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On the transmission of democratic values

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ABSTRACT

We study whether democratic values that govern the preferences over social choice rules are subject to intergenerational transmission. We focus on five social choice rules, namely, Plurality, Plurality with Runoff, the Majoritarian Compromise, Borda Rule and Social Compromise, that represent very diverse values about how to extract public will out of individual opinions. In our experiment, students and their parents are confronted with hypothetical preference profiles and are asked to decide which alternative should be chosen for the society. The design of the hypothetical preference profiles allows us to interpret a subject's choice of an alternative as her revealed preference for one of the focused social choice rules. We find significant differences between the rules most often chosen by the parents (Majoritarian Compromise and Plurality) and those by the students (Social Compromise). Analyzing the relation between the preferences over social choice rules for each parent-offspring pair, we find support for the hypothesis of parental transmission of preferences.

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1. Introduction

There is a growing literature that provides both a theoretical framework and empirical evidence that institutions matter for long-term economic development, and given the interplay between political and economic institutions, “better” political institutions bring about better economic outcomes. [Acemoglu and Robinson \(2012\)](#) defines good political institutions as “inclusive” arrangements; for a political institution to be inclusive it should distribute power to a broad plurality of groups instead of a narrow group. Inclusive political institutions welcome inclusive economic institutions that transform the energy of plurality in economic activity. [Papaioannou and Siourounis \(2008\)](#) have estimated that, on average, democratization processes are associated with a 1% increase in annual per capita growth. [Acemoglu et al. \(2019\)](#) extends this estimation and shows that democratization increases GDP per capita by about 20% in the long run.

Coined from the Greek words demos (“people”) and kratos (“rule”), democracy requires that collective decisions rely on individual opinions and on these opinions only. However, it does not specify how a social decision is to be extracted from individuals’ preferences. There are many ways of doing this. Voting is intimately linked to democracy and voting rules (social choice rules) pertain to democratic procedures according to which individual wills are aggregated into a social will. The choice of an aggregation rule to compose a representation of public will has been a major ethical question ever since the

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political philosophy of the Enlightenment.¹ “Democratic values” are the fairness principles that are employed to implement a reflection of individual opinions guiding this choice.

Like all values and norms, democratic values are not static.² Given the interaction between democratic values and political institutions, understanding the dynamics of democratic values constitutes a step toward uncovering how political and economic institutions persist and change.

This study is an attempt to investigate whether parental transmission is a component of the dynamics of democratic values. We consider democratic values that reflect the fairness notions on how individual opinions should be aggregated into a social decision. In this direction, we regard preferences over social choice rules as projections of democratic values. We select five social choice rules to focus on, namely, Plurality, Plurality with Runoff, the Majoritarian Compromise, Borda Rule and Social Compromise, that represent very diverse values about how to extract public will out of individual opinions.³ We run an exploratory panel study to elicit preferences of students and their parents over these rules. To uncover impartial and genuine beliefs on how public will should be extracted from individual preferences, we employ a hypothetical setting as a testbed.⁴ We confront each child and her parents with the same set of preference profiles of a hypothetical electorate over some abstract set of alternatives for which the rules of our focus all disagree on the winner (except Borda and Social Compromise whose winners coincide in our setting). Given a profile, we ask each subject to state an impartial view on which alternative should be chosen for the society and the reason for her choice. Verified by her reason of choice, we interpret a subject’s choice of an alternative as an indication of her democratic values that govern the rule choosing that alternative as the social outcome (winner). Using a panel data discrete choice model, we test the hypothesis that there is a vertical transmission of preferences over the focused rules, and therefore, the democratic values governing them.

Classical economic theory treats individual preference endowments as a black box. However, there is a huge literature in biology, psychology, evolutionary anthropology, political science and sociology on the formation of these endowments. Learning and imitation are the main processes through which preferences, beliefs, norms and ideological attitudes are formed and transmitted. Both “vertical socialization” (through parents and family) and “horizontal socialization” (through peers) are investigated and discussed for their relative roles in value transmission (Bisin and Verdier, 2011; Jennings and Niemi, 1968; Pacheco, 2008; Lindquist et al., 2015). On the other hand, there is a growing literature on the role of genetic heritage for preference formation and its intergenerational transmission (for instance, see Funk et al. (2013) for the genetic and environmental transmission channels of political orientation and their interaction; Hatemi et al. (2010) and Smith et al. (2012) for the role of genetic inheritance in the formation of political views; Nicolaou et al. (2008) and Nicolaou and Shane (2010) for the genetic transmission of the taste for entrepreneurship).

In the realm of economics, there are recent theoretical studies that endogenize individual preferences and attitudes by mostly assuming the family as the primary locus of value transmission, posing that parents act consciously to socialize their children to particular cultural traits. In the empirical studies, the role of transmission is highlighted on the formation of fundamental preference features (discounting, risk aversion, altruism, dishonesty, etc.), social norms and ideological tenets (attitudes towards family and fertility, practices and attitudes in the job market, etc.) and distinct cultural attributes that determine how individuals interpret and react to common choice environment (Bisin and Verdier, 1998; 2000; 2001; Corneo and Jeanne, 2010; Doepke and Zilibotti, 2005; Tabellini, 2008; Houser et al., 2016; Persson and Tabellini, 2009; Montgomery, 2010; Ghidi, 2012; Alesina et al., 2013). Bisin and Verdier (2011) provide a survey of cultural transmission models and presents the implications of these models regarding the long-run population dynamics of values and beliefs, and Spolaore and Wacziarg (2013) suggests that economic development is affected by this long-run dynamics of values.

The empirical psychology literature has not reached robust conclusions about the relative impacts of the socialization processes in the family and in other social interaction groups, such as peer groups, on cultural transmission of preferences and attitudes. While Harris (1995) argues that parental behaviors have no effect on the psychological characteristics that their children will have as adults, Eisenberg and Mussen (1989) detects positive correlation between prosocial behaviours of 7 families and children. The sociology literature also hosts mixed results on the relative role of parents in value transmission (Bengtson, 1975; Tedin, 1974). Necker and Voskort (2014) concludes that the effect of intergenerational transmission on the persistence of values is small to moderate and that the link tends to be higher when the domain is disputed in the population.

In the political psychology literature, there are many studies on the precursors of political attitudes and orientations. Hyman (1969) argues that the family is the primary agent of political socialization. Jennings and Niemi (1968) and Jennings et al. (2009) show mixed empirical evidence on the effectivity of parental transmission on the political views of children, and highlight the qualifications for a political trait to be effectively or ineffectively transmitted. There is evidence

¹ The modern scholarly research focuses on preference aggregation in a manner compatible with the fulfillment of a variety of positive and normative criteria. See Moulin (1988), Moulin (2014) and Felsenthal and Nurmi (2018)).

² See Alesina and Giuliano (2015) for a detailed literature survey and discussion.

³ See Brams and Fishburn (2002).

⁴ To our knowledge, Sertel and Kara (2003) and Kara and Sertel (2005) are the first attempts in the literature aiming to understand these democratic values in a completely hypothetical setting where, to a certain degree, a “veil of ignorance” is achieved (Rawls, 1971). Focusing on preferences over two-tier voting rules in assemblies, Weber (2019) shows that, without a “veil of ignorance”, people choose the rule that benefits their group. Blais et al. (2015) reports a similar result in a large internet-based quasi-experiment carried out during the 2012 French presidential election; voters were asked to cast different ballots under several distinct voting rules: when asked about their favourite voting rule, people prefer the one that benefits their candidate.

of parental transmission of preferences over political parties (Nieuwbeerta and Wittebrood, 1995; Grob et al., 2009). Some studies present political socialization in its relation with cultural transmission, in particular the transmission of social norms, ideological attitudes, and ethnic and religious traits. Bisin and Verdier (2011), Brañas-Garza and Neuman (2007) and Brañas-Garza et al. (2011) show that this transmission is resilient across generations. In general, studies on political transmission have been mainly concerned with specific and relevant political issues: civil liberties and civil rights, political trust, political engagement, attachment to social groups or parties (Jennings et al., 2009), individualism, collectivism (Schönplflug, 2001), gender roles (Filler and Jennings, 2015) and family values (Sabatier and Lannegrand-Willems, 2005).

In this study, we do not consider the parental transmission of political views. Our scope is the parental transmission of preferences on how to aggregate individual opinions into a collective decision, which is a more implicit and less salient transmission of democratic values. To our knowledge, this is the first study that aims to uncover the role of parental transmission in the formation of democratic values governing the preferences over social choice rules.

The paper is organized as follows. Section 2 contains the experimental design and procedures. We describe the data and present some descriptive statistics in Section 3. In Section 4, we introduce a discrete choice model for the student subjects choice of alternative and provide the regression results showing the presence of intergenerational transmission. Section 5 concludes.

2. Experimental design and procedures

In an attempt to uncover the democratic values of parents and offspring, we employ their preferences over a set of social choice rules that are anonymous (insensitive to the names of voters) and neutral (insensitive to the names of alternatives) as a proxy. We generate test beds at which we confront our subjects with hypothetical preference profiles of a hypothetical electorate over some abstract set of four alternatives. Then, we ask each subject which alternative should be chosen as the social outcome for the society whose preference profile is shown. It should be noted that this setting puts the subjects in a completely “neutral” position towards the voters and the candidates in a preference profile, and makes no voter or candidate more appealing than another. Hence, our framework leaves out preferences for non-democratic aggregation rules (such as dictatorship).

In this section, we first define the social choice rules of our focus. We then explain how we generate the hypothetical preference profiles to be presented to the subjects.

2.1. Social choice rules

We consider a set of voters who have to collectively choose from a set of alternatives. Each voter has a complete, transitive and antisymmetric binary relation (a linear preference ordering) on the set of alternatives, i.e., each voter has a strict preference ranking (with no indifference) over the available alternatives. A preference profile exhibits the preference ranking of each voter in the electorate. A social choice rule is a multi-valued mapping from the set of all possible preference profiles into the set of alternatives.

In the social choice literature, there are many well-studied rules which aggregate linearly ranked individual preferences into a social decision. Each rule processes the information embedded in a preference profile (collection of the individual preference rankings) and maps it into a decision. The democratic values behind a rule induce which information is relevant in a given preference profile and how to process it. In our selection of the rules to focus on, we aim to have a diversified set of rules in terms of the democratic values governing them.

Plurality and Borda are scoring rules and they adopt a “utilitarian” approach. However, Plurality considers only the top-ranked alternatives and chooses the most popular among them. On the other hand, Borda takes into consideration all ranks in the preference orderings and assigns a score to each alternative, linearly increasing with the alternative’s ranking in a voter’s opinion, and elects the alternative(s) with the highest total score summed over all voters.

Plurality with Runoff considers the two most popular top-ranked alternatives and chooses the one which beats the other in a binary comparison across the electorate.

Majoritarian Compromise chooses the alternative which has the maximal majority degree support: if there is an alternative which is top-ranked by the majority, then it is selected. If there is no such alternative, then first- and second-best alternatives are considered, and among those with majority support the rule selects the one with maximal support. If there is no alternative with majority support as the first- or second-best alternative in the individual rankings, then the first three ranks are considered, etc.⁵

Named also as Kant-Rawls compromise,⁶ Social Compromise employs a maximin approach and picks the alternative whose worst rank is better than the worst rank of each of the other alternatives across the electorate. That is, it picks the alternatives which render the least happy agents in society as happy as possible. This rule coincides with fall-back bargaining,⁷ and treats social choice as a conflict resolution issue. Both Majoritarian Compromise and Social Compromise

⁵ It is shown in Sertel and Yilmaz (1999) that an MC-winner always exists and at most $\lfloor n/2 \rfloor$ ranks from the top need to be considered.

⁶ See Hurwicz and Sertel (1999).

⁷ See Brams and Kilgour (2001).

- *ROOT PROFILE#1*

<i>Voter 1</i>	<i>Voter 2</i>	<i>Voter 3</i>	<i>Voter 4</i>	<i>Voter 5</i>	<i>Voter 6</i>	<i>Voter 7</i>
P	P	P	R	R	MC	B/SC
MC	MC	MC	B/SC	B/SC	B/SC	MC
B/SC	B/SC	B/SC	P	P	R	R
R	R	R	MC	MC	P	P

- *ROOT PROFILE#2:*

<i>Voter 1</i>	<i>Voter 2</i>	<i>Voter 3</i>	<i>Voter 4</i>	<i>Voter 5</i>	<i>Voter 6</i>	<i>Voter 7</i>
P	P	P	R	R	MC	B/SC
MC	MC	B/SC	B/SC	MC	B/SC	MC
B/SC	B/SC	R	P	B/SC	R	R
R	R	MC	MC	P	P	P

- *ROOT PROFILE #3:*

<i>Voter 1</i>	<i>Voter 2</i>	<i>Voter 3</i>	<i>Voter 4</i>	<i>Voter 5</i>	<i>Voter 6</i>	<i>Voter 7</i>
P	P	P	R	R	MC	B/SC
MC	B/SC	B/SC	MC	MC	B/SC	MC
B/SC	R	R	B/SC	B/SC	R	R
R	MC	MC	P	P	P	P

Fig. 1. Root preference profiles.

are guided by a compromise idea; however, Social Compromise searches for a compromise alternative starting from the bottom rank of a preference profile while Majoritarian Compromise seeks a compromise alternative starting from the top rank of a preference profile.

Among our selection of rules, Plurality, due to its ease of implementation, is the most used rule in all types of elections all over the world. Often implemented as two-round or second-ballot voting, Plurality with Runoff is also widely used in many countries for political elections. Borda and its variants are employed mostly by professional societies and educational institutions, but also for political elections in some countries. Majoritarian Compromise (also known as Bucklin voting) was used in the political elections in the United States in the early 20th century. Social Compromise is not used in elections with large electorate where it is likely that each candidate is at least one voter’s worst alternative, and so it chooses the entire set of alternatives, i.e. it fails to be decisive. Nevertheless, this rule is used for collective decisions in less formal contexts where the principle of respect for minorities affects the collective decision.

Hereafter Plurality, Borda, Plurality with Runoff, Majoritarian Comprise and Social Compromise will be denoted by *P*, *B*, *R*, *MC* and *SC*, respectively.

2.2. Preference profiles

In our aim to empirically identify the democratic values that govern the preferences over the rules of our focus, we generate hypothetical preference profiles where the winners of *P*, *R*, *MC* and *B* are unique and distinct alternatives. The least clustered case that serves this purpose is that of a set *A* of four alternatives and a society *N* of seven voters. As an inevitable consequence of our aim to economize on the size of the profiles, however, there is always exactly one alternative which is not bottom-ranked by any voter. This alternative constitutes the *SC*-winner which always coincides with the *B*-winner.

All of the five social choice rules of our focus are neutral and anonymous, i.e., they do not have any built-in bias for or against any alternative or voter. That is, the set of all preference profiles that fulfill our restriction (i.e., *P*, *R*, *MC* and *B* choosing unique and distinct winners) form anonymous and neutral equivalence classes under permutations of alternatives and voters; that is, each equivalence class contains all the preference profiles that can be generated from one another by permuting the names of the alternatives and voters. We find three equivalence classes that serve our purpose. Let us call a representative profile of an equivalence class a "root profile". A distinct preference structure is embedded in each of our three root profiles.

- A preference profile of **ROOT PROFILE #1**:

Voter 1	Voter 2	Voter 3	Voter 4	Voter 5	Voter 6	Voter 7
e	d	b	a	a	b	a
d	e	d	e	e	d	e
b	b	a	d	d	a	d
a	a	e	b	b	e	b

(**P**, **R**, **MC** and **B/SC** winners are a, b, e and d, respectively)

- A preference profile of **ROOT PROFILE #2**:

Voter 1	Voter 2	Voter 3	Voter 4	Voter 5	Voter 6	Voter 7
b	a	e	b	d	e	b
d	d	a	d	a	d	a
a	e	b	a	e	a	e
e	b	d	e	b	b	d

(**P**, **R**, **MC** and **B/SC** winners are b, e, d and a, respectively)

- A preference profile of **ROOT PROFILE #3**:

Voter 1	Voter 2	Voter 3	Voter 4	Voter 5	Voter 6	Voter 7
d	a	e	d	a	d	b
e	b	b	e	b	b	e
a	e	a	a	e	e	a
b	d	d	b	d	a	d

(**P**, **R**, **MC** and **B/SC** winners are d, a, b and e, respectively)

Fig. 2. A menu of preference profiles presented to a subject.

In Fig. 1 we present the root profiles; *P*, *R*, *MC*, and *B/SC* denote also the winner of the rule.⁸ Each of the three root profiles spans $4! = 24$ preference profiles to be obtained simply by renaming (permuting) the four candidates, *a*, *b*, *c*, and *d*. It should be noted that versions of these 72 profiles can be generated by permuting the voter names (columns).

In Fig. 2 we present examples of preferences that are generated from root profiles 1, 2 and 3, respectively.

2.3. A Menu of preference profiles

We presented each subject a menu of three preference profiles together with an instruction on how to “read” the linear orderings of the individual preferences in a profile. Each profile in the menu is of a different root. A randomly chosen profile out of the 24 profiles of a root is put in a menu after the voters in the profile are renamed. For each of the three profiles in the menu, the subject was asked to state, from an impartial viewpoint, which alternative should be selected as the winner, and the reasoning/explanation for her answer (a sample is provided in Appendix A). The order of the roots appearing in the menus is randomized.

2.4. Implementation

The study was conducted at Istanbul Bilgi University in the fall of 2010 and 2011 during the registration period of the freshly admitted students to the undergraduate programs of the university. We manually collected data from the 186 voluntary students and their parents who accepted the invitation to participate in the study.

⁸ Clearly, in our root profiles, the winner of a focused rule might coincide with the winner of an unfocused rule. For example, in all of our profiles, the SC winner coincides with the Anti Plurality winner and the MC winner is also picked by a scoring rule that assigns the scoring vector (1,1,0,0) to the ranks. In order to distinguish the rule that is actually employed by a subject, we refer to her explanation regarding her choice.

Table 1
Sample descriptive statistics.

Parents	<i>n</i>	Mean	Std. Dev.	Min	Max
<i>Education</i>	165	3.667	.577	1	4
<i>Siblings</i>	168	1.75	0.677	1	4
<i>Mother</i>	167	0.539	0.5	0	1
Students	<i>n</i>	Mean	Std. Dev.	Min	Max
<i>Female</i>	186	0.704	0.458	0	1
<i>Goodschool</i>	181	0.409	0.493	0	1
<i>Boarding</i>	181	0.072	0.258	0	1
<i>Scholarship</i>	178	35.815	37.190	0	100
<i>Year</i>	186	.522	.501	0	1

Table 2
Favored rules by gender (percentages of choices): Parents and students.

	<i>n</i>	SC	MC	P	R	B
Parents	168	23.4	34.9	33.1	4.2	4.4
Mothers	90	20.7	37.8	35.5	3.7	2.2
Fathers	77	25.6	32.0	30.7	4.8	6.9
Students	186	45.2	26.2	20.4	2.9	5.2
Daughters	131	44.3	28.2	20.6	3.3	3.6
Sons	55	47.3	21.2	20.0	1.8	9.1

Note: Although the number of participating parents is 168, one of them did not indicate gender so that the sum of fathers and mothers is 167.

Each student and her parent(s) were individually given the same printed menu of preference profiles, instructions and a short questionnaire. In the questionnaire, we asked the parent to state her education level, profession category, number of children and gender while we inquired the student’s gender, type of high school attended, merit-based scholarship status and whether she was a boarding student at high school. The members of each family were seated separately and not allowed to communicate with each other or with other participants in the room. They were asked to keep their responses void of any indication of their identities, so that they were guaranteed anonymity.

3. Descriptive statistics

We present in Table 1 the descriptive statistics of our sample, which we collected through the questionnaires.⁹ The variables for the parents are as follows: *Education* takes an integer value between 1 and 4 representing four levels of education (1: Primary School, 2: Junior High, 3: Senior High, 4: University and higher); *Siblings* is the variable for the number of kids in the family (4 represents 4 kids or more); *Mother*=1 for mothers. The variables for the students are as follows: *Female*=1 for daughters; *Goodschool*=1 if the student has attended a high school of high academic standards;¹⁰*Boarding*=1 if the subject was a boarding student during the high school years; *Scholarship* takes the values 0, 25, 50 or 100, which represent the percentage of the university tuition fee covered by a merit-based scholarship; *Year*=1 for the data collected in year 2011.

We also have information on the undergraduate degree program in which each student was getting enrolled. The respective percentages in our student sample are as follows: Law (15.4%), Business Administration/Economics (22.5%), Social Sciences and Humanities (20.3%), Engineering and Computer Sciences (15.4%), Health Services (10.4%), International Relations (5.5%), Communication (8.2%), Mathematics (2.2%).

In Fig. 3, we show for parents and students the percentage of choices favoring each rule (each subject had 3 profiles in the provided menu, therefore, was asked to submit 3 choices).¹¹

Table 2 provides the results disaggregated by gender. The students use MC and P less often than the parents ($t = -2.20$, $p - value = 0.03$ for MC and $t = -3.11$, $p - value = 0.00$ for P), while SC is more popular among the students than among the parents ($t = 5.24$, $p - value = 0.00$).

⁹ When both parents filled in the questionnaire, our data contain two pairs (student, father) and (student, mother). In the case of 18 students both mother and father filled in the questionnaire. No parent filled in the questionnaire for 18 students.

¹⁰ See high school categories 2 and 3 in Appendix B.

¹¹ Having employed the same experimental setting in a sample of 288 undergraduate students at Bogazici University (Turkey), Kara and Sertel (2005) obtained the following percentages for students: P(10.27%), R(2%), MC(42.93%), SC + B(44.7%). Note that the order in which the rules are favored is the same as in our data, with SC + B being the most preferred.

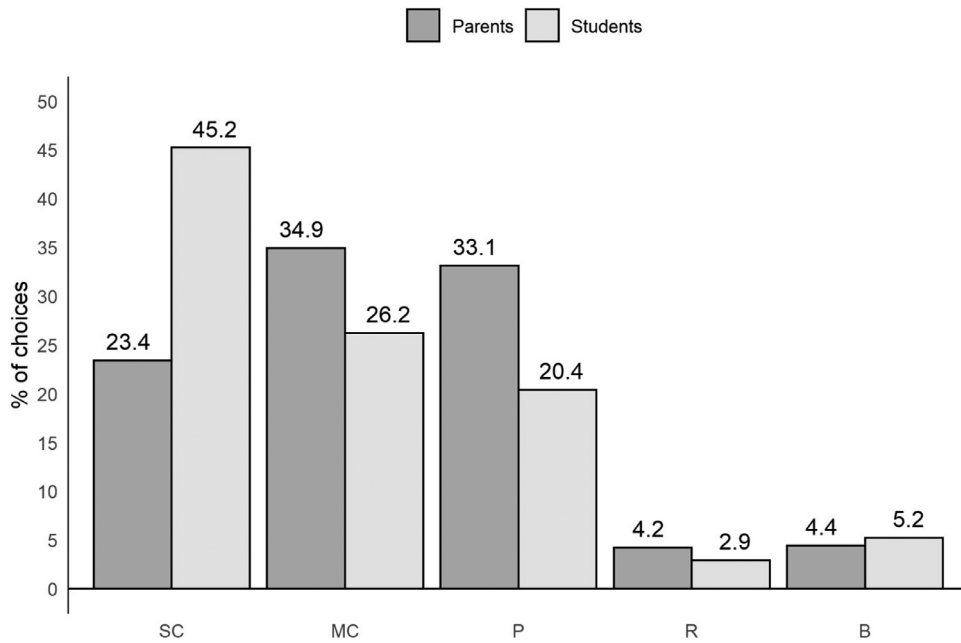


Fig. 3. Favored rules: parents and students.

Table 3
Percentage of strong preferences.

Strong preferences (%)	n	SC	MC	P	R	B	Not Strong
Parents	168	12.5	19.6	23.8	0.0	4.2	39.9
Mothers	90	11.1	23.3	22.2	0.0	2.2	41.2
Fathers	77	14.1	15.3	25.7	0.0	6.5	38.4
Students	186	29.0	11.3	12.4	0.0	4.8	42.5
Daughters	131	26.0	12.2	11.5	0.0	3.1	47.2
Sons	55	36.1	9.2	14.5	0.0	8.9	31.3

Mothers use MC and P more often than the fathers (and SC, B and R less often). However, the differences are not significant.¹² Among the students, females also use MC and P slightly more often than the males while they less often use SC and B; but again these differences are not significant.¹³

Note that 68% of the parental decisions favor the rules MC and PLU, while 45.2% of the students' decisions are for SC. This result indicates an important overall difference between the parents and students in the way they seek a social outcome. The majority of parents consider the higher ranks in a profile whereas almost half of the students focus on the bottom rank.

In Table 2 intergenerational transmission (direct vertical socialization) is not immediately apparent, since the preferred rules are different for parents and students on average. The preferences of the students for the SC rule, 45.2% of all choices, could be the result of the influence of peers or social imitation (oblique and horizontal socialization).¹⁴ However, as presented in the next sections, a closer look uncovers vertical transmission of democratic values.

Let us now narrow our focus to the subjects whose choices are the same for all the profiles in their menus (subjects with strong preferences). In Table 3 we see the frequency of a rule being chosen consistently in the three profiles in a subject's menu. For each rule, we define a dummy variable *strong* that takes value 1 if the subject chooses a given rule in all three profiles in the menu and 0 otherwise. Fig. 4 shows the percentage of subjects who strongly favor each rule. The detailed results by gender are given in Table 3.

We find that approximately 60% of the parents and 57% of the students exhibit strong preferences for a rule (last column of Table 3).

¹² For SC, $t = 0.89$ and $p - value = 0.37$; for MC $t = -0.92$ and $p - value = 0.36$; for P, $t = -0.75$ and $p - value = 0.46$; for R, $t = 0.49$ and $p - value = 0.62$; finally, for B, $t = 1.50$ and $p - value = 0.13$.

¹³ For SC, $t = 0.44$ and $p - value = 0.66$; for MC, $t = -1.26$ and $p - value = 0.21$; for P, $t = -0.11$ and $p - value = 0.91$; for R, $t = -0.93$ and $p - value = 0.35$; finally, for B, $t = 1.57$ and $p - value = 0.12$.

¹⁴ See Bisin and Verdier (2011).

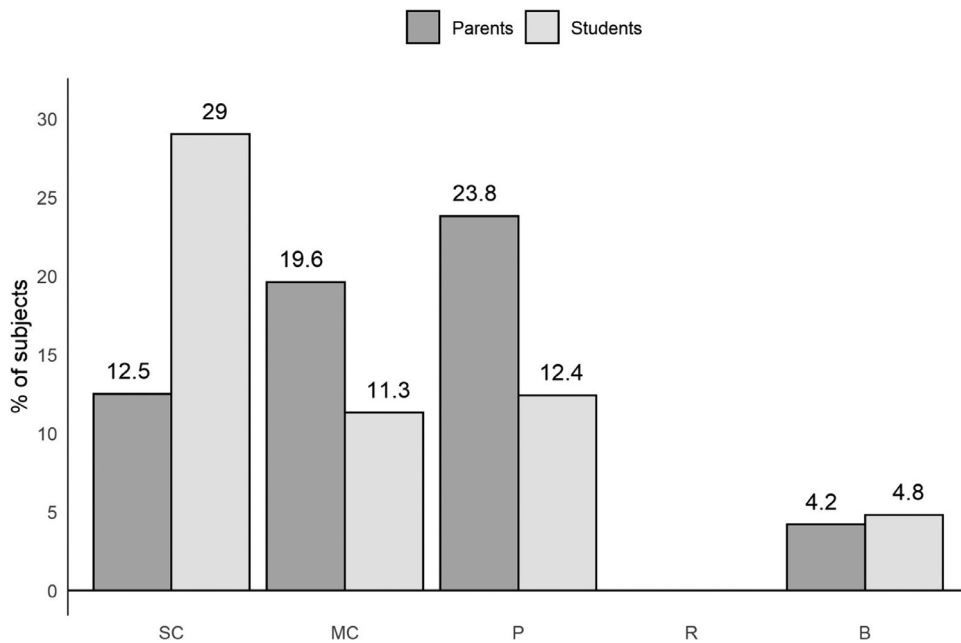


Fig. 4. Strong preferences: parents and students.

Taking into account that the subjects' task was by no means simple and required thinking over, the high percentage of strong preferences is an indication that most subjects were using a similar reasoning in each choice, and a reasoning that was consistent with a given rule. Note that using different rules in different profiles is not irrational; intuitive reasoning at each of the choices could lead to a different aggregation of individual preferences to reach the chosen alternative at each profile.

Given strong preferences, Fig. 4 shows that the parents prefer the rules (MC or P), while their offspring favour SC. In fact, 29% of all students show strong preferences for SC. The support for SC is as high as 50.4% among the students with strong preferences.

4. Results

We use a discrete choice model (McFadden, 1974) to analyse the parental transmission of democratic values. To do so, we look at the relationship between the parental use of the rule and the child's use, controlling for several characteristics which may affect the students' choice of rule.

For each student subject we observe her choice of alternative at profiles $t = 1, 2, 3$ and the parent's choice for the same profiles. The discrete choice model let us estimate the probability that a student subject chooses a given alternative in profile t as a function of two types of independent variables:

- i *Individual* specific variables. The choice may be affected by student characteristics such as gender, number of siblings, etc.
- ii *Alternative* specific variables (parental transmission), which may vary across individuals and alternatives. In our case, the alternative specific variable is a dummy variable indicating whether the same alternative was chosen in profile t by the parent or not.

Thus, we estimate the equation:

$P_{iat} = \alpha_a + \beta X_{iat} + \delta_a Z_i$, where P_{iat} is the probability that subject i chooses alternative a in profile t . X_{iat} is the alternative-specific variable (whether or not i 's parent chose the rule a in profile t); Z_i are student i 's characteristics; note that the effect of student's characteristics δ_a , as well as α_a , may be different for different rules.

The coefficient of interest is β . Our hypothesis is that there is transmission of democratic values from parents to children so that β will be positive and significant.

Table 4 shows the results of the model, following the specification defined above. Observe that we use SC as base category.

As shown in Table 4, the coefficient of the parental choice X_{iat} (the odds ratio), is significant and shows there is a positive effect of transmission over all rules combined. The odds of any student choosing a given rule a is 1.45 times larger if the parent chooses the same rule ($p = .02$). Hence, our data support the hypothesis of transmission of democratic values from parents to children.

Table 4
Panel data mixed logit model (odds ratio).

X_{iat}	1.446** (0.020)			
	B	MC	P	R
Female	0.915 (0.924)	1.706 (0.208)	1.060 (0.900)	1.264 (0.735)
Mother	1.25 (0.832)	1.051 (0.891)	1.149 (0.723)	0.276** (0.041)
Education	0.404 (0.179)	0.748 (0.315)	0.722 (0.333)	0.530* (0.058)
Siblings	0.935 (0.882)	1.292 (0.272)	0.995 (0.986)	0.781 (0.542)
Boarding	2.475 (0.494)	0.117** (0.039)	1.358 (0.713)	0.000*** (0.000)
Scholarship	1.010 (0.329)	0.998 (0.693)	1.003 (0.483)	1.006 (0.462)
Goodschool	1.958 (0.303)	0.776 (0.503)	0.368** (0.021)	0.597 (0.390)
Year	1.479 (0.610)	0.850 (0.636)	0.412** (0.041)	0.451 (0.144)
Constant	1.097 (0.976)	0.958 (0.974)	2.568 (0.541)	2.508 (0.495)
Observations	2.275			
Wald $\chi^2(33)$	1711.78		Prob > χ^2	0.0000

Notes: We use SC as base category. Standard errors adjusted for 152 clusters in subject (robust p-values in parentheses): *** $p < .01$, ** $p < .05$, * $p < .1$.

The coefficients of the subjects' characteristics, Z_i , are presented as relative risk ratios and are for the most part not significant. Notably, there is no gender effect on the probability of choosing any rule. Students coming from boarding schools are more likely to choose MC while those from high academic level schools seem to be more prone to choose P.

To study in more detail the effect of parental choices on students choices we look at marginal effects. In Fig. 5, we show graphically the positive impact on the probability that a student chooses a given rule of the fact that the parent has chosen the same rule. At the top of the figure we show the probability and the 95% confidence interval; at the bottom of the figure, the corresponding effects for the remaining rules (always negative). Table A1 shows all the marginal effects.

The largest effect of parental choice is for the rule Social Compromise (SC), with an increase in the probability for the student of 0.087 when the parent chooses the same rule versus when the parent does not. This increase in the probability of choosing SC comes mainly at the expense of a lower probability of choosing Plurality (P, -0.033) and Majoritarian Compromise (MC, -0.041). The remaining effects are almost zero.

The effect of transmission for the rules MC and P is also substantial, with an increase in the students' probability of choosing the rule of 0.069 and 0.061, respectively, when the parent chooses the same rule versus when the parent does not. In the case of MC this is at the expense of a decrease in the probability of SC (-0.041) and P (-0.021), and for Plurality at the expense of a decrease in the probability of SC (-0.034) and MC (-0.021).

For the other two rules, Borda and Run-off, the effect of parental choice is lower, with increases in the probabilities of 0.019 and 0.013, respectively. Observe that for these two rules, the 95% confidence interval includes the zero.

Our analysis points to transmission by showing a correlation between the rule chosen by the parent and child of the same family. The question may arise as to whether we would observe also a positive relationship between the choices of parents and children not in the same family, reflecting perhaps a transmission from the social environment. We ran a placebo trial randomly shuffling parents so that they were no longer matched with their own offspring but with other children. We repeated the procedure ten times and in none of the regressions the parental choice turned out to be significant at 5% ($p=0.096$). Table A3 in Appendix D shows one of the placebo panel data mixed logit regressions.

5. Discussion

The relevance of intergenerational transmission stems from the effect of long-term dynamics of political preferences on the configuration of political processes and institutions. High rates of transmission will tend to be associated to more stable political decision rules. On the other extreme, if there is a discrepancy between a generation's values and their parents', the inherited political institutions –that aggregate preferences to produce social decisions– will not fit preferences and, consequently, a change is more likely to emerge.

In this paper, we focus on the parental transmission of democratic values. As proxy for democratic values, we employ the preferences regarding a set of anonymous and neutral social choice rules. Like the well-known rules of our focus (namely, Plurality, Plurality with Runoff, Majoritarian Compromise, Social Compromise and Borda rule) that treat each voter and alternative equally, facilitated by our abstract setting, our subjects are left with no built-in reason to find any voter or

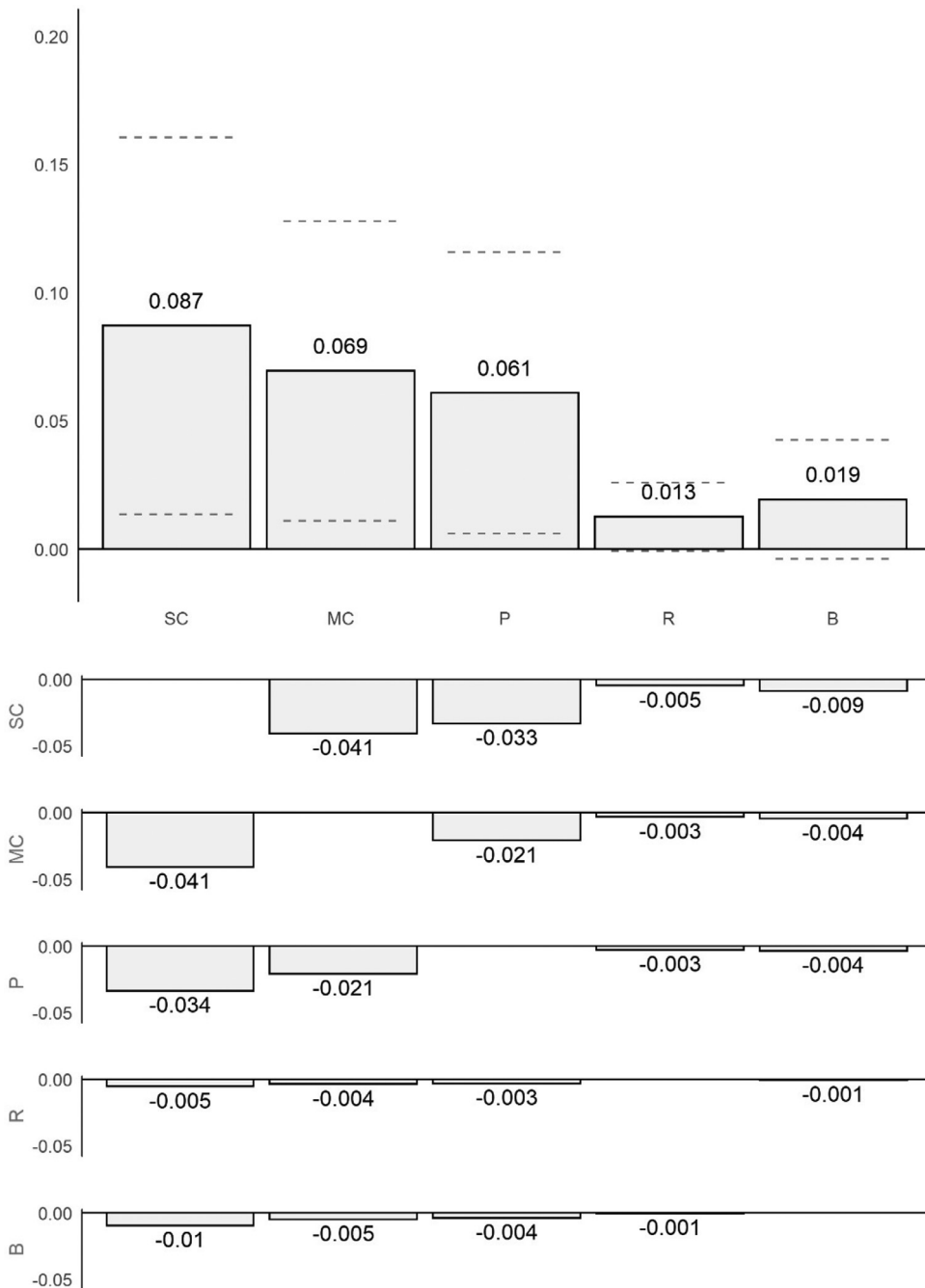


Fig. 5. Panel data mixed logit model: Marginal Effects.

candidate more appealing than another. That is, preferences for non-democratic rules (such as dictatorship) are not defined in our framework. Hence, investigating a transmission of non-democratic values and/or contrasting it with the transmission of democratic values are beyond the scope of this paper.

In most of the experimental studies focusing on parental transmission, selection of parents is based on their availability (Houser et al., 2016; Hays and Carver, 2014). In our work, a selection may exist as well because we do not observe both parents and the parent that we observe might not be random (e.g., it may be the one "closer" to the student or the one who is more of an "authority figure"). Thus, our results on transmission should be interpreted taking into consideration this selection issue and more generally the characteristics of the sample. Yet, our results on transmission in this purely abstract setting are thought-provoking.

Our results show that the overall support by parents and students for B and R is significantly less than their support for SC, MC and P. It should be noted that B and R are the rules that require careful consideration of the entire profile while, in our profiles, SC, MC and P focus only on the bottom-rank, the first two ranks and the top rank, respectively. This result might be due to the less cognitive cost that SC, MC and P require. However, among these rules, approximately 75% of the parents prefer MC and P which consider the higher ranks in a profile while almost half of the students prefer SC which considers the bottom rank.

We find support for the hypothesis of parental transmission of democratic values. Considering all rules, a subject is more likely to use a rule at a given profile when the parent also uses that rule at the same profile. We also look at the marginal effects for each rule. The social choice rule with the strongest effect is SC, when the parent chooses this rule the probability that the child also uses it increases by 0.09. The marginal effects are 0.07 and 0.06 for MC and P, respectively. Marginal effects for B and R are negligible. Note that the marginal effects are never negative. We did not find any evidence that the parental use of a rule makes it less likely that the offspring uses the same rule.

Finally, we do not find any gender effects. Both the gender of the parent and the student subject's seem to be irrelevant for vertical transmission.

Our main contribution is to show that democratic values that are not salient, but implicit in decisions on how to aggregate preferences, are also transmitted from parents to children. Previous literature on political transmission has found evidence of vertical transmission on more explicit questions (civil rights, union membership, religious preferences, ...), but our focus is on more basic principles, much less salient, and therefore, more difficult to transmit. Our results indicate that at this "deeper" level, there is intergenerational transmission of democratic values.

Voting is not an activity that people undertake frequently. We can easily assume that most people vote only in the general and local political elections at which the rule is given. To our knowledge, it is not a general practice to ask people which rule they prefer to be used. Hence, we do not expect parents to explicitly talk with their offspring on what type of voting rule should be employed to extract public will out of individual preferences. Therefore, unlike in many domains of parental transmission, explicit parental role-modelling or a conscious process is not likely to exist in this context. The underlying channels for the parental transmission of deep democratic values require further research; for instance, the cognitive and affective channels besides other indirect mechanisms. A potentially fruitful direction of further research is to investigate whether transmitted fairness values in a domain (e.g., sharing a pie), which are mostly based on explicit role modelling have reflections on fairness values in another domain (e.g., aggregating individual preferences into a public will), which do not appear to be transmitted via a deliberate process.

Declaration of Competing Interest

On behalf of all authors of the paper, the corresponding author, Prof. Maria Paz Espinosa, confirms that there is no conflict of interest, financial and/or non-financial, in relation to the work described.

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Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.jebo.2022.06.036](https://doi.org/10.1016/j.jebo.2022.06.036)

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