* epileptikoek arrisku handiagoa dute haur transexualak izateko, bi substantziok interferentzia egiten baitute “sexu-hormonen” metabolismoan eta eragina izan baitezakete fetuen burmuinen sexu-diferentziazioan. Neurobiologoak irrimo dio: “There are no indications that postnatal social factors could be responsible for the occurrence of transsexuality” (Swaab, 2007, 436. or.).

Swaab-ek Zhou eta beste egile batzuen (1997) eta Kruijver eta beste egile batzuen (2000) BSTc-aren tamainaren eta neurona kopuruaren sexu-dimorfismoaren –sexu-generizatuaren– inguruko “emaitzak” berresten ditu, hala nola hauen alderantzikatzea transexualitatearen kasuan. Halako kasuetan, burmuinaren sexu-garapena alderantzikatzen denez genitalen garapenarekiko, espero izatekoa litzateke, dio Swaab-ek, burmuin-egiturak alderantzikatzea eta horrenbestez aurkitzea “female structures in a male brain and viceversa”.

Honela jarraitzen du: “[I]ndeed, we did find such a reversal in the... (BSTc), a brain structure that, in rats, is involved in many aspects of sexual behavior... However, a gender identity test for a rat does not exist, and this can therefore be studied only in humans” (Swaab, 2007, 436. or.). Swaab-ek transexualitateari buruz hori guztia esan zuen, azterketa-lagin bakarrak 6 MtF transexualenak, trabesti batenak eta FtM transexual batenak zirenenean oraindik ere.

Neurobiologoak ukatu egiten du identitate sexu-generizatuaren garapenean ingurune sozialak jaio ondotik daukan eragina: “There is no proof that social environment after birth has an effect on the development of gender or sexual orientation” (2007, 442. or.). Burmuinaren antolaketaren aldaketak iraunkorrak dira, eta pubertaroko aldaketak antolaketa-aldaketa horien aktibazioa besterik ez dira, batik bat hormonalak dena, baina partehartze genetikoarekin ere.

#### **4.4.2. Transexualitateari buruzko teoria determinista biologikoak eztabaidatzen**

Oro har, bi kritika mota egin dakizkioke Brain Sex Theory teoriari eta Jordan-Young-ek “Brain Organization Research” izendatu duenaren zati bati: kritika metodologikoa edo diseinuaren kritika, eta mamiaren kritika. Jordan-Young-en kritikek ez dute hainbeste ikustekorik zientzia itxuratzen duten faktore sozial eta kulturalekin, baizik eta ikerketa zientifiko hauen alderdi teknikoekin. Berak honela aitortzen du: “I am trained as a scientist, and I value scientific method. I believe it is worth holding scientific research— especially high-profile research on a topic that is of great social and political importance—to the highest standards” (2010, 12. or.). Alde horretatik, Brain Organization Research osatzen duten ikerketa eta artikuluak, hemen aztertu ditugunak barne, ez dira esperimentuak, baizik eta *kuasi-esperimentuak* (2010, 3. or.).

Jaio aurreko hormonek giza garapenean zer eragin duten aztertzen duten esperimentu errealak –ikerketaren xedea genitalak, burmuina zein portaera izan– ezinezkoak dira, etika-kontuengatik. Animalia ez-gizatiarrekin egiten diren esperimentuak ez daude problematizitate etiko eta politikotik salbu, baina guztiz naturalizatuta dagoen jarduera bat da, oharkabean pasatzen dena.

Problematizitate etikoarekin batera, giza burmuinaren antolaketari buruz esperimentu kontrolatuak egitea ikaragarri konplexua eta zaila da, ezinezkoa ez esateagatik, batik bat –baina ez soilik– burmuina eta neuronen arteko konexioak bizi guztian zehar garatzen direlako, beste teknogorputz batzuekin eta ingurunearekin interakzioan, eta, horrenbestez, hauek ezinbesteko elementuak dira neuronen arteko konexioak sortzeko –neurogenesisia–, sendotzeko eta

mantentzeko, bai burmuineko zelulen artean, bai burmuinaren eta gorputzeko gainerako atalen artean (Jordan-Young, 2010, 43. or.; Boldrini et al., 2018, 589., 597. or.; Moreno-Jiménez et al., 2019, 3. or.)<sup>426</sup>. Alegia: “(the size and shape of particular brain areas and how various areas connect), as well the function of key cells such as hormone receptors, all depend to some extent upon the particular stimulation and interaction the person experiences” (Jordan-Young, 2010, 43. or.). Ondorioz, ezinezkoa da burmuinaren garapena analizatzea ingurunea kontuan hartu gabe, baina ez dimentsio beregainak diren heinean, baizik eta elkarren eraketari begira. Esperimentuen eremuan, horrek esan nahi du ezinezkoa dela –gaur egun behintzat– kondizio eta estimulu berdin-berdinak edo oso antzekoak lortzea ehunka edo milaka haur eta neraberren lagin baterako bi hamarkadatan zehar eta eguneko 24 orduetan. Ezinezkoa litzateke teknogorputz guztion interakzioak kontrolpean izatea.

Baina badago beste aukera bat, esperimentu mota ez hain kontrolatu bat, hain justu ere faktore jakin batek askotariko faktoreek parte hartzen duten prozesu luzeetan zer eginkizun duen neurtzeko: saiakuntza kliniko (Jordan-Young, 2010, 44. or.). Halako probek, estatistikoki esanguratsuak izateko, honako ezaugarri hauek izan behar dituzte: teknogorputzak zoriz aukeratuak izatea, kopuru esanguratsu bat izatea –ehunka edo milaka–, eta itsu bikoitzeko saiakuntzak izatea, hau da, ez jakinaraztea nor ari den plazeboa eta droga hartzen<sup>427</sup>. Giza teknogorputzetan hormonek dituzten efektuak neurtzeko lehen saiakuntza kliniko aleatorio eta itsu bikoitzekoa Dieckmann eta beste egile batzuek (1953) egin zuten, DESarekin, tesi honen hirugarren kapituluaz azaldu dugun bezala. Giza burmuinaren antolaera aztertzeko entsegu kliniko batek eskatuko luke haurdun asko eta asko esleitzea zenbait talderi eta talde horietan sistematikoki aldatzea hormonekiko kontaktua; aldi berean, eskatuko luke haien ingurune sozialeko inork ere –ezta berek, haurrek eta doktoreek ere– ez jakitea zer hartu edo zerekin kontaktuan egonak ziren. Denborarekin, haur horien fetu-garaiko hormonekiko esposizioa alderatu liteke, eta, helduaroan, zientzialariak saiaturiko ziren argitzen ea erlazioaren badagoen hormonekiko esposizioaren eta sexualitatearen artean. Aukera hori ere fikzioaren esparruan dakusagu (Jordan-Young, 2010, 44. or.).

Hortaz, Brain Sex Theory eta Brain Organization Research teorien sendotasuna eta indarra problematizatzen duen lehen argudioa zera da: ez daudela funtsatuta ez esperimentu zientifikoetan, ez itsu bikoitzeko saiakuntza kliniko aleatorioetan. Horrek beste bi argudio dakartza inplizituki: oso-oso teknogorputz gutxiren gainean ateratzen direla ondorioak –lau

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<sup>426</sup> Eskerrak eman nahi dizkiot Irantzu Urizi, interakzio eta estimulu bidezko neuronon arteko konexioen eraketen inguruko gure elkartrukeengatik.

<sup>427</sup> Idealki, horrek bai pazienteak bai zientzialariak inplikatzeko ditu (Jordan-Young, 2010, 44. or.).

azterketak edo artikulua kontuan hartuta, zortzi trans\* teknogorputz dira guztira: sei MtF, trabesti bat eta FtM teknogorputz bat. Horretaz gainera, ez dira aleatorioki aukeratuak. Hona hemen Jordan-Young-en ondorioa: “Neither individual studies nor even a small set of replications can ever be decisive in supporting the theory of brain organization in humans. Nor can the results of even a vast number of quasi experiments simply be evaluated in an “additive” fashion” (2010, 44.-45. or.)<sup>428</sup>.

Animalia-teknogorputz gizatiarretan berez esperimenturik egin ezin denez, zientzialariek beste animalia-teknogorputz batzuekin egindako azterketen eta giza teknogorputzekin egindako *kuasi-esperimentuen* ebidentzien piezak biltzen dituzte beren ondorioak funtsatzeko, baina halako azterketa eta *kuasi-esperimentuak* partzialak eta ez-kontrolatuak dira definizioz. Zhou eta beste egile batzuek karraskarien gaineko ikerketak bildu dituzte (1995, 68., 69., 70. or.), Kruijver eta beste egileek arratoien gainekoak (2000, 2039. or.), Swaab-ek arratoi eta hudoen gainekoak (2007, 439. or.), eta Chung eta beste egile batzuek txerri, primate eta arratoien gainekoak (2002, 1031. or.). Zhou eta beste egileek, adibidez, zerbait “berria” aurkitu baino gehiago, aurretiko hipotesi bat formulatu dute, beste animalia batzuen burmuinaren gaineko ikerketetan oinarritua, eta, gero, hipotesi hori gizakien burmuinean berresten saiatu dira:

In experimental animals... the same gonadal hormones that prenatally determine the morphology of the genitalia also influence the morphology and function of the brain in experimental animals in a sexually dimorphic fashion.... This led to the hypothesis that sexual differentiation of the brain in transsexuals might not have followed the line of sexual differentiation of the body as a whole. (1995, 68. or.)

Adibide horretan, badira bi “akats” metodologiko. Batetik, ondorioa ezarrita dago aldez aurretik: “[S]ex differences in the size and cell number of the BST have been described in rodents which are influenced by gonadal steroids in development” (Zhou et al., 1995, 68. or.). Beraz, “aurkikuntza” hori giza burmuinean ere badagoela berrestean edo egiaztatzean datza ikerketa, eta horrek nozio honekin topo egiten du: “Scientists can test only what they do not take

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<sup>428</sup> Anne A. Lawrence psikologo, sexologo eta trans\*-gaiei buruzko idazle emankorrek, parafilia gisa kontzeptualizatzen duena bere transexualitate mota, ere kritikatu ditu Zhou eta beste egile batzuen (1995), Kruijver eta beste egile batzuen (2000) eta Chung eta beste egile batzuen (2002) artikulua eta/edo ikerketak. Lawrence-ren ustez, ikerketa horiek, zerbait frogatzekotan, frogatzen dute helduaroan hormona bidezko terapiak hartzeak eragina daukala giza burmuinean: “The simplest and most plausible explanation of the Zhou/Kruijver findings is that they are attributable, completely or predominantly, to the effects of cross-sex hormone therapy administered during adulthood. There is no longer any reason to postulate anything more complicated” (2007, 7. or.).

for granted” (Jordan-Young, 2010, 55. or.). Bestetik, inferentzia eta estrapolazio batzuk ez daude justifikatuta: karraskarien burmuinen gaineko ikerketetatik ateratako ondorioak giza burmuinean aplikatzea.

Ikerketaren lausotasuna eta zorroztasun-falta agerian geratzen dira berriz ere: “Considered together with *information* from animals, then our study supports the hypothesis that *gender identity* alterations may develop as a result of an altered interaction between the development of the brain and sex hormones...” (Zhou et al., 1995, 70. or.; geuk nabarmendua). Chung eta beste egile batzuen lanean ere ikusten da nola egiten dituzten arratoien burmuinei buruzko ikerketetatik giza burmuinenetarako estrapolazio eta inferentzia justifikaezin berberak eta nola lortu nahi diren alde zuzenak jakinak diren emaitzak:

For instance, perinatal sex differences in testosterone are required for the principal nucleus of the BST in the *rat brain* to become larger and contain more cells in males than in females... Moreover, *these sex-dependent morphological changes occur within the first week of postnatal life... Therefore, gonadal steroids are presumed to play a role in the sexual differentiation of the human BSTc... which was predicted to be apparent early on during fetal or infant development. This idea is further supported by observations in humans, which indicate that dramatic changes in circulating gonadal steroid levels do not seem to alter the size of the BSTc in adult control subjects.* (2002, 1027. or.; geuk nabarmendua)<sup>429</sup>

Jordan-Young-i jarraituz, espezieen genitalen eraketan, garapenean eta eboluzioan dauden antzekotasunak ezin dira alderatu haien burmuinen eraketan, garapenean eta eboluzioan dauden antzekotasunekin. Egileak dioenez, azken horiek txikiagoak dira, giza burmuinak askoz ere konplexuagoak baitira, eta, horregatik, askoz denbora gehiago behar dute azalertzeko eta garatzeko (2010, 48.-49. or.). Hori hala izanik ere, Chung eta beste egile batzuen ikerketan badira ornodunen burmuinari buruzko orokortasun batzuk talde gutxi-asko homogeen bat iradokitzen dutenak: “In general, perinatal sex differences in gonadal steroid levels are responsible for organizing the vertebrate brain in a sex-dependent manner” (2002, 1027. or.).

Fausto-Sterling-ek ere kritikatu du beste animalia batzuen burmuinei buruzko ikerketen ondorioak giza burmuinera aplikatzea, bereziki ustezko sexu-dimorfismoari dagokionez. Ugaztun eme askok testosteronarekiko sentiberatasun diskretuko aldi bat igaro ohi dute hasieran, baina beste batzuek, hala nola txerriek, ez (2000, 231. or.). Izan ere, txerri emeek jaiotzetik pubertarora bitartean erantzuten diote testosteronari, eta injektaturiko hormonen portaera-efektuek aurrera egiten dute denborarekin (2000, 231. or.). Gogoratu dezagun Chung eta beste

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<sup>429</sup> Aiputik kendu ditugun zatiak ez dira testu-zatiak, baizik eta erreferentzia bibliografikoak.



egile batzuk “relatively late sexual differentiation has also been observed in the pig hypothalamus” delakoaren aurkikuntzetan oinarritzen direla (2002, 1031. or.)<sup>430</sup>, eta hori bat etorriko litzateke Fausto-Sterling-ek dioenarekin, baina haiek erabiltzen dute zertarako eta baieztatzeko giza burmuinaren BSTc-a jaio aurretik eta jaiotzean hormonon eraginez sexualki dimorfiko gisa antolatuta geratu arren, diferentziazio anatomikoa geroago agertzen dela, modu esanguratsu batean, helduaroan. Alegia, aldarrikatzen dute berandu agertzen bada ere sexu-dimorfismoa, hormonalki finkatuta geratzen dela giza burmuinean jaio aurreko eta jaiotzeko estadioetan. Fausto-Sterling-ek, baina, ondorio oso desberdin bat ateratzen du horretaz –kasu honetan, txerri emeen sexu-portaerari dagokionez–, esperientziaren garrantziaz dihardu eta: “Since juvenile pigs frequently engage in sexual play in both male-male and male-female combinations, it seems especially possible that experience and hormone co-produce adult behaviors” (2000, 231. or.).

Oro har, Fausto-Sterling Jordan-Young baino harago doa, zera baieztatzen baitu gorago ingurunearen garrantziaz esan dugunaren haritik:

It seems ironic, therefore, that our most prominent and influential accounts of the development of sexual behaviors in advanced mammals omit learning and experience. Because the control of hormone synthesis differs between primates and other species, a case can be made that studies on the hormonal basis of sexual behaviors in nonprimates tell us little, if anything, about primates, including humans... I make a broader claim: that the theories we have derived from rodent experimentation are inadequate even for rodents. (2000, 232. or.)

Izan ere, esperientziaren garrantzia nabarmentzen du are karraskari emeen hormona-mailetan ere, eta haien sexu-portaeraren garapena birkontatzen du ingurunearen eta biologiarren interakzioaren eta elkarrekiko osaeraren bitartez. Baina hori ere beste kontu bat da.

Lau ikerketa edo artikulu horietan aurkitzen dugun beste elementu arazotsu bat burmuinaren *postmortem* ikerketa da. Zaila da gorputz kailukara gainerako burmuinetik bereiztea, aski konplexua eta irregularra baita mugaezina izateko, eta, hortaz, haren behaketak asaldurak eta deformazioak dakartza, zaintze- eta finkatze-metodoen bitartez. Horri objektu zientifikoa *sortzen* laguntzen duten bisualizazio-teknikak eta -aparatuak gehitu behar zaizkio<sup>431</sup>.

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<sup>430</sup> Zehazki, zera diote: “The number of cells in the sexually dimorphic vasopressin and oxytocin-containing nucleus in the pig hypothalamus increases in (post)adolescent females but not in males” (Van Eerdenburg eta Swaab, 1994; Chung et al., 2002, 1031. or.-an aipatua).

<sup>431</sup> Kruijver eta beste egileek SONY B/W CCD kamera bati konektaturiko Zeiss eskaner bat erabili zuten, planapo objektibodun mikroskopio batean (Kruijver et al., 2000, 2.036. or.). Zhou eta beste egileek, berriz, HP-UX 9.0 sistema eragileari konektaturiko Calcomp 2000 digitalizatzaile baten bidez ikertu dituzte BSTaren 6 mm-ko serie-sekzioak, Zeiss mikroskopio bat erabiliz, 2.5x-eko objektibo batekin eta 10x (PLAN) motako objektibo

Fausto-Sterling-i jaramon egitera, zientzialariek zenbait segmentazio-metodo aukeratu eta zenbait subdibisio kopuru eraikitzen dituzte: “Each approach to subdividing the CC represented an attempt to tame it—to make it produce measurements the authors hoped would be objective and open to replication by others. Labeling choices gave the methods different valence” (2000, 127. or.). Finkatze-metodoei dagokienez, askotariko metodoak daude, baina denek eragiten dute deformazio edo asalduraren bat, Fausto-Sterling-ek dioenez. Zhou eta beste egile batzuen (1995, 70. or.), Kruijver eta beste egile batzuen (2000, 2034. or.) eta Chung eta beste egile batzuen (2002, 1027. or.) lanetan, formalina erabili zuten, formaldehidoaren edo metanalaren ur-soluzioa. Finkatze horren ondotik –37 egun, Kruijver eta beste egileen kasuan–, burmuinak mikrotomo batez ebaki, deshidratatu, eta parafinatan blaitu zituzten.

Fausto-Sterling-ek dioenari jarraituz, Kruijver eta beste egileek berek ere onartu dituzte muga horietako batzuk; burmuin transexual kopuru benetan txikia aztertzeaz gainera, zera diote:

The development of high resolution imaging techniques may allow *in vivo* volume measurements of particular brain areas in much larger groups of transsexuals... Although brain imaging proved to be useful in visualizing [*e.g.* septo-hypothalamic brain injuries leading to hypersexuality or altered sexual preference...], precise neuroanatomical delineation of small brain structures such as the BSTc or neuronal counts are, at present, not possible using such techniques. (2000, 2041. or.)

Fausto-Sterling-en aburuz, “that researchers continue to probe the corpus callosum in search of a definitive gender difference speaks to how entrenched their expectations about biological differences remain” (2000, 145. or.). Horren aurrean, zera azaltzen du: “[T]he real excitement of studies on the corpus callosum lies in what we can learn about the vastness of human variation and the ways in which the brain develops as part of a social system” (2000, 145. or.). Hain zuzen, giza burmuinen arteko desberdintasunen multiplizitate horretatik dator –kontuan hartuta desberdintasunok ingurunera irekitako sistema sozial baten parte gisa daukaten garapenetik eratorriak direla– halako ikerketei egiten zaien kritika garrantzitsuenetako bat: burmuinak ez direla sexualki edo, hobeki esanda, sexu-generikoki dimorfikoak. Haien anizkoitzasuna ezin da dimorfikoki sailkatu, finkatu eta murriztu:

The point here is not to say that there are no sex differences in behavior or cognitive skills; on average, when large groups of people are involved, there do seem to be some small but real sex

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okularrekin (1995, 70. or.). Chung eta beste egileen kasuan, “[c]ross-sectional digital images (every 50th to 100th section) were made using a 2.5x objective (Plan-Neofluar) on a Zeiss Axioskop microscope, mounted with a Sony B/W CCD camera (model XC77CE) that was connected to an IBAS imaging analysis system (Kontron Elektronik)” (2002, 1.029. or.).

differences (though this does not mean such differences are innate...). The point, instead, is that the nature of differences between the sexes is such that it is misleading to talk about “male-type” or “female-type” cognitive patterns, even though it is currently popular to do so. There is simply too much overlap between the sexes, and too much variation in traits and skills within each sex, for that sort of categorical reference to be meaningful. (Jordan-Young, 2010, 52. or.)

Norabide berean, Fausto-Sterling-ek eta Dafna Joel-ek baieztatu dute giza burmuina hobeki deskribatzen dela populazio heterogeneo bakar batean bitan baino, eta burmuin maskulino eta femeninoen artean maiz aurkitzen diren “desberdintasun”ek ez dakartela inongo loturarik burmuinaren eta sexuaren artean; hori dela eta, proposatzen dute “sexua” kategoria baztertzea burmuinaren egitura eta funtzioei buruzko ikerketetan (2016, 5.-6. or.). Sexu-generoa sozialki sorturiko zerbait da, baina burmuinari edo burmuinaren atal batzuei egotzi zaie – gizakiarenari, kasu honetan–, edo haien ezaugarri gisa hartu da. Burmuinaren sexu-generoaren jatorria, beraz, soziala da, eta ez dauka inongo zerikusirik burmuinarekin.

Joel-ek (2011, 3. or.) eta Joel eta Fausto-Sterling-ek (2016, 1. or.), mosaikoaren eta continuumaren ikuspegitik, adierazi dute erabilera oker bat egiten dela, askotan, “sexu-dimorfismo” eta “desberdintasun” kontzeptuak nahasi eta parekotzat hartzearen ondorioz. Hori oso garbi ikus daiteke aztertu ditugun lau artikuluetan; izan ere, batzuetan “sexu-dimorfismo” ere erabiltzen duten arren, askotan erabiltzen dute “BSTc-aren desberdintasunak” kontzeptua, hau da, gizonen BSTc-a emakumeena\* baino handiagoa dela eta neurona gehiago dituela. Zhou eta beste egile batzuen artikulua baten izenburuan bertan, honako hau irakur daiteke: “A Sex Difference in the Human Brain and its Relation to Transsexuality” (1995, 68. or.). Hortik aurrera, artikulua guztian zehar erabiltzen da oker “sexu-desberdintasun”aren kontzeptua (1995, 68., 69., 70. or.).

Chung eta beste egile batzuek zera diote: “In summary, our finding of a *sex difference* in BSTc volume only in adulthood suggests that marked sex-dependent organizational changes in brain structure are not limited to early development but may extend into adulthood” (2002, 1032. or.; geuk nabarmendua). Era berean, Swaab-en bilduma-artikuluan ere barra-barra aurkitu daiteke “desberdintasun” hitza “dimorfismo” ordez: “The different brain structures that result from the interaction between hormones and developing brain cells are thought to be the basis of sex differences in the structure of the brain, and thus for behavior” (2007, 433. or.). Hona beste adibide batzuk: “*Sex differences* are not only found in relation to gender and sexual orientation, but also in cognition, aggression, and many other behaviors” (2007, 442. or.; geuk nabarmendua); “[u]nfortunately, the *sex difference* in the BSTc does not become apparent in the

BSTc volume until early adulthood, and this neuroanatomical *sex difference* therefore cannot play a part in the early diagnosis of transsexuality” (2007, 437. or.; geuk nabarmendua).

Ildo berean, azterturiko ikerketa eta/edo artikuluen beste arazo bat definizio- eta argitasun-falta eta are kontraesan terminologikoa da<sup>432</sup>. Swaab-en artikuluan, “transexualitate”aren inguruko nahaste semantiko larria dago, kontuan izanik horixe dela bilduma-lanaren kategoria eta gai nagusietako bat. Paragrafo berean, “genero-identitate” gisa eta “sexu-orientazio” gisa definitzen da transexualitatea:

The different brain structures that result from the interaction between hormones and developing brain cells are thought to be the basis of sex differences in the structure of the brain, and thus for behavior, *gender identity* (the *feeling* of being either a man or a woman), gender role (behaving as a man or a woman in society), *sexual orientation* (heterosexuality, homosexuality or *transsexuality*) and sex differences regarding cognition and aggressive behavior... may be influenced independently of each other, which may result in people with male sexual organs *who feel female and vice versa* (a phenomenon called *transsexuality*). (2007, 433. or.; geuk nabarmendua)

Jordan-Young-en iruzkinen arabera, eta tesi honetan zehar egiaztatu dugunez, “sexua”, “generoa”, “sexu-generoa”, “sexualitatea”, “sexu-orientazioa”, “identitate sexu-generikoa”, “trans\*”, “transexualitatea” edo “transgeneroa” kontzeptu konplexuak dira; ez dute esanahi bateratu eta homogeneorik; era askotara erabiltzen dira askotariko diziplina, egile eta kolektiboetan; eta problematikoak dira, begi-bistakoak baino gehiago. Labur-labur burutu dugu “trans\*” terminoaren genealogia, zeinak gorpuztasun-subjektibitateen multiplizitate handi bati egiten baitio erreferentzia. “Genero” terminoari dagokionez, hainbat kontzeptu eta esanahi erabili izan dira eta erabiltzen dira; besteak beste, “genero-rol”, “genero-identitate” eta “genero-adierazpen”, besteak beste. Gauza bera gertatzen da “sexu”rekin; aldaera ugari edukitzeaz gainera –geneak, kromosomak, hormonak, genitalak, etab.–, agerian geratu da soziokulturalki eraikia dela. Jordan-Young-en iritziz, kontzeptuen aldaketa historikoek, haien aldagarritasun semantikoak eta diziplinaren araberrako erabilerak sexualitatearen eta generoaren gaineko ikerketek berez daukaten zailtasun kontzeptuala areagotzen dute (2010, 60. or.).

Horrek kontrastea egiten du artikuluan hauek nozio horiei buruz dagoen sinplifikazioarekin, azalpen-faltarekin eta eztabaida- edo ñabardura-faltarekin, hala nola Kruijver eta beste egileen artikuluan: pasarte batean, “sexu-identitatea”, “BSTc-aren desberdintasuna

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<sup>432</sup> Alde batera utzita, Jordan-Young-ek dioen bezala, askotan artikuluko zientifikoak itzuli egin behar direla gizarteak uler ditzan, erabiltzen duten hizkera teknikoaren eta espezifikotasunaren ondorioz, baliatzen dituzten neurri eta metodoen ondorioz, eta are ikergai dituzten elementuen ondorioz; horrek kontraste argia egiten du artikuluko ulertzeko erraztasunarekin (2010, 61. or.).

generoaren arabera”, “sexuaren ezaugarri fisiko eta genetikoak”, “aurkako sexua”, “transexualitate genetikoak”, “sexuaren ezaugarri biologikoak”, “burmuineko sexu-diferentziazioa” eta halako kontzeptuak erabiltzen dituzte haien esanahi zehatza azaldu gabe eta kontzeptu horien eta erreferentzia egiten dieten elementu biologikoen arteko lotura ere azaldu gabe:

*Gender identity (i.e. the feeling to be male or to be female) is an important trait of a subject. Transsexuals experience themselves as being of the opposite sex, despite having the biological characteristics of one sex... In line with the hypothesis that in transsexuals sexual differentiation of the brain contrasts with that of the genetic and physical characteristics of sex, our group has recently found that the size of the central subdivision of the BST (BSTc) was within the female range in genetically male-to-female transsexuals... A crucial question resulting from that study was, therefore, whether the difference according to gender in the BSTc is based on a neuronal difference in the BSTc itself or rather a reflection of a difference in innervation from the amygdala. (Kruijver et al., 2000, 2034. or.; geuk nabarmendua)*

Oro har, deigarria eta harrigarria da hain konplexua den gauza bat, identitate sexu-generikoa, kasu honetan, “trans\*” terminoan biltzen dugunarena, hormonon eraginez programatu eta antolatutako burmuineko eremu ñimiño baten tamainara edo haren neuronon kopurura murriztea eta hortik ondorioztatzea. Jauzi kontzeptual horretaz gainera, erredukzionismo horrekin batera, justifikaziorik gabeko inferentzia bat egiten da: burmuineko eremu horretatik ondorioak ateratzea norbaitek bere bizitza guztian zehar izango dituen portaera sexu-generizatuaz. Halako azalpen zientifiko bat gertu legoke magikotasunetik. Ikuspegiz irakurriz gero, fantasiako kontu bat dirudi.

Bestalde, atal honen hasieran “trans\*” terminoarekin ikusi dugun bezala, terminoak edo kontzeptuak aldatu egiten dira denborarekin. Fausto-Sterling-ek lesbianismoarekin eta homosexualitatearekin loturiko artikulu zientifikoetan terminologiak nolako eboluzioa izan duen aztertu du. Haren arabera, lesbianek eta gayek gero eta ikusgarritasun eta garrantzi sozial handiagoa izateak animalia ez-gizatiarren esperimenduetako hizkuntza aldatu zuen, baita alderantziz ere –karraskariekin eginiko esperimenduei erreparatu die berak–. Hala, 1978tik 1998ra bitartean *Hormones and Behavior* aldizkarian argitaraturiko artikuluetan erabili zen hiztegia aztertu du. Haren arabera, “sexu-lehenespen” adierazpidea darabilen lehen artikulua 1983koa da; hurrengoa, 1987koa, eta, 1987tik 1998ra bitartean, 16 aldiz ageri da: “In the 1940s,

rodents were 'bisexual.' In the (gay) 1990s, rodents have 'preferences' and 'orientations.' Whether they mount or show lordosis is a separate story" (2000, 226. or.).

Trans\*ak ez du soilik biltzen transexualitatea edo trabestismoa, baizik eta baita, edo bil dezake, androginia, anbiguotasuna, bi sexu-genero normatiboetako bakar batekoa ere ez izatearen ideia edo/eta sentimendua, edo bietakoa izatekoa ere. Alde horretatik, etorkizuneko aldaketa posibleez gainera, galdetu behar genuke nola azalduko lituzketen Brain Sex Theory eta/edo Brain Organization Researchek fenomeno horiek, ea burmuinaren alderantzikatzeko eta genitalen eta burmuinen oposizio gisa azalduko luketen, hau da, esparru kontzeptual dualista dikotomiko eta antagoniko bati eutsiz, ala ez. Alderantzikatzeko eta oposizioaren ideiek ikuspegi sexu-generiko dimorfiko eta dualista bat behar dute: "Our observations on a *reversed* sex difference in the brain support the idea that transsexuality is based on an *opposite sexual differentiation* of the brain in the second half of pregnancy and sexual differentiation of sexual organs during... pregnancy" (Swaab, 2007, 441. or.; geuk nabarmendua). Ideia hori Chung eta beste egileek ere errepikatzen dute: "Transsexuals experience themselves as being of the *opposite sex*, despite having the biological characteristics of one sex" (2002, 1034. or.; geuk nabarmendua).

Azkenik, artikuluko horietako transaren\* gaineko ikuspegi patologikoa eta trans\* identitateak burmuinaren garapen "normal"aren eta hormona-mailen "akats" edo "asaldura"n oinarrituta nahasmendu eta arazo gisa kontzeptualizatzea problematizatu eta eztabaidatuko dugu. Azterturiko artikuluen egileek "gender problem" izendatzen dute transexualitatea (Swaab, 2007, 435.-436. or.; Chung et al., 2002, 1032. or.), edo "gender identity disorder" edo "disorder" (Kruijver et al., 2000, 2034, 2040. or.; Chung et al., 2002, 1027, 1032. or.), edo "gender dysphoria" (Swaab, 2007, 435. or.).

Hiru artikulutan, abiapuntutzat hartzen da transexualitatea akats bat delako premisa, hau da, okerreko gorputzean jaiotzearen ondoriozko akatsa, eta horixe egozten zaie trans\* pertsona guztiei, denek gauza bera sentitu eta pentsatuko balute bezala, eta denek modu berean biziko balute bezala beren gorputza eta identitatea: "Transsexuals have the strong feeling, often from childhood onwards, of having been born the wrong sex" (Zhou et al., 1995, 68. or.; Swaab, 2007, 435. or.). Chung eta beste egileek ere gauza bera diote: "Differences in the size of the human BSTc have been related to the gender identity disorder transsexuality, in which subjects voice the strong feeling of being born in the wrong sex" (2002, 1027. or.). Halako ikerketek "akats" horren azalpen edo funtsatze biologiko bat bilatzen dute, hau da, noiz eta non gertatzen den "akatsa" prozesu eta elementu biologikoetan.

Horretarako, BSTc-aren bolumenaren edo neurona kopuruaren “alderantzikatzeko” kontzeptuaren eta hormona-mailaren “asaldura” kontzeptuaren bitartez azaltzen dute transexualitatea, betiere estandar maskulino eta femenino “normalak”<sup>433</sup> aintzat hartuta:

[E]pidemiological studies show that the awareness of *gender problems* is generally present much earlier. Indeed, 67–78% of transsexuals in adulthood report having strong feelings of being born in the wrong body from childhood onward (Van Kesteren et al., 1996), supporting the idea that *disturbances* in fetal or neonatal gonadal steroid levels underlie the development of transsexuality. (Chung et al., 2002, 1032. or.; geuk nabarmendua)

Nahasmenduaren edo asalduraren ideia etengabe errepikatzen da: “[O]ur study supports the hypothesis that *gender identity* alterations may develop as a result of an *altered* interaction between the development of the brain and sex hormones” (Zhou et al., 1995, 70. or.; geuk nabarmendua); “there was no difference in BSTc size between early-onset (T2, T5, T6) and late-onset *transsexuals* (T1, T3), indicating that the decreased size is related to the *gender identity alteration* per se rather than to the age at which it becomes apparent” (Zhou et al., 1995, 70. or.; geuk nabarmendua).

Ikusi dugunez, bi nozio horiek hirugarren bat eskatzen dute: “normaltasuna”. Alegia, nahasmenduak edo asaldurak estandar normalekikoak dira. Hala, transa\*, transexualitatera mugaturik, anomaliaren edo anormaltasunaren nozioarekin lotuta geratzen da: “This observation points to an early intrauterine exposure of the female fetus to *abnormally* high levels of testosterone” (Swaab, 2007, 435. or.; geuk nabarmendua); “*abnormal* hormone levels during early development may play a role” (2007, 435. or.; geuk nabarmendua)<sup>434</sup>.

Alderantzikatzearen eta nahasmenduaren kontzeptuak beste nozio eta kontakizun garrantzitsu batekin batera agertu ohi dira: “inkoherentzia” edo “inkongruentzia”. Areago, hirugarren kapituluaren zehaztu dugun bezala, OMEk buruko gaixotasunen zerrendatik atera berri du “transexual” kategoria, eta, orain, DCI-11 gidaren edizio berrian, “genero-inkongruentzia” izenarekin agertzen da, sexu-osasuneko “arazo” gisa (2018b). Genero-identitatea “arazo” gisa kontzeptualizatzea inkongruentziaren ideiaz baliaturik guztiz bateragarria da Swaab-en

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<sup>433</sup> Kruijver eta beste egile batzuek ere berretsi dituzte alderantzikatzearen eta asalduraren ideiak: “The present findings of somatostatin neuronal sex differences in the BSTc and its sex *reversal* in the transsexual brain clearly support the paradigm that in *transsexuals* sexual differentiation of the brain and genitals may go into *opposite* directions and point to a neurobiological basis of *gender identity disorder*” (2000, 2034. or.; geuk nabarmendua).

<sup>434</sup> Alde horretatik, Jordan-Young-ek Brain Organization Researchari egiten dion kritiketako bat da hormonon eraginaren eta sexualitatearen arteko erlazioak analizatu behar lituzkeela baina hormonon jatorriaren eta sexualitatearen izaeraz iritzirik eman gabe: “In a study of how early hormone exposures affect mature sexuality, the point is to discern the relationship between hormones and sexuality—not to explore the nature of hormones or the nature of sexuality. But there is no way to study that relationship without either explicitly or implicitly asserting a great deal about the nature of the things being related” (2010, 54. or.).

kontakizun zientifikoarekin (2007); izan ere, haren arabera, transexualitatea sortzen da jaiotze aurreko genitalen sexu-garapenaren, haurdunaldiaren lehen bi hilabeteetan gertatzen dena, eta burmuineko sexu-garapenaren, haurdunaldiaren bigarren erdian hasi eta helduarora bitartean ebidente bihurtzen dena, inkongruentziaren kausaz (2007). Alegia, burmuineko eta genitalak sexuazioaren arteko inkongruentzia gisa agertzen da transexualitatea. Esana dugunez, Chrysalis-ek ere ideia horixe aldarrikatzen du.

Nolanahi ere, transari\* buruzko halako kontzeptu eta kontakizun patologizatzaile, erredukzionista, determinista, innatista eta murriztaileen aurrean, trans\* multiplizitatea, emakume\* multiplizitatea eta orokorrean teknogorputzasun-subjektibitateen multiplizitatea bezala, askoz hobeki txertatzen da ingurunearen garrantzirik eta teknogorputzen eta ingurunearen arteko erlazioaltasun konstitutibotik abiatuz sexu-generoa continuum gisa kontzeptualizatzen eta gorputzen arteko desberdintasunak graduzko eta bilakaerazko gisa ulertzen dituzten kontakizunetan. Alde horretatik, hurrengo atalean, sexu-generoari eta teknogorputzen eta identitatearen eraketari buruko beste kontakizun posible batzuk azalduko ditugu, azalpen alternatiboen bitartez lau artikulu zientifiko horiek defenditzen dituzten ideia nagusietako hiru eztabaidatuz: 1) Sexu-generoa esentzia naturala da –biologikoa, kasu honetan–, jaiotzean finkatua, determinatua, antolatua, aurretik ezarria. 2) Sexu-generoa estatikoa da: jaiotzean determinatuta geratzeaz gainera, bizitza guztirako determinatzen da, eta iraunkorra eta aldaezina da. 3) Ingurunea guztiz ukatzen da sexu-generoaren eta teknogorputzasun-subjektibitateen eraketan.

#### **4.5. Bilakaera sexu-generizatuak: trans\* erlazioaltasun anizkoitzak**

Jordan-Young-ek errusiar panpinen jolas gisa deskribatzen du Brain Organization Research teoria, hots, panpina bakoitzak hurrengo panpina dauka (2010, 270. or.). Kontua feminitatearen eta maskulinitatearen esentzia garraiatzea da, oraingoan hormonien bidez: estrogenoek eta testosteronak daukate “gizon txiki” eta “emakume txiki” horiek. Honela dio: “Brain organization theory is little more than an elaboration of long-standing folk tales about antagonistic male and female essences and how they connect to antagonistic male and female natures” (2010, 291. or.). Horren aurrean, egileak azpimarratzen du beharrezkoa dela ikuspegi deterministak eta esentzialistak alde batera uztea, eta aldarrikatzen du honako hauek direla garapen-prozesuen hiru elementu gakoak: herentziaren eta esperientziaren arteko bereizetasuna, zorizko gertaeren garrantzia, eta garapena bizitza osorako prozesu dinamiko



bat izatea, ingurunearekiko etengabeko interakzioan gauzatzen dena (2010, 271. or.). Geneak bloke estatiko eta konkretu gisa hartzen dituen ideia deterministarekin kontrastea eginez eta gure herentzia genetikoak ezarritako mugen onarpenarekin batera, badago beste nozio esanguratsu bat: “[W]hatever is “written in our genes” must be a very open-ended story, because gene expression is a dynamic, contingent process that is responsive both to specific conditions during development and to random events” (Jordan-Young, 2010, 271. or.).

Hemendik aurrera, giza teknogorputzen garapenari eta koeraketa sexu-generizatuari buruzko kontakizun alternatiboak egingo ditugu, elementu batzuen bitartez antolatzen eta biratzen direnak, hala nola “prozesu”, “bilakaera”, “multiplizitate”, “aldaketa” eta “erlazionaltasun” edo “interakzio”en bitartez. Identitate sexu-generizatuen konfigurazioei erreparatzeaz gainera, bereziki jorratuko ditugu determinismo biologikoaren babesgune diren hiru elementu garrantzitsu: hezurren osaera eta garapena, kolore-lehenespena eta trebetasun kognitiboak. Halako azalpenak, gainera, dimentsio biologikora murriztu beharrean, multidimentsionalak dira, eta lekua egiten diete diferentziei, ez hierarkikoki eta patologikoki; alegia, identitate eta sexu-genero ez-normatiboak subjektibitate-gorputzasunen multiplizitate erlazional zabal eta aldakorren parte gisa azaleratzen dira, feminitate eta maskulinitate normatiboak bezalaxe.

#### **4.5.1. Hezurrez, kolorez eta trebetasun kognitiboez**

Garapenaren eredu interakzionista batek –hots, besterik gabe gehigarria izateaz gainera herentziaren eta esperientziaren arteko fusio bat islatzen duena– nola funtzionatzen duen ulertzeko, Ah-King eta Nylin-en kontzeptu bat berreskuratu beharra daukagu, hain zuzen ere sexua erreakzio-arau gisa aldarrikatzen duena eta guk “sexu-generoa erreakzio-arau gisa” kontzeptualizatuko duguna. Jordan-Young-ek (2010, 271.-272. or.) eta Fausto-Sterling-ek (2012a, 105. or.) bat egiten dute Ah-King eta Nylin-ekin, kontzeptu egokitzat jotzen dutelarik eta nabarmentzen dutelarik biologia ebolutiboan kontzeptu berria ez izan arren orain arte ez dela askorik erabili.

Richard Lewontin biologo ebolutibo eta determinismo genetikoaren kritikari sutsuak honela azaldu zuen “erreakzio-arau”aren kontzeptua: “[A] genotype does not specify a unique outcome of development; rather, it specifies a norm of reaction, a pattern of different developmental outcomes in different environments” (2000, 23. or.). Genotipoak geneei egiten die erreferentzia, DNAko material hereditarioaren oinarritzko unitateei. Fenotipoa kontzeptu

zabala da, eta garapenaren emaitzei egiten die erreferentzia, banakako “ezaugarri” anatomiko, fisiologiko eta portaerazkoei; ezaugarriok gaingiroki defini daitezke –altuera, funtzio intelektuala–, edo modu espezifikoago batean –femurraren luzera edo buru-errotazioa hobetzeko X hobekuntza lortzeko behar den praktika kopurua–. Gainerako guztia inguruneak biltzen du: airea, toxikotasuna, nutrizioa, erlazio materialak, afektuak, traumak, kognizioa, orotariko esperientziak, ezaugarri baten garapenerako esanguratsuak ez diren herentzia genetikoaren alderdi guztiak, are hormonak ere (Jordan-Young, 2010, 272. or.). Erreakzio-arauek agerian jartzen dute genotipoek eta fenotipoek hainbat inguruetan duten erlazioa.

Horrek guztiak nola funtzionatzen duen azaltzeko, landareekin egindako esperimentu edo azterketetara jo izan dute Fausto-Sterling-ek (2012a, 103.-104. or.) eta Jordan-Young-ek; lehenbizikoaren kasuan, baita euliekin egindakoetara ere. Fausto-Sterling-ek, Cook-en (1968) ikerketan oinarriturik, irudi bidez erakutsi zuen nola aldatzen den *Ranunculus aquatilis* eta *Ranunculus flabellaris* espezieen hostoen morfologia hiru inguruetan: uretan sartuta, aire-ur interfazean eta aire zabalean. Desberdintasunak harrigarriak dira. Gauza bera gertatzen da Clausen, Keck eta Heisey-k 1958an *Achillea* landarearen zazpi genotiporekin egindako esperimentuaren irudiekin, zeinak Jordan-Young-ek jaso baitzituen (2010, 274. or.); zehazki, hiru inguruetan egin zuten esperimentua: Stanfordeko Unibertsitatetik (Kalifornia) gertuko lorategietan, kostaldeko klimarekin eta itsas mailatik hurbil, Sierra Nevadan 1.400 m inguruan, eta 3.050 m inguruan. Desberdintasunak nabariak dira. Jordan-Young-en iritziz, esperimentu horiek ezbaian jartzen dute garapenaren kodearen edo mapa genetikoaren ideia. Ez dago jakiterik zer inguruetan izango den landare bakoitza altuagoa edo baxuagoa: “[T]here is no way to intuit a norm of reaction. It must be measured, rather than imagined or taken for granted” (Fausto-Sterling, 2012a, 103. or.).

Sexu-generoari dagokionez, hirugarren kapituluan adierazi dugun bezala, Ah-King eta Nylin-ek sexu-determinazioa funtsean “plastiko” gisa ezaugarritu zuten, baita genetiko izendatzen denean ere (2010, 234. or.). Haien arabera, sexua ingurunearekiko interakzioaren ondoriozko erreakzio-arau gisa uler daiteke; horregatik, oso oso aldakorra izan daiteke, bai sexu-atributu fenotipikoei dagokienez, bai portaerari dagokionez. Ah-King eta Hayward-ek erakutsi zuten, teknogorputzen –anfibioak, narrastiak eta arrainak, besteak beste– sexu-mutazio eta -eraldaketak, gure ikuspegi sexu-generikotik queer edo trans\* deituko genukeen norabide batean, teknogorputzen *potenzialaren* parte dira, haren erantzun-gaitasunarena, sexu-generoa ingurunearekiko etengabeko interakzioaren ondoriozko erreakzio-arau gisa ulertuta –interakzio horretan, toxikotasunak eta ingurumen-xenoestrogenizitateak ere parte hartzen dute– (2014, 6. or.).

Baina, toxikotasunaz gainera, badira beste adibide batzuk inguruneak teknogorputz sexu-generizatuen garapenean duen eragina adierazten dutenak, betiere gizakiez ari garela. Jordan-Young-en arabera, sexu-generiko gisa etiketatzen eta sailkatzen diren eta jaio aurreko eragin hormonalari egozten zaizkion giza teknogorputzen portaera ia guztiak –edo guztiak–, hau da, ezaugarriak, haien tamaina eta haien norabidea, malguak eta testuinguruaren arabera dira (2010, 278. or.). Hezurren adibidea bereziki egokitzen jotzen du egileak giza teknogorputzen ezaugarri sexu-generizatuen garapena birpentsatzeko, hormona esteroideek haien hazkuntzan eta mantentzean duten zeregin nagusia dela eta –gogoratu dezagun hirugarren kapituluan aipatu dugun eztabaida neketsua, emakume\* menopausiadunen osteoporosiari eta ondoriozko farmako hormonalen ustezko beharrari buruzkoa–. Hezurak, askotan, ezaugarri fenotipiko argi eta garbi sexualki dimorfikotzat hartzen dira: gizonak, batez beste, emakumeak\* baino altuagoak dira, hots, hezur luzeagoak dituzte (Jordan-Young, 2010, 280. or.). Jordan-Young-ek dioenez, altuerari dagokionez, sexu-diferentzietan edo, hobeki esanda, dimorfismo sexu-generikoari buruzko oinarritzko teoriak honako hau dio:

The growth plates or epiphyseal plates are generally more sensitive to the effects of estrogen than to those of testosterone. During puberty in the female, the rising levels of estrogen seal the epiphyseal plate earlier than testosterone does in males. The effects of the male hormone, testosterone, are felt at a later stage. Thus, females stop growing earlier than males do. (2010, 280. or.)<sup>435</sup>

“Sexu-hormonei” eta haien inguruko eta sostengurako narratiba guztiari egindako kritikaren ildo berean, Jordan-Young-ek dio bai testosterona bai estrogenoak garrantzitsuak direla teknogorputz guztien hezur-hazkuntzaren gelditzean. Horretaz gainera, azpimarratzen du kontakizun horrek ez dituela kontuan hartzen testuinguru historiko eta geografikoaren arabera hezur-hazkuntzan dauden desberdintasunak. “Sexu-hormonak” baldin badira azalpenerako faktore nagusia, nola azaldu –galdetzen du Jordan-Young-ek– holandarren eta Europako mendebaldeko gainerako herritarren arteko desberdintasunak, elikadura eta osasun-baldintzak antzekoak izanik? Nola azaldu holandar emakumeen\* batez besteko altuera duela hirurogei urte Espainiako estatuko gizonena baino altuagoa izatea (Cavelaars et al., 2000, 11. or.)? Eta holandar emakumeen\* –eta gainerako herrialde industrializatuakoen– altuera zergatik igo da

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<sup>435</sup> Egileak [skeletalsystem.net](http://skeletalsystem.net) iturria aipatzen du. Saiatu gara iturri horretan sartzen, baina bilatzaileak diosku “ezin dela webgune horretara sartu”. Dirudienez, existitzeari utzi dio.

urtetik urtera, menarkia –estrogeno-maila altueneko garaia– atzeratuz joan den garai berean?<sup>436</sup> (2010, 280. or.).

Galdera guztiok iradokitzen dutena, antza, zera da: altuera ez dela ezaugarri sexualki dimorfiko biologikoki determinatu bat. Altuera ez da modu determinista batean zuzenean eratortzen sexutik; areago, denbora-espazio testuinguruaren arabera aldatzen da. Horrek ez du esan nahi desberdintasunik ez dagoenik gaur egun “gizon” eta “emakume” deritzogunen batez besteko altueren artean, baina, Jordan-Young-en aburuz, ez da datu bereziki interesgarria. “Funtsezko sexu-diferentzi”aren kontakizunaren arazoetako bat zera da: “[H]ow sex differences, themselves, change shape in different environments. It also makes it hard to absorb information on important influences from social structures” (2010, 281. or.). Alde horretatik, Song eta Burgard-en ikerketaren arabera, Txinako batez ere landa-eremuetako haurren sexu-diferentziak –dimorfikoak–, Filipinetakoekin alderatuta, lotuta zeuden semeak alaben gainetik lehenestearekin, horrek elikadura-arreta eta zaintza handiagoa esan nahi baitu (2008, 305., 317. or.). Galdetu genezake ea Txinatik harago –Europar, adibidez– zer elikagai kopuru ematen zaizkien neska eta mutilak, eta orobat haurrei, hau da, ea genero-espektatibek eta -arauak –zeinen arabera mutilak altuagoak eta handiagoak baitira eta jarduera fisiko gehiago egiten baitute– eraginik ba ote duten inbertitutako elikadura-baliabideetan hasieratik beretik.

Egiaz, Fausto-Sterling-i jarraituz, biologikoki emandako afera sexualki dimorfiko bat baino gehiago, ingurunearekiko interakzioaren efektua dira hezurak, kontuan izanik ingurune horretan askotariko elementuek parte hartzen dutela eta haien erlazonaltasuna garapenaren sistema dinamikoen teoriaren ikuspegitik uler daitekeela, baina ez ikuspegi dikotomiko batetik, sexua afera biologiko gisa eta generoa, berriz, kultural gisa banatzen dituen. Alde horretatik, Taha eta beste egile batzuen lana (2001) aipatuz, Brooklyneko judu ultraortodoxoen talde baten adibidea dakar –Jordan-Young-ek ere erabiltzen du, erreakzio-arauaren kontzeptua azaltzeko–, zeinek beren kide sekularrek baino jarduera fisiko urriagoa egiten baitute, eguzki-argitan gutxiago egoten baitira, esne gutxiago edaten baitute eta hezur-dentsitate apalagoa baitute orno lunbarretan (Fausto-Sterling, 2005, 1491. or.). Fausto-Sterling-ek, bestalde, Hu eta beste egile

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<sup>436</sup> Jordan-Young-ek Fredriks eta beste egile batzuen azterketaren (2000) berri dakar. Azterketa horren arabera, Holandako gizon eta emakume\* gazteen altuera etengabe haziz joan da 1955etik 1997ra bitartean. Horretaz gainera, menarkia sei hilabete atzeratu da azken berrogei urteetan, 13.15 urtera arte (2000). Bestalde Jordan-Young-ek Ong, Ahmed eta Dunger-en artikulua (2006) ere baliatu zuen menarkiaren atzerapenari buruzko zenbait ikerketaren berri emateko. Ikerketa horietako batzuen arabera, hamarkada batetik bestera 3,6 hilabete atzeratu da menarkia –Alemania 1958-1975, Holanda 1955-1965, Hungaria 1935-1985 eta Turkia 1970-2000–; beste ikerketa batzuetan, berriz, aipatzen da hamarkada batetik bestera 2,4 hilabete atzeratu dela Turkian, Hegoafrikan eta Espainiako estatuan (Ong et al., 2006, 11. or.); eta, beste batzuetan, hilabete bat hamarkada batetik bestera –Alemania 1975-, Holanda 1965-1997, Espainiako estatua, Danimarka, Erresuma Batua, Belgika, Norvegia, Suedia eta Italia– (2006, 9. or.).

batzuen lana (1994) ere azpimarratzen du, Txinako landa-eremuetako emakumeen\* hezurren egoeraren eta bizimoduen arteko lotura aztertzen duena. Zehazki, Txinako bost kantonamendutako 775 emakume\* aztertu zituzten, 35 urtetik 75era bitartekoak –hiru kantonamendutan, baziren Han jatorriko emakumeak\*, eta, beste bitan, mongoliar eta kazakhstandar jatorrikoak–, eta ondorioztatu zuten eguneroko jarduera fisikoa –nekazari-lana, kasu honetan– eta hezurren osasuna lotuta zeudela (1994, 289., 296. or.). Zenbat eta lan gehiago eta gogorragoa egin, orduan eta hezur-dentsitate eta hezurretako mineral kantitate handiagoa. Nekazari-lanen ondorioz eguzki-argitan denbora gehiago pasatzeak, gainera, onura zekarkion, antza, hezur-masari, D bitaminaren sintesian laguntzen duen heinean, kontuan izanik bitamina horrek kaltzioa xurgatzen duela (1994, 296. or.).

Fausto-Sterling-en aburuz, hezurak, haien osaera eta haien bilakaera, afera sexualki dimorfiko bat baino gehiago, ingurunearekiko interakzioaren ondorio dira, eta kulturaren, klasearen, sexu-generoaren eta arrazaren erregimenen arteko loturek ere badute zerikusia, zalantzarik gabe. Egileak zehaztu zuenez, elkarren artean lotuta dauden zazpi sistemak osatzen dute hezurren garapena, eta bizitza *guztian* zehar eragiten dute hezurren indarrean. Honako hauek dira: jarduera fisikoa –jolasa zein lana–, dieta, drogak –medikamentuak zein legez kanpoko drogak–, fetu-garapenaren aldiko hezurren osaera, hormonak, hezurren metabolismo zelularra eta haien guztien ondorio biomekanikoak hezurren osaeran eta mantentzean (2005, 1513. or.)<sup>437</sup>. Era berean, zazpi sistema horietan, eragin handia dute eta, horrenbestez, haiengandik bereizezinak dira generoa, egoera sozioekonomikoa edo klasea, eta kultura –arrazak eta etnizitatea barne–, zer eta zenbat jaten dugun, zer ariketa mota egiten dugun eta zer maiztasunekin, zer droga mota kontsumitzen ditugun eta abar zehazten duten heinean (2005, 1515. or.).

Kontakizun horretan, hirugarren kapituluan adierazi dugunaren ildotik, hormona esteroideak gure teknogorputzen materialtasun sexu-generizatua etengabe aldatuz eta garatuz eratzen duten erlazioen multiplizitatearen *beste* elementu bat bezala ageri dira. Doktorego-tesi osoan sexu-generoaren elkarrekiko eraketaren inguruan aipatzen ari garen bezala, Fausto-Sterling-ek honela amaitzen du “The Bare Bones of Sex: Part 1—Sex and Gender” artikulua:

The sex-gender or nature-nurture accounts of difference fail to appreciate the degree to which culture is a partner in producing body systems commonly referred to as biology—something apart from the social... We will not lay bare the bones of sex, but we will come to understand, instead, that our

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<sup>437</sup> Fausto-Sterling-ek kontakizun zehatzagoa egin du lotura horien edo haietako batzuen inguruan, eta azalpenezko diagrama posible bat ere badakar.

skeletons are part of a life process. If process rather than stasis becomes our intellectual goal, we will improve medical practice and have a more satisfying account of gender and sex. (2005, 1516-1517. or.)

Hezurrez gainera, trebetasun kognitiboak ere determinismo biologikoaren babesguneak dira; hain zuzen, haien teoriak garatu eta defendatzeko aukeratutako esparrurik maiteenetariko bat, nahiz eta teoriok oso problematikoak izan, aniztasun argumentatibo eta faktiko baten argitan. Jordan-Young-ek dioenez, 1970eko hamarkadaz geroztik nabarmen igo da unibertsitatean ikasten duten emakumeen\* kopurua, eta horrek bertan behera utziko luke emakumeek\* gizonen baino gaitasun eta lehiakortasun gutxiago dutela dioen teoria, jaiotzetiko ustezko desberdintasun sexu-generiko naturalki eta hormonalki programatuen eraginez. Hala, erreakzio-arauetan oinarrituriko kontakizun bat eskaintzen du. Kontuan izanik, adibidez, 2018an Kaliforniako States Universities unibertsitate-sistemako master edo doktoregoetan matrikulatutakoen % 62 emakumeak\* zirela (The California State University, 2018), eta, kontuan izanik azken hamarkadetan ez dela aldaketa biologiko esanguratsurik egon, ingurune sozialean bilatu behar dira arrazoiak<sup>438</sup>.

Herrialde askotan igo da unibertsitatean ikasten duten emakumeen\* kopurua; besteak beste, Argentinan. Argentinako Hezkuntza Ministerioaren datuen arabera, 2015ean unibertsitatean sartu ziren 458.565 ikasleen % 58 emakumeak\* ziren (Costa, 2017). Bost –are zazpi– karrera ohikoenetan, ikasle gehienak emakumeak\* ziren: Zuzenbidean, % 56 (41.854); Enpresen Kudeaketa eta Administrazioan, % 51,4 (25.307); Kontularitza Publiko Nazionalan, % 74,5 (24.190); Psikologian, % 74,5 (21.519), eta, Erizaintzan, % 79,6 (20.919) (Costa, 2017).

Zientziei, teknologiari, matematikari eta ingeniariari (STEM) dagokienez, Jordan-Young-ek jakinarazi du arrakala nabarmen txikitu dela azken hamarkadetan, esparru batzuetan beste batzuetan baino gehiago (2010, 283. or.). Ingeniaritzan, adibidez, oraindik ez da lortu antzeko mailetara iristea, nahiz eta lizentziadun eta doktoreen tituluak 1966ko % 0,5etik 1996ko %17,9ra eta % 12,3ra igo diren, hurrenez hurren (Huang, Taddese eta Walter, 2000, 5. or.; Jordan-Young, 2010, 283. or.-an aipatua). Arrakala txikitu den arren, oraindik ere ikusten da Argentinako kasuan, adibidez. 2015ean, gizonen aukeraturiko laugarren karrera Konputazioa, Sistemak eta Informatika izan zen (% 83). Ingeniaritza guztiak batuta, % 36,2 izan ziren emakumeak\*.

Europar ere, arrakala nabarmena da oraindik ere, nahiz lehen baino gutxiago. 2009an, EB-27ko ikertzaileen % 33 ziren emakumeak\*; nolana ere, emakume\* ikertzaileen kopurua

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<sup>438</sup> Desberdintasun sexu-generikoak beste desberdintasun batzuekin gurutzatzen dira –klasea, arraza, gaitasuna, etab.–, eta, Jordan-Young-en dioen bezala, “[t]he shape of sex[-gender] difference is *specific* to class-race groups and has *changed differently* in specific groups over the past few decades” (2010, 282. or.).

azkarrago hazi da gizonena baino; zehazki, 2002tik 2009ra bitartean, % 5,1 hazi zen urtean, gizonena, aldiz, % 3,3. Era berean, 2002tik 2010era bitartean, emakume\* zientzialari eta ingeniariaren proportzioa urtean % 5,4 hazi zen; gizonena, berriz, % 3,1 (Europako Batzordea, 2013, 5. or.)<sup>439</sup>. 2002tik 2010era bitartean, emakume\* doktoreen kopurua % 3,7 igo zen urtean; gizonena, aldiz, % 1,6. Areago, 2016an, oreka lortu zen genero aldetik: doktoreen % 40tik % 60ra bitartean emakumeak\* izan ziren herrialde gehienetan (Europako Batzordea, 2019c, 18. or.). Arrakala txikitu den arren, oraindik ere agerikoa da aldea ingeniarietza, manufaktura eta eraikuntzan, eta informatikan; zehazki, 2012an, doktoreen % 28 eta % 21 izan ziren emakumeak\*. Nolanahi ere, Irlandan, ia erabateko oreka lortu zuten genero aldetik: 2012an, konputazio-arloko doktoreen % 45 emakumeak\* izan ziren (Europako Batzordea, 2016, 20. or.). EBko emakume\* doktore kopurua igotzea, sistemazio-ikasketetan –adibidez, Enpresen Kudeaketa eta Administrazioa, eta Kontularitza Publiko Nazionala, Argentinan–, gizon baino emakume\* gehiago egotea, STEM arloan gero eta emakume\* gehiago egotea, edo Irlandan konputazio-arloko emakume\* doktore ugari egotea ezin da modu egokian azaldu burmuin-antolaketa sexu-generikoki dimorfiko hormonalaren teoriaren bitartez, Swaab-ek eta beste egile batzuek defendatzen duten bezala. Ezta jaio aurretik hormonalki finkatzen diren burmuin sistematizataile maskulinoaren eta burmuin enpatizataile femeninoaren kontakizun deterministaren bitartez ere, Baron-Cohen-ek dioen bezala.

Mura, Yansen eta Zukerfeld-ek xeheki aztertu dute zer arrazoi egon daitezkeen Argentinako software-ekoizpenaren sektorearen maskulinizazio handiaren atzean, kontuan hartuz enplegua gero eta gehiago feminizatu dela 1990eko urteez geroztik (2012)<sup>440</sup>. Berriz ere, arrazoi biologikoek ez dute ia zerikusirik, edo batere ez. Arrazoi horien artean, ekoizleen lehen haurtzaroarekin loturikoak daude. Hauxe diote etapa horri buruz: “[S]ubjektibitate femeninoa tankeratzen hasten da genero bakoitzerako artefaktu egokiak definitzen dituzten eragin esplizitu eta inplizituen eta haiei eman beharreko erabilerean bitartez” (Mura et al., 2012, 272. or.)<sup>441</sup>. Egileek diotenez, artefaktuek eta jostailuek balio jakin batzuk eta diseinu heteropatriarkala daukate, hau da, esperimentazioarekin, esplorazioarekin eta eraikuntzarekin zerikusia duten artefaktu eta jostailuak, baita haien argibideak eta publizitatea ere, ez dira neskei zuzenduak, eta

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<sup>439</sup> Europako Batzordeak jakinarazi duenez, emakume\* ikertzaileen ratioa nabarmenago hazi da gizonena baino, arlo guztietan, bai enpresa pribatuaren sektorean, bai goi-mailako hezkuntzan eta gobernuan (2012, 5. or.).

<sup>440</sup> Zenbait datu eman dituzte: batetik, multinazional handiei buruzko datu ofizialen arabera, sektore horretako langileen % 34,7 emakumeak\* dira; bestetik, beste ikerketa batzuen arabera, % 24 dira emakumeak\*; eta, Buenos Airesen 2010ean elkarrizketatutako 24 software-ekoizleetako batzuen arabera, 1-10 (Mura et al., 2012, 272. or.).

<sup>441</sup> Jatorrizko testua: “[L]a subjetividad femenina empieza a moldearse a través de las diferentes influencias explícitas e implícitas que definen los artefactos adecuados para cada género y los usos que deben dar a los mismos”.

horrek zera dakar: “[G]enero-rolak partzialki egonkortuta daude haurra hezkuntza-sistema formalean sartu baino askoz lehenagorako” (2012, 272. or.)<sup>442</sup>. Neskei eskaintzen zaizkien jostailuek zerikusi handiagoa dute zaintzarekin, hazkuntzarekin, estetikekin eta sukaldearekin; hots, genero-estereotipoak sustatzen eta elikatzen dituzte, eta neskek teknologiarekin garatzen duten lotura kontsumoan oinarrituta dago, haren eraikuntzan baino gehiago. Haurtzaroan jolas mota jakin batzuk aukeratzea edo nahiago izatea, beraz, askoz ere lotuagoa dago genero-arauekin eta erregimen sexu-generikoaren egitekoarekin, jaiotzetik dimorfikoki egituraturiko gaitasun eta trebetasunekin baino, Swaab-ek eta Baron-Cohen-ek dioten bezala.

Mura eta beste egile batzuek programatzaile urrien kopuruak azaltzeko ematen duten beste arrazoi bat zera da: gizonak ez bezala, elkarrizketatutako emakumeek\* –24 programatzaile elkarrizketatu zituzten guztira– ez zuten harreman berezirik izan bideo-jokoekin haurtzaroan, hau da, ez zituzten hizkera teknikoa eta programa jakin batzuk ezagutzen (2012, 273.-274. or.). Hirugarren elementuari dagokionez, zaila da programatzaile bakartiaren estereotipoa<sup>443</sup> uztartzea emakumeek\* hezteko eta sozializatzeko baliatzen den enpatia-, afektibitate- eta gizartekoitasun-aginduarekin. Artefaktuarekin harreman intimo bat ezartzea askoz gaitzagoa da emakumeentzat\*, araei eta espektatiba sozialei muzin egin behar baitiete. Mura eta beste egile batzuek diotenez, laugarren arrazoi garrantzitsua enpresetako kontratatzaile edo kudeatzaileek emakume\* informatikariak kontratatzeke izan ohi duten erreparoa da (2012, 276. or.). Diskriminazio hori gauzatzeko, zenbait diskurtso mota baliatzen dira, egileen arabera: 1) Emakumeek\* ezin dute zeregin fisikorik bete, edo, hobeki esanda, haien gorputzak disruptiboak dira. 2) Gizonak ez daude ohituta emakumeekin\* lan egiten, eta ez dute hartu nahi zer gertatuko den ez jakiteko faktore bat bereganatzeko arriskurik. 3) Emakumeek\* ez lirakeke eroso sentituko halako giro maskulinoetan: “[N]ahiz beharbada pentsatuko duten gizonak ez lirakekeela gustura sentituko, ez arrazoi fisikoengatik, baizik eta, adibidez, ohiko elkarrizketa motengatik)” (2012, 276. or.)<sup>444</sup>. Hona haien ondorioa: “[N]olanahi ere, garbi dago programazioa emakumeentzako jarduera bat ez dela irudikatzea oso presente dagoela langileak kontratatzea erabakitzen dutenen artean” (Mura et al., 2012, 277. or.)<sup>445</sup>.

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<sup>442</sup> Jatorrizko testua: “[Q]ue los roles de género ya se encuentran parcialmente estabilizados mucho antes de que el niño ingrese en el sistema educativo formal”.

<sup>443</sup> Gogoratu dezagun, adibidez, Baron-Cohen-ek gizon-burmuinaren muturreko kasu gisa kontzeptualizatzen duela autismoa.

<sup>444</sup> Jatorrizko testua: “[A]unque posiblemente piensan que ellos no se sentirían a gusto, ya no por cuestiones físicas, sino, por ejemplo, por el tipo de conversaciones usuales”.

<sup>445</sup> Jatorrizko testua: “[E]n cualquier caso, es claro que las representaciones respecto de que la programación no es una actividad para las mujeres se encuentran bien presentes entre quienes deciden contratar personal”.



Hierarkia, boterea, aitorpena eta ordainsariak handitzen diren heinean, gizon eta emakumeen\* arteko arrakala ere handitzen da: “Women’s academic career remains markedly characterised by strong vertical segregation” (Europako Batzordea, 2013, 6. or.). 2010ean, gradudunen % 59 emakumeak\* ziren; emakume\* doktoreen kasuan, berriz, kopuru hori % 46ra jaitsi zen, nahiz 2016an % 48ra igo. 2010ean, C mailako langile akademikoen % 44 ziren emakumeak\*; 2016an, % 46-ra igo zen; B eta A mailetan, berriz, % 37 eta % 20 2010ean, % 40 eta % 24-ra igo zirenak hurrenez-hurren 2016an. STEM arloan, subrepresentazio hau handiago da, baina joera txikiagotzearen norabidean doa: 2010ean, doktoreen % 35 ziren emakumeak\*, eta, 2016an, % 39; A mailako langileei dagokienez, 2010ean % 11 ziren emakumeak\*, eta % 15 2016an; EBko goi-mailako hezkuntzako erakundeetako liderrei dagokienez, 2010ean % 15,5 ziren emakumeak\*, eta, 2016an, % 22 (Europako Batzordea, 2013, 6. or.; 2019c, 6. or.).

Argudiatu dugunez, esparru akademikoan eta ikerkuntzan –zientzia eta teknologia barne– gero eta emakume\* gehiago egoteak eta hazkuntza-ratioa gizonena baino altuagoa izateak ezbaian jartzen ditu Baron-Cohen-en eta Swaab-en teoria biologiko deterministak, baita Summers-ek zioen bezala gizonek berez zientzia eta ingeniartzetan aritzeko joera handiagoa dutela ere. Hala eta guztiz ere, emakumeek\* eta gorpuztasun-subjektibitate ez-normatiboek sistema sexu-generikoak inposaturiko muga, traba eta zigor asko gainditu dituzten arren, horrek ez du esan nahi gaur egun holakorik ez dagoenik: genero-ideologiak bere horretan dirau erregimen sexu-generikoa mantentzeko. Bai botere-arrakalari dagokionez, bai STEM arloetan emakume\* gutxiagok parte-hartzeari dagokionez, desberdinkerien –diferentziak baino gehiago– arrazoi nagusia soziala da, Summers-en eta Pinker-en atsekaberako. Esan nahi baita, jaiotzetiko trebetasun eta nahiagotasun dimorfikoak baino gehiago<sup>446</sup>, arau eta egitura sozialen emaitza dira. Europako Batzordeak *glass ceiling* kontzeptua darabil (2013, 7. or.). Goldenberg-en aburuz, Summers-en agintaritzapean izendaturiko emakume\* irakasle titularren lanpostuen kopurua % 36tik % 13ra jaitsi zen (2005). Gure ustez, garai horretako emakumeek\* garaturiko diferentzia biologikoei ez, baizik eta faktore sozialei zor zaie beherakada hori, bereziki genero-ideologiarekin loturiko faktoreei.

Emakumeak\* zaintzarako, ugalketarako, haurzaintzarako<sup>447</sup>, otzantasunerako, sumisiorako, enpatiarako eta konplazentziarako hezten dira oraindik ere; horrek haien lehiakortasuna eta anbizioa zigortzen ditu, eta zailtasun handiak dakartzkie zenbait karreratan aurrera egin eta arrakasta lortzeko. 2001ean, Sylvia Hann Hewlett-ek, Harris Interactive

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<sup>446</sup> Alde handia dago giza teknogorputzen artean aukera, gustu eta gaitasun ezberdintasunak egotearen eta askotariko ezberdintasun horiek dimorfikoki gauzatzearen edo adieraztearen artean.

<sup>447</sup> Summers-ek berak dio haurren zaintza emakumeen\* esku geratzen dela oraindik ere.

merkatu-ikerketarako enpresarekin eta National Parenting Association-ekin batera, inkesta bat egin zuen, AEBn, goi-mailako hezkuntza zuten eta soldata altuak zituzten emakumeen\* bizitza pertsonal eta profesionalak aztertzeko —“the top 10% of women—measured in terms of earning power” (Hewlett, 2002a)—, eta liburu batean argitaratu zituen emaitzak: *Creating a Life: Professional Women and the Quest for Children* (2002b). Hala, zera dio *Harvard Business Review* aldizkarian argitaraturiko artikulu batean:

At midlife, between a third and a half of all successful career women in the United States do not have children. In fact, 33% of such women (business executives, doctors, lawyers, academics, and the like) in the 41-to-55 age bracket are childless—and that figure rises to 42% in corporate America. These women have not chosen to remain childless. The vast majority, in fact, yearn for children. (Hewlett, 2002a)

Amatasunaren agindu sozial tinkoa alde batera utzita, azpimarratu nahi dugu Hewlett-ek elkarrizketatutako emakume\* askok amatasunari uko egiteko arrazoi gisa aipatu zutela arrakasta profesionalarekin uztartzeko zailtasuna eta, maiz, ezintasuna. 100.000 dolarretik gorako irabaziak zituzten 40 urtetik gorako emakumeen\* % 49k ez zuten seme-alabarik; gizonen artean, berriz, % 19ra jaisten zen kopurua. Zera dio Hewlett-ek: “[T]hese figures underscore... the persisting, painful inequities between the sexes. Women face all the challenges that men do in working long hours and withstanding the up-or-out pressures of high-altitude careers. But they also face challenges all their own” (2002a).

Pérez Sedeñok zuzendutako *La situación de las mujeres en el sistema educativo de ciencia y tecnología en España y su contexto internacional* ikerketan, “emaitza aipagarrienetako bat” da emakume\* ikasle eta lizentziadun gehiago dagoela, salbu ingeniartzan (2003, 29. or.)<sup>448</sup>. Arantza Etxeberria Agirianok ere emakumeen\* ordezkariak apalagoa egiaztatu du filosofia-ikasketetan ere, maila guztietan. Haren arabera, datuek diote AEBn, Kanadan eta Britainia Handian filosofian dihardutenen % 30 direla emakumeak\*, eta, enplegu finkoaz hitz egiten hasten garelarik, kopuru hori % 16-25era jaisten da (2018, p. 335). Etxeberria Agirianoren arabera, Espainiako estatuko datuak antzekoak edo okerragoak dira. Emakumeen\* presentzia, gainera, nabarmen urritzen da hierarkian gora egin ahala (Etxeberria Agiriano, 2018, 335. or.)<sup>449</sup>. Ildo horretan, zera dio Pérez Sedeñok:

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<sup>448</sup> Arlo horretan ere, gero eta emakume\* gehiago matrikulatzen dira: 1997-1998 ikasturtean, % 21,14; 2000-2001ean, % 30,9.

<sup>449</sup> Arrazoia eta pentsamendua maskulino gisa kontzeptualizatu dira historian zehar, baita gaur egun ere. Etxeberria Agirianok beste arrazoi posible batzuk ere ematen ditu, hala nola filosofia historikoki lotzea “jokabide maskulino estereotipatuekin, hala nola eztabaidetako oldarkortasunarekin eta eztabaida filosofikoetan

Berdintasun-egoera ideal batean, normala izango litzateke lizentziatura-mailan ere doktorego-ikasketetan gertatzen den gauza bera gertatzea, hau da, gizonak eta emakumeak parekatuta egotea (...) Baina, nolana ere, doktore-graduaz geroztik, proportzioak alderantzikatu egiten dira, ‘guraize’ deritzona sortuz, eta horrek goia jotzen du katedradunen mailan. Horrek adierazten du karrera akademikoan zehar emakumeak galtzen direla. (2003, 29. or.)<sup>450</sup>

Halakorik nekez gertatuko zatekeen ekitate-egoera batean, eta, arrazoiaren artean, karrera akademikoa eta haurren zaintza uztartzeko zailtasuna edo ezintasuna aipatzen dira, halako lanak emakumeen\* esku egoten baitira<sup>451</sup>. Horretaz gainera, zaintzarako egiten diren etenaldiek ere eragin negatiboa dute merezimenduetan eta maila-igoeretan (Pérez Sedeño, 2003, 111.-150. or.)<sup>452</sup>. Areago, kontuan hartu behar dira emakumeek\* karreran sufritzen dituzten bazterkeria profesionalak, mugak eta diskriminazioak, estereotipoak eta balio soziokulturalen onarpena: “Balioen, ohituren eta gainerako elementu soziokulturalen transferentziaz beteta dago zientziaren instituzioa, eta, horrenbestez, halakoek eratzen dituzte sozialki unibertsitateko emakumeen ingurunea eta lehenespenak” (2003, 30. or.)<sup>453</sup>. Diskriminazio hierarkikoarekin batera, “lurralde-diskriminazioa” deritzona ere aipatu behar da, hau da, emakumeak\* diziplina eta lan jakin batzuetara bideratzen dira, femeninotzat hartzen direnetara; besteak beste, Humanitateetara<sup>454</sup> edo Gizarte Zientzietara<sup>455</sup>. Azken hamarkadan, Osasun Zientzietan ere sartu dira, baina, Pérez Sedeñok dioenez, emakumeei\* tradizionalki esleitzen zaien eta haiek betetzen duten zaintzaren rolaren luzapen “profesional”tzat har liteke (2003, 30. or.). Jordan-Young-ek zera dio horren harira: “[C]ore gender schemas don’t seem to have changed much in this time... People still hold

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liskarrerako grinarekin” (2018, 337. or.). Berriz ere aipatu beharrean gaude otzantasuna, adeitasuna, konplazentzia, sumisioa eta lehiakortasun eza; egiletza mota eta sormen modua eta mota; diziplinaren etsaitasun-izaera; edo misoginia eta abusuak (2018).

<sup>450</sup> Jatorrizko testua: “Lo normal, en condiciones ideales de igualdad, sería que en el nivel de licenciatura sucediera lo mismo que en el de los estudios de doctorado, donde hombres y mujeres está prácticamente a la par (...) Pero, sin embargo, a partir del grado de doctor, las proporciones se invierten, formándose la denominada ‘tijera’ que logra su máxima abertura en el nivel de catedrático/a. Eso muestra una pérdida de mujeres a lo largo de la carrera académica”.

<sup>451</sup> Pérez Sedeñoren aburuz, karrera zientifiko eta profesionalak uzteari buruzko adierazleak oso altuak dira, eta horretan bat datoz, desberdintasunak desberdintasun, Kanadako, AEBko eta Europako datuekin (2003, 31. or.).

<sup>452</sup> Elkarrizketatu batzuek adierazi zuten ez dagoela estatu-mekanismoak bi esparruok uztartzeko (Pérez Sedeño, 2003, 111. or.). Horrekin batera, aipatu zuten beharrezkoa zela hutsuneak aitortzeko mekanismoak sortzea, eta karrera akademikoa luzatzeak amatasuna atzeratzea eta/edo zaintzaz arduratuko diren aitona-amonak zahartzea edo gero eta gutxiago izatea zekarrela (Pérez Sedeño, 2003, 29., 111. or.).

<sup>453</sup> Jatorrizko testua: “La transferencia de valores, costumbres y demás elementos socioculturales impregnan la institución de la ciencia y, por consiguiente, conforman socialmente el entorno y preferencias de las mujeres en la universidad”.

<sup>454</sup> Filosofia, aipatu dugun moduan, salbuespena izango litzateke.

<sup>455</sup> Emakumeen\* agentzia ukatzen duen irakurketetatik ihes egiten dugu, eta lehenetsi ditugu salatzeaz gainera emakumeen\* lanak aintzat hartzeko eta balioa emateko beharra nabarmentzen dutenak.

the same basic stereotypes about the attributes that men versus women should have” (2010, 283. or.).

Horretaz gainera, ikerketa horretan, Swedish Medical Research Council-eko Wennerås eta Wold-en ikerketaren emaitzak ere jaso dira (1997, 341. or.); haren arabera, Suedian, emakumeek\*, finantzazioa lortzeko, gizonek baino 2,2 aldiz produktiboagoak izan behar dute (Pérez Sedeño, 2003, 33. or.). Hori bat dator Pérez Sedeñok zuzenduriko ikerketako emakume\* elkarrizketatuek behin eta berriz aipatzen dutenarekin: kontuan hartuak eta balioetsiak izateko, ahalegin gehigarria egin behar dute, gizonek halako bi. Antzeko zerbait bildu da Europako Batzordearen 2016ko txostenean: “[M]en in the EU tend to have greater success in funding applications in national programmes, outstripping women by 4.4 percentage points in 2013 (success rate for men = 31.8 %; rate for women = 27.4 %)” (2016, 6. or.). Azkenik, diskriminazioa, askotan, ez da agerikoa, baizik eta sotila, ezkutukoa eta tentakularra; horrek ez du esan nahi, noski, eraginkorra eta sistematikoa ez denik. Diskriminazio horretan, honako hau ere sartzen da: “Sistematikoki ukatzea diskriminaziorik badenik ere, eta diskriminazioen kexen eta ustez emakumeei bereziki mesede egiten dieten ekintzen ondoriozko erresumina eta haserrea” (Pérez Sedeño, 2003, 34. or.)<sup>456</sup>.

Fausto-Sterling-ek, bestalde, azaldu zuen matematika eta halako trebetasun kognitiboak ez direla arlo sexu-generikoki dimorfikoak eta biologikoki determinatuak, baizik eta testuinguruaren araberakoak, dinamikoak eta etengabe garatzen ari direnak (2012a, 106.-107. or.). Ideia hori argudiatzeko, Janet Shibley Hyde-ren lanera jo zuen. Hyde-k, “The Gender Similarities Hypothesis” artikuluan, 46 meta-analisi aztertu, eta teoria bat formulatu zuen: hedabideetan nagusitzen eta sustatzen den ideiaren aurka, gizon eta emakumeen\* artean ez dago desberdintasun psikologiko handirik, eta, areago, oso antzekoak dira –ez alderdi guztietan, dena den—. Gizon eta emakumeen\* arteko desberdintasun handien ideiaz honako hau dio: “not consistent with the scientific data” (2005, 590. or.). Hyde-k aldaera kognitibo eta portaerazko ugari aztertu zituen, eta haietariko bat nabarmendu nahi genuke: matematika eta, bereziki, konputazioa eta arazo konplexuen ebazpena.

Hyde, Fennema eta Lamon-en meta-analisan, matematika-emaitzei dagokienez bi generoen artean dauden desberdintasunak oso txikiak dira haurtzaroan, edo ez da ageri halakorik, eta gizonek pubertaroan erdiesten dute emakumeen\* gaineko abantaila (1990, 151. or.). Hyde eta beste egile batzuek desberdintasun txiki bat aurkitu zuten, nesken aldekoa, konputazio-arloan,

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<sup>456</sup> Jatorrizko testua: “La negación sistemática de que exista dicha discriminación, y el resentimiento y enfado cuando se producen quejas por la existencia de discriminaciones y cuando se efectúan acciones que se considera que favorecen especialmente a las mujeres”.

*elemental school* (5-10 urte) eta *middle school* (11-15 urte) garaietan, eta desberdintasun bakar bat ere ez *high schoolean* (15-18 urte) (147. or.). Bestalde, ez zuten genero-desberdintasunik hauteman arazo konplexuen ebazpenean, ez elementalean, ez *middle schoolean*, baina baziren desberdintasun txiki batzuk gizonen alde egiten zutenak *high schoolean* eta *collegeean* (1990, 148. or.).

Hyde-ren arabera, horrek guztiak garbi erakusten du bi generoen arteko desberdintasunak ez direla ez handiak ez egonkorrak, baizik eta testuinguruaren arabekoak eta mendekoak (2005, 588. or.). Izan ere, emakume\* gazteek arazo konplexuen ebazpenean erdiesten dituzten emaitzen beherakada azaltzeko, arrazoï gisa aipatzen ditu nerabegarora iristean haien autoestimua jaistea –helduaroan desagertzen da– eta estereotipoak (2005, 588. or.). Datuek kontrakoa erakusten duten arren, guraso eta irakasleek barneratzen eta behin eta berriz errepikatzen duten mantra bat da mutilak neskak baino hobekak direla matematikan, eta, ondorioz, matematikan bikainak diren neska asko geratzen da itzalean, eta/edo helduen espektatibek eragin kaltegarria dute haiengan, autoestimua ere zauritzeraino: “In short, girls may find their confidence in their ability to succeed in challenging math courses or in a mathematically oriented career undermined by parents’ and teachers’ beliefs that girls are weak in math ability” (2005, 590. or.). Hona Hyde-ren hitzak: “The conclusion is clear: The magnitude and even the direction of gender differences depends on the context. These findings provide strong evidence against the differences model and its notions that psychological gender differences are large and stable” (2005, 589. or.). Egileak ohartarazten duenez, genero-desberdintasunak edo, hobeki esanda, dimorfismo sexu-generikoa dimentsioz gaindi aldarrikatzea kaltegarria da, eta ondorioak dakarzkie emakumeei\*, harreman-gatazkak sortzen eta lan-aukerak murrizten baititu (2005, 590. or.).

Hain zuzen ere, desberdintasun sexu-generikoak testuinguruaren arabera aldatzen direnez, Lindberg, Hyde, Petersen eta Linn-ek 2010ean eginiko meta-analisan, zeinean 1990etik 2007ra bitartean egindako azterketak analizatu eta 1.286.350 teknogorputzetan<sup>457</sup> egindako probak bildu baitzituzten, ohartu ziren adinarekin desagertu egiten zela Hyde eta beste egile batzuek (1990) aurkituriko desberdintasun txiki hori. Haien ondorioa zera da: gizon eta emakumeak\* antzekoak dira matematikan, adin-tarte guztietan. Matematikako emaitzei gagozkiela, ez dago inongo alderik bi generoen artean. Desberdintasun txiki horren desagertzea

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<sup>457</sup> Egiazki, bi meta-analisi azterketa egin zituzten. Lehena, arestian azaldukoak. Bigarrena, berriz, AEBko datu-base erraldoien bildumak aztertzean zetzan: National Longitudinal Surveys of Youth (1997-2002), Bureau of Labor Statistics, National Education Longitudinal Study (1988), National Center for Education Statistics, Longitudinal Study of American Youth eta National Center for Education Statistics-en National Assessment of Educational Progress.

azaltzeko, arrazoietakoa bat izan liteke estereotipoak aldatu –ezen ez desagertu– direla eta horren ondorioz neskato eta nerabeak ere matematika kurtsoetan izena eman dutela: “[C]ultural shifts have occurred over the last 2 decades. Specifically, girls are now taking advanced mathematics courses and some science courses in high school at the same rate as boys are, closing the gap in course choice” (2010, 1125. or.). Hona Lindberg eta beste egile batzuen ondorioa:

[I]t is clear that in the United States... girls have reached parity with boys in mathematics performance. It is crucial that this information be made widely known to counteract stereotypes about female math inferiority held by gatekeepers such as parents and teachers and by students themselves. (2010, 1134. or.)

Identitatearen auzi konplexuan sartu aurretik, kolore-lehenespina da landuko dugun hirugarren elementua. Arrosak eta urdinak ere badute genealogia bat. Ez dira unibertsalak, ezta jaiotzetikoak ere. Gaur egun, oraindik ere banaketa argia egiten da haurren eta haur jaioberrien arropa eta osagarrietan: mutilentzat, batez ere urdina, baina baita grisa edo beltza ere; neskentzat, batez ere arrosa, baina baita grisa eta lila ere. Aski da Interneten “haur jaioberrientzako arropa” idaztea segregazio sexu-generikoaren irudi garbi bat erdiesteko. Mutilentzat, futboleko bodyak, pajaritak, autoak edo dinosauroak; neskentzat, adarbakarrak, tximeletak, loreak eta untxiak. Nolanahi ere, Fausto-Sterling-ek dioenez, 1880ko hamarkadaren amaieran, Europako mendebaldean eta AEBn, haur jaioberriei gona luze zuriak jartzen zitzaizkien, eta, hiru urteetatik bost urteetara bitartean, soineko edo gona laburrak (2012a, 110. or.). Fausto-Sterling-ek Frassanito eta Pettorini-ren “Pink and blue: the color of gender” artikuluan oinarrituz dio garai historiko hartan arropa eta kolorea ez zirela baliatzen generoak bereizteko (2008, 881. or.). 1910eko eta 1920ko hamarkadetan, arrosa mutilentzat eta urdina neskentzat erabiltzen hasi ziren<sup>458</sup>, eta, ondoren, II. Mundu Gerraren ostean ezarri zen, zorrotz eta sakon, urdina mutilentzat eta arrosa neskentzat izango zirela (Frassanito eta Pettorini, 2008, 881. or.). Egileen arabera, Alemania naziak eta homosexualak markatzeko erabiltzen zuten triangelu arrosak eragina izan zuten arrosa feminitatearekin lotzeko orduan, eta, II. Mundu Gerraren ondoren, urdina gizonen uniformeetarako erabiltzea orokortu zen (2008, 881. or.).

Aldaketa horren arrazoiak, haurrak jaiotzetik arroparen kolorearen bitartez sexu-generikoki bereizteko beharra edo agindua, Fausto-Sterling-en iritziz, ez daude garbi, baina

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<sup>458</sup> Frassanito eta Pettorini-ren iritziz, kristau-tradizioan, urdina –batez ere urdin iluna– Ama Birjinarekin lotzen zen, lapis lazulia eramaten baitzuen, eta baliteke horrek eragina izatea (2008, 881. or.). Egileek 1910eko zenbait egunkari eta aldizkaritako artikulua bildu dituzte, *The Sunday Sentinel* edo *Ladies Home Journal*, adibidez, kolorearen arabera bereizkuntza sexu-generikoa gomendatzen dutenak (2008, 881. or.). Haietako batean, arrosa gomendatzen da mutilentzat, kolore sendoagoa eta ausartagoa delakoan.

berak dio beharbada zerikusia izan zuela emakumeak\* esparru publikoan agertzen hasteak eta zenbait eskubide lortzeak, hala nola botoa ematekoa edo jabego pribatua edukitzekoa (2012a, 110. or.). Bitxia da, baina koloreen patroia korapilo askatuak, Haraway-ri jarraituz beste modu batera lotu nahi dugun korapilo horrek, Kapitalozeno neoliberalaren hasierara garamatza. Orogen zuritik arrosa eta urdin zorrotzetarako garai historikoa bat dator paradigma hormonalaren sorrera eta ezarpenarekin. Nolanahi ere, honako hau garbi dago: “[S]trong as it is, the specific shape of so-called feminine and masculine color coding is peculiar to our (historical) period. Pink and blue provide a colorful example of socially produced gender coding” (Fausto-Sterling, 2012a, 111. or.). Hala ere, honako hau gehitzen du: “[D]espite the code being socially produced, it probably *has* changed how our bodies work” (2012a, 111. or.).

Gogoratu ditzagun Swaab-en adierazpenak: haren arabera, neskek gorria, laranja eta horia aukeratzeko joera dute beren marrazkietan, eta irudi baketsuak marrazten dituzte, hala nola tximeletak, loreak, emakumeak eta neskatoak; mutilek, berriz, kolore ilun eta hotzak erabiltzen dituzte, urdina, adibidez, eta irudi tekniko edo belikoak marrazten dituzte, hala nola autoak, trenak, hegazkinak eta armak; eta hori guztia umetokiko fetuak izandako hormonon eraginez gertatzen da (2007, 433.-434. or.). Nola azalduko genuke haur batzuek kolore bat aukeratzea eta beste batzuek beste bat, hormonalki finkaturiko burmuineko sexu-dimorfismoaz landara? Ez bakarrik begirada dimorfiko batetik, baizik eta baita erregimen sexu-generikoak esleitzen dienaz harago beste aukera edo praktika batzuk adierazten dituzten haurrak ere kontuan hartuz, haurtzarotik presente dagoen subjektibitate eta gorputzen multiplizitatearen parte gisa azalera direnak.

Fausto-Sterling-en arabera, ikerketa sistematiko gutxi egin da bi urtetik beherako haurren kolore-lehenespenaren inguruan. Nolanahi ere, Chiu eta beste egile batzuek, “Sex-Dimorphic Color Preference in Children with Gender Identity Disorder: A Comparison to Clinical and Community Controls” lanean (2006), sexu-genero ez-bitarreko eta/edo jaiotzean esleitutako sexu-generoarekin identifikatzen ez ziren haurren kolore-lehenespena aztertu zuten. Fausto-Sterling ikerketa honetan oinarritzen da, nahiz eta berak arreta gorpuztasun-subjektibitate normatiboetan ipintzen duen.

Chiu eta beste egileen helburua “genero-identitatearen nahasmendua” diagnostikoa duten haurren kolore-lehenespen sexualki dimorfikoak aztertzea eta lehenetsun horiek komunitatearen kontrolpean eta kontrol klinikoaren mende dauden haurrenekin alderatzea da (2006, 386. or.). Lehen taldea, Torontoko Adikzioaren eta Buru Osasunaren Zentroko Genero Identitate Zerbitzuko 65 haurrek osatzen dute –egileen arabera, 47 mutil eta 18 neska–. Bigarrena, 100 haurrek –mutil gisa kontzeptualizaturiko 65 haur eta neska gisa

kontzeptualizaturiko 35-; haurrok kontrol klinikoaren mende zeuden zentro berean, eta DSM diagnostiko heterogeneoak zituzten, betiere “genero-identitatearen nahasmendu”az bestelakoak (2006, 387. or.). Hirugarren taldea, 100 haurrek osatzen zuten –56 mutil eta 44 neska–, Torontoko eguneko zentro batekoak. Hiru taldeetako haurrak 3 urtetik 12 urtera bitartekoak ziren. Haur bakoitzari hamaika kolore eskaini zizkieten, askotariko asetasun, argitasun eta tonalitatetakoak: beltza, urdina, marroia, grisa, berdea, laranja, horia, morea, arrosa, gorria eta zuria. Haurrek hiru aukeratu behar zituzten, bat txanda bakoitzean.

Egileek argi eta garbi hauteman zuten dimorfismo sexu-generiko normatiboa; izan ere, neskek –bai kontrol klinikoaren mende zeudeneke, bai komunitatearen kontrolpean zeudeneke– mutilek baino maizago lehenetsi zituzten arrosa eta morea (2006, 392. or.). Sexu-genero ez-bitarreko eta/edo jaiotzean esleitutako sexu-generoarekin identifikatzen ez ziren haurren kasuan<sup>459</sup>, erregimen sexu-generikoaren arabera aurkako gisa kontzeptualizatzen den sexu-generoari dagozkion koloreak lehenetsi zituzten. Egileen hitzetan, diformismo sexu-generikoa alderantzikaturik ageri zen, eta, hala, arrosa/morea lehenetsi zituzten mutilen ehunekoak kontrol klinikoaren mendeko eta komunitatearen kontrolpeko taldeetako neskenarekin alderatu liteke; arrosa/morea lehenetsi zuten neska ez-normatiboen ehunekoak, berriz, kontrol klinikoaren mendeko eta komunitatearen kontrolpeko taldeko mutilenarekin alderatu liteke (2006, 392. or.). Urdinari dagozkion emaitzak konplexuagoak dira. Hiru probetako bakoitzean, egileek ez zuten sexu-dimorfismo nabarmenik aurkitu, ez komunitatearen kontrolpeko taldean, ez kontrol klinikoaren mendekoan; dena den, neska ez-normatiboek sarriago lehenetsi zuten urdina mutil ez-normatiboek baino. Izan ere, komunitatearen kontrolpeko eta kontrol klinikoaren mendeko mutil ugari gorria lehenetsi zuten, neskek baino nabarmen gehiago (2006, 392. or.).

Arrosa/morea vs. urdina aukeratzeko orduan, eredu normatibo sexu-generikoa argi eta garbi azaleratu zen hiru probetan, egileen arabera: mutil ez-normatiboek eta kontrolpeko bi taldeetako neskek arrosa/morea lehenetsi zuten; neska ez-normatiboek eta kontrolpeko bi taldeetako mutilek, berriz, urdina (2006, 392.-393. or.). Hala eta guztiz ere, mutilek oso gutxitan lehenetsi zuten arrosa/morea urdinaren gainetik, eta neskek, arrosa/morea lehenetsi arren, urdina ere aukeratu zuten. Eredu hori alderantzikaturik ageri zen haur ez-normatiboen artean. Egileen arabera, mutilek araua estuago betetzea eta nesken artean aldakortasun handiagoa egotea beste ezaugarri sexu-generikoki estereotipatu askotan ere hautematen da (2006, 393. or.). Argitasunari dagokionez, kontrolpeko bi taldeetako neskek mutilek baino urdin argiagoak lehenetsi zituzten.

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<sup>459</sup> Behin zehazturik ikerketan “genero-identitatearen nahasmenduaren diagnostikoa duten haurrak” erabili zirela, komenigarria iruditu zaigu terminologia patologizatzaile hori baztertzea eta beste bat erabiltzea haren ordez. Bestalde, garrantzitsua iruditzen zaigu ohartaraztea haur batzuek, beren gorpuztasun-subjektibitatea etengabe aldatzeaz eta garatzeaz gainera, beharbada identitate-kategoria ere aldatuko dutela etorkizunean.



Bi ondorio atera litezke ikerketa horretatik: 1) Giza multiplizitatea; heteroarau sexu-generiko bitarra zorrotza eta nonahikoa den arren, ez du lortzen errealitatea bi multzotara murriztea, eta hori argi ikusten da haurtzarotik bertatik. 2) Identifikatzeko beharraren eta/edo agindu sozialaren indarrak eta sakontasunak –elkarren aurkako bi aukeraren artean hautatu behar baita: arrosa/morea edo urdina– eragiten du arauaren barnean ez bagaude araua urratzea. Alegia, ez du onartzen multiplizitatearen aberastasuna eta askotarikotasuna agertzetik.

Chiu eta beste egileek genero-eskemaren teoriaren bitartez azaldu dituzte emaitza horiek. Haurrak, jaiotzen direnetik, sexu-generikoki kodeturiko eredu baten arabera jantzen dituzte, eta inguruan dituzten estimulu, jostailu eta are ingurunea bera sexu-generikoki eta dimorfikoki kodetuta daude koloreen bidez; horregatik, baliteke ezaguna zaiena lehenestea, autoidentifikazio sexu-generikoaren emergentzia eta kolore batzuen konnotazio sexu-generiko dimorfikoaren gaineko kontzientzia baino lehenago betiere. Alde horretatik, zera diote: “If early parental gender stereotyping plays a contributory role, it would suggest that parents of children with GID were more likely to have engaged in cross-gender color-coding... but on this point there is no confirming or disconfirming empirical evidence” (2006, 394. or.). Egileen arabera, haurrak, sexu-generikoki autoidentifikatzeko gaitasuna garatzen dutenean eta aktiboki hasten direnean generoarekin loturiko informazioa bilatzen, baliteke konturatzea neskek eta mutilek eta emakumeek\* eta gizonek ez dituztela kolore berak erabiltzen arropetan eta jostailuetan, eta gerta daiteke une horretan kolore-lehenespenaren inguruko genero-estereotipoak “gender-linked schema system” baten atal bihurtzea, zentzu zabalago batean (2006, 394. or.). Hala, ondorio gisa, zera diote: “[G]ender stereotyped color preferences... provide yet another window into the subjective construction of gender in both typical and atypical children” (2006, 394. or.).

Fausto-Sterling-ek, nagusiki biologian *edo* kulturaren oinarritzen diren azalpenak baztertu, eta garapenaren sistema dinamikoen teoriaren ikuspegitik egiten du kolore-lehenespenaren garapenari buruzko kontakizuna; haren arabera, gorputzak eta inguruneak, korporalak eta soziokulturalak elkar osatzen dute: “[I]f we try to disentangle them we end up losing the forest amidst the trees” (2012a, 111. or.). Halako kontakizunek eboluzioaren ikuspegiaren bitartez azaltzen dituzte zenbait ezaugarri edo elementu, esaterako, kolore-lehenespena, hau da, ezaugarriok azaleratzen diren eta denboran garatzen diren *prozesuak* aztertzen dituzte. Horretaz gainera, gorputzean errotzen dira; ez gorputz finko batean, baizik eta denborarekin aldatzen den gorputz batean. Ezaugarriak egonkorak, nahiko egonkorak, aldakorak edo oso aldakorak izan daitezke. Kolore-lehenespena ere aldatzen da. Fausto-Sterling-ek berak hasieran arrosa edo morea aukeratzen duten eta gero gorriara igarotzen diren nesken adibideak dakartza. Beste adibide bat ematearren, ni neu haurra nintzela, arrosaz eta lore-

irudiz jantzita ibiltzen nintzen maiz, ama arrosazale eta lorezale bati esker. 18 urteetatik 30 urteetara, nire arropetan ez nuen erabili ez arrosa, ez zuria, baizik eta batez ere beltza; gaur egun, baina, arrosa eta zuria ere badaude nire arroparen koloreen artean. Horra Fausto-Sterling-ek azpimarraturiko beste elementu bat: aldaketak ez datoz ezerezetik; dagoenaren gainean eraikitzen dira (2012a, 113. or.).

Fausto-Sterling-en iritziz, kolore-lehenespena ez datorke nerbio-sistema bisualaren garapen, trebatze edo trebetasun handiago batetik (2012a, 114. or.). Zenbait azterketatan oinarriturik, egileak dio nahiz eta kolorea hautemateko gaitasunaren alderdi batzuk jaio aurretik finkatuta egon helduaro osoan irauten duela trebatzeko gaitasunak (*trainability*), batez ere L-M kolore-sistemari dagokionez (gorria-berdea)<sup>460</sup> –beste sistema horia-urdina da–; hortaz, teorian bederen, baliteke arrosa edo urdin ugarirekin kontaktuan egoteak lotura izatea koloreen pertzepzioa hobetzearekin. Hala eta guztiz ere, azken aldiko aurkikuntzak ez datoz bat hipotesi horrekin (Fausto-Sterling, 2012a, 114. or.). Jaioberriak gai dira zuriaren gainean horia, berdea eta gorria bereizteko, betiere koloreen asetasuna oso altua bada, helduentzat baino askoz altuagoa (2012a, 115. or.). Horia/urdina hautemateko sistemak gorria/berdea hautematekoak baino bi hilabete gehiago-edo behar izaten ditu. Egilearen arabera, txikitatik arrosa edo urdin ugarirekin kontaktuan egoteak haurren ikusmen-sistema baldintzatzen badu, lehenetsun fisiologiko bat garatzeraino, orduan, efektua nabarmen atzeratzen da. Zenbait ikerketaren arabera, 9 hilabeteak arte haurrek ez dute interesik agertzen arrosarekiko, eta urdina edo gorria atsegin dituzte (Franklin eta Davies, 2004 eta Franklin, Bevis, Ling eta Hurlbert, 2010, Fausto-Sterling, 2012a, 115. or.-an aipatua); 1 edo 2 urteko neska eta mutilek nahiago dituzte gorrikkak urdinkarak baino (Jadva, Hines eta Golombok, 2010, 1262. eta 1271. or.). Nolanahi ere, Fausto-Sterling-en arabera (2012a, 115. or.), arrosaren “aurkako” “pertzepzio-isuri” hori egon arren, 2-3 urteko neskatok, hitz egiten eta aukeratzen hasten direnean, argi eta garbi lehenesten dute arrosa (Chiu et al., 2006, 292. or.).

Fausto-Sterling-ek dioenez, arrosa lehenesteko joera 2 urtetik 3 urterako epean garatzen da, eta haren hipotesia da dopamina elementu garrantzitsua dela haien garapenean (2012a, 116. or.). Dopamina burmuinean sortzen den molekula bat da; zehazki, nerbio-sisteman sortzen den neurotransmisore kimiko bat, batez ere burmuineko “substantzia beltza” deritzon horretan, eta, aldi berean, hipotalamoan eratzen den neurohormona bat ere bada (Oates, Karmiloff-Smith eta Johnson, 2012, 10.-11. or.; Fausto-Sterling, 2012a, 116. or.) –hirugarren kapituluaz azaldu dugu

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<sup>460</sup> “L-M” izendapenak kono motei egiten die erreferentzia, hau da, erretinako zelula fotosentikorrei, zeinek koloreak ikustea ahalbidetzen baitute. Badira hiru motatakoak: L, uhin luzeko luzerekiko sentikorrak direnak; M, uhin ertaineko luzerekiko sentikorrak; eta S, uhin laburreko luzerekiko sentikorrak.

sistema neuro-immuno-endokrinoaren lotura-. Horrek guztiak batez ere hirugarren kapituluaren aipatu dugun Kapitalozeno neoliberalaren bilakaera molekularra garrantzitsua berriz ere, zeinean hormonak gure sexu-generoak koerazten dituzten elementu garrantzitsu –baina inolaz ere ez bakar– gisa agertzen diren, ingurunera irekita dagoen etengabeko prozesu aldakor baten barnean. Baina kontakizun horren eta determinismo biologikoaren narratibaren artean badira bi desberdintasun garrantzitsu: Fausto-Sterling-en kontakizunaren arabera, kolore-lehenespena interakzioaren bidez *bakarrik* garatzen da, hau da, ez dago elementu bat bestearen aurretik, ezta bata bestetik bereiz ere, aldi berean eta elkarrengandik bereizi gabe jarduten baitute interakzioan<sup>461</sup>. Ezaugarri hori estimulu soziokulturalen eta kolorearen gaineko genero-arauen, eta, beste elementu batzuen artean, burmuineko zenbait eremuren eta dopaminaren arteko interakzioaren eta bereizezintasunaren bitartez garatuko litzateke soilik. Bestalde, ezaugarria denborarekin garatzen da, etengabeko bilakaera –aldakor– baten barnean. Ez dago aurretik ezarrita, antolatuta eta determinatuta behin betiko eta modu mugiezin eta aldaezin batean.

Burmuinak plazer beraren bilaketaren errepikapena sorrarazten duten zirkuituak garatzen ditu, eta horrek plazerezko gauzak bilatzen laguntzen digu, baina mendekotasunak ere eragin ditzake. Bide dopaminergikoak –“desiraren bidea” ere esaten zaio– estimulu motibagarriekin batera aktibatzen diren enbor entzefalikoko atalak arreata eta funtzio betearazleak kontrolatzen dituzten kortex prefrontalaren atalekin lotzen ditu (Oates et al., 2012, 12. or.)<sup>462</sup>. Dopaminak, gainera, higuinezko erantzunak susta ditzake egoera desatseginen aurrean (Fausto-Sterling, 2012a, 116. or.). Premisa gisa hartuz sari psikologiko batek portaera bat sendotzen duela eta hainbat sarik portaera bat areagotzen dutela, Fausto-Sterling-ek honako hipotesi hau planteatzen du: inguruan gauza arrosak izatea sari bat da milioika neskarentzat, eta fisiologikoki lotua dago plazer-sentimenduarekin. Egilearen arabera, haurtzarotik hasita inguruan kolore bat duela hazitako umeak plazera senti dezake ingurunearen etengabeko auresangarritasunean, gertutasunak segurtasuna eta erosotasuna ekar baititzake, eta, horretaz gainera, etxean eta kalean aurkitzen dituen heldu guztiek, amaz gainera, kitzikapena eta sari emozionalak adierazten dituzte jostailu bat eskaintzean edo arropa bati buruzko oniritzia ematean. Erantzun positiboa haurren

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<sup>461</sup> Esperientziaren edo interakzio sozialen eraginez burmuin-predisposizioak edo joera naturalak aldatzearen ideia ez dator bat naturaren eta kulturaren arteko koeraketaren ideiarekin edo, Doktorego-tesi honetan erabili dugun izendapena erabiliz, elementu organiko-teknologiko-diskurtsibo-materialen arteko koeraketarekin. Fausto-Sterling-ek honela dio: “As long as one insists that in the interaction between nature and nurture, at some early moment in development nature starts it all, while only later does nurture tinker, a resolution is impossible... What I suggest is that we switch our vision..., so that we see nature and nurture as an indivisible, dynamic system. Such a systems approach to developmental psychology is not new, merely underreported” (2000, 227.-228. or.).

<sup>462</sup> Zehatzago, dopamina erdiko burmuineko bi eremutan dago: nigrostriatala eta mesolimbikoa. Biok bi bideren jatorria osatzen dute. Nigrostriatala funtsezkoa da mugimenduak kontrolatzeko, eta mesolimbikoa, berriz, maiz “desiraren bide” izendatua, oso garrantzitsua da motibazioarako (Oates et al., 2012, 10. or.).

dopamina-sistema kitzikatzen dute, eta, ondorioz, haurrak, neskatoak, etengabe ariko dira gauza arrosen bila; alegia, arrosa lehenestea ez da jaiotzetiko ezaugarri bat, baizik eta garatzen den zerbait (2012a, 116. or.).

Hurrei dagokionez, Chiu eta beste egileek ere aipatu zuten simetria falta azaltzeko, hau da, zergatik mutil askok saihesten duten arrosa baina gustuko dituzten urdina, berdea eta beste kolore ilunago batzuk, nahiz ez neskek arrosa gustuko duten grina berarekin, Fausto-Sterling-ek sistema dopaminikoaren higuin-funtzioa nabarmendu du: kontua ez da mutilek urdina gustuko izatea grinaz eta plazerez, baizik eta arrosak higuina ematen diela, arrosa saihesteko beharra dutela beren identitate sexu-generizatua osatzeko (2012a, 117. or.). Kolore-lehenespina garapen handiko une batean gauzatzen da, genero-arauak eta portaera sexu-generizatuak ikasteko prozesuaren barnean. 3 urteetan, haur asko gai dira neska ala mutila diren esateko; horregatik, koloreekin eta arropa edo jostailu motekin loturiko kritikak eta laudorioak bereziki garrantzitsuak dira aro horretan, eta, beste elementu sexu-generizatu batzuekin gertatzen den bezala, zorrotasuna handiagoa da mutilentzat neskentzat baino (2012a, 117).

Dena den, Fausto-Sterling-ek kolore-lehenespenez emandako azalpena, dopaminaren sari- eta zigor-sisteman oinarritua, ez da nahikoa arauaren eta saritzen, onartzen eta askotan zigortzen dietenaren aurka doazen haur sexu-generikoki askotarikoen multiplizitatea kontuan hartzeko. Hori azaltzeko, beharbada, pentsatu behar dugu geure burua identifikatzeko beharra edo agindua –hau da, ulergarritasuna lortzea eta “nor bait” gisa autoafirmatzea– sendoagoa dela saritze-sistema baino, eta alde bat edo bestea aukeratzeak eragiten duela geure burua sozialki esleitu digutenarekin identifikatzen ez badugu aurkakoa hautatzea, zigorrak zigor. Neska zakildunen edo mutil bulbadunen kasuan, jaiotzean esleitu zitzaizenaren aurkako generoarekin identifikatzean, kolore-lehenespina genero-arauek ezarritako koherentziaren barnean geratuko litzateke<sup>463</sup>. Baina badira argi eta garbi kolore bat lehenesten ez dutenak ere; hori ere araua ez betetzeko modu bat izango litzateke, ezbaian jartzen baita kolore bat lehenetsiz sexu-genero batekin *edo* bestearekin identifikatzeko beharra. Araua hain goiz betetzen ez dutenen aukerak azaltzean, faktore asko eta asko sartzen dira jokoan, hala zoria nola nortasun-ezaugarriak, ausardia, indarra, askatasuna, kasu. Banakako aldakortasunari dagokionez, Fausto-Sterling-ek

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<sup>463</sup> Esate baterako, Ekhi da bere historia Naizen-en webgunean kontatzen duen nesketako bat. 11 urte ditu. Haren ama Alaitzek dio txiki-txikitatik gustuko izan zituela soinekoak, gonak, diademak, ile luzea, mototsak, makillajea, takoiak, panpinak, poltsak, sirenak, printzesak, maitagarriak, Hello Kitty, gauza distiratsuak, arrosa-kolorea eta fuchsia (2019). Nahiera bere historia kontatzen duen beste neska bat da. Haren kolore kutunak aldatu egin dira denborarekin. 4 urte zituela, arrosa eta morea zituen gogokoen; gero, urdina, eta, orain, arrosak “zoratu” egiten du berriz ere (2019). Webgune berean, badago Ekhi izeneko beste neska bat. Haren ama Laurak dio txikitan den-dena arrosaz margotzen zuela. Soinekoak, gonak eta zapata takoidunak jantzen zituen, eta panpinekin jolasten ibiltzen zen beti. Garrantzitsua iruditzen zaigu azpimarratzea webgunean agertzen diren haurrak askotarikoak direla.

garapenaren sistema dinamikoetara jotzen du berriz ere, eta adierazten du beharrezkoa dela informazio gehiago izatea ingurune fisikoaren, genero-garapenaren, zaintzaile eta gurasoen interakzio eta jarreraren, eta banakako fisiologiaren aldaketei buruz, eta horrek epe luzeko ikerketak egitea eskatuko luke, haurrak denbora-tarte luzeetan behatzeko (2012a, 117.-118. or.). Aurrerago helduko diogu gai horri.

Kolore-lehenespenak osagai sozial eta kultural garrantzitsua dauka, eta haren jatorria paradigma sexu-generikoan dago, hau da, gorputzak bereizteko eta sailkatzeko ezarritako arau bati erantzuten dio, baina, horrekin lotuta, estuki lotuta, badauka dimentsio biologiko bat ere, gure gorputzek sexu-generoa barneratzen eta performatzen baitute. Pinker-en *The Blank Slate* liburuaren izenburua berreskuratuz –500 orrialdetan ahalegintzen da ideia horren kontrako argudioak ematen–, ideia hau gogoratuko dugu: “We aren’t blank slates, but we also aren’t pink and blue notepads” (Jordan-Young, 2010, p. 290). Demagun bost sexu-generoren bitartez egituraturiko gizarte batean bizi garela eta geure burua arrosaz eta urdinaz gainera horiarekin, berdearekin eta gorriarekin ere identifikatzen dugula; orduan, bost kolore horiek izango lirateke, beharbada, Chiu eta beste egileen ikerketaren edo antzekoen emaitza. Bestalde, haurrak kolorearen arabera bereizten eta sailkatzen ez diren gizarte batean biziko bagina –eta badirudi hala zela 1880. urtearen aurretik, nahiz orduan ere baziren beste genero-arau zorrotz batzuk–, beharbada ez litzateke egongo halako lehenespenik. Kolore-lehenespena koeraketa organiko-teknologiko-diskurtsibo-materialen arteko harremanen ondorioa da. Hortik dator, hain zuzen, haren aldakortasuna eta gorputzen artean eta bizitzetan zehar aldatzeko aukera, eta hori pentsaezina litzateke kolore-lehenespena jaiotzetikoa balitz.

#### **4.5.2. Trans\* bilakaerak: begirada bat garapenaren sistema dinamikoen teoria eta genero-performatibitatea uztartuz**

Jatorriari buruzko galdera identitate sexu-generikoarekin lotuta agertzen da berriz ere. Afera biziki konplexua da, askotariko elementuak biltzen dituena eta ezaugarriaren edo bereizgarriaren kategoria nabarmen gainditzen duena:

We have these differences at birth. They are small; they don’t tell us much about any particular individual. And they may be a moving target as the environmental conditions for fetal growth and development change... (1) what do we know about sex differences in adults? and (2) if there are any, *where they might have come from?* (Fausto-Sterling, 2012a, 105. or.; geuk nabarmendua)

Determinismo biologiko mota jakin batek ematen dituen erantzunez harago, ñabardurak ñabardura eta aldaerak aldaera, badira identitate sexu-generizatuen *locusari* eta jatorriari buruzko beste kontakizun eta ikuspegi batzuk esentzialismotik urruntzen direnak eta teknogorputzen multiplizitate ikaragarri zabalarentzako espazio bizigarri eta desiragarriagoak eraikitzen laguntzen dutenak, multiplizitate hori, desberdintasunak eta aldaketak, ez zerbait problematiko, inkoherente, anormal edo patologiko gisa kontzeptualizatuz, baizik eta existitzen denaren parte gisa kontzeptualizatuz, bere aberastasun eta aldakortasun guztiarekin. Garapenaren sistema dinamikoaren teoriaren arabera, dimentsio soziokulturalen eta biologikoen lotura banaezinetatik sortzen diren interakzioen multiplizitateek eratzen dituzte gure identitate sexu-generikoak eta sexualitatea –zeinak modu bereizezin batean lotuta baitaude beste faktore batzuekin, hala nola klasea, etnia, gaitasuna, etab.–, historian<sup>464</sup> eta gure bizitzetan zehar etengabe aldatzen eta garatzen ari den prozesu baten bidez, nahiz eta identitateen egonkortasuna asko alda daitekeen batzuen eta besteen artean.

Butler-en performatibitatearen teoriaren norabide berean, Fausto-Sterling-ek zera dio: “[G]ender is never absent. There is never a point at which it begins” (2012b, 413. or.). Genero-arauak lehenagotik daude arauok performatzen, iraultzen edo haragitzen dituzten gorputzak baino: “[G]ender identity is a pattern in time. In any one individual, it is shaped by the preceding dynamics and becomes the basis of future identity transformations” (2012b, 405. or.). Dena den, galdera aurrez aurre daukagu oraindik: “How do increasing levels of gendered embodiment, knowledge about gender in the world, the growing abilities to self-label and modulate behaviors to correlate with labels, become part of an internal sense of self?” (Fausto-Sterling, 2012b, 413.-414. or.). Batuz eta konjurtatuz, Fausto-Sterling-en beraren proposamenari jarraiki, Butler-en genero-performatibitatea eta garapenaren sistema dinamikoaren teoria, sexu-generoa barruratzeko-gorputzeko prozesuari buruzko zenbait ikerketatako hipotesi eta emaitzak bildu eta erakutsiko ditugu. Helburua ez da kontakizun sistematiko, azken, itxi eta behin betiko bat eskaintzea, baizik eta identitate sexu-generikoen, besteak beste, “trans\*” terminoaren pean biltzen ditugun

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<sup>464</sup> Maskulinitatea, feminitatea, nahasketa, tartekoak edo anbiguotasuna ulertzeko modua aldatu egiten da denborarekin. Ikus, adibidez, Jordan-Young (2010, 129.-143. or.), nola aldatu den 1967tik 1980ra bitartean Brain Organization Researcheko ikertzaileengan gizon eta emakumeen\* sexualitatea ulertzeko modua. Fausto-Sterling-ek oso adibide grafikoa dakar: XVII. mendean Europako mendebaldeko gizonen zerabiltzaten estetika eta arropak oso femininotzat hartuko genituzke gaur egun: zapata takoidunak, ile luzea eta kopeta-ilea, kapela lumadunak, kapak, mahuka luze eta zabaleko alkandorak, galtzerdi luzeak, lerre-zapiak, xingolak eta begiztak, etab. (2012, 80. or.). Gaur egun ere, gizonen tunika edo soineko luzeak jantzen dituzte planetako hainbat tokitan; herrialde musulmanetan, adibidez, Saudi Arabiako *qamisak*, Indiako gizonen *lungui* gona, edo hinduen *khalata*, bereizketa sexu-generikorik ez duen jantzia. Hala eta guztiz ere, nekez ikusiko dugu gizon bat gona edo soinekoa jantzita Mendebaldeko gorputz zurietan. Esan genezake genero-transgresio handienetako bat dela Mendebaldeko gizon zuri batentzat.

subjektibitate-gorpuztasunen multiplizitatearen, osaeran parte hartzen duten askotariko elementu biologiko eta materialen hari-zuntzen bat txirikordatzea. Garrantzitsua iruditzen zaigu esatea sexu-generoaren eta sexu-joeraren jabeakuntza-prozesuaz daukagun ezagutza<sup>465</sup> eskasa dela (Fausto-Sterling, 2019, 530., 545. or.); hein batean, badirelako gauza batzuk beharbada sekula “jakingo” ez ditugunak, esparru epistemologikoaz gaindi eta esparru politikoaren barnean daudelako, nahiz eta badakigun bi esparruok elkar osatzen dutela.

Zenbait kontakizunen arabera, identitate sexu-generikoa 3 urtetik 5 urtera bitarteko epean agertzen da. Fausto-Sterling-ek (2019, 530. or.) Jan Morris idazle eta historialari transexualaren adibidea dakar. Morrisek *Conundrum* lanean kontatu zuen nola 3 edo 4 urte zituela bat-batean kontzientzia piztu zitzaion eta jakin zuen transa\* zela (1974, 4. or.). Kapitulu honen hirugarren atalean oin-ohar batean bildu dugunez, Bonnie Morris historialari lesbianak ere, zeinak ez baitu babesten “sexualitatea oro jariakorra delako argudioa”, gardentasun handiz deskribatu zuen nola idatzi zion amodiozko gutun bat bere haurtzainari 5 urte zituela (jakinarazpen pertsonala, 2017ko abenduaren 7a). Badira sexu-generoari buruzko istorio ederrak, maitasunez eta ausardiaz beteak, 3 urtetik 5 urtera bitarteko hurrek bizi izandakoak. Kapitulu honen hasieran aipatu dugun *Ur handitan* telebista-saioan aurkeztu zituzten haietariko batzuk (2017). Ikerrek 3 urte ditu. Aurreko urtean, Ekhiñe zuen izena, baina ikaskideei eskatu zien “Iker” deitzeko. Denisek, 5 urte zituela, bizpahiru urte zeramatzan gurasoei eskatzen galtzontzillo batzuk oparitzeko (2018). Udako arropa erosteko sasoia iritsi, eta Denisi galdetu zioten ea galtzontzillo batzuk erostea nahi zuen. Ederne Belamendiak kontatzen du nola Denis, pozaren pozez, aulkitik jauzi egin eta bera besarkatzen hasi zen, “maite zaitut” behin eta berriz errepikatuz, dardarka. Sekula ez zuen horrela ikusi. Sentitu zuen Denisek une horretan pentsatu zuela “azkenean, ikusi naute”. Beldurrarekin batera, burura etorri zitzaizkion zergatik ez ote zizkieten lehenago erosi eta nolako zama zeraman gainean Denisek. Zer gertatzen ari ote zen galtzontzillo batzuk hain garrantzitsuak izateko hiru edo lau urteko ume batentzat. Uda hartaz geroztik, Denis mutil gisa hasi zen ikastolan. Naizen Adingabe Transexualen Familien Elkartearen webgunean ere badira beste haur batzuen istorioak. Ekhi –gorago aipatu dugu– txiki-txikitatik garbi izan du nor den. Panpinak gustatzen zaizkio, printzesaz mozorrotzea eta dantza egitea. Haren ama Laurak kontatzen du nola 3 edo 4 urte zituela esan zien zakila moztu behar ziotela (2019). Beste Ekhi baten istorioa ere bildu dugu: berak betidanik jakin du neska

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<sup>465</sup> Behin eta berriz azpimarratzen ari garen arren sexu-generoa eta sexualitatea lotuta daudela, ez dugu sexualitatean sakonduko, ez baita Doktorego-tesi honen gai nagusia. Ikus Fausto-Sterling (2012a, 70.-98. or.; 2019). Bestalde, nahiz eta “sexualitate” terminoa erabili dugun desira izendatzeko, baita, horrekin batera –baina gutxiagotan–, “sexual-sexu-generiko” ere, atal honetan, “sexu-joera” erabili dugu, Fausto-Sterling-en postulatu teorikoekin bat eginez, nozio horixe baitarabil berak.

dela. Anderrek 5 urte ditu. Neska-laguna zeukan besteek mutila zela jakin aurretik ere. Handitan, mekanikaria eta galtzontzillo-diseinatzailea izan nahi du. Norbaitek behin esan zuen Anderrek erabaki zuela mutila izatea eta Anderrek berak zuzendu zuen, zera esanez: “Ez nuen erabaki mutila izatea; mutil jaio nintzen” (2019).

Halako kontakizunen ezaugarri komuna “pertsona hala jaiotzen delako ideia” da. Aldaketak aldaketa, beraz, halako identitate-ikusmoldeei esentzialismoa darie. Fausto-Sterling-ek honela dio: “Nothing happens before language and self-consciousness develops. Then gender/sex and orientation appear, if not full-blown, still, somehow magically clear and constant. This leaves me wondering what does happen and what might happen in the period from... birth to three years” (2019, 530. or.). Berezkotasun sexu-generikoa kritikatu, egileak azpimarratzen du garrantzitsua dela fokua haurtzaro goiztiarrean ipintzea, baldin eta sexu-generoa gauzatzeko prozesua azaldu eta ezbaian jarri nahi badugu norbera emakume, lesbiana eta/edo trans jaiotzen delako ideia. Horri dagokionez, honako galdera hau egiten du: “What processes mediate this transfer of gender/sex from primarily exterior to strongly interior?” (Fausto-Sterling, 2019, 539. or.). Nola txertatzen da identitate sexu-generikoa gure niaren sakon-sakonean, harik eta zerbait finkoa eta egonkorra bihurtzen den arte?

Galdera horri erantzuteko, Esther Thelen-ek (2000, 2001) kognizio gorputzuaren<sup>466</sup> aldera eginiko biraketan txertatzen du Fausto-Sterling-ek sexu-generoa, eta Jean Piaget-i jarraituz (Piaget eta Inhelder, 1972), desberdintzen ditu identitate sexu-generizatuaren eraketaren eta garapenaren fase auresinbolikoa, haurra jaio eta lehen 16-18 hilabete bitartekoa, eta fase sinbolikoa, 16-18 hilabeteetatik 3 urteetara edo, askotan, 5 urteetara doana, ni sexu-generizatu barneratu eta nahiko sendotu baten zentzua sumatzen eta adierazten den momentua (Fausto-Sterling, 2012b, 410. or.; 2019, 537. or.).

Fase auresinbolikoan, sexu-generoa amaren edo zaintzaile nagusiaren eta haurraren arteko interakzio diadikoaren bidez barneratzen da neurri handi batean, hori baitute sozializatzeko funtsezko modua (Fausto-Sterling, 2012a, 49. or.; 2012b; 2019; Fausto-Sterling, Crews, Sung, García Coll eta Seifel, 2015). Interakzio hori ukimenaren bitartez gauzatzen da hasieran; horri esker, haurrak gorputz-tenperatura erregulatzen du, loaren eta negarraren kontrola

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<sup>466</sup> Thelen-ek defendatzen du burmuina gorputzean barneratua dagoela. Konexio neuronal eta neuromuskularrak –nerbio-sistema muskuluekin lotzen dutenak– gorputz-burmuinen eta munduaren arteko interakzioaren bidez eratzen dira. Pertzepzio-trebetasunen eta trebetasun psikomotorren bidez, gorputz-burmuinek mundua bizitzen eta barneratzen dute, eta nerbio-sistemaren parte izatera igarotzen da. Thelen-ek berak honela dio: “[T]he very same neuron frequently responded to multiple aspects of the task: It fired when the visual stimulus was presented and fired again during the memory or motor decision time. Is this a visual neuron or a motor neuron or one representing the stimulus in memory? It does all of these things. The line between what is perception, what is action, and what is cognition is very hard to draw” (2000, 12. or.).



eta komunikazioa garatzen, estres hormonalaren maila murrizten edo sistema immunea indartzen, beste funtzio gorputzezko, psikologiko eta emozional batzuen artean (Fausto-Sterling, 2012b, 408. or.). Ukimenarekin batera, zaintzaile nagusiak ahoskera, aurpegi-adierazpena, gorputz-tonua eta mugimendua transmititzen ditu, eta, hala, haurren eskaerak eta beharrak asebetetzen dira, haien garapena sustatzen da, afektua sortzen da, eta diadako bi aldeen sistema autonomo, neurologiko eta hormonalak sinkronizatzen edo harmonizatzen dira. Desberdintasun etniko, kultural eta klasekoak, familia mota eta egitura, eta zaintzaileen trebetasunak eta egoera emozionalak garrantzitsuak dira fase horretan (Fausto-Sterling, 2012b, 408. or.). Interakzioen eta jarduera motor eta kognitiboaren bidez sexu-generoa barneratzeko eta jabetzeko prozesua jaio aurretik hasten da, umetokian (Fausto-Sterling, 2012b, 409., 413. or.; 2015, 2. or.; 2019, 541. or.; Fausto-Sterling et al., 2015, 1360. or.).

Fausto-Sterling eta beste egile batzuek, ama batzuen eta beren 3 hilabetetik 12 hilabetera bitarteko seme-alaben arteko 30 interakzio aztertu, eta ikusi zuten, amek haurrak mutil ala neska gisa kontzeptualizatu, haurrenganako tratua desberdina zela; alegia, interakzio-prozesu sensorial, afektibo eta kognitibo horretan, haurrak, mutil edo neska kontzeptualizatuak izan, desberdin *barneratzen* doaztela generoa (2015). Hau da, genitalen arabera, zaintzaileek praktika espezifiko orokortuak sortzen dituzte, bai eta halaber bizipen-mundu orokortuak ere, eta horrek guztiak generoa haurtzaro goiztiarrean barneratzea eragiten du (Fausto-Sterling et al., 2015, 1352. or.). Ikerketa horretan, egileek amaren ukimenari erreparatu zioten, baina ordurako argitaratuak zituzten amaren ahoskerari eta diziplinari buruzko emaitzak (Ahl, Fausto-Sterling, Garcia Coll eta Seifer, 2013; Sung, Fausto-Sterling, Garcia Coll eta Seifer, 2013)<sup>467</sup>. Ikerketa egiteko, Seifer, Sameroff, Barrett eta Krafchuk-ek beren ikerketan erabilitako bideo-zintak baliatu zituzten, zeinetan 50 familia grabatu baitzituzten, haurren izaera analizatzeko asmoz (1994)<sup>468</sup>. 50 familia horietatik, Fausto-Sterling eta beste egile batzuek 30i erreparatu zieten –15

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<sup>467</sup> Argitaratu diren hiru ikerketen artean, bi arrazoiengatik aukeratu dugu atal honetan aipatzen ari garena. Lehenik, indarra eta jarduera fisiko handiagoa eta hobe gizon gisa kontzeptualizatutakoen ezaugarri nagusitzat hartzen dira, eta zaintzarekin lotutako lanak, berriz, emakumeen\* berezko ezaugarritzat, eta hori guztia haurtzaroan jasotzen den ukimen motarekin lotuta dago. Bigarrenik, aurrerago hitz egingo dugu hizkuntza-kategoria edo haur-kanta sexu-generikoak bereganatzeaz eta abarrez; halako gaiek zeharkako lotura izan arren ahoskerari eta diziplinari buruzko ikerketekin, ezaugarri linguistiko eta ahoskerazko gisa kataloga genitzake; eta bestela, mugimenduaren gaia landu gabe geratuko litzateke gure analisisan.

<sup>468</sup> Fausto-Sterling eta beste egile batzuek, portaera sozial sexu-generizatuen aldaketa esanguratsuen ondoriozko kritika posibleen aurrean, kontuan izanda datuak zaharrak zirela, zalantzan jarri dute aldaketa horren probabilitatea, argudiatuz AEBn eta Britainia Handian gutxienez genero-desberdintzeak onarpen eta ospe zabala duela, “gender reveal parties” delakoek eta haurren arropa, jostailuak eta etxeko apaingarriak erosteko ohitura estereotipatuek erakusten dutenez (2015, 1361. or.). Hala eta guztiz ere, egileek diote zaintzaile eta haurren interakzioen azken hogeitako aldaketa xumearen hipotesia empirikoki frogatu behar litzatekeela. Horretaz gainera, nabarmendu dute beharrezkoa dela halako ikerketak beste kultura, talde etniko, komunitate eta/edo familia mota batzuetara –ez-heterosexuak, ez-bitarrak, bi amak edo bi aitak baino gehiagok osatuak, anai-arreba nagusien eragina kontuan hartzen dutenak, eta abar– ere hedatzea. Alde horretatik, ikerketaren

ama-seme gisa kontzeptualizatuak eta beste 15 ama-alaba gisa– (2015, 1353. or.). Ama gehienak erdiko klasekoak ziren, langileak, zuriak, lehenerdiak, ezkonduak eta Rhode Island-ekoak; eta haien adinaren batezbestekoa 29,1 urtekoa zen.

Butler-en genero-performatibitatearen teoriarekin bat eginez –zeinaren arabera generoa efektu gisa agertzen baita, baina ez subjektu baten ekintzaren efektu gisa, baizik eta subjektuaren beraren aurreko genero-arau kulturalen efektu gisa–, Fausto-Sterling eta beste egile batzuek aldarrikatu dute generoarekin loturik dauden eta sexu-generoa barneratzen edo gauzatzen laguntzen duten prozesuak barneratze edo gauzatze horren aurrekoak direla (2015, 1354. or.). Urtebetera arte, jaioberrien artean gorputz eta harreman aldakortasun ikaragarria egon arren, ez dago genero-desberdintasun nabarmenik (Fausto-Sterling et al., 2015, 1354. or.). Desberdintasunok, haurren gorputzetan baino gehiago, haien zaintzaileengan daude. Zaintzaileen genero-estereotipoen araberrako ereduak modu berezian eragiten diote mutil eta neska gisa kontzeptualizaturiko haurren nerbio-sistemari, eta, azkenean, barruratu-gorputzu egiten dira: “We argue that during human infancy sex-related socialization (which is culturally grounded), and which includes the physical minutia (touching, lifting, moving, supporting new activities) of daily infant experience, contributes to the production of embodied (and thus biologically grounded) gender” (Fausto-Sterling et al., 2015, 1356.-1357. or.)<sup>469</sup>. Alegia, generoa ikasi eta nerbio-sistema zentraleraino barneratzen da, eta ukimena da “diferentziazio [sexu-generikoa]aren belaubaldi arteko transmisio”aren mekanismo bitartekarietako bat (Fausto-Sterling, 2012b, 409. or.; Fausto-Sterling et al., 2015, 1354., 1360. or.). Hala, Chiu eta beste egile batzuen (2006) ikuspegitik aldenduz, Fausto-Sterling eta beste egileek testuinguruaren eta banakakoen historiaren araberrako prozesu dinamikotzat hartzen dituzte identitate sexu-generikoa eta generizatutako ezaugarriak, eta ez garapenaren aldi jakin batean agertzen diren propietate edo ezaugarri finkotzat eta, horrenbestez, neurgarritzat (2015, 1351.-1352. or.)<sup>470</sup>.

Egileek amen zenbait ukimen mota bereizten dituzte: positiboa –afektuzkoa eta zaintzazkoa–, estimulatzailea –motrizitate larria estimulatzea, altxatze-jolasak, kulunkatzea, sehaskari eragitea– eta instrumentala –motrizitate xehea garatzen laguntzea, mugitzea, esertzea

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ahulgunetzat hartu dute ez islatzea aztertutako familia ez-normatibo urrien eta batezbestekoaren arteko desberdintasun esanguratsuak edo taldeen arteko desberdintasunak, eta kontuan ez hartzea sexu-genero ez-bitarreko aita, ama edo zaintzaileekiko interakzioak (2015, 1362. or.).

<sup>469</sup> Egileek “sexua” darabilte kategoria genital edo demografiko gisa; “sex-related”, ezaugarri genital edo demografikoekin lotuta egon ohi diren –nahiz ez beti– portaera edo lehenespenak izendatzeko; eta “generoa”, “stereotypes, concepts, or beliefs about human male or female preferences or behaviors” delakoentzat (Fausto-Sterling et al., 2015, 1361. or.).

<sup>470</sup> Eskerrak eman nahi dizkiot Alejandra Martínezi, “berezitasun” eta “ezaugarri finko” kontzeptuei buruzko bere inpresioak partekatzeagatik.

edo objektu bat hartzen edo hari eusten laguntzea– (2015, 1354. or.)<sup>471</sup>. Haien arabera, ukimenezko interakzio mota horien maiztasuna linealki gutxitzen da, bai ama-semeen interakzioetan, bai ama-alaba interakzioetan, adinean aurrera egin ahala; halako interakzioak 3-4 eta 5-6 hilabeteetan dira maizenak eta iraunkorrenak. Bestalde, ukimen estimulazailea eta instrumentala ohikoagoa da mutil gisa kontzeptualizaturiko umeekin neska gisa kontzeptualizaturikoekin baino<sup>472</sup> –amek denbora gehiago ematen dute beren semeak birposizionatzen 3-8 eta 11-12 hilabeteetan, eta altxatze-jokoetan 3-4 hilabeteetan–; mutilenganako afektuzko ukimena handiagoa da neskenganakoa baino –nahiz desberdintasuna esanguratsua ez izan–; eta neskenganako zaintzako ukimen-interakzioa handiagoa da mutilenganakoa baino, modu nabarmen batean; hau neskak mutilak baino gehiago zaintza-jolasetan aritzen direlakoarekin erlaziona liteke (Fausto-Sterling et al., 2015, 1.361. or.). Hala, etorkizunerako ikerketa gisa proposatzen dute hipotesi hau enpirikoki frogatzea: 4. hilabetetik aurrera, neska eta mutil gisa kontzeptualizaturiko haurren jarduera fisikoa gero eta desberdinagoa da mutilek ukimen estimulazaile gehiago jasotzen dutelako neskek baino, hau da, jarduera fisikoan desberdintasun horiek aldeztatik generikoki bereizitako zaintzaile-haur eredu diadikoen interakzioen emaitza dira (2015, 1360.-1361. or.).

Zaintzaile eta haurren arteko prozesu erlazional diadikoan, non barne-prozesuak estuki lotuta baitaude prozesu erlazionalekin, bigarrenak interakzioaren bidez autorregulatzen dira: “Across development, interactive regulation reorganizes inner as well as relational processes; reciprocally, changes in self-regulation in either partner alter the interactive process. This integration of self- and interactive regulation is one way of conceptualizing the organization of experience” (Beebe eta Lachmann, 2002, 36. or.). Beebe eta Lachmann-ek erregulazioaren bost alderdi garrantzitsu bereizten dituzte, denboraren, espazioaren, afektuaren eta kitzikapenaren bidez antolatutako; elementu horiek, era berean, haurren bizipenak antolatuko dituzte, eta aurreinbolikoki adierazita egongo dira (2002, 153. or.)<sup>473</sup>; Fausto-Sterling-ek lura ekarri ditu (2019, 537.-538. or.). Lehen alderdia egoeraren eraldaketa da (*state transforming*), hau da, bikotekide batek besteari kitzikapen-egoera alda dezakeelako itxaropena edo aurreikuspena,

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<sup>471</sup> Zaintzailearen eta haurren arteko ukimen-interakzioaren barnean leudeke elikatzea, mukiak kentzea, garbitzea, janzea, fardela aldatzea, babestea, korrokada eginaraztea, eta abar. Afektuzko interakzioan, berriz, afektua adierazteko edozein ukimen-jokabide sartzen da: laztanak, besarkadak, kilimak, musuak, etab. (Fausto-Sterling et al., 2015, 1365. or.).

<sup>472</sup> Neska-mutilen portaera aztertu eta gero, baztertua utzi zuten ama-semeen eta ama-alaben arteko interakzio desberdina alaben edo semeen berezko sexu-desberdintasunen ondoriozkoa izatea, nahiz eta esaten duten aztertzen jarraitu beharra dagoela, batez ere haurren lehen hiru hilabeteetan, hain justu berek ikertu gabe utzitako adin-tartean (2015, 1361. or.).

<sup>473</sup> Beebe eta Lachmann-ek bost hauek bereizten dituzte: *facial mirroring*, *derailment*, *interpersonal timing* (2002, 153.-154. or.), *disruption and repair* (2002, 160.-169. or.) eta *heightened affective moments* (2002, 169.-175. or.).

hala nola ama batek bere haur jaioberria magalean kulunkatzea negar egiteari utz diezaion. Bigarrena, aurpegi-*isla* (*facial mirroring*), beste bikotekideak afektuzko seinalea errepikatuko duelako itxaropenean datza; esate baterako, aita batek haur jaioberriari irribarre egitea hark irribarra itzuliko diolakoan. Hirugarren elementua, disrupzioa eta erreparazioa, diada batek tirabira bat, bategite huts bat edo aurpegi- eta begi-erantzun falta bat konpontzeko erraztasunean eta azkartasunean konfiantza izatean datza; adibidez, demagun zaintzailea eta haurra elkarri begira daudela zaintzaileak hitz egin eta haurra laztantzen duen bitartean. Haurrak begi-kontaktua eten, eta zaintzailea makurtu egiten da, kontaktua berreskuratzeko. Pertsonen arteko *timinga*, Beebe eta Lachmann-en arabera, honetan datza: “[R]egulation of the mother—infant interaction along the temporal dimension and includes kinesic rhythm..., coactive and alternating vocal exchanges..., vocal congruence..., and the interpersonal timing of vocal interaction” (2002, 154. or.).

Etengabeko erregulazioa, disrupzioa eta erreparazioa, eta afektuzko momentu goren edo sakonak bereziki garrantzitsuak dira lehen urtean zehar interakzioa eta bizipen diadikoa antolatzeari eta autorregulatzeari begira (Beebe eta Lachmann, 2002, 146. or.). Fausto-Sterling-en hipotesia da diadaren osaera sexu-generikoan oinarrituriko osagai batzuen edo guztien aldaketak direla barneratze edo materializazio sexu-generikorako lehen pausoa. Hori azaltzeko, eta aurretik deskribaturiko elementuak erabiliz, bost puntako izar bat eratzen du, jaioberrien materializazio sexu-generikoa laguntzen edo koeratzen duten bost elementuekin, nahiz eta aitortzen duen ez dagoela garbi elementu horiek ba ote duten loturarik elkarren artean eta, baiezkoan, nolakoa zatekeen lotura hori (2019, 538. or.). Alegia, ea espazio-erlazioak nerbio-sisteman materializatzeko eta barneratzeko prozesua modu edo konfigurazio sexu-generizatu jakin baten arabera garatzeak eraginik ba ote duen gainerako elementuetan, edo zer eta zenbat elementu behar diren gainerakoek haurra genero eta/edo sexu-genero jakin batekin hauteman dezaten, eta berak ere gauza bera egin dezan bere buruarekin<sup>474</sup>. Fausto-Sterling-en arabera, hori enpirikoki azter liteke. Bost elementuen artean lehenbizikoa denbora da: haur jaioberriak ratioa, erritmoa, sekuentzia eta kontingentzia biltegitratzen ditu bi norabideko interakzioetan. Bigarrena

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<sup>474</sup> Ez du ematen Fausto-Sterling-ek hemen neska zakildunak eta mutil bulbadunak buruan dituenik, hau da, buruan sexuaren eta generoaren artean koherentziarik ez daukaten gauzatze sexu-generikoak dituenik: “How many aspects of presymbolic embodiment need to point in the same gender/sex direction for another to perceive the infant as male/masculine or female/feminine? Similarly, how many aspects of presymbolic embodiment need to become embedded in an infant’s nervous system for the internal system to produce a subjective sense of self as boy or girl?” (2019, 538. or.). Nolanahi ere, beharbada, Fausto-Sterling eta beste egile batzuek diotenaren arabera lehen urtera bitartean genero-desberdintasun nabarmenik ez dagoenez, haurtzainek praktika espezifiko generizatuak egiten dituzte genitalen arabera (2015, 1352., 1354. or.), eta adin txikiak ahalbidetzen ez duenez gorputz- eta hitz-adierazpide garatuagorik erakustea, zaila da pentsatzea –baina posible, aldi berean– amek araua aldatuko dutenik.

propriozeptioa da: haur jaioberriak bien mugimenduen bizipen propiozeptiboa gordetzen du. Hirugarrena, aurpegi-afektua: haurrak aurpegi bidezko afektu positibo edo negatiboak biltegitratzen ditu, nola mugitzen diren aurpegiak aldi berean eta zer korrespondentzia edo bat-etortze dagoen aurpegien eta ahotsen artean. Laugarrena espazioa da: haur jaioberriak diadaren barneko hurbiltze-hurbiltze, hurbiltze-saiheste edo urruntze ereduak alderdiak barneratzen ditu. Bosgarrena kitzikapena da: haurrak truke diadiko partikularrekin lotzen ditu kitzikapen-ereduak.

Fausto-Sterling-ek zera galdetzen du: “How, for example, might embodiment develop if one broke down “mother” into butch-presenting, fem-presenting, and trans\*?” (2019, 538. or.). Galdera bera egin genezake “emotive faces, voice timbre and expression, touching while playing, bathing (including genital touch) and feeding” (Fausto-Sterling, 2012b, 411. or.) gisako elementuekin lotuta baina baita etapa auresinbolikoan parte hartzen duten gainerako elementuen kasuan ere –logelaren kolorea, sehaska, jostailuak, arropak, orrazkera, etab.–, hau da, zein izango liratekeen eta zer eragin izango luketen ama lesbianek, butchek, transek\*, trans\* butchek, trans\* femmeek, femmeek, aita gayek, aita transek\*, aita trans\* heterosexualek, aita trans\* gayek eta haien arteko eta ama eta aita zis heterosexual, pansexual edo bisexualekin konbinazio posible guztiek, izan bikote gisa, izan hiru heldu edo gehiagoko familia gisa, aukeratuko balituzte. Zer espektatiba eta itxaropen sortuko lirateke familia eta/edo komunitate ez-normatiboetan?

Hortaz, jaioz geroztik, haurrek ukimena, mugimendua, aurpegiak, ahotsak, zaintzak, erritmoak, distantziak, kitzikapen-ereduak, koloreak, jostailuak, arropak, heltzeko moduak eta abar xurgatzen, barneratzen eta biltegitratzen dituzte oroimenean; haiei buruzko espektatibak sortzen dituzte, eta “beren” sexu-generoari buruzko gorputz-mezuak jasotzen dituzte (2012b, 410. or.). Hau da, generoaren adierazpen auresinboliko guztiak itxuratzen dituzten inputek garapen emozionalekin bat egiten dute. Haurrak beren bizipenetan erregulartasunak hauteman ahala hasten dira kategoriak eratzen. 3.-4. hilabeterako, gai dira maskulino gisa eta femenino gisa kontzeptualizaturiko aurpegiak bereizteko (Quinn, Yahr, Kuhn, Slater eta Pascalils, 2002; Fausto-Sterling, 2012a, 53. or.-an aipatua). Fausto-Sterling, García Coll eta Lamarre-ren arabera, normatiboki ahots sexu-generizatuak aurpegi sexu-generizatuarekin lotzen dituzten ikusizko eta entzunezko kategoriak 6-9 hilabeteetarako sumatzen dira (2012, 1696. or.). 10 hilabeteko 32 haurrekin egindako esperimentu batean –haietariko 16 neska gisa kontzeptualizatuak eta beste 16ak mutil gisa–, Levy eta Haaf-ek ondorioztatu zuten haurrak gai direla emakume\*-aurpegien irudiak genero femeninoaren rolen estereotipoak adierazten dituzten objektuekin lotzeko –zapiak, zartagiak–, baita gizon-aurpegien irudiak objektu estereotipatu maskulinoekin lotzeko ere –mailuak, futboleko baloiak– (1994; Fausto-Sterling, 2012a, 54. or.-an aipatua). Levy eta Haaf-ek zera diote ondorio gisa: “10 month-olds can use basic cognitive abilities to categorize social

information, and the resultant categories could be precursors to the acquisition of gender-typed categories” (1994, 459. or.).

Haurrak urtebete duenean hasten da, gutxi gorabehera, aldi auresinbolikotik aldi sinbolikorako pausoa, eta hizkuntza-garapenak bitartekoturik egiten da trantsizio-prozesu hori (Fausto-Sterling, 2012b, 411). Berriz ere gogoratuko dugu analisi hau kulturalki, historikoki eta geografikoki kokatuta dagoela, batik bat AEBko eta Europako mendebaldeko literaturan eta ikerketetan oinarrituta. Diferentziazio sexu-generikoa areagotu egiten da hurrek adierazpen sinbolikoak bereganatu edo sortu ahala. Jostailuen lehenespen sexu-generizatua haurrak urtebete duenean hasten da agertzen. Jadva eta beste egile batzuek ondorioztatu dute bai mutilek bai neskek panpinak autoak baino nahiago dituztela 12 hilabetetan (2010, 1271. or.). Mutil txikienek panpinak autoak baino nahiago izateak, egileen aburuz, iradokitzen du mutilek panpinak baztertzeko joera ikasitako jarrera bat dela, eta ez berezkoa. Era berean, kolore- eta forma-lehenespenean adin horretako hurrek erakusten duten antzekotasun sexu-generikoak adieraziko luke geroko desberdintasun sexu-generizatuak ere eskuratu egiten direla eta ez direla berezkoak, hau da, sozializazioaren edo garapen kognitibo sexu-generizatuaren ondorio dira (Jadva et al., 2010, 1267. or.).

Bigarren eta hirugarren urteetan –urte eta erdirekin edo bi urterekin–, hizkuntza-kategoria identitario sexu-generikoak eta kategoria horiekin loturiko metaforak eta objektuak ikasten edo barneratzen hasten dira, Zosuls eta beste egile batzuek (2009) eta Eichstedt, Serbin, Poulin-Dubois eta Sen-ek (2002) diotenez. Zosuls eta beste egileek kategoria identitarioen sorrera<sup>475</sup> eta hori jostailu sexu-generikoki estereotipatuen erabilerarekin nola erlazionatzen den aztertu zuten (2009). Horretarako, eguneroko bat osatu zuten, bi astean behin, 82 haurren – haietariko 46 neska gisa kontzeptualizatuak eta beste 36ak mutil gisa– amek emandako informaziotik abiatuta, 10 hilabeteekin mintzatzen hasi zirenetik 21 hilabeteetara, fokua batez ere 17. eta 21. hilabeteetan jarrita (Zosuls et al., 2009, 690. or.). Erdiko-goiko klaseetako familietako haurrak ziren, europar-amerikarrak<sup>476</sup>, salbu europar-asiar bat, eta ingeles-hiztunak. Ikertzaileek bi alderdiri erreparatu zioten: kategorien sorrera (adibidez, “girl”, “boy”, “man”, “woman”, “lady” eta “guy”) eta autoizendapena (adibidez, “boy” edo “girl”)<sup>477</sup> (2009, 691. or.).

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<sup>475</sup> Zosuls eta beste egileek gogorarazten digute generoa dela ikasten den lehen kategoria sozial kolektiboa (2009, 688. or.).

<sup>476</sup> Gure ustez, “European American” terminoa arazotsua eta nahasia da; izan ere, Amerika kontinente bat izaki, etnia ugari egin liezaioke erreferentzia. Artikuluan ez da beste informaziorik ematen lagina hobeki kokatzeko, baina, nolana ere, honako hau dio: “In our ongoing research using a less educated and more ethnically diverse sample, we are finding differences across ethnic groups in the timing of gender labeling” (Zosuls et al., 2009, 699. or.). “Estatubatuarra” adierazteko “American” erabiltzeak, problematikoak izanik ere, pentsarazten digu estatubatuar familia zuriez ari dela.

<sup>477</sup> Interesgarria litzateke esperimentua egitea haur eta ama/aita euskaldunekin.

Era berean, 17 eta 21 hilabeterekin, haur horien beren jostailu-lehenespenak aztertu zituzten, bakarkako zein beren amekin antolaturiko jolas-saioretan. Erabilitako jostailuak genero-estereotipoen arabera sailkatu zituzten: maskulinoak (kamioia), pixka bat maskulinoak (zurezko blokeak), femeninoak (haur baten panpina), pixka bat femeninoak (kolore neutroko te-jokoa, eskuila eta orrazia) eta genero neutrokoak (telefonoa, kamioian sartzeko jendea, belakia, bata bestearen gainean pilatzeko kuboak) (2009, 691.-692. or.).

Zosuls eta beste egileen arabera, 17 hilabeterekin, haurren % 25ek –16 neska eta 3 mutil– erabilia zuen hizkuntza-kategoriaren bat; 21 hilabeteetarako, ehunekoak % 68ra igotzen zen –35 neska eta 17 mutil–<sup>478</sup> (2009, 692. or.). % 68 horren barnean, % 10ek hizkuntza-kategoria sexu-generiko bakarra erabilia zuen, % 33k bi, % 27k hiru, % 29k lau eta % 2k bost<sup>479</sup>. 21 hilabeterekin, haurren % 17k –3 mutil eta 10 neska– sexu-generikoki izendatzen zuen bere burua. Erabilitako jostailuei dagokienez, antzekotasun gehiago aurkitu zituzten desberdintasunak baino, bai 17 hilabeterekin, bai 21ekin, eta aldakortasun handia taldeen artean. Desberdintasun sexu-generiko esanguratsu bakarra, Zosuls eta beste egileen arabera, kamioiaren eta panpinaren erabilera agertzen zen; areagotu egiten zen, gainera (2009, 695., 698. or.). 17 hilabeteetatik 21 hilabeteetara, bai neskak bai mutilak gero eta gehiago jolasten ziren genero-estereotipoen arabera ustez zegozkien jostailuekin –panpina eta kamioia, hurrenez hurren–; era berean, mutilak gero eta gutxiago jolasten ziren panpinekin, baina neskek, estereotipora gehiago mugatu, eta mutilek baino gehiago parte hartzen zuten joko generizatuan, bai 17 hilabeterekin, bai 21ekin.

Egileek ondorioztatu zuten hitzezko kategorizazio sexu-generikoak –bai kategoria bitarrak erabiltzea, bai kategoria kopuru handiagoa erabiltzea, bai autoizendapena– eragina zeukala 17 hilabeteetatik 21 hilabeteetara jostailu sexu-generikoki estereotipatuaren erabilera areagotzean (2009, 698. or.). Zera nabarmendu zuten: “[A] basic gender identity, as demonstrated by the presence of gender self-labeling, was associated with increased levels of

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<sup>478</sup> Aztertu behar litzateke zergatik ekoitzi zituzten neskek hizkuntza-kategoria sexu-generikoak mutilek baino nabarmen lehenago, Zosuls eta beste egileek ere azpimarratu dutenez (2009, 697. or.). Nolanahi ere, diotenez, badira sexu-diferentzia posible batzuk garapen kognitiboan; neskak, zaintzaileen bitartez, rol femeninoen eragin handiagoa dute beren sozializazio-prozesuetan; generoa nabarmenagoa eta estereotipatuagoa da nesken haurtzaro goiztiarrean, arrosa-kolorearen eta arropa motaren bidez, eta, mutilen kasuan, arrosa eta femenino gisa katalogatzen dena saihesten da, maskulinoa azpimarratu baino gehiago. Fausto-Sterling eta beste egileen (2015) ikerketaren bidez gezurta daitekeen beste arrazoi bat zera litzateke: jaioberriak direnean, haur guztiak oso modu femeninoan tratatzen dira, eta, aurrerago bihurtzen da generoa garrantzitsuagoa mutilentzat, trebetasun motorrak garatzen dituztenean eta fisikoki sendoagoak eta independenteagoak egiten direnean (Zosuls et al., 2009, 697. or.). Zosuls eta beste egileek, halaber, garrantzitsutzat jotzen dute neskek gizarte-harremanekin loturiko hitz gehiago ikasi ohi dituztela (“amona”, adibidez) eta mutilek, berriz, mugimenduarekin loturikoak (“autoa”, “atea”), eta horrek nesken kasuan kategoria sexu-generiko gehiago eta lehenago ikastea ekar lezake (2009, 697. or.).

<sup>479</sup> Egileen arabera, ez da harrizkoa haur gutxi lau kategoria sexu-generiko baino gehiago erabiltzea, emakume\* helduei erreferentzia egiteko joera baitaude kategoria bat baliatzeko (“lady” edo “woman”), ez bi, eta gauza bera gizonen kasuan (2009, 692. or.).

gender-typed play from 17 to 21 months” (2009, 696. or.). Bestalde, haurrak, amarekin batera jolastean, gutxiago jolasten ziren beren sexu-generoari esleituriko jostailuekin bakarrik jolastean baino. Amarekin jolastean, ez zen nabari kategoria sexu-generikoen jabeakuntzaren eta jolas sexu-generizatu mota areagotzearen arteko harremanaren ebidentziarik. Zosuls eta beste egileen arabera, horrek esan nahi luke amek jolas berdinzaleagoak sustatzen zituztela: “This idea is consistent with the egalitarian values associated with the demographic represented in our sample—European American, upper-middle class mothers” (2009, 699. or.). Baliteke. Hala eta guztiz ere, klase sozialaren<sup>480</sup> eta etnia edo arrazaren eta parekotasunaren edo berdintasunaren arteko lotura problematiko eta alferrikakoaz harago, Fausto-Sterling eta beste egileek frogatu dute gaur egun oraindik ere indarrean dela segregazio sexu-generikoa, nahiz modu irekiago batean (2015).

Azkenik, amaren –hau da, sozializazioaren– eragina minimizatzearen helburua generoaren auto-sozializazioaren<sup>481</sup> teoria indartzea izan liteke, Zosuls eta beste egileek harekin bat egiten baitute. Izan ere, haurrak amarekin jolasten direnean desberdintasun sexu-generizatuak apaltzea azaltzen dutenean ere, mantentzen da 21 hilabeteko mutilak kamioiekin jolasten direla (2009, 698. or.). Era berean, zera diote: “Results investigating children’s relative play... also indicated that children engaged in less gender-typed play when with their mothers, although girls still engaged in significantly greater levels of gender-typed play compared with boys, as they did in the alone play session” (2009, 698. or.). Hortaz, ez da oso argi geratzen zertan datzan orduan jolas sexu-generikoki estereotipatuaren apaltasunak edo nolatan den apalagoa berau amarekin daudenean. Geure buruari galdetzen diogu emakume gisa kontzeptualizaturiko heldu batekin jolasteak ez ote duen eraginik izango neskei esleituriko jostailu femeninoekin jolastea bultzatzean. Alegia, zer neurritan jolasten diren neskak panpina, katilu eta sukaldeekin beren aitarekin daudenean; ez ote diren halakoekin maizago jolastuko amarekin daudenean, amarekin sozialki esleituriko rolak eta portaerak “partekatzen” dituzten heinean.

Zosuls eta beste egileek auto-sozializazioaren hipotesitik abiatuta diotenez, norik bere burua eta besteak kategorizatzekeo gaitasunak eragina du genero-ezaugarrien garapenean. Kapitulu honetan eta Doktorego-tesi guztian zehar, sexu-generoa ezaugarri edo ezaugarri multzo

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<sup>480</sup> Beste pasarte batean, zera diote: “These findings suggest that, if anything, this group of middle- to upper-middle class mothers are socializing gender-neutral play” (Zosuls et al., 2009, 696. or.).

<sup>481</sup> Auto-sozializazioaren teoriaren arabera, haurrak “genero-detektibe”ak dira: “[G]enero detektibeak, berezko motibazioek bultzaturik generoari buruzko informazioaren bila diharduten agenteak” (Halim eta Linder, 2013, 1. or.). Teoria horrek haurrek beren genero-garapena determinatzeko duten zeregin aktiboa azpimarratzen du. Haien sexu-generoaren ulermenak eta kontzientziak eragina izango dute eskura daukaten informazioa antolatzekeo orduan. Genero-eskemen bitartez, ezagutza-egitura antolatuak diren heinean, haurrek beren portaera sexu-generizatuak garatzeko beharrezko informazioa eskuratuko lukete.



finkotzat hartzea kritikatu dugu, eta 2 urteak baino lehenago kokatu dugu sexu-generoaren koeraketa organiko-teknologiko-diskurtsibo-materialaren prozesuaren hasiera –nahiz etengabe garatzen eta aldatzen den–, hau da, identitate sexu-generiko bat eskuratu aurretik, haur jaioberriaren eta haren zaintzaile nagusiaren arteko, eta teknogorputz txiki horren eta haren ingurunearen arteko interakzioan, hots, ingurunera irekita dagoen gorputz batean, kontuan izanik genero-arauak, toxikotasuna eta abar gorputza bera baino lehenagokoak direla. Nolanahi ere, identitate sexu-generiko bat eskuratzeak sexu-generikoki esleituriko jolas mota indartzea ez litzateke bateraezina sexu-generoa eskuratu, barneratu eta konfiguratzeko prozesua lehenago –zaintzaile nagusiarekiko eta ingurunearekiko interakzioaren bitartez– hasten dela dioen ideiarekin. Garapenaren etapa aldaketa markatu arren, auresinbolikotik sinbolikora, hain argi ez legokeena da zer rol betetzen duen oinarrizko identitate sexu-generiko bat eskuratzeak portaera sexu-generizatuen garapenean<sup>482</sup>, eta hori gakoa da autosozializazioaren teorian, ezta identitate sexu-generikoa jolas edo jostailu sexu-generizatuaren aurretik agertzen dela dioen ideia ere, zeina artikulatu horretan agertzen baita. Baliteke sozializazioak bietan eragina izatea, bai jolas eta jostailuetan, bai identitate sexu-generikoaren eskuratzean eta haren hizkuntza-adierazpenean. Era berean, baliteke jolas eta jostailu motak eragina izatea identitatearen osaeran eta identitate hori hizkuntza-kategorien bitartez adierazteko joeran, beste elementu batzuekin batera, hala nola interakzio diadikoa, arroparen, logelaren edo sehaskaren kolorea, hizkuntza ikastea, eta abar. Edonola ere, Zosuls eta beste egileek argi uzten dutena da haurrak urte eta erdirekin edo bi urterekin hasten direla hizkuntza-kategoria sexu-generikoak erabiltzen, hau da, 17 hilabeterekin; 21. hilabeterako, haur askok zenbait kategoria erabiltzen dituzte, eta horrek eragina du jolas motetan (2009, 697. or.).

Eichstedt eta beste egile batzuek adin horretako haurrek generoaz duten ezagutza aztertu dute, baina ez hizkuntza-kategorien bitartez, baizik eta irudien bitartez (2002). Hala, zehazki aztertu dute ea generoari buruzko ezagutza konbentzional eta metaforikorik<sup>483</sup> agertzen ote den 18 eta 24 hilabeteko haurengan. 18 hilabeteko 30 haurrek –16 mutil gisa kontzeptualizatuak eta 14 neska gisa– eta 24 hilabeteko 37k –19 mutil gisa kontzeptualizatuak eta 18 neska gisa– parte

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<sup>482</sup> Fausto-Sterling-en iritziz, aldaketa horrek zeregin konkretuetarako bakarkako irtenbideak bilatzen –adibidez, jostailu bat aukeratzea edo modu gustagarri batean janztea–, genero-kategoriarekin lotutako irtenbideak bilatzera igarotzea dakar, modu honetan halakoak generoari loturik geratzen direlarik (2019, 540. or.).

<sup>483</sup> Generoaren ezagutza konbentzional edo konkretuak gizon edo emakume\* gisa kontzeptualizaturikoen neurri handi batean eraman, erabili eta performatu izan dituzten jardura edo objektuei egiten die erreferentzia; adibidez, neskak panpinekin jolastea eta mutilak kamioiekin (Eichstedt et al., 2002, 297. or.). Generoaren ezagutza metaforikoa, berriz, elkarrekin lotura arruntik ez duten –hots, sozialki eta historikoki loturik ez duten– objektu eta gertaerak kategorien arteko antzekotasunak bilatuz edo kategoria bat talde sexu-generiko batekin lotuz elkartzean datza; adibidez, tximeletak eta emakumeak\* elkartzea biak delikatu gisa kontzeptualizatzen direlako (2002, 298. or.).

hartu zuten<sup>484</sup>. Erdiko klaseko familietakoak ziren, eta ingeles-hiztunak. % 81 kaukasoarrak ziren, % 15 afrikar-kanadarrak eta % 4 asiarrak-kanadarrak. Bat ez beste guztiak bi gurasoko familia tradizionaletan bizi ziren (Eichstedt et al., 2002, 300. or.). Esperimentua egiteko, item generizatuen edo historikoki generoarekin lotu izan diren itemen hamabi irudi erabili zituzten sexu-genero bitar bakoitzarekin; haietariko sei konbentzionalki (prakak, suhiltzaile-txanoa, mailua, soinekoa, tiara eta begizta) eta beste sei metaforikoki (hartza, katua, bihotza, urdin iluna, arrosa argia eta izeia) (2002, 301. or.). Haur bakoitzari item baten bi irudi berdinekin erakusten zituzten, eta, ondoren, bi aurpegi heldu, bata emakume batena eta bestea gizon batena. Itemen irudiekin batera, genero anbiguoko ahots bat entzuten zuten: “Hau da gehien gustatzen zaidana”, haurren espektatiba bat sortzeko gero ikusiko zuten aurpegiaren generoari buruz. Itemetako irudien ordean aurpegiak agertu, eta ahotsak esaten zuen: “Begiratuko didazu?”. 13 proba esperimental egin zituzten, bat item bakoitzeko, seiko bloketan banatuta, eta, horretaz gainera, 2 kontrol-proba (2002, 302. or.).

Egileek ondorioztatu zuten haurrek (61,5%) denbora gehiago pasatu zutela beraiek “gaizki parekatu”<sup>485</sup> (*mismatched*) esaten zieten emakume-aurpegiei begira gizon-objektuen atzetik, gizon-aurpegiei begira baino. Gizon-aurpegi “gaizki parekatu”en kasuan, baina, emakume-itemen atzetik, ez zen gauza bera gertatu. Haurrek “ongi parekatu”ei eta “gaizki parekatu”ei begira ematen zuten denbora ez zen askorik aldatzen (2002, 305. or.). Egileek ondorioztatu zuten haurrek generoaren oinarritzko ezagutza konbentzional eta metaforiko bat lortzen dutela bizitzaren bigarren urtean. Emaitzetan ikusten denez, 18 eta 24 hilabeteko haurrek badute genero-estereotipo maskulinoen berri, baina ez dago hain garbi genero-estereotipo femeninoen berri ba ote duten neurri berean. Haurrek, femenino gisa estereotipututako itemak erakusten zitzaizkienean, ez zieten desberdin begiratzen gizon- eta emakume-aurpegiei. Baliteke horren arrazoia izatea genero-rol maskulinoak zorrotzagoak izatea eta gizonak haietatik aldentzeak zigor eta gaitzespen handiagoa ekartzea, emakumeak\* rol femeninoetatik aldentzeak baino gehiago betiere –nahiz eta lehen haurtzaroan femeninoetasuna saihestuz edo harengandik aldentuz eraikitzen den maskulinitasuna–; ondorioz, rol eta estereotipo horiek azkarrago, tinkoago eta sendoago ikasi behar dira. Ideia hori bera dakarte Eichstedt eta beste egile batzuek ere (2002, 306. or.). Hemen hipotesi gisa aurkezten dugun beste arrazoi bat izan liteke, gizonen espazio publikoan, hedabideetan eta orobat literaturan duten nonahikotasuna; horrek haien rol eta

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<sup>484</sup> Beste 16 haurrek ere parte hartu zuten ikerketan, baina alde batera utzi ziren “akats”engatik edo bestelako arazoengatik.

<sup>485</sup> Erantzun “gaizki parekatu”ek, hau da, haurrek denbora luzean edo ohi baino luzeagoan begiratzen zientenean aurpegi sexu-generizatuei “aurkako” sexu-generoari esleituriko itemen atzetik, berritasuna, harridura edo inkongruentzia adierazten dute, egileen arabera.

estereotipoak behin eta berriz ikusaraztea dakar, baita halakoak gehiago eta lehenago ikastea sustatzea eta estimulatzea ere. Item metaforikoei dagokienez, egileek diote gizonen kasuan fisikotasun handiagoa zutela emakumeenean\* baino, hau da, azkenok ezagutza handiagoa eta konplexuagoa eskatzen zutela, eta baliteke horrek erraztu izana item horiek eta kategoria sexu-generikoak mapatzea (2002, 307. or.). Azkenik, Eichstedt eta beste egileek ere azpimarratu dute ezagutza hori gradualki eskuratzen dela eta aldakortasuna erakusten duela.

Hala, ingurunera irekitako garapen sexu-generikoko prozesuan, fisionomia, hormona-maila, gene edo nerbio-sistema konkretu eta indibidualizatuak dituzten gorputzetan txertatzen, eskuratzen eta barneratzen doa sexu-generoa, baina aldaketa eta garapen jarrian; horrenbestez, 2 urtetik 5era bitarteko haur gehienek baieztatzen dute identitate sexu-generiko bat, edo beren burua sexu-generikoki izendatzen dute. Fausto-Sterling Butler-ekin batera berrirakurritik, ikasi, materializatu eta performaturiko genero-arauen ondorio bat da generoa; arauok, errepikatzearen errepikatzeaz, ohitura bihurtzen dira, eta, gero, modu sexu-generizatu jakin batean jokatzeko ohitura hori natural bihurtzen da; horrenbestez, eraikuntza, hartutako ohitura, ikusezin, esentzial, berezko bilakatzen da (Fausto-Sterling, 2019, 550. or.). Generoa barruratu-gorputzu egiten da, eta teknogorputzen materialtasunak ere performatiboki funtzionatzen du, errepikapenaren bitartez, ikusmolde sexu-generikoaren arabera esleituriko funtzioak burutzeko: “Don’t throw that ball like a girl!” (Zosuls et al., 2009, 697. or.). “What a big boy! What a great throw!” (Fausto-Sterling, 2019, 539. or.). Zenbat aldiz esan ote digute emakumeoi\* gure gurasoek “txilibitu-ahotsa” daukagula, ozen hitz egiteagatik edo eztabaidatzen hasteagatik? Edo zenbat aldiz zigortu gaituzte “ozen barre egiteagatik”? Izan ere, umorea, ozen hitz egitea eta sendotasunez mintzatzea gizon-ezaugarriak dira oraindik ere. Hona Fausto-Sterling-en ondorioa: “[A]s children and even as adults, we can choose consciously from among the many cultural features of gender to embed new bodily habits into our sensorimotor (neuromuscular) system. Even without conscious choice, however, many cultural features of gender shape how our bodies function” (2019, 533. or.).

Gaur egun, baina, badago beste elementu garrantzitsu bat paradigma sexu-generiko heteronormatibo hegemonikoa osatzen duena: sexu-generoa eta sexualitatea aldaezinak direlako ideia, hau da, bat direla eta bizitza guztirako berdina, baita batetik bestera aldaturiko edo trantsitatutako trans\* askorentzat ere –gogoratu ditzagun “beti izan naiz mutila” edo “transok holakoak gara” eta halako ideiak–. Noiz eta nola barneratzen dugu ideia hori, are gure sakoneko niaren parte bilakatzeraino? Fausto-Sterling-ek dio AEBko haurrek 7 urterekin barneratzen dutela generoa “permanent state of being” edo jabego finko gisa (2012a, 55. or.). 1966an, Lawrence Kohlberg-ek “genero-konstantzia” kontzeptua asmatu zuen. 5-6 urteak arte, haurrek

uste dute generoa gorabeheratsua dela. Esate baterako, Fausto-Sterling-en bi urte eta erdiko iloba txikiak esaten zuen handitan poney bat izan nahi zuela (2012a, 55. or.), edo lau urteko Jimmyk lau urte eta erdiko Johnnyri esan zion handitan ama izango zela (Kohlberg, 1966, 95. or.). Genero-identitatearen konstantziak esan nahi du mutil bat gizon bihurtuko dela handitan eta neska bat emakume, eta, aldi berean, eraldaketa “azalekoago” batzuk ere gerta daitezke, hala nola neska bat neska izango dela beti, prakak jantzi eta kamioiekin jolasten bada ere (Halim eta Lindner, 2013, 2. or.). Kohlberg-ek, 4 eta 8 urte bitarteko haurrei neska baten irudia erakutsi, eta galdetu zien ea mutil bilakatu ote zitekeen berak hala nahi izanez gero, mutilen jolasetan arituz gero edo mutilen arropa eta janzkera eramanez gero (1966, 95. or.). Kohlberg-ek dakarrenez, 4 urteko haur gehienek erantzun zuten mutil bilakatu zitekeela nahi izanez gero edo mutilen arropa eta janzkera eramanez gero. 6-7 urtekoen kasuan, berriz, gehienak nahiko ziur zeuden neska bat ezin zela mutil bihurtu, ezta bere portaera edo itxura aldatuta ere.

2 urtetik 5 urtera bitarteko trans\* haurren kasuan eta, zehazki, neska zakildun eta mutil bulbadunen kasuan ikusten dugunez, genero-konstantziaren nozioarekin batera agertzen diren eraldaketa edo elementu “azalekoago” horiei genitalak gehitzen zaizkie. Esan nahi baita, neska batek neska izaten segituko du prakak jantzita ere, kamioiekin jolastuta ere eta/edo zakila edukita ere, eta mutil batek mutil izaten segituko du bulba edukita ere<sup>486</sup>. Nolanahi ere, ez dakigu nola identifikatuko duten beren burua eta zer bilakaera izango duen haur horien materialtasunak nerabezaroan eta helduaroan. Baliteke haietariko batzuek beren burua transexual izendatzea; beste batzuek, trans\*, edo emakume\* trans\* edo gizon trans\*; beste batzuek, trabesti; beste batzuek, emakume\* edo gizon, besterik gabe, edo *nongender*; beste batzuek, genero ez-bitarreko. Baliteke batzuek genero-adierazpide femeninoa baina identitate maskulinoa izatea, eta beste batzuek, genero-adierazpide maskulinoa baina identitate femeninoa. Beste batzuk, apika, mutil trans\* izatetik lesbiana edo butch izatera igaro litezke. Genital-ezaugarrien, genero-adierazpidearen eta genero-identitatearen arteko konbinazio ugarietako sexualitatea gehituz gero, aukerak izugarri ugaltzen dira<sup>487</sup>. Interesgarria litzateke aztertzea ea oraingo edo etorkizuneko

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<sup>486</sup> Garrantzitsua iruditzen zaigu azpimarratzea diskurtso hau normalizatzeko hasi berri den prozesua ez litzatekeela posible izango, batetik, haurron ausardiarik eta haien familien lanik gabe, eta, bestetik, hainbat eta hainbat kolektibo eta aktibistak hainbat hamarkadatan aurretik egindako lan eta borrokarik gabe.

<sup>487</sup> Gauza bera gertatzen da zis teknogorputzekin. Emakume bat heterosexual izatetik/egotetik lesbiana, bisexual eta/edo pansexual edo asexual izatera iragan daiteke, hurrenkera horretan edo beste batean, eta, era berean, gizon bat heterosexual izatetik/egotetik gay, bisexual edo pansexual edo asexual izatera iragan daiteke. Eta gauza bera gertatzen da txikitan “gender non-conforming”tzat hartuak izan eta heldutan emakume\* edo gizon zis heterosexual izandakoetan (Fausto-Sterling, 2019, 546.-547. or.). Aldaketak eta mugimenduak ugariak eta askotarikoak dira hainbat noranzkotan. “Gender non-conforming” terminoari dagokionez, kontuan hartuta autore batetik bestera aldatu egiten dela kontzeptualizazioa, zera dio Fausto-Sterling-ek: “Gender non-conforming behaviors, however, are quite common” (2012a, 68. or.). Hemen ulertzen dugunaren arabera, erregimen heteronormatibo bitarrak inposaturiko sexu-genero-sexualitatearen koherentziatik kanpo geratzen den guztia

haurrek “neska” edo “mutil” kategoriez bestelakoak erabiltzen ote dituzten beren burua izendatzeko, batez ere 7 urteetatik aurrera, edo ea kategoria bat baino gehiago eta/edo biak erabiltzen ote dituzten, eta ea batetik bestera ibiltzen diren, edo ea ez duten kategoriarik erabiltzen; edo ea, orain edo etorkizunean, beren burua “trans\*” edo “neska trans\*”/“mutil trans\*”/“haur trans\*” izendatzen ote duten, edo oraindik existitzen ez diren eta asmatzeko dauden beste kategoria batzuk erabiltzen ote dituzten. Gure hipotesia zera da: sexu-generoari eta sexualitateari buruzko diskurtso irekiagoak eta malguagoak eta aldaketak eta eraldaketak kontuan hartzen dituztenak garatu eta partekatu ahala, eta hizkuntza-kategoriak eta identitate-aukerak haurtzarotik hasita ugaritu ahala, desberdintasun sexual-sexu-generiko gehiago adieraziko dira txikitatik, bai gorputzaren bitartez, bai hizkuntzaren bitartez.

Bestalde, heldutan gizon edo trans\* ez-bitar sentitu diren edo esleiturikoaz bestelako identitate-kategoriaren bat erabili izan duten neskek eta heldutan emakume\* edo trans\* ez-bitar sentitu diren edo esleiturikoaz bestelako identitate-kategoriaren bat erabili izan duten mutilek genero-konstantziaren ideia problematizatzen eta iraultzen dute.

Materialtasun eta identitate sexu-generikoa bizitza guztian zehar garatzen da, egonkortasun handiagoarekin edo txikiagoarekin, subjektibitate-gorputzasunen arabera. Ezinezkoa litzateke kontakizun hori hemen osatzea, Doktorego-tesi honen zabalera gainditzen baitu. Haurtzaroan ipini dugu arreta, zalantzan jartzen baitu zuzenean transexualitatearen eta orobat identitate sexu-generikoen gaineko ikusmolde esentzialista eta biologizista, hau da, identitatea jaio aurretik eta/edo jaioberritan hormonon eraginez sortzen eta burmuinean zigilatzen den zerbait berezkoa, jaiotzetikoa, finkatua edo programatua balitz bezala ulertzen duena. Lehen haurtzaroa aztertzeak agerian uzten du zein garrantzitsuak diren sozializazioa eta patroiz generizatuen araberakoak ez diren hasierako gorputz-desberdintasunen multiplizitatearen interakzioa, askotariko elementuekin, zeintzuen barruan garrantzitsuki aurkitzen diren genero-arauak, biologikoa denarekin, organikoa denarekin, gorputz-materialtasunarekin urtzen direnak. Trans\* gorputzasun-subjektitateen multiplizitatea hasierako gorputz-desberdintasunen espektro zabalaren beste adierazpen edo aukera batzuk baino ez dira, identitate eta materialtasun sexu-generizatu gisa konfiguratu eta garatuko direnak.

Hala eta guztiz ere, fokua hainbat elementutan ipini arren, funtsezko afera erantzun gabe dago oraindik, hau da, nola garatzen diren gorputzasun-subjektibitate ez-normatiboak; zehazki, trans\* multiplizitatea. Identitate sexu-generikoaren garapena zaintzaile nagusien eta haurren

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litzateke, hots, neskek eta emakumeek\* femeninoak eta mutilek eta gizonen maskulinoak izan behar dutela eta dagokien sexu-generoaren arabera desiratu, sentitu eta jokatu behar dutela dioen ikusmoldeetik kanpo geratzen dena.

arteko interakzioaren bitartez transmitituriko genero-arauak barneratzea besterik ez bada, nola da posible identitate ez-normatiboak egotea haurtzaroan? Nola azaleratzen, itxuratzen eta konfiguratu dira bestelako identitate, praktika eta desirak, espektatiba, instrukzio, ikasbide, entrenamendu, zigor, errepresio eta sariak gaindituz edo berauetara gainjarriz? Azalpen orokor eta kontakizun itxi, sistematiko eta behin betikorik ez daukagun arren, hiru elementu aipatu ditugu desberdintasunen aukera zabalaren koeraketa azaltzeko. Lehena zaintzailea-haurra diada izango litzateke, non hasierako desberdintasunak babestu, besarkatu eta zabaldu litezkeen eta aukera sexu-generikoak ugaritu, baita familia ez-normatiboetan ere –bi heldu baino gehiagokoak eta/edo askotariko genero eta sexualitateetako pertsonak osatuak–. Bigarrena hizkuntza-kategoria sexu-generikoak barneratzea eta nork bere burua izendatzea izango litzateke. Orain arte haur transen\* familien elkarteetan –Chrysalis, Naizen– jasotako kontakizunetan ikusi dugunez, haurrek, nahiz eta helduaroan beren burua trans\*, genero ez-bitarreko, *nongender* edo bestelakotzat hartu, haurtzaroan, identitatea bereziki garrantzitsua den aroan –nork bere burua sexu-generikoki identifikatzea, aukera bat baino gehiago, hil edo biziko kontu bat da, agindu sozial larri bat–, mutil edo neska gisa identifikatzen dute beren burua. Alegia, ez dago bitarra ez den kategoriarik nork bere burua izendatzeko.

Teknogorputz sexual-sexu-generikoen multiplizitate zabalaren koeraketan parte hartzen duen hirugarren elementua, kolorearen harira mamitu dugun hipotesiarekin lotuta, dopamina da. Egon daitezke –eta badaude– kolorearen genero-estereotipoak urratu eta beren umeak hainbat koloreekin eta modu ez sexu-generizatu batean janzten dituzten gurasoak. Kolore horietako bat errefortzu positibo edo sari batekin laguntzen den aldiro, plazeretzko sentipen batekin lotuko da, eta oroimenean gordeko. Gauza bera gertatuko da kolore horietako beste elementu batzuekin ere, jostailuak, kasu, edo baita beste elementu batzuekin ere, mugimenduak eta portaerak, kasu, erantzun positiboak emanaz gero haurren dopamina-sistema estimulatu baita eta, horrenbestez, haurrak gauza zehatzak bilatzen jarraituko baitu. Ez dakigu zer gertatzen den, baina baliteke beste lotura batzuek edo antzeko sari edo ordainekin indarturiko beste elementu batzuen arteko loturek sortzea plazeretzko sentipenak haurrengan eta horrek eragitea haurrek bestelako lehenespenean, gustu edo aukera batzuk garatzea.

Dena den, entrenamenduaz, ikasketaz, hezkuntzaz, sariez edo errefortzu negatiboez harago, interakzioan *bertan* eta interakzioak berak sorturiko plazera legoke. Haurrek askotariko elementuetan aurkitu dezakete plazera, beren gorputz sexu-generizatuei esleituak eta/edo onartuak izan zein ez izan. Eta haurrek plazera sortuko balute *interakzioan*, askotariko elementuekiko interakzio eta harremanetan –zorizkoak izan zein kausa jakinak dituztenak izan–, eta dopamina askatzearen ondorioz eta sentipen hori errepikatzean haiekiko lotura edo

atxikimendua (*attachment*) sortuko balitzaie? Badira elementu batzuk, hala nola musika, dopamina askatzen dutenak (Salimpoor, Benovoy, Larcher, Dagher eta Zatorre, 2011; Zatorre eta Salimpoor, 2013; Salimpoor, Zald, Zatorre, Dagher eta McIntosh, 2015). Izan liteke zaintzaileen kanta-marmar, xuxurla, sehaska-kanta eta abestiek eragitea haur jaioberriek dopamina askatzea? Egiaz, haurrak loarazteko eta lasaitzeko tekniketako bat kantatzea da, musikak estresa gutxitzen eta gogo hobetzen baitu. Izan liteke beste soinu eta/edo ahots batzuek dopamina askatzea? Dopamina mugimenduaren kontrolarekin lotuta ere badago (Oates et al., 2012, 10. or.). Dopamina askatzea, zelula-jarduera dopaminergikoaren goren-unea beharrezkoa da mugitzen hasteko, mugimenduaren atea ireki edo itxiko balu bezala, eta mugimenduen indarrerako (da Silva, Tecuapetla, Paixão eta Costa, 2018). Dopaminaren beste funtzio batzuk oroimenarekin, kognizioarekin, arretarekin, prolaktina hormonaren ekoizpenaren inhibizioarekin, loarekin, umorearekin eta ikasketarekin lotuta daude (Frank eta O'Reilly, 2006; Schultz, 2007).

Fausto-Sterling-ek dioenez, haurtzaroan, helduaroan cunnilingusarekin, koitoarekin edo beste sexu-praktika edo -harreman batzuekin lotzen ditugun sentsibilitate neuralak sistema neuralaren osagai gisa garatzen dira, eta haurraren eta zaintzailearen arteko ohiko interakzio multzoen parte dira; interakzio horien artean daude afektuz ukitzea, zaintzaz ukitzea, lasaitzeko kulunkatzea, garbitzea, krema edo talko-hautsak ematea, eta abar (2019, 543. or.). Trevarthen eta Aitken-ek 12 nerbio kranialen taula bat aurkeztu dute, zeinek haurraren trebetasunak, sentsibilitateak eta komunikazio-ezaugarri sensorialak gaitzen edo aktibatzen baitituzte (2001, 23. or.; Fausto-Sterling, 2019, 543. or.-an aipatua)<sup>488</sup>. Usaimen-nerbioak, adibidez, usaimenaren eta dastamenaren barne-zentzu bat ematen du, eta usaintzearen eta, edo bitartean, beste bat musukatzearen esperientzia intersubjektiboak bideratzen ditu. Nerbio trigeminoak aurpegi-sentsazioak ahalbidetzen ditu, eta, hari esker, haurrak beste pertsona batek ukitzearen bizipena izan dezake; nerbio bagoak, berriz, bihotza eta urdaila inerbatu, eta norberaren emozioak sentitzeko gaitasuna ematen du. Nerbio guztiok martxan daude jaiotzean: edoskitzea ahalbidetuz; bihotz-erritmoa, tenperatura eta digestioa erregulatuz; eta haurrak helduen afektuzko inputaren aurrean erne ipiniz. Fausto-Sterling-en arabera, sexualitatea, “[e]ven though, progressively during childhood and on into adulthood, it becomes a physiological “thing” (that we imagine as unique) linked to heightened emotion and the special attachments of love and lovemaking”, haurrak helduen zaintza-lanak ebokatzeko eta haien aurrean erantzuteko erabiltzen duen oinarrizko erreperitorio fisiologikoaren atal gisa hasten da. Alegia: “Sexuality emerges from the

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<sup>488</sup> Ikus 12 nerbioen irudi bat hemen: Trevarthen eta Aitken (2001, 22. or.).

same neurological and physiological events that establish mutual caregiver–infant intersubjectivity” (2019, 543. or.).

Garapenaren unerren batean, eremu libidinaletako sentzibilitate neuralak garun-kortexeko erregio somatosensorial espezifikotara konektatzen dira. Fausto-Sterling-ek dio ezer gutxi dakigula haurtzaroko burmuineko mapa somatosensorialaren garapenez (2019, 544. or.). Garun-kortexeko eremu horiek gorputz-atalekin lotzen dituzten konexio neuronalek plastikotasuna garatzen dute helduaroan; hortaz, aldarrikatzen du sexu-adierazpidearen fisiologian parte hartzen duten gorputz-burmuin loturak haurtzaroan hasten direla garatzen. Sexu-adierazpideak, orgasmoa dakarten erreflexuez gainera<sup>489</sup>, plazerezko sentimenduak ere badakartza, eta, egileak dioenari jarraituz, dopamina askatzearen ondorioa lirateke (2019, 544. or.). Baliteke gorputz eta objektuekin interakzioan egotearen ondorioz dopamina askatzea; lehenbizi, interakzio diadikoan, eta, gero, harago, ukimenaren, ahotsaren, ikusmenaren, entzumenaren, afektuaren, emozioaren, kitzikapenen, mugimendu konkretuen eta esperientzia-ereduen bitartez, plazera sorraraziko luketenak eta halakoak errepikatzeak eta gordetzeak zenbait mugimendu, modu, objektu, jostailu, arropa, kolore, adierazpide, praktika eta identitate erabiltzea, sortzea eta aukeratzea eragingo luke.

Gorputz-irudiari dagokionez, Fausto-Sterling-ek adierazten du norberaren eta besteen esplorazioaren eta ukimenezko sentrazioen bitartez –beharbada, garbiketarik eta fardelak aldatzetik hasita–, eta norberaren eta besteen arteko *feedback* bisualaren, gorputzaren, burmuinaren eta lotura neuralen bitartez eraikitzen eta garatzen dela (2012a, 57. or.). Horretaz gainera, ez dakigu zer gertaera espezifikok parte hartzen duten haurtzaroko, nerabezaroko eta helduaroan gorputz-irudiaren sorreran eta garapenean, eta, halaber, ez dakigu zer gertatzen den “when chromosomal, gonadal, hormonal, and genital sex disagree with body image and gender identity (childhood transgender identity)” (2012a, 57. or.)<sup>490</sup>, eta, gehituko genuke, halakorik ez dagoenean ere.

Hainbat eta hainbat elementuk eragin dezakete identitate disidente, anizkoitz eta arauaz bestelakoak agertzea adin goiztiarrean. Hona Fausto-Sterling-en hitzak:

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<sup>489</sup> Ikus 4 hilabeteko haurren orgasmoei buruzko lan bat hemen: Kinsey, Pomeroy eta Martin (1948).

<sup>490</sup> Egileak (2019, 535. or.) Manzouri eta Savic-en (2018) ikerketa aipatzen du, eta ondorio nagusietako baten interes potentziala nabarmentzen, hots, ikerturiko trans\* eta zis pertsonen sare neuronalen arteko desberdintasunak, zeinek gorputzaren gaineko autopertzepzioa bideratzen baitute. Nolanahi ere, ikerketa horretan, burmuineko sexu-dimorfismoa onartzen da, eta behin eta berriz aipatzen “gender dysphoria” terminoa. Ildo horretan, hona Manzouri eta Savic-en ondorioa: “Although a less pronounced cerebral sex dimorphism was detected in transgender persons compared with heterosexual cisgender controls, this seems primarily due to the higher proportion of homosexual persons in the GD groups, and does not seem to be the signature of GD. We suggest that GD is, instead, specifically linked to cerebral networks mediating self–body perception, possibly due to certain developmental and acquired changes” (2018, 2098. or.).



[T]here are probably so many... and they probably interact in so many different ways, that we will never have a single story to tell about gender development. Even within the same culture, the future of gender will consist of individual case studies that illuminate our questions. But I predict no specific universal story. (2012a, 57. or.)

Galdera asko, erantzun gutxi eta kontuan hartu beharreko aferaren bat. Plastikotasun neuronala da haietariko bat. Neuronen arteko loturak aldatu egiten dira; neurona berriak jaio, eta lotura berriak sortzen dira, gorputzaren eta munduaren arteko interakzioaren emaitza gisa. Hona hemen Fausto-Sterling-en gogoeta: “[I]ndividual variations in neurosensory development might combine with particular family psychodynamics, and that such a combination somehow disrupts the usual developmental patterns for gender identity formation” (2012a, 67. or.).

Jordan-Young-ek ere, Fausto-Sterling-ek eta Ah-King eta Nylin-ek bezala, gizakien plastikotasuna azpimarratu du: “Very few developmental endpoints are truly “final”; instead, they are interim states, with the possibility of growth and change until death” (2010, 286. or.). Garapena –garapen sexu-generizatuak– etengabeko prozesu bat da, eta, prozesu horretan, teknorganismo baten oraingo egoera interakzioan dago hurrengo aldagai edo input esperientzial edo fisiologikoetako bakoitzarekin –biokimikoak barne–. Jordan-Young-en iritziz, Brain Organization Researchen ikerketek ideia hori ezkututzen dute, edo ez ikusiarena egiten diote, edo ukatzen edo alde batera uzten dute hormonon efektu asko itzulgarriak direla eta bizipenen bidez erraz molda daitezkeela: “[C]ausing them to misrepresent scientific knowledge on the effects of hormone exposures during the ‘critical’ periods for development of the brain” (2010, 286. or.). Fausto-Sterling-ek honela dio: “[T]he science you do depends on the model of the body you start with” (2012a, 63. or.).

Hormonek ezin konta ahal bizi-prozesutan parte hartzen dute, eta ezin konta ahal bizi-prozesu azaltzeko balio digute, hala nola sexu-generoaren garapena eta identitate sexu-generizatuak, baina baita hazkuntza, ikaskuntza, loa, mugimendua, portaera, umorea, plazera eta, Jordan-Young-en arabera, neuronon garapena ere (2010, 288. or.). Burmuina plastikoa da, hau da, interakzioaren bitartez *bakarrik* garatzen da: “[S]o too is hormone biology and physiological regulation” (Fausto-Sterling, 2012b, 400. or.). Alegia, azken fenotipoa ez da agerikoa jaiotzean, ezta haurtzaroan eta nerabezaroan ere, heriotzara arte garatzen da eta (Jordan-Young, 2010, 289. or.). Hala, hormona goiztiarrek neuronon garapenean eragina duten arren, “programatu”, “aztarna”, “sortasuna” edo “antolaketa iraunkorra” hitzek oker deskribatzen dute nola funtzionatzen duten hormonon efektu goiztiarrek portaeran. Hormonen eragin goiztiarrak ez

dakar behin betiko oinarri bat portaerari dagokionez (2010, 288. or.). Fausto-Sterling-ek honela dio: “The fact that ildhood gender identity variability can appear as early as the third year of life is not itself evidence that the cause is biological, and certainly not that it comes from a malfunction of fetal hormonal sex” (2012a, 65. or.). Bestalde, dimentsio kognitiboaren emaitzak kontingenteak dira beti, ez behin betikoak.

Egoera iraunkor bat, esentzia bat eta/edo programa bat baino gehiago, sexu-generoa eta identitate sexu-generikoak, haien artean, “trans\*” terminora biltzen ditugun gorpuztasun-subjektibitateak, *bilakaeran diren prozesu dinamikoak eta ingurunera irekiak* dira, eta elementu edo dimentsio organiko-teknologiko-diskurtsibo-materialen multiplizitate batek parte hartzen du haien koeraketan. Galofre eta Missé-k adierazten dutenez, transaren\* gaineko ikusmoldea gizarte bateko ikusmolde sexu-generikoaren mende dago (2015, 17. or.). Trans\* gorpuztasun-subjektibitateak garai historiko jakin batean azaleratu dira, Haraway-ri, Moore-ri eta Malm-i jarraituz, “Kapitalozeno neoliberal” izendatu duguna, eta teknobiopolitikaren eta teknozientziaren bilakaera molekularra inplikatzeko duena. Gonaden Aroak lekua utzi dio Hormonen Aroari, zeinaren azken hamarkadetan, hainbat ahots altxatu diren erregimen sexu-generikoaren irekitzea eskatuz.

“Muturreraino” dikotomikoa den sozializazio-testuinguru batean, espero izatekoa da aldakortasun sexu-generikoa “larriki” ahultzea eta dimorfismo sexu-generikoa zabaltzea (Jordan-Young, 2010, 289. or.). Jordan-Young-entzat, honako hau da funtsezko auzietako bat:

[W]hat kinds of differences should we —socially and politically— accept or even embrace, and conversely, what kinds of skills and traits would we prefer to encourage (or discourage) in everyone. As I have argued, this is not a scientific question, but a political one. Putting this important political issue back to science by suggesting that some things are simply the “state of nature” clearly will not do. (2010, 290. or.)

Diskurtso deterministak, esentzialistak, naturalizatzaileak eta patologizatzaileak ez dira adiskide onak, eta ez dute eskuzabaltasunez funtzionatzen autodeterminatzeko askatasuna eta gorputz-adierazpidea eta/edo -moldaketa legitimatzeko. Eta ez hori bakarrik; horretaz gainera, halako diskurtsoek teknogorpuztasun-subjektibitate ez-normatibo eta ez-hegemonikoen gutxiagotasuna zurrizteko bidea zolatzen dute. Honela diote Galofre eta Missé-k:

[G]ure gorputzak sekula ez dira oker egon; gure kultura da dena zuria edo beltza dela ulertzen duen bakarra, pertsonok adierazten dugun genero-aniztasun oso ikusezin bihurtzen duena (...) ekinen

jarraituko dugu genero-aniztasuna askatasun indibidual eta kolektiborako modu gisa goratzen, zaintzen, mainatzen eta sustatzen duen gizarte baten alde. (2015, 27. or.)<sup>491</sup>

Bukatzeko, uste sendoa dugu gure ikusmolde sexual-sexu-generikoen azken bermea ez litzatekeela biologia izan behar, baizik eta jendearen ongizatea eta zorientasuna, orainaldian bizi ditugun teknogorputzen desirak eta premiak asebetetzeko gaitasuna. Oraindik ere utopia bat da egunen batean kolektiboki aukeratu ahal izatea ea nahi dugun maila sakonenetatik maila azalekoagoetara kategoriatan sexu-generikoen arabera egituraturiko gizarte bat eta ea zer kategoriatan, nola eta zertarako jarri nahi ditugun eskuragarri. Utopiazko une hori iritsi bitartean, baita utopiazko une horretan ere, badira, gutxienez, hiru elementu aintzat hartu beharrekoak kontakizun zientifikoetan, Galofre eta Missé-k adierazitako bidean aurrera egiteko: subjektibitate-gorpuztasunak –sexu-generizatuak– eta sexualitatea prozesu edo bilakaera gisa ulertzea, eta, horrenbestez, aldatzen, bilakatzen eta eraldatzen diren elementu kontingente gisa ulertzea. Errealaren izaera anizkoitza, errealitatearen osaera anizkoitza, hots, desberdintasun, gorputz eta subjektibitateen multiplizitatea. Eta, azkenik, haien koeraketa erlazionala, hau da, desberdintasun, gorputz, subjektibitate horien koeraketa organiko-teknologiko-diskurtsibo-materiala eta erlazio horien efektu gisa haien azaleratze edo agerpena.

#### 4.6. Laburbilduz

Kapitulu honen helburua gorpuztasun-subjektibitateen sexu-generoaren koeraketa organiko-teknologiko-diskurtsibo-materialaren berri ematea izan da, bereziki transen\* kasuan. Kategoriatan hori aukeratzeko arrazoien atzean, azpimarratu nahi dugu transa\* esparru garrantzitsua bilakatu dela sexu-generoari buruzko esanahi eta kontakizun eztabaidatzeko, eta analogia historiko bat ondorioztatu dugula elkarloturiko emakume\*-trans\* kolektibitateen artean hiru ideiatan oinarrituta: farmakologizatutako eta (bio)teknologizatutako bizi-, gorputz- eta identitate-prozesu anizkoitzen kontzeptualizazio mediko-patologikoa, eta haien koeraketa teknologikoa, hirugarren kapituluaz azaldu dugun bezala; “emakumeak\*” eta “trans\*” kategoriatan identitarioen irekiera, esanahi homogeen, naturalizatzaile eta baztertzailetatik multiplizitatea, erlazionaltasuna eta bilakaera besarkatzen duten ikusmoldeetara igaroz; eta bi subjektibitate-

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<sup>491</sup> Jatorrizko testua: “[N]uestros cuerpos nunca han estado equivocados, sino que es nuestra cultura la que solo entiende de blancos y negros, e invisibiliza toda la diversidad de género que las personas expresamos (...) seguiremos trabajando incansables por una sociedad que celebre la diversidad de género, la cuide, la mime, la promueva, como una forma de libertad individual y colectiva”.

teknogorpuztasun taldeok –maiz, bera eta bakarra dira– kontzeptualizatzen dituzten diskurtso determinista, esentzialista, biologizista eta erreduktionistak eta ondorioz desberdintasunak, hierarkiak eta gutxiagotasun soziala hauspotzen dituztenak. Auziok kapitulu honetan aztertu ditugu.

Trans\* gorpuztasun-subjektibitateak koeritzen dituzten elementu diskurtsiboez eta kategoriez denaz bezainbatean, “trans\*” kategoriaren genealogia bat egin dugu. 1940ko eta 1950eko hamarkadetako Cauldwell-en eta Benjamin-en “transsexual” kategoria mediko eta patologizatzailea abiapuntu gisa harturik, haren garapena, zabalkuntza semantikoa eta politizazioa azaldu ditugu, lehenik, “transgender”-ren bidez, zeina autodeterminazio identitarioaren eta multiplizitatearen ideietan oinarrituta egin baitzuten Boswell-ek, Feinberg-ek eta hainbat kolektibok 1990eko hamarkadan, eta, ondoren, “trans\*”-ren bidez, zeina anizkoitz, ireki eta aterkitzat hartzen baita. Hala, nabarmendu dugunez, historian zeharreko eta mundu-globoaren luze-zabaleko gorputz eta identitate ez-bitarren existentziaz harago, “trans\*” kategoria soziala da eta historikoki kokatua dago, eta Kapitalozeno neoliberallean azaleratu da, teknobiopolitikaren eta teknozientziaren bilakaera molekularrean murgilduta eta “Hormonen Aroa” izendatu dugun paradigma sexual-sexu-generikoaren konfigurazio zehatz batekin.

Trans\* subjektibitate-teknogorpuztasunen koeraketa azaldu nahian, ikuspegi historikotik gorputzean oinarrituriko ikuspegi batera igaro gara, eta zenbait elkartek –Chrysallisek, adibidez– eta hedabidek –*El Intermedio* telebista-programak, adibidez– hedatzen dituzten ikusmolde eta kontakizunak aztertu ditugu. Halako diskurtsoek, nahiz eta aurrera egiten lagundu duten trans\* eskubideen defentsan eta trans\* gorputz eta identitateen normalizazioan, kutsu esentzialista eta biologizista dute; izan ere, transexualitatea burmuineko ildaska terminaleko ohantzeko nukleoaren erdiguneko subdibisioan (BSTc) kokatzen duten diskurtso zientifikoetan funtsatuak dira, eta postulatu arazotsu eta patologizatzaileak dakartzate, helburuen kalterako.

Identitate sexu-generikoen –batez ere transen\*– koeraketan parte hartzen duten elementu biologikoen azalpenean, elementu teknologiko eta diskurtsiboekin modu banaezinean loturik, transexualitatea BSTc-an dagoela defendatzen duen ideia-arrastoari segitu diogu, harik eta “Brain Sex Theory” deritzon literatura-gorputzera iritsi garen arte, zeina nagusiki Swaab-en lantaldeak garatu baitu, Jordan-Young-ek “Brain Organization Research” izendatzen duenaren parte gisa. Hala, literatura-gorputz hori osatzen duten lau artikuluko esanguratsu aztertu eta problematizatu ditugu, bai haien ikusmolde teorikoengatik, bai haien zorrotasun-faltagatik eta metodologia- edo diseinu-akatsengatik. Artikulu horiek burmuineko sexu-dimorfismoa defendatzen dute, hau da, identitate sexu-generikoak burmuinean behin betiko finkatzen eta

programatzen direla jaio aurreko eta jaiotzeko hormonen eraginengatik, eta transexualitatea alderantzizkatze, anomalia, arazo, asaldura eta/edo nahasmendu gisa ulertu behar dela.

Sexu-generoaz eta identitate sexu-generikoaz modu ez-hierarkizatu, ez-desberdin eta ez-patologizatzaile batean kontu emateko, erreakzio-arauan, interakzioaren ideian eta garapenaren sistema dinamikoen teoriaran oinarrituriko kontakizunetara jo dugu; kontakizun horien arabera, sexu-generoa eta identitateak testuinguruaren arabekoak dira, anizkoitzak, ingurunera irekiak, eta bilakaeran daude. Horretarako, nagusiki hiru elementu hartu ditugu ardatz gisa, determinismo biologikoen babesguneak hirurak ere: hezurak, koloreak eta trebetasun kognitiboak. Elementuok testuinguruaren arabera kontzeptualizatu dira, interakzio organiko-teknologiko-diskurtsibo-materialaren emaitza gisa, eta garapen, prozesu edo bilakaeran.

Garapenaren sistema dinamikoen teoriaren eta genero-performatibitatearen elkarlotzetik sortutako begirada batetik aztertu ditugu haurtzaroko sexu-generoa eta identitateak, fokua trans\*etan ipinita; haien garapena erakutsi nahi izan dugu, elementu sozial, kultural, biologiko eta diskurtsiboak interakzioan daudeneko prozesu baten bitartez, eta, hala, kontakizun biologizistak, deterministak eta esentzialistak eztabaidatu ditugu. Azaldu dugu nola barruratzengorpuzten dituzten genero-arauak hasieran desberdintasun ez-generizatuak dituzten gorputz askok, lehenik zaintzailearen eta haurren arteko harreman diadikoaren bitartez, eta gero testuinguru sozial zabalago batean, non hizkuntza-kategoria sexu-generizatuak barneratzen diren, generoaren ezagutza metaforikoa eta lehenespenak garatzen diren, hots, 2 urtetik 5 urtera bitarteko haur gehienek beren burua izendatzen dute, eta 7 urterekin barneratzen dute genero-konstantziaren nozioa. Trans\* haurren kasuan, neska zakildunen eta mutil bulbadunen ideia genero-konstantziaren parte bilakatzen da. Halaber, ohartarazi dugu ezjakintasun handia dagoela oro har subjektibitate-gorpuztasun sexu-generizatuaren, eta ez-normatiboaren –bereziki trans\*en– emergentziari eta garapenari buruz. Nolanahi ere, nabarmendu nahi izan dugu sexu-generoaren eta identitate sexu-generizatuaren barneratzea eta garapena etengabe bilakatzen eta aldatzen den prozesu bat dela, anizkoitza eta ingurunera irekia, eta hormonek –elementuen multiplizitate baten artean– zerikusia dutela horretan, baina, burmuineko garapen neuronala bezala, hil arte daudela interakzioan eta eboluzioan. Bestalde, aldarrikatu dugu subjektibitate-gorpuztasunaren multiplizitatea eta haien adierazpidea zabaldu egin litezkeela gizartean ikusmolde sexu-generiko ez hain zorrotza eta anizkoitzagoa eta irekiagoa bagenu; izan ere, elementu diskurtsibo, teknologiko eta materialekin estuki lotuta dauden elementu biologikoez harago, sexu-generoa auzi nagusiki politikoa da.

Azkenik, sexu-generoari buruzko diskurtso eta ikusmolde zientifiko zein bestelakoetan kontuan hartu behar liratekeen hiru elementu identifikatu ditugu: sexu-generoa eta sexualitatea

prozesu edo bilakaera gisa; desberdintasunen multiplizitatea; eta desberdintasunen koeraketa erlazionala.

## *5. Conclusion*

The principal objective of this Doctoral Dissertation consists of understanding the main processes, elements, and technologies that operate within the co-constitution and the significance of technobodies' sex-gendered materiality in the neoliberal era, with a focus on trans\* bodies, thus creating new opportunities for multiplicity. As we indicated, this main objective with an epistemic feature presents an onto-political dimension at the same time.

The first specific objective deals with delving into the processes of construction and the significance of the materiality of sex, in the context of the relation between “gender” and “sex,” aiding in strengthening the questioning of the normative framework that imposes a coherence among gender, sex, and sexuality, while exploring the creation of new possibilities for multiplicity.

The second specific objective lies in departing from a relational cyborg onto-epistemology, gaining in depth understanding of the meaning of our co-constitution as technobodies, as far as sex-gender is concerned, in addition to analyzing and describing the main technologies that intervene in this sex-gendered co-constitution.

The third specific objective digs into the processes of the co-constitution and the significance of the materiality of technobodies' sex-gender, especially emphasizing the category of trans\*, which aids in strengthening the challenging of the normative framework that imposes coherence among gender, sex, and sexuality, in addition to exploring the creation of new possibilities for multiplicity in depth.

The fourth specific objective consists of investigating the principal features and tendencies of neoliberal capitalism related with the sex-gendered paradigm, placing special emphasis on the role technology plays.

The fifth and final specific objective investigates the perspectives that characterize technobodies' sex-gender as a process, becoming, and effect of relational practices and interactions, with a special focus on trans\* technobodies.

The philosophical relevance of pondering the constitution or configuration of “things,” elements, or “material-semiotic” knots (Haraway, 2003, 2016a, 2016b) is a matter which has been reiterated historically. In this case, following the feminist philosophical tradition that emphasizes and focuses its critical and analytical gaze on the body or bodies, this Dissertation has focused on the material-semiotic knots we call technobodies. The philosophical, as well as

the social and political importance of contemplating the co-constitution of technobodies' materiality, emphasizing its sex-gendering can be attested by two recent examples, paradigmatic of the forms of production, management, and co-constitution of the latter and the environment in this day and age. COVID-19 and the catastrophe of the Zaldibar landfill show the increasing technobiopolitical control and management, production, and co-constitution of bodies, much beyond that of humans, awarding renewed relevance to the micropolitics theorized by Foucault (1978 [1976], 1995 [1975]) and later developed by Haraway (1991), which acquires a molecular aspect now more than ever, as Preciado (2008) and Sandoval (2020) indicate.

As we have pointed out, in this Dissertation we have focused our attention on the sex-gendered co-constitution of technobodies. The philosophical and socio-political transcendence of this matter is multiple. On the one hand, the debate surrounding sex-gender, intertwined with other differences and inequalities such as race or ethnicity, class, sexuality, ability, etc., is one of the main contemporary feminist philosophical debates. In this sense, analyzing the processes and elements of the co-constitution of the materiality of sex-gender is a contribution to said debate. In addition to this, we encounter the historically reiterated fact that “sex,” and “gender,” coupled with their relation, have been employed to naturalize social inequalities, sex-gendered in this case. If one thing characterizes philosophy, it is a critical view, the questioning of what is naturalized, sedimented, and assumed. In this way, analyzing and problematizing scientific and philosophical discourses that naturalize sex-gender as well as reduce and pathologize corporeal sex-gendered multiplicity appears as a philosophical duty of the utmost importance. This undertaking becomes even more relevant from my situated position as a feminist and as a body that is conceptualized and socialized as female.

The current socio-historic context in which this Dissertation is inscribed, presents elements that strengthen its interest and reach. We are experiencing an intense increase in the breaching of rights and freedoms worldwide, carried out in states such as the United States, Russia, Brazil, or the United Kingdom –coincidentally, the countries that present the highest number of confirmed cases of COVID-19– by openly misogynistic, homophobic, and transphobic presidents. Likewise, we are also in the midst of the uprising of the ultra-right in many countries in the world, whose declarations, measures, and promises deny sexist violence, repeal or modify the laws of gender violence, or fervently fight against affective-sexual education. The current socio-political makeup in very diverse places on the planet also presents a high rate of violence against women\*, and nonbinary trans\* bodies, an exponential increase in sexist murders, a deep-seated discrimination, precarization, and exclusion of trans\* bodies, as



well as a high degree of feminization, invisibilization, devaluation and precarization of care work.

The philosophical pertinence and transcendence of problematizing essentialist, determinist, naturalizing and pathologizing accounts of sex-gender, among whose consequences we can find the legitimization, on a biological bases, of inequalities, the inferiority of multiple technocorporealities-subjectivities, the sexual division of labor, and even the violence of some bodies toward others are accompanied by the equally relevant and necessary philosophical duty of generating and strengthening alternative narratives that account for the processes of co-constitution and materialization of sex-gender. As Alaimo and Hekman (2008) and Missé and Fernández (2018) indicate, constructionism left the field open to biologicistic “misogynist” discourses, paradoxically to the extent that discourses criticizing biological determinism are catalogued as anti-trans\* or anti diversity nowadays (Jordan-Young, 2010). The biological determinist narrative that establishes the innate feature of sex-gendered identities and the distinct preferences of men and women\*, is awarded acceptance and prestige permeating throughout very diverse disciplines, social institutions, cultural expressions, and even discourses of part of queer and trans\* communities (Missé, 2009; Ostertag, 2016). This Dissertation is not only a philosophical contribution to the analysis and problematization of this account, but to the creation and strengthening of other narratives around sex-gendered development that attempt to encompass biological elements, in addition to discursive and technological elements in their explanation. Alaimo and Hekman stress that there is not as much philosophical-discursive production in this respect (2008).

Inherent to this approach is another element accrediting philosophical interest to this Dissertation, namely, its contribution to a relational onto-epistemology of processes through which relational processes of technobodies’ sex-gendered co-constitution emerge and are conceptualized.

Finally, another characteristic of the current socio-political configuration is its hyper technologized aspect. The control, management, and production of bodies and subjectivities is conducted to a large extent through technologies. This Dissertation is also a contribution to the analysis and elucidation of the meanings, effects, and interests condensed in certain technological artifacts that participate in the co-constitution of the sex-gendered materiality of animal technobodies, human in particular, and, along the same lines as Ostertag, namely reclaiming that navigating the digital era of permanent surveillance, global warming, mass extinction, and the increasing pharmacological constitution of our “selves” requires that all the meanings of technology are on the table, open to scrutiny (2016).

Regarding the main objective of understanding the principal processes, elements, and technologies that operate within the co-constitution and significance of the materiality technobodies' sex-gender in the neoliberal era, focusing on trans\* bodies and creating new opportunities for multiplicity, we have aimed to show that hormones are some of the main *technological* elements that operate within the co-constitution of technobodies' sex-gendered *materiality* –which implies their subjectivity– in the neoliberal era, not only in the case of trans\* technocorporealities, but in that of technobodies in general, which allows for the questioning of sex-gender as something given, natural, fixed, and stable, making possible the deconstruction and reconstruction of this materiality in a more fluid and changing way.

In order to question sex-gender as something given, natural, fixed, and stable, and offer other accounts on the co-constitution of sex-gendered materiality, paying special attention to trans\* technobodies, we have returned to interactionist narratives that explain sex-gender as a reaction norm and to the dynamic systems theory of development. The reason for turning to these two theorizations resides in their convincing and robust dispute of the ideas of innatism, immutability, dimorphism, and the exclusively biological aspect of sex-gender. Through them we have shown that sex-gender and sex-gendered identities are dynamic processes in becoming, which are open to the environment, in which a multiplicity of technological-organic-discursive-material elements or dimensions participate.

To do so, in the fourth chapter, together with the development, incorporation, and acquisition of sex-gendered identity, we have analyzed bone formation, cognitive abilities, and the preference of color because of their stronghold in biological determinism. Facing neuroscientific accounts that establish boys' innate preference for blue and cold tones, and girls' inclination toward pink and warm tones through their conceptualization of sex-gendered cerebral dimorphism that is hormonally programmed and fixed for life, we have intended to show that: 1) The current sex-gendered color divide has a genealogy, which originates around 1940 –which would coincide with the emergence of the neoliberal Capitalocene and the Age of Hormones. 2) Socialization, toys, clothing, decoration, etc. are of great importance in the development of this preference. 3) Following Fausto-Sterling, the neurohormone and neurotransmitter dopamine, which is produced through the positive reinforcement awarded to choosing something pink, in the case of girls, linking the feeling of pleasure and intensifying this behavior, and its adverse effect on boys, can play an important role in the development of this preference. In this way, we have offered an account in which the preference of color is *only* developed as the result of a simultaneous interaction between biological elements and socio-cultural elements, the body and its surroundings, which can and do change over time. 4) Chiu et al. show that these preferences

appear to be reversed in nonbinary and/or trans\* children (2006). 5) This may be due to the strength of the sex-gender imperative of having to identify oneself, which, given the binary nature of our sex-gender regimen, if it is not with the color assigned, it is with the opposite. 6) Even with all this all this, multiplicity exceeds normativity of the binary heteronormative regimen. In this sense, we have hypothesized that if we inhabit a society with a more multiple sex-gendered regimen and/or in which there would not be a sex-gendered imperative of color, preferences would be more multiple.

Regarding bones, an alternative to determinist biological accounts that posit a sex-gendered dimorphism determined by the influence of hormones, we have proposed a conception from the notion of reaction norm and the dynamic systems theory of development in which the environment –which encompasses hormones– crucially influences the shaping and development of bones throughout the *entirety* of life. To do so, we have analyzed various studies of technobodies in various geographies, historic moments, ethnic groups, and sex-genders, that show how multiple elements, from geography, latitude, physical activity, nutrition, sunlight exposure, legal and illegal drugs, bone formation in fetal development, hormones, cellular bone metabolism, and the biomechanical effects of all of these impact bone formation and maintenance, which, in turn, are influenced by gender norms, socio-economic status or class, culture, and race or ethnicity. With all of this, we have intended to show that bone formation and development, rather than being sexually dimorphic, are the effects of the interaction of multiple elements in which steroid hormones are found, which vary depending on the environment and spatial-temporal context.

As an alternative to the account that postulates men's and women's different innate cognitive abilities and behaviors, chiefly, that men's brains are hormonally fixed and wired in the uterus for systematization, technical aspects, and greater physical aggressiveness while women\*'s are wired for empathy and care, seemingly accounting for the fewer numbers and lower results of women\* in the fields of science and technology (Summers, 2005; Baron Cohen, 2005; Swaab, 2007), we have intended to show that cognitive abilities and behavior can also be explained from the notion of norms of reaction and from the dynamic systems theory of development.

To do so, we have analyzed several studies in different geographical contexts, work and academic settings, and age ranges. Together with all this we have shown: 1) The theory of innate differences between men and women\* would be invalidated by the number of women\* in all academic degrees –which encompass examples implying systematization– or even in masters and doctorates surpassing or even matching that of men, except in mathematics, technology, and

engineering, in which the amount of women\* is on the rise, with the existence of places which have equality; the increase in the number of women\* in academic and research positions, including the fields of science and technology at a higher ratio than that of men; and the parity of results in mathematics at younger ages. 2) The broader the sex-gender regimen, the better results women\* obtain. 3) Despite this, the elements of the sex-gender regimen such as the feminization of care, gender prejudices and stereotypes, the different socialization of men and women\* –who continue to be raised for care, childrearing, docility, submission, empathy, and complacency, implying punishing competition and ambition– the design of certain artifacts and the still prevailing misogyny and sexism make the access in some fields, and the continuity and success in the professional world, in general, more difficult, especially in higher levels of the hierarchy. 4) Rather than innate biological differences, the difficulties women\* come up against in their professional careers and their access to certain positions and fields have to do with gender stereotypes, expectations, barriers, and discrimination.

Regarding sex-gendered identities, in view of the neuroscientific accounts that conceptualize identities following Aristotelian logic of the masculine as presence and the feminine as absence, as hormonally wired and set for life in the prenatal brain (Kruijver et al., 2000; Chung, et al., 2002; Baron-Cohen, 2005; Swaab, 2007), we have attempted to show through the intertwining of gender performativity and the dynamic systems theory of development, that they –inseparably linked to sexuality, class, ethnicity, ability, etc.– are dynamic processes in development that are open to their environment, in which their stability can differ in some cases or others. This focus is particularly adequate because under its relational and processual explanatory umbrella it encompasses discursive, socio-cultural, biological, environmental, and technological elements.

To do so, we have analyzed sex-gendered development from birth. What our analysis has shown is that: 1) Sex-gender conception precedes the incorporation and materialization of sex-gender in corporealities-subjectivities, although this is only accomplished through the simultaneous interaction of the biological, corporeal, material, technological, discursive, and socio-cultural. 2) From multiple nongendered corporeal differences, gender norms, expectations, and messages become incorporated into the central nervous system, stored in memory, and linked to emotional development through the dyadic interaction of principal caregiver and infant through vocalization, touch, movement, facial expression, affection, moments of arousal, and through colors, toys, clothing, etc. (Fausto-Sterling, 2012a; 2012b; 2019; Ahl et al., 2013; Sung et al., 2013; Fausto-Sterling et al., 2015). 3) From initial common preferences, sex-gendered preferences for toys appear within the first year of age. Between 2 and 5 years of age, the

majority of children state a sex-gendered identity (Zosuls et al., 2009, p. 692; Fausto-Sterling 2012b; 2019); the idea of gender constancy appears around 7 years of age (Kohlberg, 1966; Fausto-Sterling, 2012a). 6) Despite the influence of early hormones on neuronal development, the brain, neurons, their connections, and the very biology of hormones are developed *only* through the interaction between the body and the world, in a changing and continuous process throughout life in which sex-gender is incorporated, interiorized, and performed (Fausto-Sterling, 2012b; Jordan-Young, 2010).

In order to question sex-gender as something given, natural, fixed, and stable, and offer other accounts regarding the co-constitution of trans\* technobodies' sex-gendered materiality, we have strived to offer a narrative that contemplates discursive, biological, and technological elements in its interweaving. To do so, we have conducted a genealogy of "trans\*," from the appearance of the biologicistic and medical category, "transsexual," from Cauldwell in 1949 and Benjamin in the decades of 1950 and 1960, to its evolution through political categories that pointed toward identity self-determination and corporeal-subjective multiplicity such as "transgenderist" in the decades of 1970 and 1980, "transgender," by Boswell in 1991 and Feinberg in 1992, and "trans\*," in use since 2010. With this we have shown that: 1) Despite the historic existence of nonbinary corporealities-subjectivities worldwide, "trans\*" is a category that emerges in the neoliberal Capitalocene and in the Age of Hormones, which imply a particular configuration of politics, sex-gender regimen, and technological development. 2) In the face of essentialist ideas of trans\* identities as something innate, according to Galofre and Missé, the means of understanding "trans\*" depends on the sex-gender conception of a society. 3) "Trans\*" makes reference to a corporeal-subjective multiplicity that does not identify with the sex-gender assigned at birth and/or identifies with this category, regardless of undergoing surgery and/or hormone treatment or not, in which multiplicity, expressed with the use of the asterisk, exceeds the category.

To account for the biological-discursive elements that participate in the co-constitution of trans\* technocorporealities-subjectivities, we have analyzed four articles on the Brain Sex Theory. These articles conceptualize transsexuality as "gender dysphoria," "gender problem," or "gender identity disorder," based on an alleged "mistake" or "alteration" of "normal" development due to the reversal of the size of the BSTc, the number of neurons and/or the incoherence between brain and genital "sexing," all brought on by "alterations," "disturbances," or "anomalies" in the hormone levels in the uterus (Zhou et al., 1995; Kruijver et al., 2000; Chung et al., 2002; Swaab, 2007). We have problematized these articles for neither being based on scientific experiments nor on double-blind clinical trials, and because of their small sample

size analyzed –8 trans\* technobodies in total– that were not randomly selected, and for the *postmortem* study of brains; for their confusion and lack of conceptual precision, such as the use of “sexual difference” to make reference to “sexual dimorphism” or distinct definitions of transsexuality in the same article; for their unjustified inferences and conclusions, among others, through the mixing and extrapolation of results of studies on the brain of pigs, rodents, etc. to the study of human brains, through jumps from the size or number of neurons in the BSTc to sex-gendered identities or through conclusions established beforehand; for their gender bias, reductionism, biological determinist theoretical foundations, and their pathologization of trans\* with dangerous social consequences.

In view of this, we have aimed to show that trans\* corporeal-subjective multiplicity, which exceeds the norms of binary sex-gender, emerges as the result of the multiplicity of technological-organic-discursive-material interactions in a changing process that is open to the environment, just as any other normative sex-gendered expression. Despite lacking general explanations, and systematic and definitive accounts, we have postulated four explanatory elements that could be relevant: 1) Following Fausto-Sterling, we have asked ourselves what expectations and interactions are generated in non-normative families and/or communities regarding touch, movement, facial expression, vocalization, affection, moments of arousal, color, and type of clothing, toys, and the rest of the elements that participate in the pre-symbolic stage, and how they would influence children. Coupled with the evidence of the lack of studies, we have hypothesized that initial differences could be welcomed and broadened and sex-gendered possibilities could be multiplied in non-normative families as well. 2) We have evidenced through accounts of collectives such as Naizen and Chrysallis that, at present, the categories that appear between 3 and 5 years of age that trans\* children use to call themselves continue to be binary: “boy” or “girl.” In this sense, it would be interesting to see what would happen if this imperative disappeared in childhood, or if we made other nonbinary categories of identification available to children. 3) We have put into dialogue idea of gender identity constancy with the account of “girls with penises and boys with vulvas” and we have shown that genitals become part of the “most superficial” elements, such as clothing, toys, or hairstyle that accompany the notion of gender constancy. Likewise, we have shown that the same notion of gender constancy remains problematized and subverted by all children who as adults have considered themselves to have a sex-gender not assigned at birth and employed identity categories distinct from those assigned. 4) We have hypothesized that, beyond positive reinforcement, which could be associated in nonnormative families to other colors, toys, clothing, movement, expressions, etc. releasing dopamine, this could be generated by children *in* and through multiple pleasure-

inducing interactions, regardless of whether they are assigned or permitted for their sex-gendered bodies or not, influencing the search for these elements and interactions.

To account for the technological elements that participate in technobodies' sex-gendered technological-organic-discursive-material co-constitution, as well as that of trans\* bodies, we have concluded from a cartographic analysis of distinct elements and a literature review that hormones and xenoestrogens, which mutually implicate and exceed each other, are some of the main technological elements that co-constitute technobodies' sex-gendered materiality. To do so, in the third chapter, we have conducted an archeology of the scientific discourses that analyze the effects of xenoestrogens, and, more broadly speaking, endocrine disruptors in animal technobodies, non-human technobodies in particular, as well as those of humans. We have also conducted an analysis of xenoestrogenic products that contain them, human practices in which they are produced and the uses they are conferred. In addition to this, we have analyzed the modes of production, management, and co-constitution of technobodies and their sex-genders in the neoliberal Capitalocene. Together with this, we have carried out a genealogy of "sex hormones" as technoscientific artifacts and market products, and we have opened the hormonal black box to critically analyze the interests condensed within them as well as the effects they produce in the technobodies that consume them and in the technobodies from which they are extracted.

Through the analysis of pharmacological, xenoestrogenic, and hormonal products and the archaeology of scientific discourses, we have aimed to show that: 1) The sex-gender of animal technobodies, human or not, of very diverse geographies around the world, and the environment are co-constituted by the very same xenoestrogenic-hormonal elements. 2) The toxicity and xenoestrogenicity produced by human technobodies simultaneously co-constitutes these technobodies and their sex-genders. 3) The scientific discourses that analyze the xenoestrogenic effects on animal technobodies place excessive emphasis on sex-gendered effects such as feminization, imposex, transsex, hermaphroditism, or reproductive problems in detriment of other grave effects on health, be they immunological, digestive, carcinogenic; or on the environment, such as the loss of the ozone layer and global warming. 4) Following Ah-King and Hayward (2014), this can be explained from a heteronormative anthropomorphizing view that unveils the fears and the vulnerability of hegemonic masculinity. 5) Beyond this perspective, without understating the problem of xenoestrogenic toxicity, this can be conceptualized as part of technobodies' multiple and changing process of sex(gendering) that is open to the environment. 6) In this sense, technobodies' sex-gendered transformations, which are the result of xenoestrogenic toxicity, form part of their response potential and are signs of resilience (Ah-

King & Hayward, 2014). Sex in both its genetic and environmental determination, is eminently plastic and can be conceptualized as a reaction norm (Nilyn & Hayward, 2010).

Through the analysis of technobodies' and their sex-genders' modes of production, management, and co-constitution in neoliberal capitalism, in the third chapter, we have attempted to show that: 1) Following Malm and Hornborg, and Moore and Haraway, the current historical timeframe is better conceptualized through the notion of Capitalocene than that of Anthropocene, given that the planetary transformations and destruction are not exclusively anthropogenic, but capitalogenic, multispecies, and multimaterial. "Capitalocene" focuses on relations, specifically capitalist, colonialist, imperialist, and heteropatriarchal modes of relation and production that emerge from "nature." Following the theorizations of these authors, we have called the historic period after WWII the "neoliberal Capitalocene" in which the market and the media stand out as apparatuses of verification (Preciado, 2008). 2) Xenoestrogenic-hormonal toxins are one of the agents of the neoliberal Capitalocene. 3) Technobiopolitics (Haraway, 2003; Preciado, 2008) and technoscience, the modes of production, management, and co-constitution of technobodies and sex-gendered identities in the neoliberal Capitalocene become molecular through multiple chemical artifacts (Preciado, 2008). 4) The molecular management and becoming of technobiopolitics permeates all forms of production, from microprocessors to seeds, through the agro-chemical-biotechno-pharmacological-military conglomerate. 5) The great power of the chemical, pharmacological and biotechnological industry, with high profits and market value.

Through the genealogy of "sex hormones" in the third chapter, we have intended to reveal that: 1) The Age of Gonads (Dreger, 1998) gave way to what we have called the "Age of Hormones" around 1920-1940, in which hormones substitute the gonads as *locus* and principal defining elements –but not the only ones– of sex-gender. Nowadays, androgens, particularly testosterone is synonymous of masculinity and estrogens of femininity. Sex-gender acquires a chemical feature and sex-gendered identities become molecular. 2) As Oudshoorn indicates this step would not have been made possible without the close collaboration and joint work of pharmaceutical companies, medical entities, and scientists. 3) The current sex-gendered, dimorphic and antagonistic feature of "sex hormones," which condenses and reproduces heteronormativity and masculine superiority, is the result of a contingent historic process and can and should be disputed. 4) In this sense, we have offered four arguments: 4.1) Hormones are found in all bodies. 4.2) They are secreted by multiple organs in addition to those called "sex organs" –pineal gland, hypothalamus, pituitary gland, thyroid gland, parathyroid gland, thymus gland, heart, adrenal gland, and pancreas– or are found spread out in the diffuse neuroendocrine



system and are transported by the blood. 4.3) They stem from cholesterol, therefore, they can be called “steroid hormones.” 4.4) They participate in the growth and development of bones, nerves, the heart, liver, kidneys, the intestine, the brain, lungs, blood vessels, and sex-gendered organs and morphology; they regulate cell growth, cellular differentiation, cellular physiology, and programmed cell death, therefore Fausto-Sterling defines them as growth hormones (2000).

Through the opening of the hormonal black box, we have aimed to show that: 1) Hormones have a multiple feature: they are social fictions, technoscientific artifacts, market products, scientific facts, and theoretical constructs. 2) In the neoliberal Capitalocene we are witnesses to capitalization, that is, the obtaining of economic benefit by pharmacological and biotechnological multinationals through the conversion of sex-gendered identities, sexuality, desire, affection, and multiple corporeal and vital processes into marketable chemical substances and molecules. 3) Hormones present an ambivalent characteristic: on the one hand they have brought with them great autonomy and independence for many women\*, trans\*, and nonbinary trans\*, separating reproduction from sexuality and offering great opportunities for identity self-determination and body modification (Preciado, 2008; Beccalossi, 2018). Likewise, for bodies that could not, they have materialized the opportunity to gestate and reproduce. Similarly, they carry out their function of naturalizing and normalizing sex-gender and the binary heteronormative regimen. In addition, they have served to pathologize and medicalize numerous corporeal and vital processes such as aging, menopause, pregnancy, loss of vigor or sex potency, as well as sex-gendered identities and sexuality themselves. 4) Women\*’s bodies have historically been the most medicalized, capitalized and hormonally treated: DES, Premarin® and their families and multiple hormone and xenoestrogenic products employed in TRH, as contraceptives, fertility treatments or by trans\* women\*, and administered to dogs, fowl, and cows significantly increase the risk of various cancers, miscarriages, endometriosis, blood clots or cardiovascular heart attacks, among others (Oudshoorn, 1994; Watkins, 2007; Langston, 2010; National Women’s Health Network, 2012; Hayward, 2014; Haraway, 2016b; DES Action, 2019). 4) Premarin® and its family have been extracted from mares, causing the murders of thousands of colts and the exploitation and enslavement of mares. 5) The bodies of men have appeared as a new market niche through the testosterone deficit syndrome, which is embroiled in great problematicity given its questionable nature and harmful effects of testosterone treatments (Hoberman & Yesalis, 1995; Bashin, 2016; Ostertag, 2016; FDA, 2014, 2018d). 6) A critical approach on hormones is necessary.

Departing from a relational cyborg onto-epistemology, with the aim of gaining in-depth understanding of the meaning of our co-constitution as technobodies in terms of sex-gender, and analyzing and describing the main technologies that intervene in this sex-gendered co-constitution, we have traced a genealogy of “technobody” through its use by different authors (Hawthorne, 2001; Braidotti, 2002; Balsamo, 1995; Pitts, 2003; Croissant, 2006; Preciado, 2008). Of these conceptual elaborations, we have selected the threads we consider relevant and significant to weave the configuration of the concept of technobody that we have proposed in this Dissertation, based to a great extent on the theorizations of Balsamo, Croissant, and Preciado in particular, namely equipping technobodies and their sex-genders with a multiple feature and emphasizing hormone and pharmacological products that participate in this co-constitution. We have added to these xenoestrogenic toxins threads, which have not been linked to the concept until now, bestowing it with greater explanatory power, robustness, and allowing it to delve into a relational ontology that embraces differences and multiplicity.

With all of this, in the second chapter, we have strived to show that: 1) Technobodies’ sex-gender is technologically-organically-discursively-materially co-constituted. 2) We are technobodies inasmuch as our –and more-than-our– sex-gendered materiality is hormonally and xenoestrogenically co-constituted. “Technobody” accounts for the transcendence that hormones and xenoestrogens have in the conceptualizations of sex-gender in the neoliberal Capitalocene. We may have always been technical corporealities, but our sex-genders have not always been technologically co-constituted, much less through the most profitable molecular artifact of sex-gendered materialization in history: hormones. 3) Techno-xeno-estrogenicity and toxicity, semantically condensed in the concept of technobody unite us and challenge certain ontological boundaries among species –not only animal, but vegetal, fungal and of other natures– among these and the rest of matter and sex-genders; not only because we are composed of the same types of xenoestrogenic-hormonal molecules, but also because we are constituted by the molecules of others, which deepens into the relational cyborg onto-epistemology.

In this development of conceptual elucidation, we have analyzed the differences and similarities that “technobody” presents in respect to another conceptual triad: “cyberbody” (Hawthorne, 2001), “cyborg” (Clynes & Kline, 1960; Haraway, 1985, 1991, 2003, 2016a, 2016b), and “posthuman (body)” (Halberstam & Livingston, 1995; Hayles, 1999; Braidotti, 2013, 2017; Braidotti & Hlavajova, 2018; Ferrando, 2016; Jelača, 2018). Together with this we have argued in favour of the suitability of “technobody” to account for the current sex-gendered co-constitution of animal bodies –placing special emphasis on humans– open to the environment and the co-constitution of bodies that exceed animality, which can be summarized in the

following points: 1) “Technobody” pivots around the notion of body, giving continuity to the feminist philosophical tradition that addresses bodies. 2) It nominally sets out the current relevance of technological artifacts, hormones and xenoestrogens in the sex-gendered co-constitution. In this sense, although it is an undeniable heir to the cyborg, it points toward toxic xenoestrogenicity whereas cyborg does not. 3) It eludes the anthropocentrism that “posthuman (body)” intends to overcome, but does not succeed in doing so. Along these lines, it is differentiated from Haraway’s cyborg, not because of its anthropocentric nature, but because it only points at one of the members of the great queer family of companion species. 4) It accounts for chemical molecular fusion, a characteristic mode –but not the only– of technobodies’ sex-gendered co-constitution in the neoliberal Capitalocene, which implies a technological-organic-discursive-material materiality distinct to that of virtual or robotic.

With respect to exploring the processes of construction and meaning of the materiality of sex in depth, in the context of the relation between “gender” and “sex,” to aid in strengthening the questioning of the normative framework that imposes coherence among gender, sex, and sexuality and delve into the creation of new opportunities for multiplicity, we have traced a brief genealogy of the notions of “sex” and “gender” and we have analyzed various approaches that conceptualize both concepts and their relation. With all of this we have intended to show that: 1) Following Laqueur, sex, as a biological entity and the logic of sexual dimorphism appear in the eighteenth and nineteenth centuries. 2) The concept “gender” arises, in the context of intersexuality, first in the article of Blair-Bell in 1915 (Dreger, 1998), and later through the scientific *rationale* and practical guide offered by Money and the Hampson siblings in the decade of 1950 (Money, 1955; Money et al., 1955, 1957; Hausman, 1995; Preciado, 2008; 2009). The concept “gender,” in turn, emerges from the idea of psychological sex, which we could date back to around 1900 (Mak, 2012). 3) The emergence of “gender” coincides with the Age of Hormones and the neoliberal Capitalocene. 4) According to Fausto-Sterling and Haraway, the dichotomic relation that has been established since then between sex, understood as natural, and gender, understood as socio-culture can be reconfigured co-constitutively. 5) Following these co-constitutive approaches as well as Butler’s and Haraway’s characterization of sex and gender as effects, we have conceptualized the sex-gender of technobodies, interwoven with sexuality, race, ethnicity, class, ability, etc., as an effect of the technological-organic-discursive-material relations of co-constitution.

For the third and fifth specific objective, we have not been able to offer complete findings. Although we have elaborated an account with an emphasis on trans\* technobodies, which encompasses technological-organic-discursive-material elements that co-constitute

technobodies' sex-gendered materiality under its processual and relational umbrella, which questions the normative framework of the coherence of gender and explains the development of sex-gendered identities from early childhood, we have not been able to offer a final, complete, and systematic account. The underlying reasons are multiple. On the one hand, as Fausto-Sterling (2019) confirms the knowledge we have on the processes of the acquisition of sex-gender and sexual orientation, both normative and non-normative, is scarce, partly because there are things that we may never come to "know" given that they exceed the epistemological realm and belong to political realm –while acknowledging that both areas are mutually constituted. In this sense our hypothesis is that the more open and more multiple the sex-gender regimen, the more open and more multiple the sex-gendered technocorporealities-subjectivities. On the other hand, the neural connections, hormones, subjectivity, desire, bones, physical activity, and the incredibly multiple elements that shape sex-gendered technocorporealities change and are developed throughout life in interaction with the world, thereby making it *impossible* to offer a closed, definitive and final account for sex-gendered identities in any moment or vital state.

Even with all of this, the question of the development of non-normative, nonbinary and/or trans\* identity remains, beyond the narrative of the incorporation and materialization of sex-gender norms. In this sense, despite the lack of general explanations and systematic and definitive accounts, we have pointed out the following elements in our three-fold hypothesis: 1) The dyadic relations of caregiver/infant also in non-normative families and communities and with the rest of the elements in the presymbolic stage, and the interaction of these socio-cultural elements with biological elements such as neuronal connections and dopamine. 2) The role of dopamine produced *in* and by these very interactions that produce pleasure. 3) The possible broadening of sex-gendered multiplicity through the availability of nonbinary identity categories in childhood.

Fausto-Sterling signals a fourth element which is the shaping of body image through neuronal connections, around which there is also a great lack of knowledge, as with the development of the somatosensorial brain map in childhood (2019). In this sense, she indicates that there are so many interactions that operate and create distinct effects that we will probably never have a single story to narrate about sex-gendered development (2012a). Hence, she predicts rather than universal histories, specific case studies. All of these matters with respect to the most general question of the development and shaping of identities will be considered in future research.

The lack of knowledge surrounding the functioning of the endocrine system, and xenoestrogens in particular is remarkable. Analyzing their effects on bodies and the environment

in depth from a sex-gender or a broader point of view will also be contemplated in future research. In this context, the case of Zaldibar presents various elements of great transcendence and pertinence at present, which are framed in the analyses and theorizations deployed in this Dissertation. Consequently, it will be studied in the future from a philosophical perspective.

Within this line, following Fausto-Sterling's proposal of abandoning the terminology "estrogens" and "androgens," another matter that has been considered is the pertinence of the terms "xenoestrogens" and/or "estrogen receptors," "androgen receptors," together with "thyroid hormone receptors." The reasons surrounding the pertinence, convenience and suitability of the use of "xenoestrogens" have been specified in section 3.2. With respect to the latter, as the author states, changing the vocabulary implies changing the conception of gender. New theorizations will have to be thought of and developed to be able to explain the effects of xenoestrogens and/or endocrine disruptors without employing this terminology. Evaluating the extent to which this may be interesting, convenient, and transforming or not, as well as investigating current possible proposals and the possibility of generating new ones are tasks that remain for future lines of investigation.

Finally, with respect to the problems not contemplated at the beginning of this research, the question of xenoestrogenicity and its role in technobodies' sex-gendered co-constitution emerged during my research stay at UC Berkeley, upon discovering the profound and intimate nexus of hormones and xenoestrogens. There arose the pertinence and suitability of analyzing how hormone and xenoestrogenic products also affect animal technobodies of various ecosystems and their sex-genders in particular. From there came the archaeology of scientific discourses that analyze the sex-gendered effects of xenoestrogens and the ascertainment of the interweaving of trans-species and trans-material, which contributed to the sketching of the idea of toxicity as an agent of the neoliberal Capitalocene, at the same time it contributed to the in depth exploration of relational cyborg onto-epistemology through the xenoestrogenicity shared by technobodies and the environment.

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