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Linguistic Approaches to Bilingualism

Gender assignment strategies and L1 effects in the elicited production of mixed Spanish-Basque DPs

--Manuscript Draft--

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Abstract:	This paper investigates the strategies involved in gender assignment in Basque-Spanish mixed Determiner Phrases (DPs) with a gendered Spanish determiner (elM /laF) and a Basque ungendered noun. Previous studies on Spanish-Basque mixed DPs have revealed conflicting results regarding the determining factor affecting gender assignment, namely, phonological ending vs. analogical gender. We designed a forced-switch elicitation task in order to elicit mixed DPs with a Spanish determiner and a Basque noun (controlled for both phonological vs. analogical cues). Thirty highly proficient Spanish-Basque bilinguals with different profiles and sociolinguistic backgrounds participated in the study. Three cues were significant in the selection of the Spanish M/F determiner: the analogical gender and two phonological cues, the word ending and the root ending of the Basque noun. Further statistical analyses revealed participants’ L1 as a strong factor in the variability attested: bilinguals with Spanish as (one of) their L1(s) rely predominantly on the analogical criterion, whereas speakers with only Basque as L1 follow mainly the phonological criterion. Overall, this study provides an explanation for the previous conflicting results and highlights the fact that bilinguals may use different strategies depending on their bilingual profile and the morpho-phonological properties of the languages in contact.
Author Comments:	Dear editor, We are very grateful for the opportunity to publish our paper entitled “Gender assignment strategies and L1 effects in the elicited production of mixed Spanish-Basque DPs” to LAB. The present version of the manuscript includs acknowledgments and some information we did not include in previous versions in order to preserve anonymity. Furthermore, we agree with the editor about the importance of making the data and code openly available. As already indicated in the previous revised manuscripts, we have added all the experimental responses and scripts for running the analyses within an OSF project (https://osf.io/uz4ew/). In order to enhance visibility, all the files are also available as a GitHub repository (https://github.com/vdca/mixed-DPs). Thus, we would like our article to be awarded recognition from the Center for Open Science via an 'Open Materials' badge and an 'Open Data' badge.

	We look forward to hearing from you, Amaia Munarriz-Ibarrola, Maria-José Ezeizabarrena, Varun deCastro-Arrazola and M. Carmen Parafita Couto
Response to Reviewers:	
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APPENDICES

Appendix 1: sociolinguistic information on each participant (S(panish), B(asque)).

Participant ID	Role	Age	L1	AoA L2	Language ease	Sociolinguistic area[1]
1	director	30	S	4	S&B	1
2	matcher	23	S	4	S	1
3	director	35	S&B		S&B	1
4	matcher	37	S	4	S	1
5	director	33	S	4	S	1
6	matcher	33	S	4	S	1
7	director	36	S	4	S	1
8	matcher	40	B	6	B	4
9	matcher	47	S	18	B	2
10	director	50	S	18	S	2
11	director	24	S&B		S	2
12	director	28	B	6	B	3
13	director	22	B	6	B	3
14	director	24	S&B		S&B	2
15	director	27	B	6	B	3
16	director	25	S	4	S&B	3
17	director	26	S&B		S&B	3
18	director	27	B	6	B	3
19	director	30	B	4	B	3
20	director		S	4	S	2
21	director	25	B	4	S&B	2
22	matcher	24	S&B		S	2
23	matcher	26	B	6	B	3
24	matcher	20	B	6	B	4
25	matcher	23	B	4	B	2
26	matcher	22	B	6	B	4
27	matcher	26	S	4	S	3
28	matcher	23	S	6	S	3
29	matcher	21	B	6	B	3
30	matcher	28	B	6	B	3
Mean		**28.79**				
SD		**7.47**				

[1] Type of sociolinguistic area was determined on the basis of data available in the EDB database from the Soziolinguistika Klusterra (2014) as follows: 1 (< 20% of population Basque speaker), 2 (20%-50% of population Basque speaker), 3 (50%-80% of population Basque speaker), 4 (≥ 80% of population is Basque speaker).

Appendix 2: instructions for the forced-switch elicitation task.

Basque	English
# Lehen txanda	# First round
Orain bien artean joko bat egingo duzue orain arte aurkeztu ditugun irudiekin. Irudi multzo berdina daukazue, baina orden ezberdinean antolatuta. Beraz, helburua da jokoaren amaieran irudi guztiak orden berdinean egotea, hau da, taula Xek [zuzendariari] duen moduan antolatuta egon behar da bukaeran. Zuk zuzendari lanak egingo dituzu, eta zuk zuzendariak esandakoa bete beharko duzu.	We are going to play a small game with the pictures we've already presented. Both of you have the same set of pictures, but ordered in a different way. The goal of the game is to finish off with both sets of pictures ordered in the same way, that is, the boards should be arranged as X [to the director] has. You will be the director, and you will carry out the instructions given by the director (you).
Beraz, zuk agindu beharko diozu non jarri irudi bakoitza. Azkar egiten saiatu behar duzue, baina hutsik egin gabe. Azkenik, ondorengo arau hau bete behar duzue: Hizkuntza sekretu moduko bat erabili behar duzue, espiek egiten duten moduan-edo. Oro har, gaztelaniaz hitz egin behar duzue, baina marrazkietako irudien izenak beti euskaraz esan behar dituzue, orain arteko bi ariketetan egin duzuen bezala, inoiz ez gaztelaniaz. Irudien izenak dira euskaraz esan behar duzuen bakarra, beraz. Adibidez, primero a la derecha está el aita, luego el segundo es la izeba	So, you will have to provide instructions so that the matcher knows where to place each item. You need to work quickly but without making mistakes. Finally, you need to respect the following rule: You will be using some sort of secret language, something like what spies do. Generally, you will be using Spanish, but you will be naming every picture in Basque, as you did in the two previous tasks, never in Spanish. The names of the pictures are the only thing you will be saying in Basque. For example, first on the right there is the father, then the second one is the aunt
Zalantzarik baldin baduzu(e), galdetu lasai.	Please do ask any question you may have.
# Egiaztatu lehen txanda	# First round check
Oso ondo. Orain zeuk [jarraitzaileari] irudiak ongi antolatu dituzula ziurtatzeko, galdetu egiozu. Gogoratu hizkuntza sekretua mantendu behar duzula, alegia, gaztelaniaz hitz egin behar duzula baina izenak euskaraz esan behar dituzula, amaitzen duzunean ziurtatu beharko duzu, adb. "primero a la derecha está el aita, luego el segundo es la izeba eta abar"	Great. Now, you [to the matcher] will ask him/her in order to check whether you ordered the pictures alright. Remember that you have to keep using the secret language, I mean, you have to speak in Spanish but name the objects in Basque, when you finish you will have to check. For example, "first on the right there is the father, then the second one is the aunt"

Appendix 3: mixed-effects logistic models.

Table 3.1. Model 1

det.gender ~ es.gender + noun.end + root.end + (1|participant)

term	estimate	std.error	odds.ratio	z.value	p.value	signif
(Intercept)	-2.57	0.31	0.08	-8.27	< 2e-16	***
es.gender_m	2.42	0.19	11.30	12.72	< 2e-16	***
noun.end_i	1.42	0.47	4.14	3.01	0.0026	**
noun.end_n	1.80	0.45	6.04	4.02	5.9e-05	***
noun.end_o	2.87	0.46	17.72	6.23	4.7e-10	***
root.end_i	1.26	0.27	3.54	4.76	1.9e-06	***
root.end_n	0.73	0.26	2.07	2.75	0.0060	**
root.end_o	1.19	0.26	3.28	4.52	6.3e-06	***

Table 3.2. Model 2

det.gender ~ es.gender + noun.end + root.end + L1S + S_area + L1S:es.gender + S_area:es.gender + L1S:noun.end + (1|participant)

term	estimate	std.error	odds.ratio	z.value	p.value	signif
(Intercept)	-2.14	0.43	0.12	-4.99	6.1e-07	***
es.gender_m	0.60	0.27	1.82	2.26	0.0238	*
noun.end_i	2.59	1.08	13.30	2.40	0.0163	*
noun.end_n	2.90	0.72	18.20	4.05	5.2e-05	***
noun.end_o	2.59	0.63	13.29	4.11	4.0e-05	***
root.end_i	1.41	0.28	4.08	5.02	5.3e-07	***
root.end_n	0.87	0.28	2.40	3.14	0.0017	**
root.end_o	1.41	0.28	4.09	5.04	4.7e-07	***
L1S_yes	-0.22	0.58	0.80	-0.39	0.6998	
S_area_yes	-0.94	0.57	0.39	-1.65	0.0994	.
es.gender_m:L1S_yes	2.36	0.43	10.64	5.45	4.9e-08	***
es.gender_m:S_area_yes	1.36	0.43	3.88	3.14	0.0017	**
noun.end_i:L1S_yes	-1.45	1.16	0.23	-1.25	0.2127	
noun.end_n:L1S_yes	-1.67	0.89	0.19	-1.88	0.0595	.
noun.end_o:L1S_yes	0.52	0.81	1.69	0.65	0.5167	

Appendix 4: full set of descriptive results.

Table 4.1. Proportion of F/M determiner by es.gender and noun.end

es.gender	noun.end	det.gender	n	proportion	example
f	a	f	318	81%	la belaun-a 'rodilla.F, knee'
f	a	m	74	19%	el pospolo-a 'cerilla.F, match'
f	i	f	11	52%	la gezi 'flecha.F, arrow'
f	i	m	10	48%	el ilargi 'luna.F, moon'
f	n	f	15	52%	la babarrun 'alubia.F, bean'
f	n	m	14	48%	el babarrun 'alubia.F, bean'
f	o	f	8	21%	la pospolo 'cerilla.F, match'
f	o	m	30	79%	el pospolo 'cerilla.F, match'
m	a	f	135	40%	la errota 'molino.M, mill'
m	a	m	206	60%	el eguzki-a 'sol.M, sun'
m	i	m	37	100%	el zubi 'puente.M, bridge'
m	n	f	3	16%	la eraztun 'anillo.M, ring'
m	n	m	16	84%	el kirten 'mango.M, handle'
m	o	f	2	5%	la soineko 'vestido.M, dress'
m	o	m	41	95%	el soineko 'vestido.M, dress'

Table 4.2. Proportion of F/M determiner by es.gender and root.end (only nouns ending in -*a*)

es.gender	noun.end	root.end	det.gender	n	proportion	example
f	a	a	f	107	91%	la tanta 'gota.F, drop'
f	a	a	m	10	9%	el kipula 'cebolla.F, onion'
f	a	i	f	78	80%	la ezti-a 'miel.F, honey'
f	a	i	m	19	20%	el euri-a 'lluvia.F, rain'
f	a	n	f	67	77%	la belaun-a 'rodilla.F, knee'
f	a	n	m	20	23%	el babarrun-a 'alubia.F, bean'
f	a	o	f	66	73%	la leiho-a 'ventana.F, window'
f	a	o	m	25	27%	el pospolo-a 'cerilla.F, match'
m	a	a	f	59	51%	la errota 'molino.M, mill'
m	a	a	m	56	49%	el uda 'verano.M, summer'
m	a	i	f	22	26%	la zubi-a 'puente.M, bridge'
m	a	i	m	63	74%	el eguzki-a 'sol.M, sun'
m	a	n	f	26	47%	la eraztun-a 'anillo.M, ring'
m	a	n	m	29	53%	el ezpain-a 'labio.M, lip'
m	a	o	f	28	33%	la beso-a 'brazo.M, arm'
m	a	o	m	58	67%	el soineko-a 'vestido.M, dress'

Table 4.3. Proportion of F/M determiner by es.gender and noun.end, separated by L1S

es.gender	noun.end	det.gender	n	proportion	example
L1S: no					
f	a	f	133	78%	la belaun-a ‘rodilla.F, knee’
f	a	m	38	22%	el pospolo-a ‘cerilla.F, match’
f	i	m	6	100%	el ilargi ‘luna.F, moon’
f	n	f	2	18%	la babarrun ‘alubia.F, bean’
f	n	m	9	82%	el babarrun ‘alubia.F, bean’
f	o	f	2	13%	la pospolo ‘cerilla.F, match’
f	o	m	13	87%	el pospolo ‘cerilla.F, match’
m	a	f	96	61%	la errota ‘molino.M, mill’
m	a	m	62	39%	el eguzki-a ‘sol.M, sun’
m	i	m	11	100%	el zubi ‘puente.M, bridge’
m	n	f	1	11%	la eraztun ‘anillo.M, ring’
m	n	m	8	89%	el kirten ‘mango.M, handle’
m	o	f	2	12%	la soineko ‘vestido.M, dress’
m	o	m	15	88%	el soineko ‘vestido.M, dress’
L1S: yes					
f	a	f	185	84%	la ezti-a ‘miel.F, honey’
f	a	m	36	16%	el hosto-a ‘hoja.F, leaf’
f	i	f	11	73%	la gezi ‘flecha.F, arrow’
f	i	m	4	27%	el ilargi ‘luna.F, moon’
f	n	f	13	72%	la babarrun ‘alubia.F, bean’
f	n	m	5	28%	el txanpon ‘moneda.F, coin’
f	o	f	6	26%	la leiho ‘ventana.F, window’
f	o	m	17	74%	el pospolo ‘cerilla.F, match’
m	a	f	39	21%	la moko-a ‘pico.M, beak’
m	a	m	144	79%	el eraztun-a ‘anillo.M, ring’
m	i	m	26	100%	el eguzki ‘sol.M, sun’
m	n	f	2	20%	la eraztun ‘anillo.M, ring’
m	n	m	8	80%	el eraztun ‘anillo.M, ring’
m	o	m	26	100%	el moko ‘pico.M, beak’

Gender assignment strategies and L1 effects in the elicited production of mixed Spanish-Basque DPs

1. Introduction

Mixed utterances containing lexical elements from two languages (1) are common in the speech of bilinguals, who may not be always conscious of the mixing they produce and yet may have negative attitudes towards mixing (Lipski, 2016; Parafita Couto, Deuchar, & Fusser, 2015). More specifically, the variability in rates of acceptance or production of mixed DPs has been shown to depend on individual factors, such as bilinguals' language dominance (Liceras, Fernández Fuertes, & Klassen, 2016), first language (Liceras, Fernández Fuertes, Perales, Pérez-Tattam, & Spradlin, 2008), language prestige (Blokzijl, Deuchar, & Parafita Couto, 2017; Parafita Couto & Gullberg, 2019), and also on community norms (Beatty-Martínez & Dussias, 2019).

(1) a. quiero comprar [A MOUSE]

want-1pS buy a mouse

b. quiero comprar [un MOUSE]

want-1pS buy a.$_{M}$ mouse

c. I want to buy [UN RATÓN]

I want to buy a.$_{M}$ mouse.$_{M}$

d. I want to buy [a RATÓN]

I want to buy a mouse.$_{M}$

‘I want to buy [a mouse]’

All DETERMINER PHRASES (DP) listed in square brackets in (1)[1] have in common the fact that they are structures conformed by two lexical elements, Det(erminer) and N(oun), in a syntactic dependency, called *agreement*, according to which features of the N appear elsewhere in the phrase. Crosslinguistic variation is found regarding the features (none/one/two/three gender and/or number features) and the categories involved in DP-internal agreement (articles, quantifiers, adjectives…).

Spanish and English DPs, both unilingual (1a,1c) and mixed DPs (1b, 1d), share word order (Dets precede Ns), but they differ in the features and categories involved in DP-internal agreement: unilingual Spanish Det (Det_{SP}) agree in gender (binary M/F distinction) and number (binary sing/pl distinction) features with the N_{SP} (1c), whilst (only some) English determiners (Det_{E}), such as the article *a* (1a) may agree with nouns (N_{E}), but only in number. Mixed DPs (1b) and (1d) need to be described more carefully, since the language switch happens in a CONFLICT SITE (Poplack & Meechan, 1998, p. 132). These Spanish-English mixed DPs illustrate the optionality/competition bilingual speakers face when building a linguistic expression from elements, which do not share the same features in the two languages: Det with obligatory vs. absent gender marking combined with non- vs. gender-featured N. In (1b), the DP results from combining the indefinite masculine singular Spanish article *un* with the singular and genderless N_{E} *mouse*. Example (1d) combines the non-gendered singular article *a* with the N_{SP} *ratón*, which agrees with it in singular number.

After this brief introduction on mixed DPs, the remainder of the paper proceeds as follows: in section 1, gender features and agreement in Spanish DPs (section 1.1.) and in

[1] The ‘other language’ insertions are capitalised throughout the paper.

mixed Spanish-Basque DPs (section 1.2.) are described followed by an overview on the gender marking strategies reported in the literature on mixed DPs with Spanish determiners (section 1.3.). In section 2 the methodological details regarding the participants, the forced-switch elicitation task and the procedure are included. The results on mixed Spanish-Basque DPs are reported in section 3. Finally, we present the discussion of the results (section 4) and the main conclusions (section 5).

1.1 Gender in Spanish DPs

Spanish nominal morphology has a quite consistent and transparent binary (M/F) gender marking system (Corbett, 2006; Harris, 1991). The word endings *–a* and *–o* in many nouns, adjectives as well as in the determiner and direct object clitics (M *lo*/ F *la*) are salient markers of masculine (M *un/el/ -o*) and feminine (F *una/la/ -a*) respectively, as in nouns referring to humans (2a, 2b) and to domesticated animals (3a, 3b).

(2) a. **el** maestr**o** simpátic**o** b. l**a** alumn**a** estudios**a**

the.M teacher.M friendly.M the.F student.F studious.F

'The friendly male teacher' 'The studious female student'

(3) a. **el** gat**o** b. **la** gat**a**

the.M cat.M the.F cat.F

'the male cat' 'the female cat'

Word ending and gender marking are not restricted to biological gender distinctions, since M and F nouns with *epicene* gender may refer indistinguishably to males and females (*el topo* 'the.M mole'/ *la foca* 'the.F seal') and nouns with the so-called *género común* (common gender) may be M or F depending on the referent (*el/la internauta* 'the.M/the.F internet user' *el/la artista* 'the.M/the.F artist' or *el/la estudiante* 'the.M/the.F student').

Moreover, most inanimate nouns intrinsically have a gender feature, independent of their current meaning (4a, 4b), though there are lexical pairs which are built upon the M vs. F contrastive ending. Such is the case of the name of some fruits ending in *–a* (F) (5a) and their corresponding M tree names ending in *–o* (5b).

(4) a.	**el**	puert**o**	b. **la**	puert**a**
	the.M	harbour.M	the.F	door.F
	'the harbour'		'the door'	

(5) a.	**la**	ciruel**a**	b. **el**	ciruel**o**
	the.F	plum.F	the.M	plum tree.M
	'the plum'		'the plum tree'	

Nevertheless, word endings are a good predictor of gender in Spanish, since most nouns ending in *-o* are masculine (99.87%) and most of the nouns ending in *-a* (96.30%) are feminine (Teschner & Russell, 1984). Therefore, F words with *–a* and M words with *–o* endings are considered words with prototypical or *canonical* gender (2-5). Other word endings such as *-e*, *-i*, *-s*, are considered less reliable predictors or *non-canonical,* since they appear in both M (6a) and F nouns (6b). Finally, F words ending in *–o* (7a) and M words ending in *–a* (7b) can be called *anticanonical* (7), as suggested by one of the anonymous reviewers. One more exception are the so-called *hermaphroditic* nouns. As illustrated in (7c) and (7d), many feminine nouns starting with *a-* like *agua* 'water' alternate between M and F determiners, quantifiers and demonstratives, but are consistently followed by F adjectives (Eddington & Hualde, 2008).

(6) a. **el** maniqu**í**
the.M mannequin.M
'the mannequin'

b. **la** metrópol**i**
the.F metropolis.F
'the metropolis'

c. **el** timbr**e**
the.M bell.M
'the bell'

d. **la** clas**e**
the.F classroom.F
'the classroom'

(7) a. **la** man**o**
the.F hand.F
'the hand'

b. **el** map**a**
the.M map.M
'the map'

c. **el**/est**e** agu**a** frí**a**
the.M/this.M water cold.F
'the/this cold water'

d. **la**/est**a** agu**a** frí**a**
the.F/this.F water cold.F
'the/this cold water'

Furthermore, variability has been found also in synonyms, cognates and lexical borrowings, which differ in gender across dialects of Spanish: e.g. *el ordenador* (Iberian Sp), *el computador* / *la computadora* (American Sp) 'the computer', *el / la tablet* 'the tablet', *un /una selfie* 'the selfie' (Muñoz-Basols & Salazar, 2019).

In terms of markedness, masculine has been traditionally considered the *non-gender*, the *unmarked* or the *default* option, in contrast to the feminine, considered as the *marked* and the only grammatical gender in Spanish (Harris, 1991; Roca, 2005). Evidence for the masculine default has been provided referring to some extended "non-standard" use of M determiners and modifiers preceding F nouns, as shown by psycholinguistic studies (see review by Beatty-Martínez & Dussias, 2019). An extensive literature on unilingual Spanish production by L2 bilinguals and heritage Spanish speakers (see Montrul, Foote, & Perpiñán, 2008, a.o.), and by children with Spanish as L1 and L2 (Pérez-Pereira, 2009;

Pérez-Tattam, Ezeizabarrena, Stadthagen-González, & Mueller Gathercole, 2019) also supports the *masculine default* option. Interestingly, the high variability observed across L1 Spanish speakers in the production and in the acceptance rates of the M/F prenominal modifiers of hermaphroditic Spanish nouns has led some researchers to question the inherent lexical gender feature (Eddington & Hualde, 2008).

All these facts are in line with the assumption that Spanish gender is an idiosyncratic, inherent and formal feature (comparable to classifiers in many African and Asiatic languages) which triggers concord on the determiner (López, 2020), and that "it is only through agreement with determiners and adjectives that we can infer to which gender class these nouns belong" (Delgado, 2018, p. 42).

1.2 Mixed Basque-Spanish DP structures

Spanish (8) and Basque DPs (9) share a few morphosyntactic features, such as the rigid placement of the determiner with respect to NP, and the overt marking of number. However, they diverge in a set of features. First, the two languages have reverse head-complement directionality, since the determiner precedes the NP in Spanish (8), whilst it follows the NP in Basque (9). Second, the set of overtly marked morphological features differs, since DPs are marked for number in the two languages but gender is only marked in Spanish DPs (8) and in the few Basque DPs containing some of the scarce gender-marked borrowings from Spanish duplets (*koinatu/koinata,* 'brother-/sister-in-law'; *majo/maja* 'nice-M/-F') (Trask, 2003). Third, there is internal agreement within the DP in Spanish, since taking a few examples aside (7c), Det, N and Adj agree in gender and number (8a-8c). In Basque, there is no DP-internal agreement, so that number features are marked just once, in the last element of the DP (9a, b, d, e). Note that bare nouns precede adjectives (9b) and demonstratives (9d) and follow numeral quantifiers, in both, non-definite (9c) and definite DPs (9d).

(8) a. los ojos rojos
the.M-pl eye-pl red-M-pl
'the red eyes'

b. *la-s ojo-s
the.F-pl eye-pl
'the eyes'

c. (los) dos ojos
the.M-pl two eye-pl
'(the) two eyes'

d. *(los) dos ojo
the.M-pl two eye
'(the) two eye'

(9) a. begi-a-k
begi-the-pl
'the eyes'

b. begi gorri-a-k
eye red-the-pl
'the red eyes'

c. bi begi
two eye
'two eyes'

d. bi begi hau-ek
two eye this-pl
'these two eyes'

Such conflicting features in the DPs of the two languages lead to predict different options, even for the simplest mixed DPs, such as those formed by a determiner from one language and a noun from the other. Chan (2008) proposed that functional heads "always determine the order of their code-switched complements". Accordingly, the Spanish determiner or Det_{Sp} (M (10a) or F (10b)) is predicted to precede the Basque noun (N_{B}), whilst the Basque determiner (Det_{B}) will follow the Spanish noun (N_{SP}), regardless of whether the determiner is the suffixed article –*a* (10c) or the demonstrative (free morpheme *hura*) (10d).

(10) a. el BEGI

b. la BEGI

the.M EYE the.F EYE

'the eye' (Spanish: ojo.M) 'the eye'(Spanish: ojo.M)

c. ojo-A d. ojo HURA

eye.M-THE eye.M THAT

'the eye' 'that eye'

Scholars disagree on the definite/indefinite features of the article *–a* (Artiagoitia, 2012). This suffix, which is restricted to common nouns, is frequently used as the citation form (11a, 12a), but it is optional with loanwords and borrowings (12d-e).

(11) Question: zer da hori?

what AUX that

'What is that?'

Answer:

a. begi-a b. begi bat c. *begi

eye-D eye one eye

'an eye' 'one eye' 'eye'

(12) Question: nola da "eye" euskaraz? Eta "yogurt"?

'How do you say "eye" in Basque?' And "yogurt"?

Answer:

a. begi-a b. *begi bat c. ?begi

eye-D eye one eye

'an eye' 'one eye' 'eye'

d. jogur(t)-a e. jogur(t)

yogurt-D yogurt

'(a) yogurt' 'yogurt'

1.3. Gender marking in mixed Det_{SP} *N structures*

The Spanish grammar rules out Det_{SP}-N_{SP} structures without gender features, and accordingly, speakers have to choose between M or F Det (*el/la, un/una*) when combining Det_{SP} with a N, regardless of whether it is a N_{SP}, as in unilingual Spanish DPs, or from any other language (N_X). The gender features of Det_{SP} may correspond to the gender features the speaker already knows (familiar nouns), guesses (less familiar nouns) or even "invents" for novel Ns following it. To date, the majority of studies on mixed DPs has been carried out in bilingual communities where Spanish is in contact with English, which, similar to Basque, is a grammatically genderless language.

Three main GENDER ASSIGNMENT STRATEGIES (GAS) have been identified across Spanish-English bilingual individuals and communities when determining the overt gender features of mixed Det_{SP}-N_E.

The ANALOGICAL CRITERION refers to the strategy according to which bilinguals attribute to the inserted N_E the gender features of its Spanish translation equivalent: M gender to *book* corresponding to its Spanish equivalent *libro* (book.M) and F to *house* because of the Spanish *casa* (house.F). This is the most frequent option in production for Spanish-English bilinguals with Spanish as L1, though they also accept other options for mixed DPs (i.e. M Det_{SP} with a N_E whose translation equivalent is F). Simultaneous bilinguals adhere to this criterion too, though to a lesser extent (see Liceras et al., 2016). Note that the analogical strategy has been attested in other language contact situations as we.ll, such is the case in mixed Det_G-N_E DPs produced by German-English bilingual children, where DPs following the analogical criterion were considered as the "correct" option (13a), in contrast to (13b) (Jorschick, Endesfelder Quick, Glasser, Lieven, & Tomasello, 2011).

(13) a. der DOG b. die DOG

the.M DOG the.F DOG

'the dog' (German: Hund.M)

Another GAS widely reported in the literature on mixed Spanish-English DPs is the use of a gender (masculine) as DEFAULT. Some bilinguals tend to attribute masculine gender to inserted English nouns, as is the case of bilinguals with English or French as their L1 and/or dominant language (Liceras et al., 2016; Liceras et al., 2008), and some bilingual communities do it extensively (see Balam, 2016 and Valdés Kroff, 2016 for production data), especially the Spanish-English communities where code-switching is more frequent (Beatty-Martínez & Dussias, 2019). Additionally, masculine default was attested in the Basque-Spanish bilingual acceptability judgement task by Badiola and Sande (2018), despite a feminine preference observed with nouns with lexical *–a*. In contrast, preference for feminine (Iriondo, 2017; Parafita Couto, Munarriz, Epelde, Deuchar, & Oyharçabal, 2015) or no overall gender preference (Ezeizabarrena & Munarriz-Ibarrola, 2019) was found in other acceptability studies. As regards spontaneous production by adults, feminine revealed the most frequent gender (Parafita Couto, Munarriz, et al., 2015), and in the case of children, the scarce $\mathrm{Det}_{\mathrm{SP}}$-$\mathrm{N}_{\mathrm{B}}$ did not reveal any gender preference (Ezeizabarrena, 2009).

The inconclusive results on $\mathrm{Det}_{\mathrm{SP}}$-$\mathrm{N}_{\mathrm{B}}$ structures could be attributed to methodological issues and/or to participants' profiles. Spanish-dominant Basque-Spanish bilinguals tested orally adhered to the analogical criterion (Iriondo, 2017), in contrast to the masculine default found in the written acceptability task conducted with Basque-dominant bilinguals (Badiola & Sande, 2018), and the preference for feminine determiners observed in both acceptability data from Spanish-dominant bilinguals and naturalistic production of Basque-dominant bilinguals (Parafita Couto, Munarriz, et al., 2015).

In this paper, we want to draw attention to a third GAS: the PHONOLOGICAL STRATEGY. The phonological shape of the word has been mentioned as a factor which influences the gender assignment of (ungendered) English loanwords across corpora of oral bilingual Spanish production (Clegg, 2010; Poplack, Pousada, & Sankoff, 1982). In line with this, Otheguy and Lapidus (2003) refer to the tendency to assign "feminine gender to words perceived as ending in /-a/" to English lexical insertions ending in /-a/ (*la repocá* 'the report card'), /-ay/ (*la high* 'the high school') and schwas followed by consonants which are generally omitted (la boiler 'the boiler') in the Spanish spoken in NYC. They posit that "these feminines are the result of a general rule and not of a memory-based process of arbitrary assignment like the feminines *suerte, moto, mano*" (Othegy & Lapidus, 2003, p. 215). Bellamy, Parafita Couto and Stadthagen-González (2018) also found a preference for F Spanish determiners preceding Purepecha words ending in *-a* in an online acceptability judgement task conducted with Purepecha-Spanish bilinguals, in line with the preference to assign F to lexical insertions ending in *–a* observed in previous studies on Basque-Spanish bilinguals (Parafita Couto, Munarriz, et al., 2015).

All these results are compatible with a phonological strategy based on gender-to-ending correspondences (see section 1.1), which may lead speakers to a strict application of the *-a* ending F rule and to associate the rest of endings (canonical *-o* and non-canonical ones) with the complementary M gender. The fact that such preference was not observed in elicited production remains unexplained though, but the additional issue that the article -*a* is frequently suffixed to Basque nouns (see section 1.3), may affect bilinguals perception of a lexical insertion like *begia* (*begi*-***a*** 'the eye') as word ending either in *–i* or in -*a*.

So far, none of those studies explains in a satisfactory way the variability found in the features of mixed DPs. The current paper aims to fill in this gap by providing a unified account for the heterogeneous pattern of gender assignment found across studies on mixed DPs with a $\mathrm{Det}_{\mathrm{SP}}$, through the identification of the GAS used by different profiles of Spanish-Basque bilinguals. Hence, the two-fold novelty of the current paper relies on the production data obtained from different profiles of Spanish-Basque bilingual adults using the same experimental method and the control of several variables in the experimental design: phonological ending of the Basque noun and gender of the Spanish translation equivalent and participants' bilingual profile.

2. Method

2.1 Participants

Thirty Spanish-Basque bilinguals aged between 20 and 50 years (mean 28.8, SD 7.49) participated in the study. All of them used both languages on a daily basis. Based on self-reported information, participants were put into three groups: sequential bilinguals with Basque as their first language (L1) (L1B group), sequential bilinguals with Spanish as their L1 (L1S group) and simultaneous bilinguals (2L1 group). Additionally, the sociolinguistic environment was determined for each participant as B-dominant (>50% Basque speakers) or S-dominant (<50% Basque speakers) according to the rate of Basque speakers in their area of residence (Soziolinguistika_Klusterra, 2014). See Table 1 and supplementary material available at the OSF project (https://osf.io/uz4ew/).

Thirteen participants formed the L1B group (mean age 26.1, SD 5.2). They acquired Basque at home and Spanish as an early L2 either at school or within the community (mean AoA of Spanish 5.5, SD 0.9). Most of them (11/13) lived in B-dominant sociolinguistic areas; they reported a frequent (30.1%) or sporadic (15.4%) use of code-switching.

Twelve bilinguals with L1 Spanish formed the L1S group: ten of them acquired Basque in immersion schools at an early age and two learnt it as adults in Basque language schools (mean AoA of Basque 6.5, SD 5.4). They lived mainly in S-dominant areas (9/12) and most of them (66.7%) use code-switching in oral conversations.

The 2L1 group consisted of five simultaneous bilinguals (mean age 26, SD 4.8) who acquired both languages at home by age 2. Four out of five live in S-dominant areas. Furthermore, three out of five (60%) are used to code-switching in oral conversations.

Despite heterogeneity in the sample, it is balanced regarding the participants' sociolinguistic environment, since half of them (15/30) live in B-dominant areas and the other half in S-dominant areas. See Appendix 1 for detailed sociolinguistic information.

Table 1. Main characteristics of the three groups of participants.

Group	**N**	**L1**	**Age range**	**Mean Age (SD)**	**AoA L2**	**Sociolinguistic environment**	
						S-dominant	B-dominant
L1B	13	B	20-40	26.1 (5.2)	5.5 (0.9)	2	11
L1S	12	S	23-50	33 (9.1)	6.5 (5.4)	9	3

2L1	5	S and B (2L1)	24-35	26 (4.,8)	4	1
Total	**30**		**20-50**	**28.8 (7.47)**	**15**	**15**

2.2 Procedure

Eliciting code-switching is not always an easy task, at least in the specific case of Basque-Spanish DPs (Parafita Couto, Munarriz, et al., 2015). Therefore, we included an explicit code-switching requirement in a modified version of the director-matcher task or *Toy Task* (Gullberg, Indefrey, & Muysken, 2009), following Bellamy, Parafita Couto and Stadthagen-González (2018). In this forced-switch elicitation task, performed in pairs, each participant was presented with an 8-by-4 board containing the same set of 32 images but, crucially, the images were ordered differently on each board. Participants could see their own board, but not the board of the co-participant. Each participant had a different and single role. The director instructed the other participant, the matcher, on how to re-arrange the objects so that they ended up with the same order on both boards. In order to elicit the target Det_{SP}-N_{B} structures, participants were asked to play a game in Spanish and use Basque as the “secret language” to name the objects (see Appendix 2 for the instructions). Once they finished the task, the matcher was asked to check whether the images were properly ordered one by one.

Participants gave informed consent before they started the experiment following the Ethics Code for linguistic research in the Faculty of Humanities at Leiden University.

All participants performed a naming task individually before doing the Toy Task in order to ensure that they were familiar with the target lexical items and phonological forms. The procedure elicited a numeral preceding a bare noun (9c) e.g. *hiru gazta* ‘(three cheeses') by presenting an Arabic number together with an image (from a representative subsample of those to be used later in the forced-switch task), and asking: *zer ikusten duzu hemen?* 'what do you see here?'. See participants' responses at OSF project (https://osf.io/uz4ew/).

All the sessions were audio-recorded. After completing the task participants filled in a questionnaire with 21 questions covering some basic information on their linguistic biography such as first language(s), language use at different age points, ease in language use (*What language do you feel more comfortable with*?) self-rated proficiency in Spanish and Basque and use of code-switching.

2.3 Stimuli

A battery of visual materials was designed in order to elicit 32 mixed DPs (Det_{SP}-N_B) by participant (Table 2). The Basque nouns (N_B) were selected following morphological criteria (monomorphemic words), phonological criteria (2-3 syllable length and word ending) and lexical frequency. Other phonological factors such as final rhyme, final syllable and penultimate rhyme, which may aid in gender assignment, were not included (cf. Eddington, 2002). The battery was balanced for the following two experimental criteria (Table 2):

1. Analogical gender: 16 Basque nouns with feminine translation-equivalent in Spanish (*belaun* 'rodilla.F, knee'), and 16 nouns with masculine translation-equivalent (*ezpain* 'labio.M, lip').
2. Noun-final phoneme: 8 Basque nouns ending in *-a* (frequent in Basque, prototypically feminine in Spanish), 8 ending in *-o* (frequent in Basque, prototypically masculine in Spanish), 8 ending in *-i* (infrequent in Spanish), and 8 nouns ending in *-n* (frequent in Basque and in Spanish, non-prototypical in

Spanish). Interestingly, Teschner and Russel (1984) reported the following rates of M nouns corresponding to these four endings: -*a* 6.4%, -*o* 99.87%, -*i* 93.13% and –*n* 48.39%.

Table 2. Target Basque nouns.

Noun-final phoneme	**Feminine translation**	**Masculine translation**
-*a*	*gona* ‘falda, skirt’	*gazta* ‘queso, cheese’
	tanta ‘gota, drop’	*galtza* ‘pantalón, trouser’
	soka ‘cuerda, rope’	*uda* ‘verano, summer’
	tipula ‘cebolla, onion’	*errota* ‘molino, mill’
-*i*	*gezi* ‘flecha, arrow’	*begi* ‘ojo, eye’
	euri ‘lluvia, rain’	*zubi* ‘puente, bridge’
	ezti ‘miel, honey’	*ogi* ‘pan, bread’
	ilargi ‘luna, moon’	*eguzki* ‘sol, sun’
-*n*	*belaun* ‘rodilla, knee’	*komun* ‘cuarto de baño, toilet’
	txanpon ‘moneda, coin’	*kirten* ‘mango, handle’
	bekain ‘ceja, eyebrow’	*ezpain* ‘labio, lip’
	babarrun ‘alubia, bean’[2]	*eraztun* ‘anillo, ring’
-*o*	*leiho* ‘ventana, window’	*beso* ‘brazo, arm’
	hosto ‘hoja, leaf’	*lepo* ‘cuello, neck’
	malko ‘lágrima, tear’	*moko* ‘pico, beak’
	pospolo ‘cerilla, match’	*soineko* ‘vestido, dress’

[2] For the first 8 participants the tested item was *zartagin* ‘pan’. As several participants produced this noun without –*n* (*zartagi*), it was replaced with *babarrun* ‘bean’ to keep the phonological ending.

Two additional constraints were introduced in order to minimize potential confounds: animate concepts were excluded, since they may trigger biological gender, and Basque nouns with a transparent Spanish cognate were avoided (*botila* ‘botella, bottle’). As pointed out by an anonymous reviewer, a few items in the list have Spanish cognates (Basque *soka* vs. Spanish *soga* ‘rope’) or false cognates (Basque *beso* ‘arm’ vs. Spanish *beso* ‘kiss’). However, such cognates were either infrequent (*cuerda* 91% vs. *soga* 3% naming agreement in MultiPic database) or they had the same analogical gender as the target item (soga.F and cuerda.F ‘rope’; beso.M ‘kiss’ and brazo.M ‘arm’). In order to achieve concrete and imageable nouns, stimuli from the standardised MultiPic database were employed (Duñabeitia et al., 2018). Crucially, the subset of drawings we selected reliably elicited the same noun across Spanish speakers (mean consistency = 97%, SD = 5.49).

Familiarity with the experimental items (Basque nouns and their Spanish equivalents) was crucial to test participants’ use of the analogical GAS. Therefore, the relative frequency of the target Basque nouns was also controlled (Acha, Laka, Landa, & Salaburu, 2014; Sarasola, Salaburu, & Landa, 2013). Frequency-wise, all 32 items in the stimuli are within the top 15% of Basque nouns.[3] All the nouns selected showed Zipf-values higher than 4 within a 7-point scale in both corpora, which is the conventional threshold (van Heuven, Mandera, Keuleers, & Brysbaert, 2014) for high-frequency words (*EHME*: mean = 4.75, SD = 0.48; *ETC*: mean = 4.54, SD = 0.44). According to CREA corpus (RAE), Spanish equivalents were also high-frequency words (mean Zipf frequency=4.34), comparable to the frequencies of the Basque nouns, which also passed

[3] We log-normalised (base = 10) the frequencies, and applied Laplace additive smoothing.

the conventional threshold of 4 in the Zipf scale (4.54). The difference between the mean frequencies of the experimental conditions was not statistically significant.

2.4 Data coding

We transcribed each mixed DP into a separate row of a data frame, and added a number of linguistic variables related to the Spanish determiner and the Basque noun as additional columns (see Table 3). For the main regression analysis, the dependent variable was the gender of the determiner (*det.gender*), while the independent ones were: final phoneme of the noun (*noun.end*), final phoneme of the noun root (*root.end*), and gender of the Spanish translation equivalent (*es.gender*).

Besides the regression analysis, we also performed a detailed per-participant analysis. For this purpose, we coded each DP as providing positive or negative evidence for a given strategy. Therefore, we derived three further variables which reflect whether a given DP supports (=1) or contradicts (=0) a gender assignment strategy (GAS) based on the gender of the Spanish translation (variable *analog*), based on the noun-final phoneme (*phon.noun*), or based on the root-final phoneme (*phon.root*). Thus, we interpret that the analogical-gender strategy (*analog*) is used (1 in Table 3) when det.gender matches es.gender. Similarly, either the noun-ending or the root-ending phonological strategy is used if the gender of the determiner (*det.gender)* matches the prototypical gender of the respective phonological endings.

Examples 1-4 in Table 3 illustrate the fact that certain DPs support only one of these three strategies; e.g. *la BESO-A* ‘brazo.M, arm’ satisfies phon.noun because it ends in a prototypically feminine phoneme, but it does not support phon.root (*-o* is prototypically masculine) or analog (the Spanish equivalent is masculine). Examples 5–8, however, provide ambiguous evidence, because they simultaneously support two or even all three strategies considered here; e.g. the DP *la EZTI-A* ‘miel.F, honey’ is inconclusive, since the feminine determiner *la* could be driven by the noun-final *–a* or by the Spanish feminine equivalent *miel*. Finally, the last two DPs are not compatible with any of the strategies at hand.

Table 3. Sample of dataset illustrating data coding.

#	det	noun	es	en	det.gender	es.gender	analog	phon.noun	phon.root
1	el	gazta	queso	cheese	m	m	1	0	0
2	la	ezti	miel	honey	f	f	1	0	0
3	la	beso-a	brazo	arm	f	m	0	1	0
4	el	hosto-a	hoja	leaf	m	f	0	0	1
5	la	ezti-a	miel	honey	f	f	1	1	0
6	el	beso-a	brazo	arm	m	m	1	0	1
7	la	gazta	queso	cheese	f	m	0	1	1
8	la	tanta	gota	drop	f	f	1	1	1
9	el	tanta	gota	drop	m	f	0	0	0
10	la	beso	brazo	arm	f	m	0	0	0

Participants' profiles were coded based on the self-reported data as follows:

- L1: Participants reported having Basque and/or Spanish as their L1(s); hence we created two dummy variables (L1_B, L1_S), where one of the two had a positive value (=1) for participants with a single L1, and both had a positive value for participants with two L1s.
- Sociolinguistic environment based on the presence of Basque speakers: S(panish)-dominant area, where < 50% of the population is Basque speaker (S_area= 1), or in a B(asque)-dominant area, where > 50% of the population is Basque speaker (S_area= 0).

2.5 Statistical analyses

In a first step, item-based cues were used only as predictors for the dependent variable Det gender. That is, data analyses were performed using a mixed-effects logistic regression, with the three cues: final phoneme of the produced noun (noun.end), final phoneme of the noun root (root.end), and gender of the Spanish translation equivalent (es.gender) as fixed effects, and subject as a random effect.

In a second step, a more complex analysis was performed adding participant-specific predictors to the model: the reported L1 (Basque and/or Spanish) and the sociolinguistic environment. Besides, we have also considered their pairwise interaction with each of the item specific cues. In this way we can evaluate, for example, whether the effect of the translation equivalent on Det gender is modulated by the participant's L1.

All the mixed models are implemented in R (R_Core_Team, 2017) using the statistical packages lme4 (Bates, Mächler, Bolker, & Walker, 2015) and lmerTest (Kuznetsova, Brockhoff, & Christensen, 2017). Significance of the predictors was calculated in two ways. First, we conducted maximum likelihood z-tests using Laplace approximations to degrees of freedom. Second, for each predictor, we ran a comparison with a null model; null models are identical to the full model except that the variable of interest has been excluded. The fit of the model to the data is compared through a likelihood ratio test to determine whether the full model bears greater explanatory power, hence showing support for the predictor under consideration (Glover & Dixon, 2004). In the case of the second model (the one including participant-specific predictors), the model selection process has been automatized using a backwards stepwise procedure, as implemented in the R function StatisticalModels::GLMERSelect().

Finally, we investigated which is the most likely strategy followed by each participant. The proxy to decide which GAS is followed by each participant is to pick the cue with the highest explanatory value for the set of mixed DPs produced by that participant (e.g. if 90% of the data can be explained by noun.end, that would be the strategy followed by the participant; see Section 2.4 above). Besides single-cue strategies, we also considered combined strategies, such as the possibility of a primary strategy (e.g. es.gender), which may be overridden by a secondary strategy (e.g. noun.end) for a small subset of nouns.

3. Results

Overall, 954 singular mixed Det_{SP} N_B (85%) out of the total 1,070 DPs produced by 30 participants (mean 32 by participant) were analysed. The complete dataset, as well as the R scripts used to perform the analyses, are included in the online Supplementary

Information[4]. Excluding criteria were: DPs with non-target nouns (n=83), DPs with some kind of disfluency between the Det and the noun (n=12) or plural DPs (n=21).

A noteworthy result is the predominance of Basque nouns with the suffixed article -*a*: 529 (73%) out of a total of 722 nouns whose root does not end in -*a*, included this suffix (14).

(14) la EZTI-A

the.F HONEY-THE

'the honey' (Spanish: miel.F)

The general distribution of feminine and masculine determiners was fairly balanced (F 505 (53%) / M 449 (47%)) and so was the overall distribution for the 529 Basque nouns with the suffixed article -*a* (F 300 (57%) / M 229 (43%). Hence, any strong default gender can be excluded[5].

3.1. Item-specific cues in gender assignment

All three item-specific cues influence the assignment of gender to the mixed DPs. First, 71% of the determiners match the gender of the Spanish equivalent (73% F and 68% M). Indeed, the mixed logistic regression in Model 1 (see Table 3.1 in Appendix 3 for the full results) reveals that words with a masculine equivalent have an increased likelihood of having a masculine determiner assigned (logit estimate=2.42±0.19, p<0.0001).

[4] https://osf.io/uz4ew/

[5] Note that our dataset was still balanced with regards to the gender of the Spanish equivalents; out of 954 mixed DPs, 480 included a F equivalent (50.3%), and 474 included a M equivalent (49.7%).

Model 1: det.gender ~ es.gender + noun.end + root.end + (1|participant)

Second, the phonological ending of the Basque noun also influences the assignment of gender (see Table 4.1 in Appendix 4[6]). Words like *gazta* 'queso.M, cheese' (i.e. ending in -*a* but with a Spanish masculine equivalent) show a feminine determiner in 40% of the cases; words like *soineko* 'vestido.M, dress' (i.e. also with a masculine equivalent, but ending in -*o*), however, only show a feminine determiner in 5% of the cases. Hence, this difference can be attributed to the noun-final vowel: in spite of the gender of the Spanish equivalent, nouns ending in -*a* are more likely to get a feminine determiner assigned, compared to nouns ending in -*o*, -*i*, or -*n*. The latter three endings triggered a masculine determiner more often: this is particularly so for -*o* (logit estimate=2.87±0.46, p < 0.0001), but also for -*n* (logit estimate=1.80±0.45, p <0.0001), and for -*i* (logit estimate=1.42±0.47, p = 0.0026).

Third, the phonological ending of the Basque root also influences the assignment of gender. On the one hand, most DPs in the dataset contain a Basque root with the suffix -*a* added (*soineko*-*a* 'vestido.M, dress'). Hence, words with the same lemma (*soineko*-*a* vs. *soineko*) behave differently: those in the first group (masculine equivalent, -*a* noun ending) are more prone to receiving a feminine determiner than those in the second group (masculine equivalent, -*o* noun ending), as explained previously (cf. Table 4.1 in A4). On the other hand, let us consider only words within the first group, i.e. those with noun ending -*a* (Table 4.2 in A4). Words like *gona* 'falda.F, skirt' (feminine equivalent, -*a* root ending) receive a masculine determiner in 9% of the cases, while words like *hosto*-*a* 'hoja.F, leaf' (feminine equivalent too, but -*o* root ending) receive a masculine determiner in 27% of the cases. The regression model

[6] The full set of descriptive results is provided in Appendix 4 (in what follows A4).

(Table 3.1 in A3) reveals a significant effect for -*i* root ending (logit estimate=1.26±0.27, p<0.0001), -*o* root ending (logit estimate=1.19±0.26, p< 0.0001), and -*n* root ending (logit estimate=0.73±0.26, p = 0.0060), as compared to the -*a* root ending.

The naming task participants completed before the Toy Task revealed that –*a* is indeed part of the lexical root for virtually all –*a* ending words and participants (212/213, 99.5%), with only one exception: *tipul* instead of *tipula* 'onion' (participant 10). Conversely, words without lexical –*a* were nearly always named without –*a* (316/319, 99.1%; only 3 exceptions). The overall analysis showed that all three item-based cues play a role in the gender assignment of these mixed DPs.

3.2. Bilingual profile and the gender assignment strategy

Overall, 71% of the mixed DPs satisfy the analogical GAS; however, reliance on analogy is greater for speakers who have Spanish as L1 (L1S or 2L1s) and/or speakers living in Spanish-dominant sociolinguistic areas. This relation can be observed in Figure 1, where the percentage of DPs matching the analogical GAS has been plotted for each subject. Those who rely most on analogy are located on the right panel (bilinguals with Spanish as L1), and even more so as the rate of monolingual Spanish speakers increases (S-dominant area, rightwards within each panel). Bilinguals with Spanish as an L1 from Spanish-dominant areas satisfy analogy in 84% of the cases, vs. 71% for those from Basque-dominant areas. L1B speakers from Basque-dominant areas show the lowest reliance on analogy (56%), and the two L1B subjects from Spanish-dominant areas show an average of 62%.

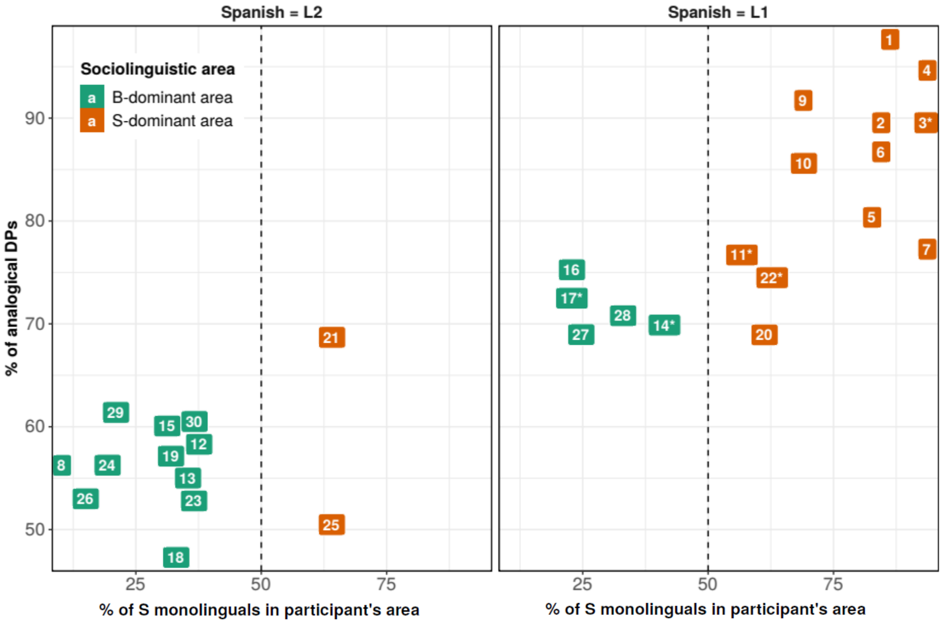

Figure 1. Frequency of analogical GAS by bilingual profile in terms of L1 and sociolinguistic areas. Participants with a star (*) are simultaneous bilinguals (2L1).

As noted by one anonymous reviewer, potential priming effects surfacing as similar GAS for the director and the matcher should not be disregarded. Taking into account that most pairs of participants have a similar socio/psycholinguistic background, we cannot tease apart the effect of participants' sociolinguistic profile from the potential priming effect. Note, however, that no evidence for such option is found in the only two pairs formed by participants with opposite sociolinguistic profiles (participants 7-8 and 25-14), where directors and matchers showed diverging GAS, in line with the primary strategy according to their L1.

Model 2 below refines the previous logistic model by adding these interactions (Table 3.2 in A3). Having Spanish as an L1 increases the reliance on analogy (logit estimate=2.36±0.43, p<0.0001), and living in an area with a higher percentage of Spanish monolinguals does so too, although to a lesser extent (logit estimate=1.36±0.43, p=0.0017).

Model 2: det.gender ~ es.gender + noun.end + root.end + L1S + S_area +

L1S:es.gender + S_area:es.gender + L1S:noun.end + (1|participant)

This model was defined following a stepwise procedure, by which we ruled out one additional predictor of GAS we had taken into account initially (cf. Section 2.4): whether Basque was participants' L1 or not. Note that reliance on analogy is driven by the fact of having Spanish as L1 (L1S and 2L1), and *not* only Basque (L1B). The crucial piece of data here is the simultaneous bilingual subjects (marked with a star* in Figure 1), who pattern like L1S participants in terms of reliance on analogy. Following the suggestion by one anonymous reviewer, we tested whether the self-reported frequency of use of code-switching modulates the use of the analogical GAS. After controlling for L1 and sociolinguistic environment, the frequency of use of code-switching does not interact in a statistically significant way with the analogical strategy (logit estimate=0.0147±0.178, p=0.934).

Our data confirms the reliance on the phonological strategies, as illustrated in Figure 2, where we plot the link between noun endings and the gender of the determiner for L1B (left panel) vs. participants with Spanish as L1 (L1 and 2L1) (right panel). Successive bilinguals with L1B show a stronger link between noun endings and gender, i.e. nouns ending in -*a* are assigned a feminine determiner in 70% of the cases, whereas the other endings select preferentially a masculine determiner. For L1S participants, this link is only robust for the -*o* ending (88% of masculine determiner).

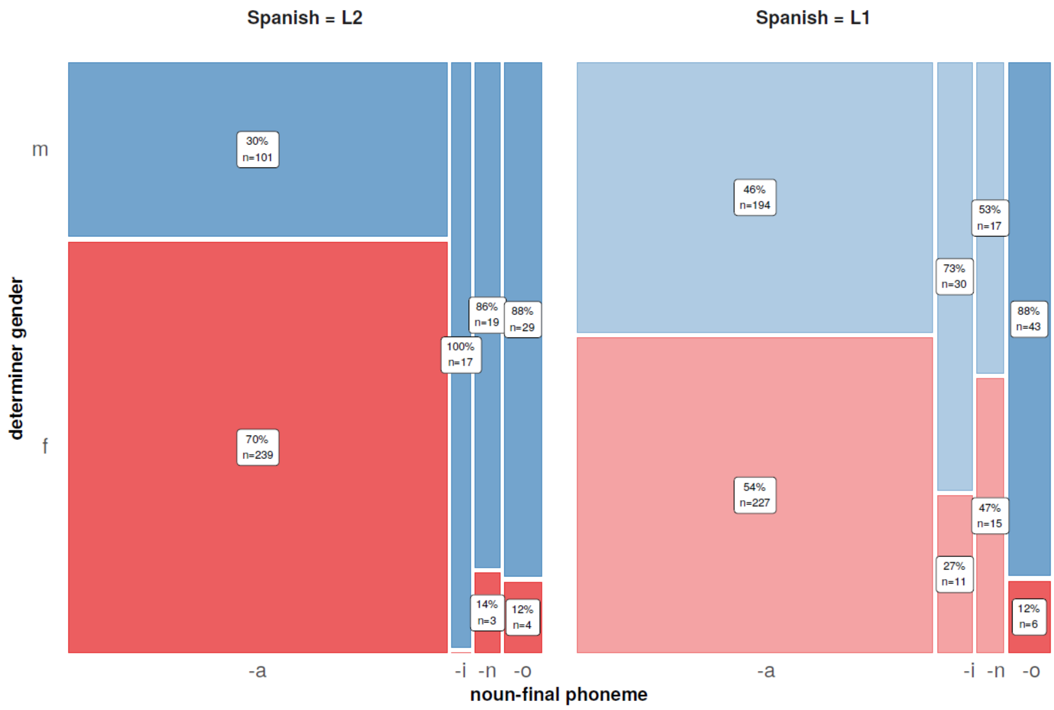

Figure 2. Gender assigned to nouns with different endings by participants with Spanish as L2 (L1B) and participants with Spanish as L1 (L1S and 2L1).

In order to illustrate how bilinguals with Spanish as L1 rely less on noun endings than participants with Basque as only L1, we compared the M/F type of determiners preceding words with a masculine equivalent but which end in *-a* (*gazta* ‘queso.M, cheese’) in the two groups (Table 4.3 in A4). Participants with Spanish as L1 (who tend to rely on analogy) only assign a feminine determiner to such items in 21% of the cases, while L1B participants do so three times as often (63%). Regarding phonological cues for a masculine determiner, consider words like *txanpon* ‘moneda.F, coin’, i.e. ending in *-n* and with a feminine equivalent (Table 4.3 in A4). For these words, L1B participants use a masculine determiner in 82% of the cases (disregarding the analogical gender), and participants with Spanish as L1 do so only 28% of the times. Model 2 (full results in Table 3.2 in A3) shows that the effect of the *-n* noun ending is reduced for participants with Spanish as L1 (logit estimate=-1.67±0.89, p = 0.0595).[7]

3.3. Individual GAS

In order to model participant-specific gender assignment strategy (GAS) we first checked whether all the mixed DPs produced by a participant satisfy one of the candidate strategies (masculine/feminine default, analogy, noun ending or root ending). If that failed, we proposed a combined GAS involving a primary and a secondary strategy; e.g. if 80% of the data satisfies an analogical strategy, and the remaining 20% satisfied a noun-ending strategy, we would propose a combined analogy > noun-ending GAS for that participant.

Overall, none of the participants follows a cue-based GAS in 100% of the cases, although participants 1, 4 and 9 (all L1S speakers) followed the analogical criterion in more than 90% of the DPs, with one or two exceptions each.

Twenty-nine out of 30 participants showed evidence for a combined GAS. For 15 of them, a combined GAS explained 100% of the DPs. Looking at all participants together, the average percentage of DPs explained by a combined GAS is 97.42% (SD=3.56). Participant 24 shows the lowest proportion, with 84% of explained DPs, and 5 DPs not predicted by the combined GAS. 9 participants (all of them speakers with Spanish as L1) used the analogy > noun.ending GAS; on the other hand, 7 participants (all of them having only Basque as their L1) used the noun-ending > root-ending GAS. This confirms the L1B preference for the use of phonological cues.

Focusing now on the most frequent primary strategies, 12 participants (all of them speakers with Spanish as L1) have analogy as their primary strategy, whereas 17

[7] This is not statistically significant (α=0.05), but note that, as participants include the *-a* suffix to most nouns, the sample size for the three other noun endings is greatly reduced, limiting therefore the statistical power.

participants (12 L1B, 5 with Spanish as L1) use noun (n=12) or root ending (n=5) as their primary strategy. This suggests that speakers rely primarily on analogical cues only if they acquired Spanish as an L1. The other cues, however, are not as L1-dependent.

Finally, our per-subject analysis revealed almost no evidence for a default-gender strategy. Only participant 26 (L1B) showed evidence for a feminine-default GAS: this participant not only produced a feminine determiner in all cases with feminine cues (29/31 DPs), but also did so in the remaining 2 mixed DPs, including masculine cues (both phonology-wise and analogy-wise: *la ERAZTUN* 'anillo.M, ring', *la SOINEKO* 'vestido.M, dress'). Noteworthy, this participant did not produce any *–a* when naming words with root endings other than *–a* (0/16; 0%), and produced all *–a* ending roots with *–a* (7/7, 100%).

4. Discussion

In this study, we analysed the gender-assignment strategies used by Spanish-Basque bilingual adults in elicited mixed DPs. The methodology used, a forced-switch elicitation task, succeeded in the elicitation of the intended DPs, namely Det_{SP}-N_{B}.

Two types of morphosyntactic structures were identified, though at very different rates: First, nouns ending in *–a* (14), which result in double determiner DPs, were the most frequent type (73%), as compared to the less complex second type of mixed DPs (*la EZTI-A* 'miel.F, honey'), formed by Det_{SP} preceding Basque BARE nouns or ROOTS *(la EZTI* 'miel.F, honey') (23%).

Interestingly, the distribution of bare root vs. root*–a* was almost complementary in the two elicitation tasks conducted in the current study: bare roots were the predominant response in the naming task, conducted in unilingual Basque, as opposed to the predominant *–a* ending form for nominal insertions in the toy task (bilingual mode). The task-dependent (*ezti/eztia*) alternation observed in the production of virtually the same participants confirms their knowledge of the word boundaries (root vs. root + *-a*), and may indicate that participants select a different form depending on both the task and the language mode: bare NPs when naming objects in unilingual Basque conversation and DPs when inserting nominal items in the bilingual mode as required, explicitly, in the forced-switch task; but it could also be motivated by the syntactic context. In the Basque naming task, participants inserted the bare root following a numeral (like in 9c), in a sort of filling-gap task which prompted non-definite nouns ("Tell me what you see here" "I see 2 ___") (9c). In contrast, the Toy Task provided a context that may elicit both roots with and without *–a* ending, as in (12) ("on the left you put the (picture of) __"). Our participants preferred the more complex double determiner mixed DP structures in the Toy Task. This preference is in line with the production and acceptability study by Parafita et al. (2015), although it contrasts with the higher acceptability of bare nouns not ending in *–a* reported by Badiola and Sande (2018). The preference/motivation for each type of morphological structure goes far beyond the aim of the current paper.

Next, the procedure allowed us to test the validity of each of the three gender assignment strategies (GAS) used by bilinguals with Spanish and a non-gendered language. None of the three GAS reported in the literature (the analogical, the default and the phonological) could explain alone the elicited Basque-Spanish mixed DPs.

First, the analogical strategy, has been widely reported in production studies on mixed DPs by bilinguals with Spanish (L1) and different non-gendered languages as well: Spanish-English, French-Spanish (Liceras et al., 2016; Liceras et al., 2008), German-English (Jorschick et al., 2011), Spanish-Basque (Iriondo, 2017). In our sample, the analogical criterion was one of the main strategies participants used to assign gender, since it predicted 70.5% of the data obtained. More specifically, most words with M-gendered translation took the masculine article (68%) and most words with F-gendered translation took the feminine one (73%), which reveals the strength of this strategy in our sample. Interestingly, the analogical GAS was the primary strategy for simultaneous (2L1) and successive (L1S) bilinguals, both, with Spanish as L1, who showed higher rates for the analogical gender (M 84% and F 78%).

Second, the balanced distribution of masculine and feminine articles questions the existence of any default, and the strong predictability of the other strategies considered, single or combined (almost 100% or the data), rules out the default option in these highly proficient Spanish-Basque bilinguals. Such results contrast with the tendency to masculine default found in mixed DPs across Spanish contact situations, methodologies and bilingual profiles (Badiola & Sande, 2018; Balam, 2016; Bellamy et al., 2018; Valdés Kroff, 2016). Moreover, the majority of the lexical insertions of the single (L1B) participant showing preference for feminine were words ending in *–a*, and consequently, the only case of F default appear, as compatible with the canonical gender, illustrated in examples (2-5), and with the phonological GAS, rather than with any default.

Third, overall participants were sensitive to word ending and they followed a phonological strategy, at least to some extent**.** Interestingly, such strategy applied not only to word ending but also to root ending. The phonological strategy was especially visible in the L1B group, who showed higher rates of correspondence between gender and ending: F articles preceded 70% of nouns ending in *-a* and M articles did so with almost all nouns with endings other than *-a*: *–i* (100%), *-o* (88%) and *–n* (86%). The strength of phonological cues (*-a* ending F; non *-a* ending M) was identified previously in the naturalistic production of Basque dominant bilinguals and in L2 Basque speakers' acceptability judgements (Parafita Couto, Munarriz, et al., 2015). Similarly, processing data of Basque dominant Spanish-Basque bilinguals revealed shorter reaction times with canonical feminine words (Imaz Agirre, 2016).

On the one hand, the widely attested preference for feminine articles preceding Basque N in the production, acceptability and processing of (unilingual and mixed) DPs points towards the Basque-Spanish bilinguals' generalized sensitivity to word ending (*-a* ending, especially), rather than the effect of some "random" or "by-default" choice of one of the two gender options in Spanish nominal categories.

On the other hand, there is no reason to think that the phonological GAS may not be available to fluent bilinguals of Spanish and a language other than Basque. In this regard, the so-called "M default" observed in many studies on Spanish-English code-switching is compatible with a covert phonological strategy according to which English nouns (rarely ending in "canonical" F *-a* ending) are assigned M gender. As an illustration, an exploration of data from Valdés Kroff (2016)[8] revealed that a single noun out of the 304 English nouns (0.33%) within mixed DPs ended in *-a*. Hence, an alternative interpretation of the M default proposed in this and other studies would be that Spanish-English bilinguals assign M gender to every noun with an ending other than *-a*.

Fourth, interaction between the type of GAS and the bilingual profile is another important finding, which appears to be compatible with *transitional gender*. This term, defined as the "period of ambivalence between gender categories that borrowings undergo when they are first integrated into a language" (Muñoz-Basols & Salazar, 2019, p. 2) has been used to explain variability across Spanish-speaking communities. We propose an extension of the term to interindividual (and even intra-individual) variation

[8] Data is available at http://ufdc.ufl.edu/IR00006198/00001.

within the community in the account of the patterns found in Spanish-Basque, as well as in other contact situations (Liceras et al., 2008).

The analogical strategy was the dominant GAS for bilinguals with Spanish as L1, regardless of Spanish being their only first language (L1S) or whether it was acquired simultaneously with Basque (2L1). In contrast, the phonological strategy appeared as the unique or the primary GAS among bilinguals with Basque as their only L1. Individual analyses revealed that most of the bilinguals with S as L1 (12 out of 17) followed analogy as the primary strategy, with phonological GAS as secondary, while most L1B (12/13) had the phonological word/root ending strategy as their primary strategy.

Thus, on the one hand the pattern found in the successive or simultaneous L1S bilinguals supports the strength of the analogical strategy attested in L1 Spanish-L2 English bilinguals (Liceras et al., 2008) and in Spanish-dominant Spanish-Basque bilinguals in both oral and written acceptability judgements (Iriondo, 2017; Parafita Couto, Munarriz, et al., 2015). This outcome contrasts with the masculine default widely attested in native (Balam, 2016; Valdés Kroff, 2016) and non-native Spanish speakers (Liceras et al., 2008). On the other hand, the results of the L1B group confirm that these bilinguals are especially sensitive to word ending (either noun or root ending): not only to -*a* ending, as observed by Parafita et al. (2015), but also to non-*a* endings, predominantly associated to M and interpreted by Badiola and Sande (2018) as evidence for M default. One alternative account for the preference for M reported by Badiola and Sande (2018) could be that L1 Basque bilinguals follow a root-based phonological strategy, which leads them to assign F to roots ending in –*a* and M to roots with endings other than –*a*. Such an explanation would provide a unified account for the apparently conflicting results attested across Spanish-Basque bilingual studies.

In accordance with the present results, preliminary findings from an ongoing study (Ezeizabarrena & Munarriz-Ibarrola, 2019), where a subgroup of these participants was tested in an acceptability oral task, revealed similar strategies to our production study. Preliminary results show a) no overall preference for any gender in any of the groups, and b) a significant interaction between the L1 of the participants and the use of analogy as a strategy. The analogical strategy was found to be more robust in L1 Spanish simultaneous or successive bilinguals in comparison to L1B speakers.

Together, these results on bilinguals with a diverging degree of exposure/dominance are in line with the effect of the order of acquisition of languages found by Caffarra, Barber, Molinaro and Carreiras (2017) for Spanish-Basque bilinguals' gender processing and Liceras et al. (2008) for Spanish-English code-switching. Along the same lines, Lipski (2015) and Valdés Kroff et al. (2019), in their studies on gender interference in these highly cognate languages (Palenquero-Spanish and Papiamento-Spanish bilinguals)**,** found that Spanish-dominant bilinguals experience the greatest interference of Spanish gender features in both ungendered Palenquero and Papiamento.

More specifically, Caffarra et al. (2017) interpreted Basque-dominant bilinguals reliance on word ending as an effect of their less stable representation of Spanish gender and attributed the use of the noun-ending cue to the fact that Basque is an agglutinative language. However, the agglutinative (Basque) vs. fusional (Spanish) nature of the languages in contact does not explain the findings. In our opinion, it is the existence of word-final *–a* morphemes in the two languages (F in Spanish vs. article in Basque), which allows bilinguals to reanalyse such endings as either morphological markers of prototypical Spanish F gender in lexical insertions, or as parts of morphological content (non-specified for gender) attached to the nominal root with which the Det_{SP} needs to agree.

Finally, the individual variation regarding cues (analogical vs. phonological) appears as compatible with the less stable representation of Spanish gender suggested for Basque-dominant bilinguals by Caffarra et al. (2017)**,** as well as with the less stable "bilingual mode" (Grosjean, 1997). Nevertheless, the GAS tested in the current experimental study with frequent words is evidence for a very consistent gender agreement system, according to which Spanish Det agrees with every N**,** including the ones with "transitional" gender, as proposed for "recent" not-yet integrated English loanwords by Muñoz-Basols and Salazar (2019). Notice that the Basque nouns selected are words which are not(-yet) integrated into the Spanish variety spoken in the area, as compared to other words such as *el BASERRI* 'the farm', *los AITAS* 'the parents' or other school related terms such as *la ariketa* 'the exercise' or *el idazlan* 'the essay', which can be observed in the speech of monolingual Spanish speakers living in the area.

The variability found across participant groups, is compatible with the existence of a different predominant strategy in "transitional" gender assignment, rather than with an unstable gender feature in their Spanish grammar. Our study demonstrates that our participants make use of either one or even both GAS available to monolingual speakers of Spanish, namely the analogical GAS and/or the phonological one. Our results indicate that differences reported across bilinguals (individuals and communities), which may vary across testing procedures, depend on their language profile and the specificities of the languages involved (Beatty-Martínez & Dussias, 2019; Poplack, 1988, a.o.).

Thus, further research should be undertaken to investigate bilingual social experience in a finer-grained continuous manner. A greater focus on the linguistic background of the participant sample would allow us to understand individual differences or phenotypes (Green, Crinion, & Price, 2006) in the language use of bilinguals.

5. Conclusion

The results of an elicited production task, targeting Basque-Spanish mixed DPs produced by highly competent Basque-Spanish bilinguals are relevant for a comprehensive account of the previous contradictory results on the gender assignment strategies (GAS) of bilinguals with Spanish and another language.

The data obtained ruled out any default strategy, widely attested in other contact situations, and can be better accounted for based on the widely-reported analogical and the less-reported phonological GAS. Interestingly, though, their distribution appears as closely related to bilinguals' profile: the phonological strategy prevails among bilinguals with the non-gendered language as dominant (Basque as L1 and dominant in the sociolinguistic environment), whilst the analogical strategy prevails among bilinguals with the gendered language as functionally dominant (Spanish as L1 and socially dominant). Elicited bilingual adults' production data of Basque-Spanish mixed DPs contributed to the explanation of the apparently contradictory GAS reported across studies on mixed DPs in a unified way, according to which bilinguals speaking the same language pairs and living in the same community may rely on one (or more than one) out of three GAS (default, analogical and phonological), depending on the morpho-phonological properties of the languages in contact, their bilingual profile and the sociolinguistic environment.

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References

Acha, J., Laka, I., Landa, J., & Salaburu, P. (2014). EHME: a new word database for research in Basque language. *The Spanish Journal of Psychology, 17*, E79. doi:10.1017/sjp.2014.79

Artiagoitia, X. (2012). The DP Hypothesis in the grammar of Basque. In U. Etxeberria, R. Etxepare, & M. Uribe-Etxebarria (Eds.), *Noun phrases and nominalization in Basque: syntax and semantics* (pp. 21-78). John Benjamins.

Badiola, L., & Sande, A. (2018). Gender assignment in Basque/Spanish mixed Determiner Phrases: a study of simultaneous bilinguals. In L. López (Ed.), *Code-switching - Experimental answers to theoretical questions: in honor of Kay González-Vilbazo* (pp. 15-38). John Benjamins.

Balam, O. (2016). Semantic categories and gender assignment in contact Spanish: Type of code-switching and its relevance to linguistic outcomes. *Journal of Language Contact*, *9*(3), 405-435. doi:https://doi.org/10.1163/19552629-00903001

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *2015*, *67*(1), 48. doi:10.18637/jss.v067.i01

Beatty-Martínez, A. L., & Dussias, P. E. (2019). Revisiting Masculine and Feminine Grammatical Gender in Spanish: Linguistic, Psycholinguistic, and Neurolinguistic Evidence. *Frontiers in Psychology, 10*(751). doi:10.3389/fpsyg.2019.00751

Bellamy, K., Parafita Couto, M. C., & Stadthagen-Gonzalez, H. (2018). Investigating gender assignment strategies in mixed Purepecha–Spanish nominal constructions. *Languages*, *3*(3), 28. doi:10.3390/languages3030028

Blokzijl, J., Deuchar, M., & Parafita Couto, M. C. (2017). Determiner asymmetry in mixed nominal constructions: The role of grammatical factors in data from Miami and Nicaragua. *Languages*, *2*(4), 20. doi:10.3390/languages2040020

Caffarra, S., Barber, H., Molinaro, N., & Carreiras, M. (2017). When the end matters: influence of gender cues during agreement computation in bilinguals. *Language, Cognition and Neuroscience*, *32*(9), 1069-1085. doi:10.1080/23273798.2017.1283426

Clegg, J. H. (2010). Native Spanish speaker intuition in noun gender assignment. *Language Design: Journal of Theoretical and Experimental Linguistics*, *12*, 5-18.

Corbett, G. G. (2006). *Agreement*. Cambridge University Press.

Chan, B. H.-S. (2008). Code-switching, word order and the lexical/functional category distinction. *Lingua*, *118*(6), 777-809.

Delgado, R. (2018). The familiar and the strange: Gender assignment in Spanish/English mixed DPs. In L. López (Ed.), *Code-switching – Experimental Answers to Theoretical Questions: In honor of Kay González-Vilbazo* (pp. 39-62). John Benjamins.

Duñabeitia, J. A., Crepaldi, D., Meyer, A. S., New, B., Pliatsikas, C., Smolka, E., & Brysbaert, M. (2018). MultiPic: A standardized set of 750 drawings with norms for six European languages. *Quarterly Journal of Experimental Psychology, 71*(4), 808-816. doi:10.1080/17470218.2017.1310261

Eddington, D. (2002). Spanish gender assignment in an analogical framework. *Journal of Quantitative Linguistics*, *9*(1), 49-75. doi:10.1076/jqul.9.1.49.8482

Eddington, D., & Hualde, J. I. (2008). El abundante agua fría: Hermaphroditic Spanish Nouns. *Studies in Hispanic and Lusophone Linguistics, 1*(1), 5-32. doi:https://doi.org/10.1515/shll-2008-1004

Ezeizabarrena, M. J. (2009). Development in language mixing: early Basque-Spanish bilingualism. In J. Grinstead (Ed.), *Hispanic child languages: typical and impaired development* (pp. 57-89). John Benjamins.

Ezeizabarrena, M. J., & Munarriz-Ibarrola, A. (2019). *Gender variability in mixed DPs as evidence for a less stable "third" lexicon in code-switching*. Paper presented at the AESLA 37, Valladolid.

Glover, S., & Dixon, P. (2004). Likelihood ratios: A simple and flexible statistic for empirical psychologists. *Psychonomic Bulletin & Review, 11*(5), 791-806. doi:10.3758/BF03196706

Green, D. W., Crinion, J., & Price, C. J. (2006). Convergence, degeneracy, and control. *Language Learning, 56*(s1), 99-125. doi:10.1111/j.1467-9922.2006.00357.x

Grosjean, F. (1997). The bilingual individual. *Interpreting, 2*(1-2), 163-187. doi:https://doi.org/10.1075/intp.2.1-2.07gro

Gullberg, M., Indefrey, P., & Muysken, P. (2009). Research techniques for the study of code-switching. In B. E. Bullock & A. J. Toribio (Eds.), *The Cambridge Handbook on linguistic code-switching* (pp. 21-39). Cambridge University Press.

Harris, J. (1991). The exponence of gender in Spanish. *Linguistic Inquiry, 22*, 27-62.

Imaz Agirre, A. (2016). The processing of gender assignment in Spanish: does canonicity have an effect on Basque speakers? *Revista Española de Lingüística Aplicada, 29*(2), 523-543.

Iriondo, A. (2017). Kode-alternantzia elebidun gazteetan: DS nahasiak. *Gogoa, 16*, 25-56.

Jorschick, L., Endesfelder Quick, A., Glasser, D., Lieven, E., & Tomasello, M. (2011). German-English-speaking children's mixed NPs with 'correct' agreement. *Bilingualism: Language and Cognition, 14*(2), 173-183. doi:10.1017/S1366728910000131

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest Package: Tests in linear mixed effects models. *2017, 82*(13), 26. doi:10.18637/jss.v082.i13

Liceras, J. M., Fernández Fuertes, R., & Klassen, R. (2016). Language dominance and language nativeness: the view from English-Spanish code-switching. In R. E. Guzzardo Tamargo, C. M. Mazak, & M. C. Parafita Couto (Eds.), *Spanish-English codeswitching in the Caribbean and the US* (pp. 107-138). John Benjamins.

Liceras, J. M., Fernández Fuertes, R., Perales, S., Pérez-Tattam, R., & Spradlin, K. T. (2008). Gender and number agreement in bilingual native and non-native grammars: a view from child and adult functional-lexical mixings. *Lingua, 118*(6), 761-852. doi:10.1016/j.lingua.2007.05.006

Lipski, J. M. (2015). From 'more' to 'less': Spanish, Palenquero (Afro-Colombian creole) and gender agreement. *Language, Cognition and Neuroscience, 30*(9), 1144-1155. doi:10.1080/23273798.2014.975727

Lipski, J. M. (2016). The role of unintentional/involuntary codeswitching: Did I really say that? *Spanish-English codeswitching in the Caribbean and the US.* (pp. 139-168). John Benjamins Publishing Company.

López, L. (2020). *Bilingual grammar: Toward an integrated model* Cambridge University Press.

Montrul, S., Foote, R., & Perpiñán, S. (2008). Gender agreement in adult second language learners and Spanish heritage speakers: The effects of age and context of acquisition. *Language Learning, 58*(3), 503-553. doi:10.1111/j.1467-9922.2008.00449.x

Muñoz-Basols, J., & Salazar, D. (2019). ¿Nos hacemos un/una selfie con la/el tablet? Cross-Linguistic Lexical Influence, Gender Assignment and Linguistic Policy in Spanish. *Revista signos, 52*, 77-108.

Othegy, R., & Lapidus, N. (2003). An adaptive approach to noun gender in New York contact Spanish. In R. Cameron, L. López, & R. Núñez-Cedeño (Eds.), *A Romamnce perspective on language knowledge and use* (pp. 209-229). John Benjamins.

Parafita Couto, M. C., Deuchar, M., & Fusser, M. (2015). How do Welsh-English bilinguals deal with conflict? Adjective-noun order resolution. In G. Stell & K. Yakpo (Eds.), *Code-switching between structural and sociolinguistic perspectives* (pp. 64-84). Mouton de Gruyter.

Parafita Couto, M. C., & Gullberg, M. (2019). Code-switching within the noun phrase: Evidence from three corpora. *International Journal of Bilingualism, 23*(2), 695-714. doi:10.1177/1367006917729543

Parafita Couto, M. C., Munarriz, A., Epelde, I., Deuchar, M., & Oyharçabal, B. (2015). Gender conflict resolution in Spanish-Basque mixed DPs. *Bilingualism: Language and Cognition, 18*(2), 304-323. doi:10.1017/S1366728916000572

Pérez-Pereira, M. (2009). The acquisition of gender: what Spanish children tell us. *Journal of Child Language*, *18*(3), 571-590. doi:10.1017/S0305000900011259

Pérez-Tattam, R., Ezeizabarrena, M. J., Stadthagen-González, H., & Mueller Gathercole, V. C. (2019). Gender assignment to Spanish pseudowords by monolingual and Basque-Spanish bilingual children. *Languages, 4*(3), 58. doi:10.3390/languages4030058

Poplack, S. (1988). Contrasting patterns of code-switching in two communities. In M. Heller (Ed.), *Codeswitching: Anthropological and Sociolinguistic Perspectives* (pp. 215-244). Mouton de Gruyter.

Poplack, S., & Meechan, M. (1998). Introduction: how languages fit together in codemixing. *International Journal of Bilingualism, 2*(2), 127-138. doi:10.1177/136700699800200201

Poplack, S., Pousada, A., & Sankoff, D. (1982). Competing influences on gender assignment: variable process, stable outcome. *Lingua, 57*, 1-28.

R_Core_Team. (2017). A language and environment for statistical computing. *Computing, 1*. doi:10.1890/0012-9658(2002)083[3097:CFHIWS]2.0.CO;2

RAE. Banco de datos (CREA) [en línea]. Corpus de referencia del español actual. Retrieved 05/07/2020

Roca, I. M. (2005). La gramática y la biología en el género del español. *Revista Española de Lingüística, 35*(1), 17-44.

Sarasola, I., Salaburu, P., & Landa, J. (2013). Egungo Testuen Corpusa. https://www.ehu.eus/etc/

Soziolinguistika_Klusterra. (2014). Euskararen datu soziolinguistikoen biltegia [Database for Basque Sociolinguistic data]. Retrieved 22/01/2020 http://www.soziolinguistika.eus/edb/index.php?erakus=aurkezpena

Teschner, R. V., & Russell, W. M. (1984). The gender patterns of Spanish nouns: An inverse dictionary-based analysis. *Hispanic Linguistics*, *1*, 115-132.

Trask, R. L. (2003). The Noun Phrase: nouns, determiners and modifiers; prononuns and names. In J. I. Hualde & J. Ortiz de Urbina (Eds.), *A grammar of Basque* (pp. 113-170). Mouton de Gruyer.

Valdés Kroff, J. R. (2016). Mixed NPs in Spanish-English bilingual speech: Using a corpus-based approach to inform models of sentence processing. In R. E. Guzzardo Tamargo, C. M. Mazak, & M. C. Parafita Couto (Eds.), *Spanish-English code-switching in the Caribbean and the US* (pp. 281-300). John Benjamins.

Valdés Kroff, J. R., Rooijakkers, F., & Parafita Couto, M. C. (2019). Spanish grammatical gender interference in Papiamentu. *Languages*, *4*(4), 78. doi:10.3390/languages4040078

van Heuven, W., Mandera, P., Keuleers, E., & Brysbaert, M. (2014). SUBTLEX-UK: a new and improved word frequency database for British English. *Quarterly Journal of Experimental Psychology*, *67*(6), 1176-1190. doi:10.1080/17470218.2013.850521