Persistent Inequalities: The Origins of Intergenerational Associations in Voter Turnout

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Abstract

We use population-wide Swedish data with information on adopted childrens biological and adoptive parents to assess the importance of pre-birth factors (above all, genes) and post-birth socialzation factors for generating intergenerational associations in voter turnout. We find that both pre-birth and post-birth factors explain the parent-child link in turnout behavior. More importantly, we show that the conditions that strengthen the social pathways to intergenerational transmission - such as young age and parental turnout consistency - at the same time weaken the biological mechanisms, and vice versa. Follow-up analyses on US and UK samples suggest that these results are externally valid. Our findings are important for understanding how political inequality is reproduced across generations.

Keywords: voter turnout, intergenerational transmission, pre-birth factors, post-birth factors, Sweden

1 Introduction

Understanding how political inequality is reproduced across generations is of paramount interest to scholars of political behavior. As pointed out by Verba et al. (2003, 45) intergenerational transmission in political inequality constitutes "a double infringement: transgressing not only the principle of equality of opportunity but also the principle of equality of outcome among citizens." Against this backdrop the overarching aim in this study is to shed new light on the mechanisms driving parent-child concordance in political participation.

The current state of knowledge on this important question is less than satisfactory. Previous research on voter turnout provides a telling example. On the one hand, studies within the field of political socialization have demonstrated *i*) that there is a moderate to strong intergenerational association in turnout propensities, *ii*) that this relationship is independent of the parent-child link in educational attainment, and *iii*) that the strength of the transmission is dependent on the age of the child and on whether the child lives with his/her parents (Verba et al., 1995; Andolina et al., 2003; Bhatti and Hansen, 2012; Gidengil et al., 2016). Overall, this evidence seems to suggest that the intergenerational transmission in turnout behavior to a large part can be accounted for by social learning mechanisms such as cue giving, imitation and reinforcement processes.

On the other hand, recent studies using methods from the field of behavior genetics have shown that genetic factors account for a moderate to large share of variation in political variables including participation and voter turnout (Alford et al., 2005; Fowler et al., 2008; Hatemi and McDermott, 2012; Hatemi et al., 2014; Klemmensen et al., 2012; Dawes et al., 2014; Oskarsson et al., 2015). Moreover, these studies suggest that the fraction of variation accounted for by shared or family environment is rarely statistically distinguishable from zero and is often estimated to be exactly zero. These results have led to calls for investigating the possible role of genes and other pre-birth factors in generating parent-child resemblance in political traits (Alford et al., 2005; Fowler et al., 2008).

Cesarini et al. (2014) is so far the only study to have heeded this call. Based on a sample of Swedish adoptees and their parents linked to validated turnout data Cesarini et al. (2014) were able to decompose the parent-child association in voter turnout into a social and a biological path and found that both mechanisms account for the parent-child resemblance in turnout. Thus, the results that they report seem to strike a chord between the contradictory findings from the politcal socialization and behavior genetics approaches.

Although valuable, this previous research cannot provide more than a first step in increasing our understanding on how political inequality, and especially turnout inequality is transmitted across generations. What the previous studies tell us, in short, is that there is a positive parent-child link in turnout propensities and that this link is probably explained by both genetic and social factors. However, they cannot help us to unravel the relative importance of social and biological transmission and under which conditions we should expect the social and biological paths to intergenerational transmission to be either hampered or reinforced. Answering such questions could provide important clues as to how persistent political inequalities could be counteracted, a discussion we return to in the conclusion.

In this paper we use population-wide register data from Sweden, including validated turnout information from five national elections held between 1970 and 2010, to address these issues. We use our data to construct three large samples of parent-child pairs. The first one includes parent-child pairs in which the children were raised by their biological parents (N≈11,000,000) and is used for estimating very precise overall intergenerational transmission rates in turnout propensities under different conditions. The second sample consists of all native adoptees aged 18-50 at each of the four latter elections paired with their adoptive and biological parents (N≈34,000). We use this sample to decompose the overall transmission into pre-birth or biological factors, measured by biological parents voting, and post-birth or social factors, measured by adoptive parents' voting. The last sample consists of foreign adoptees and their (Swedish) adoptive parents (N≈52,000) and it enables us to corroborate the results based on the native adoptee sample. Finally, we use a number of parent-child samples from different countries, among others a sample of foreign adoptees and their adoptive parents from the Minnesota Center for Twin and Family Research (MCTFR), to verify the external validity of our results.

To preview our results, we report an overall transmission rate equal to 0.26. That is, the probability of voting in an election increases by 26 percentage points if one's parents voted in earlier elections. The strength of this parent-child association varies substantially depending on the age of the child, whether the child was still living with his/her parents and the consistency of the parental behavior. Under the most favorable conditions (individuals aged 18 residing with their parents and whose parents are either consistent voters or non-voters) the transmission coefficient increases to almost 0.45. This can be contrasted to a transmission rate less than 0.10 for individuals in their fifties who received less consistent turnout cues from their parents.

Furthermore, our decomposition estimates suggest that the overall intergenerational association in voter turnout is both social and biological in nature. However, the relative importance of the biological and social transmission pathways differ quite drastically depending on the individuals' age and living conditions and the consistency in parental cue giving. In essence, the social and biological pathways behave like communicating vessels such that the conditions that amplify the social transmission at the same time weaken the biological mechanisms, and vice versa. Thus, in certain situations the intergenerational association in voter turnout is almost fully accounted for by social factors whereas under other circumstances biological factors are more decisive for the transmission of political inequality across generations.

2 Social and Biological Transmission Pathways

Why should we expect parent-child concordance in turnout behavior? The departure point for our expectations are guided by the social learning theory that has characterized the bulk of previous studies on the intergenerational transmission of political attitudes (Jennings and Niemi, 1968; Tedin, 1974; Beck and Jennings, 1991; Westholm, 1999; Jennings et al., 2009). Social learning theory argues that "most human behavior is learned observationally through modeling: from observing others one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action" (Bandura, 1977, 22). More specifically, we posit that children may model parental turnout behavior on the basis of, on the one hand, cue giving and imitation, and, on the other, reinforcement processes. Thus, a child may be influenced by seeing his or her parents exercising their right to vote. Moreover, parents may strengthen their children's sense of civic duty by actively teaching them about the importance of voting in elections.

An important implication of the social learning theory is that we should see higher rates of transmission under certain more favorable circumstances. Above all, the learning mechanisms, especially those emanating from observational learning, will be more effective if parent behavior remains consistent rather than inconsistent while the child is growing up (Bandura, 1977). Consequently, in line with previous studies on the intergenerational transmission in political values and orientations we expect children to be more likley to take on the turnout behavior of their parents the more consistent are the parental behavioral cues in terms of voting or non-voting (Jennings et al., 2009). Variations in parental consistency are important in at least two respects. First, variations in consistency reflect the degree of importance the parent attaches to politics in general and to voting in elections in particular. Second, the manifestation of behavioral guidelines and practices increases if the parental cues are more consistent. Regularily observing a parent going to vote or accompanying the parent to the polling booth provides a stronger lesson for the child in terms of the practicalities and importance of voting.

Two additional and related propositions derived from social learning theory are that the transmission success should be related to the age at which the child exposes the behavior in focus and whether the child has left the parental home (Jennings et al., 2009; Bhatti and Hansen, 2012). We should expect the highest concordance in parent-child turnout behavior when the children are young and still living with their parents. The influence of parents on their offspring should subsequently drop as the children leave home and are more exposed to a wider circle of potential socializers such as peers, partners and co-workers. However, even if the children live with their parents for an extended period of time during adulthood, parental influence on turnout decisions should decrease as their social networks outside the immediate family are likely to expand when they move on to higher education or into the workforce (Gidengil et al., 2016). This is also the pattern reported in Bhatti and Hansen (2012) in which the intergenerational transmission in turnout behavior decreases sharply during early adulthood and then continue to dwindle as the children grow older.

However, parent-child agreement in turnout behavior is not, itself, evidence that social learning processes are operating. For one thing, the social or modeling pathway may be confounded by other social transmission processes. One such potential confounder is intergenerational transmission in socioeconomic status, especially educational attainment (Verba et al., 2005; Gidengil et al., 2016). According to this line of thought, education is the main impetus for the transmission of political engagement between generations. First of all, well-educated parents may provide a rearing environment that is more conducive to the development of political skills and interests. Second, well-educated parents tend to have well-educated children who, for this reason, are more politically active. In the empirical analyses we take this into account and show that the parent-child turnout link remains strong also when controlling for parental and child educational attainment.

More importantly for our purposes, though, is that correlations between biological relatives are etiologically ambiguous because parents transmit both a rearing environment and a set of genes to their children. A by now voluminous literature in political science uses comparisons of mono- and dizygotic twins and shows that monozygotic twins exhibit greater similarity or concordance on a wide range of attitudes and behaviors (Alford et al., 2005; Oskarsson et al., 2012; Hatemi and McDermott, 2012; Hatemi et al., 2014; Oskarsson et al., 2015), including political participation and voter turnout (Dawes et al., 2014; Fowler et al., 2008; Klemmensen et al., 2012). There is a heterogeneous set of complicated pathways through which genetic variation could ultimately impact political attitudes and behavior. A common hypothesis in the field is that any genetic effects on complex political outcomes will be mediated by basic psychological mechanisms such as personality traits and cognitive abilities (Mondak et al., 2010; Dawes et al., 2014; Oskarsson et al., 2015).

A provocative finding emerging from these studies is that the amount of variance explained by shared environmental factors is often statistically indistinguishable from zero, a claim often reiterated in individual difference psychology (Turkheimer, 2000; Polderman et al., 2015). These results raise the possibility that the intergenerational associations in political participation (and, for that matter, attitudes, issue opinions, and vote choice) reported in earlier socialization research are mostly accounted for by a factor, the genetic endowment, which has been largely ignored in the literature on intergenerational transmission.[1] These strong claims are, however, partly refuted by Cesarini et al. (2014). Using a sample of Swedish adoptees and their biological and adoptive parents, Cesarini et al. (2014) show that the intergenerational association in voter turnout can be decomposed into both a genetic and a social pathway.

Nevertheless, our understanding of the relative importance of how genetic and biological factors and social learning mechanisms jointly give rise to the reproduction in political inequality is still very limited. First, the estimates presented in Cesarini et al. (2014) are quite imprecise, especially so concerning the post-birth effects as captured by the adoptive parents' turnout. Thus, based on previous studies we cannot with any certainty tell whether the biological or the social pathway on average is the most potent driver of the intergenerational transmission in turnout behavior.

Second, we should expect any genetic or biological factors to interact with social and environmental conditions in influencing complex human traits such as individuals' inclinatation to vote in elections (Mondak et al., 2010; Conley and Rauscher, 2013; Spinath and Bleidorn, 2017). More precisely, we argue that the same conditions and circumstances that dampen or amplify social learning processes will also influence the genetic transmission in voter turnout but in an opposite fashion. Consequently, we expect genetic

[1]See Merelman (1971) for an early call to investigate genetic factors contributing to the intergenerational transmission in political traits.

and biological effects to be weaker among younger voters, individuals living with their parents, and children whose rearing parents' turnout behavior is more consistent.

This claim is partly supported by studies on life course patterns of genetic and environmental influences. A consistent finding in this research is that the genetic and environmental contributions to different social traits vary substantially across individuals' age. For instance, Eaves et al. (2008) show that environmental factors that are shared between siblings in a twin pair (among other things parental influences) accounted for the vast majority of variance in children's and adolescents' religious practices and church attendance, but decreased in importance during late adolescence and young adulthood. In parallel to this, genetic influences on religious attitudes and behavior increased over the same period. Hatemi et al. (2009) report a very similar pattern of results for political attitudes.

To summarize, the combined insights from previous research in both political socialization and behavior genetics lead to a number of testable hypotheses concerning the intergenerational transmission in voter turnout. First, at the most basic level we expect a sizeable intergenerational transmission rate in turnout behavior. Second, we expect the mechanisms accounting for the overall transmission in voter turnout between parents and children to be both social and biological or genetic in nature. Third, the overall transmission rate as well as the strength of its social and biological components should be related to child age, the living arrangements of the children, and the consistency in parental tunout behavior. More precisely, we expect the social transmission from parents to children to be stronger among young voters who has not yet left their childhood home and whose parents are consistent in their (non)turnout behavior. The same conditions should instead dampen any biological transmission from parents to offspring. That is, we expect social learning processes and genetically influenced predispositions to be substitutes in the production of turnout behavior.

3 Empirical Framework

Our departure point is a simple model in which we regress voter turnout (y) of a (own-birth) child (oc) born into family i on the turnout of his/her parents (bc) in a large sample of non-adopted children and their parents, in order to obtain an estimate of the overall transmission in turnout propensities:

$$y_i^{oc} = \beta_0 + \beta_1 y_i^{bp} + \epsilon_i^{oc} \tag{1}$$

Previous research has documented a moderate to strong intergenerational association in both political participation in general and turnout in particular. In line with this, we expect β_1 to be positive and rather large in magnitude.

However, the main focus in this study is to unpack this intergenerational association in voter turnout. More precisely, we have two aims with this part of the analysis. First, we will decompose the parent-child correlation into two broad mechanisms: pre-birth factors (including genetic endowments and, in case of maternal transmission, the quality of the uterine environment) and post-birth factors (all environmental effects that occur after birth) (Björklund et al., 2006). This is the same question investigated in Cesarini et al. (2014). Our contribution here lies in the fact that we use much larger samples and therefore can provide more precise estimates of the relative importance of pre- and post-birth effects. As discussed below we also use data from two different adoption samples to further strengthen our results. Second, and more importantly, we will investigate how several factors condition the relative strength of the pre- and post-birth effects on voter turnout.

To address these questions we will make use of a sample of native adoptees (children born in Sweden and given up for adoption) and their biological and adoptive parents and estimate different versions of the following linear regression model:

$$y_j^{ac} = \alpha_0 + \alpha_1 y_i^{bp} + \alpha_2 y_j^{ap} + \epsilon_j^{ac}, \tag{2}$$

where superscripts ac and ap denote adopted child and adoptive parent, respectively, and the subscripts show that the child was born into family i but reared in family j.

Thus, we use biological parent turnout to estimate the pre-birth effect (α_1) whereas the adoptive parent turnout captures the post-birth effect (α_2). Under the assumption that the pre- and post-birth factors enter additively and linearly, this model can be used to shed some more light on the structural interpretation of the parent-child association estimated using equation 1. Most importantly, for non-adopted children who were raised by their biological parents, we have that $y_i^{bp} = y_j^{ap}$. That is, for ownbirth children and their parents equation 2 collapses into equation 1 with the restriction that $\alpha_1 + \alpha_2 = \beta_1$. Since our native adoption sample include information on both sets of parents we can directly test this restriction.

We will also make use of a third sample of foreign adopted children and their adoptive parents to indrectly infer the value of α_1 as the difference between β_1 from equation 1 and α_2 from equation 2. We will combine this sample with the sample of non-adoptees and their parents and estimate the following regression model:

$$y_j^c = \gamma_0 + \gamma_1 O_j^c + \gamma_2 y_j^p + \gamma_3 O_j^c \times y_j^p + \epsilon_j^c, \qquad (3)$$

where superscripts c and p denote child and parent, and O_j^c is a dummy indicator taking the value 1 for children who were raised by their biological parents (that is, non-adoptees). In this framework γ_2 is a direct estimate of the post-birth effect whereas γ_3 is an indirect estimate of the pre-birth effect.[2]

Two assumptions are required in order to interpret the α_1 and α_2/γ_2 parameters as measures of pre- and post-birth effects. The first is about the timing of adoption: adopted children are assumed to be assigned to their rearing parents at birth. This is of course not

[2] We will include a full set of interaction terms between the control variables and the dummy indciator for being a non-adoptee when estimating equation 3. In effect this means that γ_2 from equation 3 will be equal to an estimate of α_2 from equation 2 based on the sample of foreign adoptees and their adoptive parents. Moreover, γ_3 will be equal to the difference between β_1 from equation 1 and α_2 from equation 2.

strictly true, but it suffices to assume that the environment to which the child is assigned between birth and adoption does not differ appreciably from the family environment the child would have been in had he or she been adopted at birth. The second assumption is that there is no selective placement. Since our data includes information about both biological and rearing parents we can directly test for non-random placement among the native adoptees.

In addition, to further generalize our estimates of the relative importance of pre- and post-birth effects beyond our sample of adopted children two additional assumptions are necessary. First, the three sets of parents (adoptive parents, biological parents to children given up for adoption, and parents with ownbirth children) should be randomly drawn from the same distribution of parents. More concretely this assumption implies that ownbirth and adopted children should not have systematically different pre-birth characteristics nor should they face systematically different post-birth environments. Second, adoptive parents are assumed not to treat their children differently than ownbirth children just because they were adopted.

Previous overviews and evaluations of the Swedish adoption system provide a first check of the plausibility of these identifying assumptions. Several important conclusions related to the the assumptions underlying our empirical framework follow from these studies. First, a majority of both native and foreign adoptees were placed with their adoptive parents at very young age, most often before turning two (Bohman, 1970; Nordlöf, 2001; Rooth, 2002). Second, the original guidelines instructed social workers in charge of the native adoptions to try to match children to adoptive parents with similar cognitive and physical characteristics as the biological parents (Allmänna Barnhuset, 1955). These recommendations were removed from an updated version of the guidelines (Allmänna Barnhuset, 1955). However, Oskarsson et al. (2018) report modest positive correlations in education between adoptive and biological parents to adopted children, suggesting that some selective placement persisted. Third, there are some systematic differences between the three sets of parents. Above all, adoptive parents tend to be somewhat older, better educated, and more likely to be employed in the white collar sector compared to compared to the (native) adoptees' birth parents. The characteristics of parents to ownbirth children lie in between those of adoptive parents and parents who gave up at least one child for adoption (Bohman, 1970; Nordlöf, 2001; Rooth, 2002). Finally, evaluations report slightly higher levels of parent-child communication problems among families with foreign adoptees (Berg-Kelly and Eriksson, 1997; Carlberg and Nordin Jareno, 1991).

The conclusions from these evaluations of the Swedish adoption system inform the set of sensitivity checks that we present in the result section. As we will see the rather minor deviations from the ideal conditions do not seem to affect the substantive findings.

4 Data and Descriptives

Our dataset is constructed by merging data from several administrative sources, most importantly the Swedish Multi-Generation Register, and turnout information from a number of elections. The Multi-Generation Register includes all Swedes born in 1932 or later who were domiciled in Sweden at some point after 1961. It contains detailed pedigree data which can be used to trace the biological relatedness of any two people, including information on biological parents and, when applicable, adoptive parents. We use the Multi-Generation Register to construct three distinct samples: a sample of non-adopted children and their parents; a sample of native adoptees and their biological and adoptive parents; and a sample of foreign adoptees and their adoptive parents.

In the next step we add information on voter turnout to the three samples. Thanks to a recent effort to scan and digitize election roles we have access to near complete information on individual-level turnout in five elections held between 1970 and 2010: the national elections in 1970, 1982[3], 1994 and 2010 and the European Union referendum in

[3]The data for this election were collected, and generously shared with us, by Magnus Carlsson and Dan-Olof Rooth.

1994.[4]

We impose a number of restrictions on all three samples. First, in order to avoid biased transmission estimates due to election-specific effects influencing both parents and children in the same fashion we will measure child turnout in the four elections between 1982 and 2010 whereas parental turnout is measured as average turnout across the four elections between 1970 and 1994 preceding the election in focus. Moreover, we only retain child-parent pairs for which we have information on parental turnout from at least three of the five available elections.

Second, we focus on children aged 18 to 50 at the time of each election. The reason for this is twofold. First, the individuals enter the dataset once they reach the voting eligibililty age – 18 years. Second, since the Multi-Generation Register only includes individuals born 1932 or later the oldest children in the sample were 50 years of age at the first election in which we measure child turnout in 1982. Consequently, for each of the four elections we include individuals who were between age 18 and 50 at the time of the election, implying that the children in our three samples are born between 1932 and 1992.[5]

Third, the two adoption samples are restricted to children who were adopted by two parents. Moreover, the native adoption sample is constructed such that *i*) at least one biological parent is identified and *ii*) the children were not adopted by a grandparent. After imposing these restrictions, the final samples consist of 4,761,705 non-adopted children and their parents (10,622,880 observations), 11,952 native adoptees (34,388 observations),

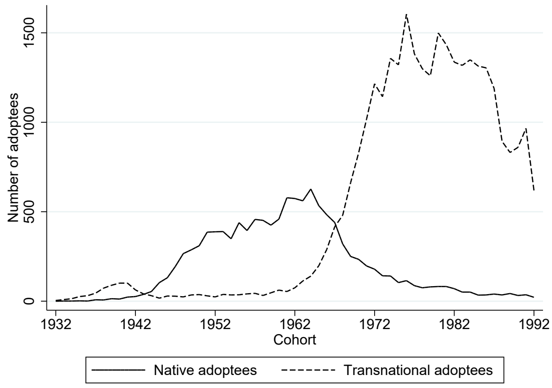
[4]The individual-level voter turnout data resulting from this undertaking is unique both in terms of number of observations and data accuracy. Lindgren et al. (2019) provide a detailed description of the procedures used to scan and digitize these election rolls. Extensive quality checks suggest that the digitized information on electoral participation conforms with actual voting behavior in at least 99.7% of the cases.

[5]The average ownbirth child appears 2.2 times in our dataset. The corresponding number for native and foreign adoptees are 2.9 and 1.7. These differences reflect the fact that the native/foreign adoptees are slightly older/younger than the individuals in the ownbirth sample and therefore enter the dataset earlier/later.

and 30,954 foreign adoptees (51,887 observations).

Figure 1 displays the number of adoptees per birth cohort in the two adoption samples. The number of native adoptions started to increase in the 1940's, primarily reflecting an increase in the overall fertility rate in Sweden (Lindahl et al., 2016). The decrease in native adoptions from the 1960's and onwards was offset by a large increase in foreign adoptions.

Figure 1: Adoption samples



Note: Native and foreign adoptees by year of birth of the adoptees.

Apart from voter turnout information we matched the children and parents in the three samples to administrative registers with information regarding educational attainment and some additional demographic and socioeconomic characteristics.[6] Table 1 reports summary statistics separately for the children and parents in the ownbirth (upper panel), native adoption (mid panel), and foreign adoption (lower panel) samples.

A number of important patterns stand out. Regarding the distributions of adoptees across birth cohorts displayed in Figure 1 we can see that native adoptees are older than foreign adoptees whereas the average age of the sample of ownbirth children fall in between. Moreover, there is a tendency for the adopted children to be slightly worse off in terms of educational attainment and average voter turnout compared to children

[6]See the Appendix for additional details on these registers and variables.

Table 1: Summary Statistics

	Birth year	Age at Birth	Schooling	Turnout
Ownbirth Sample				
(1) Children	1966.1	–	0.1	0.866
	[4,761,705]	–	[4,718,814]	[4,761,705]
(2) Mothers	1939.4	27.3	0.1	0.908
	[2,218,321]	[2,218,321]	[2,106,732]	[2,184,199]
(3) Fathers	1936.8	30.4	0.0	0.897
	[2,159,401]	[2,159,401]	[1,958,693]	[2,070,570]
Native adoption Sample				
(4) Children	1961.3	–	-0.3	0.839
	[11,952]	–	[11,845]	[11,952]
(5) Bio mothers	1937.0	24.3	-1.0	0.760
	[10,782]	[10,782]	[10,048]	[9,984]
(6) Bio fathers	1933.3	28.0	-0.9	0.749
	[11,002]	[11,002]	[9,880]	[10,187]
(7) Adopt mothers	1928.3	32.7	0.4	0.937
	[10,675]	[10,675]	[10,040]	[10,508]
(8) Adopt fathers	1925.6	35.4	0.6	0.949
	[10,680]	[10,680]	[9,498]	[10,210]
Foreign adoption Sample				
(9) Children	1978.1	–	-0.2	0.799
	[30,954]	–	[30,389]	[30,954]
(10) Adopt mothers	1945.0	32.6	1.2	0.943
	[21,928]	[21,928]	[21,528]	[21,710]
(11) Adopt fathers	1942.8	34.8	1.3	0.943
	[21,940]	[21,940]	[21,361]	[21,618]

Note: Means and number of individuals (in brackets) for some key variables. Turnout is measured as average turnout across all the elections for which we have information for the children and parents. Education is measured as the difference from the within birth cohort average in years of schooling.

raised by their biological parents.[7]

[7]To take the positive secular trend in educational levels into account we measure education as the difference from within birth cohort average years of schooling in Table 1. The somewhat lower turnout rate among the foreign adoptees partly reflects that they are younger. When taking age into account, the difference in turnout rate between foreign adoptees and ownbirth children decreases from 0.066 to 0.035.

Turning instead to the parents the main lesson from Table 1 is that adopted children appear to come from less advantaged backgrounds but are placed in families higher up on the socioeconomic ladder. Above all, the adoptive parents are on average better educated, older when their children are born and more likely to vote in the elections compared to both parents of non-adopted children and, especially, the biological parents of the native adoptees. However, despite these differences in means there is substantial overlap in the distributions of parental characteristics.

5 Results

Table 2 reports the transmission coefficients for the sample of ownbirth children (columns 1 and 4), native adoptees (columns 2 and 5), and foreign adoptees (columns 3 and 6). The dependent variable in all regressions is a dummy for having voted in the three national election in 1982, 1994 and 2010 and the referendum for EU membership in 1994. In columns 1 through 3 our explanatory variable is an indicator for the average turnout among both parents in all elections preceding the outcome election in focus.[8] In the last three columns we enter maternal and paternal turnout separately. To account for cohort effects in turnout propensities, all models include fixed effects for child and parental birth years. The models also include controls for child sex and fixed effects for election in focus. Throughout we report estimates from linear probability models.[9]

[8]For instance, we regress child turnout in 2010 on average parental turnout in 1970, 1982, 1994 (national), and 1994 (EU).

[9]We use linear probability models to facilitate comparisons with earlier adoption studies. Moreover, we are interested in testing if the parent-child transmission is conditioned by different factors. As Ai and Norton (2003) show, interaction coefficients are not easy to interpret in non-linear models such as probit and logit. However, as we show in the Appendix, our main findings are very similar if we use a logit model instead.

5.1 Baseline Transmission Estimates

First, consider the intergenerational transmission among ownbirth children in columns 1 and 4. The estimates show that there is a strong parent-child link in turnout propensities. The first model suggests that having parents who always voted is associated with an approximate 26 percentage points increase in casting a vote among the children. The results in model 4 tell us that the turnout behavior of mothers appears to play a somewhat more important role in determining the children's likelihood of voting in the elections. As we will show below the magnitude of these transmission coefficients are well on par with corresponding estimates based on parent-child samples from other countries.

The results from the native adoption sample (columns 2 and 5) suggest that both pre-birth and post-birth factors account for the overall transmission in turnout propensities. According to the estimates, the post-birth effects are on average approximately twice the size of the pre-birth effects. The sum of the pre- and post-birth effects in column 2 is somewhat lower than the overall transmission rate as reported in column 1. However, it should be noted that the 95% confidence interval around this sum (0.217 ± 0.433) includes the point estimate of the rate of transmission in the ownbirth sample (0.257).[10] As expected the results from the native adoption sample in column 5 indicate that the difference in transmission rates between mothers and fathers is accounted for by post-birth factors rather than genetic endowments.[11]

Finally, corroborating the results based on the native adoption sample the estimates in columns 3 and 6 show that the post-birth transmission in the foreign adoption sample is somewhat smaller in magnitude compared to the overall transmission rates in columns

[10] The confidence interval around the sum for maternal transmission based on the estimates in column 5 (0.152 ± 0.043) also include the point estimate of maternal transmission from column 4 (0.154). The max value of the 95% confidence interval around the joint paternal pre- and post-birth effects (0.056 ± 0.044) falls just short of the corresponding transmission coefficent in column 4 (0.106).

[11] The difference in effects between adoptive mother and father turnout is statistically different from zero ($0.085, p = 0.014$). The corresponding difference between the effects of biological mother and father turnout is much smaller (0.011) and not statistically significant ($p = 0.372$).

1 and 4. The indirect estimates of the prebirth effect obtained by applying equation 3 to the combined non-adoptee and foreign adoptee sample are equal to 0.065 ($p < 0.001$, joint parental effect), 0.061 ($p < 0.001$, maternal effect), and 0.026 ($p = 0.077$, paternal effect).[12] In all three cases the 95% confidence intervals around the three coefficients overlap the corresponding pre-birth point estimates based on the native adoptee sample in columns 2 and 5 in Table 2.

However, one should also note that the post-birth effects, expecially the paternal transmission, are stronger in the foreign adoption sample compared to the corresponding estimates in the native adoption sample. A possible explanation for this is the average birth year differences across the parents in the three samples (see Figure 1 and Table 1). In the Appendix (Table A2) we show that the paternal transmission rate is decreasing whereas the mother-child link is, to a lesser degree, increasing in parental age. These results are compatible with two features in Table 2. First, when comparing the estimates based on the somewhat younger foreign adoption sample to those obtained in the older native adoption sample the overall post-birth transmission (0.192 vs. 0.142) and the paternal post-birth effect (0.081 vs. 0.023) are stronger among foreign adoptees. Second, the maternal post-birth coefficient is instead somewhat larger in magnitude in the native adoption sample (0.108 vs. 0.093).

In the Appendix we report a set of robustness checks that corroborate the internal validity of the results displayed in Table 2. Above all, we show that *i*) the pattern of results are very similar when using a logit estimator instead of linear probability models; *ii*) the turnout transmission estimates change only marginally when controlling for potential confounding due to intergenerational transmission in socioeconomic status as measured by parent and child educational attainment; *iii*) the limited number of adoptees that were placed with their adoptive parents after turning one are not likely to bias the pre- and post-birth effects; *iv*) the transmission estimates do not seem to be affected by non-random placement based on observable parental characteristics such as educational attainment and occupational status; and *v*) reweighting the adoption samples in order

[12] The full results from these models are presented in Table A1 in the Appendix.

Table 2: Baseline transmission results

	Non-adoptees	Native adoptees	Foreign adoptees	Non-adoptees	Native adoptees	Foreign adoptees
Bio Parents	0.257***	0.075***	–	–	–	–
	[0.001]	[0.009]	–	–	–	–
Adopt Parents	–	0.142***	0.192***	–	–	–
	–	[0.021]	[0.016]	–	–	–
Bio Mother	–	–	–	0.154***	0.045***	–
	–	–	–	[0.001]	[0.008]	–
Bio Father	–	–	–	0.106***	0.034***	–
	–	–	–	[0.001]	[0.008]	–
Adopt Mother	–	–	–	–	0.108***	0.093***
	–	–	–	–	[0.020]	[0.015]
Adopt Father	–	–	–	–	0.023	0.081***
	–	–	–	–	[0.021]	[0.015]
N	10,116,142	31,493	51,279	9,387,411	25,696	49,912

Note: OLS regression estimates using child turnout in the 1982, 1994 and 2010 national elections and the 1994 EU referendum as outcomes. The sample includes individuals born between 1932 and 1992 and is restricted to individuals aged 18-50 at each election. The standard errors (in brackets) are clustered by rearing mother. Parental turnout is measured as averages across four elections: the national elections in 1970, 1982 and 1994 and the EU referendum in 1994. Only turnout in elections preceding the outcome election are included in the parental turnout measures. All models include controls for child sex, child birth-year dummies, parents birth-year dummies (defined as average age across parents in columns 1-3), and fixed effects for election. ***/**/*, indicates significance at the 1/5/10 percent level.

to make the birth and adoptive parents more similar to the parents of non-adoptees only marginally affects the pre- and postbirth transmission estimates.

5.2 Transmission across Social Conditions

Next we turn to the main focus of this study – the conditional impact of different transmission mechanisms. To reiterate, we argue that the overall parent-child transmission in turnout behavior should be stronger when *i*) the child is younger, *ii*) he/she still resides with the parents, and *iii*) the parents behavior is consistent in terms of always voting or abstaining. Moreover, we expect those same factors to influence the rate of social and biological transmission in different ways: when the post-birth effects are amplified the pre-birth effects should decrease in magnitude.

To test these assertions we have added interaction terms between parental turnout and measures of child age, living arrangements and parental turnout consistency to our baseline transmission regression equations. The results from these models are presented in Figure 2. To save space, we focus on models using the joint parental turnout indicators. Moreover, we only display results for the non-adoptee and the native adoptee samples in Figures 2 and 3. In the Appendix we show that the conditional post-birth effects estimated from the foreign adoptee sample are very similar to the ones obtained using the native adoptee sample.[13]

The estimates in the leftmost bar triplet in each subgraph show transmission estimates under conditions hypothesized to be more favorable to stronger post-birth effects whereas the conditions in the rightmost triplets should be expected to lead to stronger pre-birth effects. Child age is entered linearly. We measure living conditions as an indicator variable equal to one if the child was living with the rearing mother or father at the time of each of the four elections between 1982 and 2010. Our measure of parental consistency is constructed using both parents' turnout behavior across all five elections between 1970 and 2010. We restrict the sample to child-parent pairs for which we have information on parental turnout from at least three of these elections. Consistency (1) is defined as both parents always voting or always abstaining. Inconsistency (0) include all other cases.[14]

The pattern of estimates in Figure 2 is quite clear. First, it is evident that the transmission process is conditioned by child age, living arrangements and parental cues. The overall parent-child link is stronger when the child is younger, resides with the parents and, especially, the parents are consistent voters or abstainers. In the latter case the transmission coefficent decreases from 0.435 to 0.125 when comparing the group of

[13]In the models used to produce the estimates shown in Figure 2 we have also entered interaction terms between all remaining covariates and our measures of child age, living arrangements and parental turnout in order to control for spurious conditional effects. This means that the transmission coefficients presented in Figure 2 are identical to the ones obtained using a split sample design. All estimates on which Figure 2 is based are reported in Table A7 in the Appendix.

[14]It should be noted here that our measure of parental consistencey for some children relies on behavior before the child was born or well after the child left the parents' home. Our assumption here is that the degree of consistency of parental turnout behavior across the elections between 1970 and 2010 is informative about turnout consistency during the child's pre-adult and young adult years for all children (born 1932-1992) in our samples.

children whose parents' turnout behavior is consistent to those whose parents sometimes vote and sometimes refrain. Second, the post-birth estimates follow the same pattern as the overall transmission. Younger age, living with one's parents and parental cue consistency are all factors that enhance the social part of the transmission process.[15] Third, the pre-birth effects are, if anything, suppressed under the same conditions. The genetic and biological part of the transmission is, instead, at its strongest among older children having left the parental home and whose parents are inconsistent in their turnout behavior.[16]

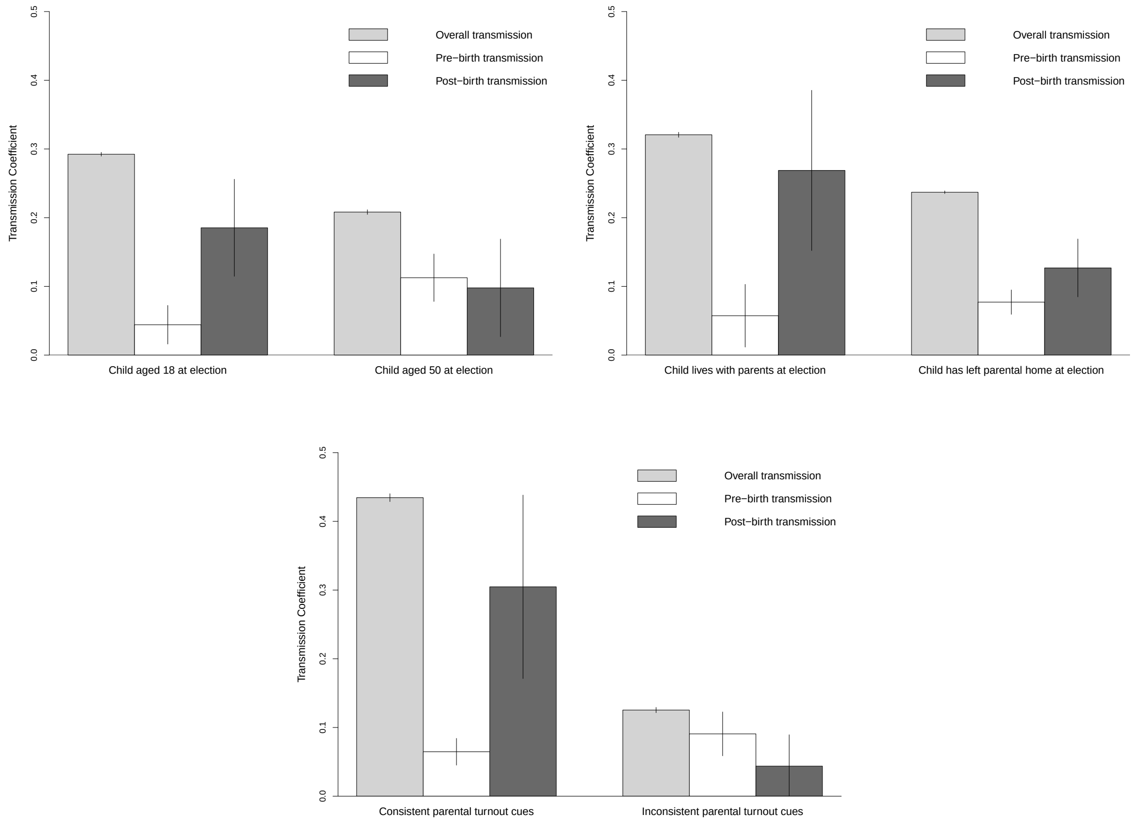
A possible objection against the results displayed in Figure 2 is that the three moderating conditions are correlated. For instance, since the likelihood of residing with one's parent is decreasing with age the interaction effects between parental voting and child age might as well signal the conditioning impact of living arrangements. To control for this we report estimates in Table A8 in the Appendix from models in which we have included interaction terms between, on the one hand, child age at the election, parental turnout consistency, and a dummy for living with one's parents and, on the other, parental turnout and all covariates (child sex, fixed effects for parental and child birth year and fixed effects for election). The results are similar to the ones displayed in Figure 2 and Table A7 in the Appendix. Specifically, child age at election significantly increases the strength of pre-birth effects, whereas the post-birth effects are stronger when the child still lives with his/her parents and the parents are consistent in their turnout behavior.

The estimates from these models can also be used to illustrate the joint impact of these conditioning factors. We report such estimates in Figure 3. The height of the bars in Figure 3 corresponds to the magnitude of the transmission coefficients under conditions that we expect to be maximally conducive to amplified post-birth effects (leftmost triplet) and pre-birth effects (rightmost triplet). When evaluating the strength of the transmission

[15] The interaction effect between child age at election and adoptive parent turnout is weakly significant in the foreign adoption sample ($p = 0.064$) but not in the native adoption sample ($p = 0.139$). The interaction terms involving parental consistency ($p < 0.001$) and living arrangements ($p = 0.020$) are both statistically different from zero.

[16] Only the interaction between child age and biological parent turnout reach conventional levels of statistical significance in these models ($p = 0.011$).

Figure 2: The conditional impact of age, parental turnout consistency and living conditions



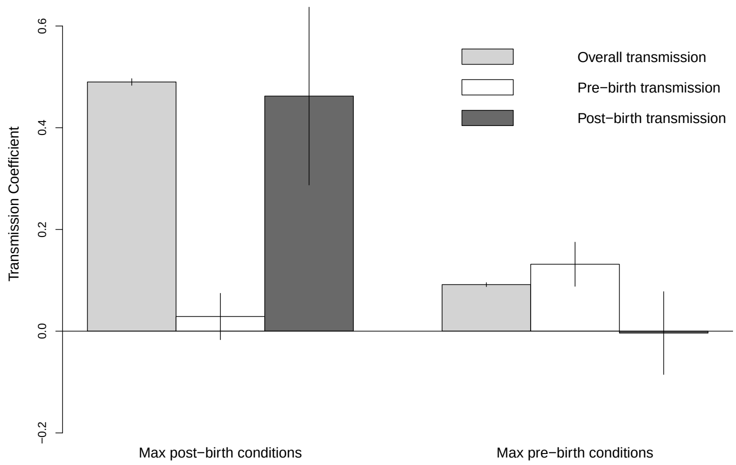
Note: Intergenerational transmission in turnout propensities across child age at election (upper left subgraph), living arrangments (upper right subgraph), and consistency in parental cues (lower subgraph). The height of the bars corresponds to the size of the transmission coefficient. 95% confidence intervals are included.

process at these extreme points a clear pattern emerges. For young individuals (aged 18) living with parents who are consistent voters or abstainers the overall transmission in turnout propensities is fully accounted for by social or post-birth factors. At the other end of the spectrum we can see that for older (aged 50) individuals who have left their parents' home and whose parents are inconsistent in their turnout behavior the overall transmission is, instead, fully accounted for by genetic and biological pre-birth factors.

5.3 External Validity

A possible concern is that our results may not generalize to other countries and contexts. Sweden's electorate and political institutions stand out along many dimensions in

Figure 3: The conditional impact of age, parental turnout consistency and living conditions



Note: Intergenerational transmission in turnout propensities across child age at election, consistency in parental cues, and living arrangments. The height of the bars corresponds to the size of the transmission coefficient. 95% confidence intervals are included.

cross-country comparisons. Of particular importance is the high Swedish turnout rates that may depress estimates of the pre-birth and post-birth influences relative to other countries. Given this, a key question is to what degree the parameter estimates obtained in our study translate to other contexts.

To explore the external validity of our results we report estimates of the overall parent-child transmission in voter turnout in four samples from two countries: parent-child pairs based on the first and second generations from the Three Generations Combined Panel Study (TGC)[17]; parent-child pairs based on the second and third generations from TGC; parent-child pairs based on two studies from the Minnesota Center for Twin and Family

[17]TGC is a four-wave panel study covering three biologically related generations of Americans. The original study was based on a national probability sample of 1,669 individuals who were high school seniors in 1965. We refer to these respondents as the second generation, their parents as the first generation, and the children of the original cohort members as the third generation. The first generation was surveyed once in 1965. The members of the second generation have been surveyed four times: in 1965, 1973, 1982, and 1997. The 1997 survey attempted to include all third-generation cohort members who had reached an age of 15 or greater.

Research (MCTFR)[18]; and parent-child pairs from the British Household Panel Survey (BHPS).[19] The (self-reported) turnout rates in the child generations in these four samples vary between 54.6% (BHPS) and 81.8% (TGC Gen1-Gen2).

Estimates of the overall transmission rates are presented in Table 3. As can be seen the magnitude of the transmission coefficients differ somewhat between the four samples and in two cases fall short of and in two cases exceed the corresponding and comparable estimate in the Swedish non-adoptee sample displayed in column 1 of Table 2 (0.257). Moreover, the sizes of these samples are quite small and the estimates therefore less precise. To account for this we report the transmission coefficient based on a pooled sample in column 5. The estimated transmission rate in this pooled sample (0.256) is almost identical in magnitude to the one obtained in the large Swedish non-adoptee sample.

The information provided in the TGC, MCTFR and BHPS samples also allows us to partially examine the external validity of the conditional transmission estimates presented in Figures 2 and 3. Figure 4 shows transmission coefficients based on the pooled TGC, MCTFR and BHPS samples (lightgrey bars) across two conditions: child age at election (the leftmost quartet of bars) and consistency in parental turnout cues (the rightmost quartet of bars). To simplify the interpretation of these results the darkgrey bars in Figure 4 reproduce the corresponding transmission coefficents based on the Swedish

[18]The MCTFR sample includes twins and their parents from the Minnesota Twin Family Study and adoptees and biological siblings and their parents from the Sibling Interaction and Behavior Study (Iacono et al., 2006). The estimates reported in columns 3 and 5 in Table 3 are based on a sample restricted to non-adoptee children and their parents. The transmission coefficient reported in column 6 is obtained from adoptees and their adoptive parents.

[19]We use the same sample restrictions as applied to the Swedish samples. Thus, we only include children between age 18 and 50 at each election. To construct turnout indicators in the sample based on generations 1 and 2 from TGC we use turnout data from the presidential elections in 1964, 1972 and 1980 (parents) and 1968, 1976 and 1984 (children). For the second US sample (generations 2 and 3 from TGC) we use turnout information from all presidential elections held between 1968 and 1992 for the parents and all three elections held 1988, 1992 and 1996 for the children. For the MCTFR sample we use turnout in the midterm elections in 2006, 2010 and 2014 for the parents and the midterm elections in 2010, 2014 and 2018 for the children. Finally, for the UK sample we have access to turnout information from the four general elections in 1992, 1997, 2001 and 2005 and use the first three to construct the parental voting variables and the last three to measure child turnout. In the Appendix we provide a more detailed discussion about the four samples and the measures used to produce the estimates reported in Table 3 and Figure 4.

Table 3: Transmission in comparable samples

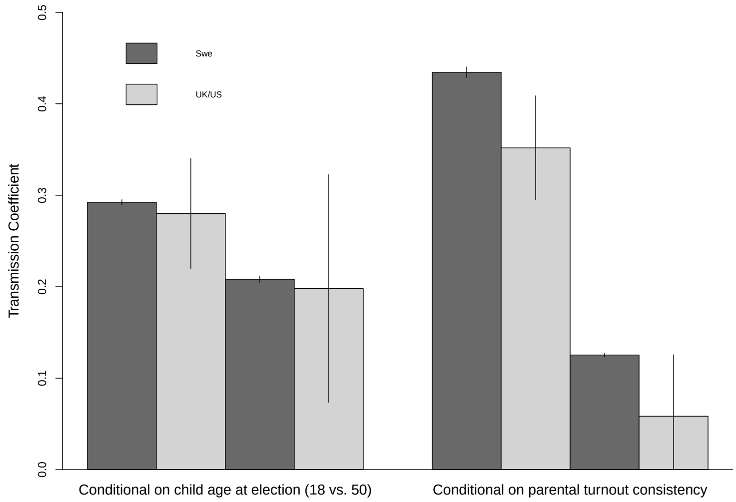
	TGC G1-G2	TGC G2-G3	MCTFR	BHPS	Pooled	MCTFR
Bio Parents	0.138***	0.319***	0.226***	0.337***	0.256***	–
	[0.043]	[0.076]	[0.031]	[0.031]	[0.020]	–
Adopt Parents	–	–	–	–	–	0.134
	–	–	–	–	–	[0.095]
N	1,650	1,119	5,875	4,283	12,927	958

Note: OLS tranmsission estimates in four samples: i) parent-child pairs (generation 1 and 2) from the Youth-Parent Socialization Panel Study; ii) parent-child pairs (generation 2 and 3) from the Youth-Parent Socialization Panel Study; iii) parent-child pairs from the British Household Panel Survey (BHPS); iv) parent-child pairs from the Minnesota Twin Twin Family Study (MTFS). The samples include individuals aged 18-50 at each election. The standard errors (in brackets) are clustered by rearing mother. Parental turnout is measured as averages across all available elections in each sample. Only turnout in elections preceding the outcome election are included in the parental turnout measures. All models include controls for child sex, child birth-year dummies, parents birth-year dummies (defined as average age across parents), and election dummies. ***/**/*, indicates significance at the 1/5/10 percent level.

non-adoptee sample (also found in Figure 2). The overall pattern is one of consistency across the Swedish and UK/US samples. The decrease in transmission rate among the older children and when the parents are inconsistent in their turnout behavior is of similar magnitude across the two samples. As already noted the estimates in the UK/US sample are somewhat noisy and only the interaction effect between parental voting and consistency (the difference in magnitude between the two lightgrey bars in the rightmost quartet) is statistically significant ($p < 0.001$).

The results in Table 3 and Figure 4 suggest that the magnitude of the overall and conditional parent-child transmission coefficients in voter turnout is similar across the Swedish, UK and US samples. Another issue concerns the relative importance of pre- and post-birth influences reported in this study. To examine this question we make use of the subset of adoptees and their adoptive parents included in the MCTFR sample. Column 6 in Table 3 reports the rate of transmission in this subsample. As expected the coefficient is smaller (0.134, $p = 0.160$) than the corresponding estimate among the MCTFR non-adoptees and their parents (column 3). The indirect estimate of the prebirth

Figure 4: The conditional impact of age and parental turnout consistency in comparable samples



Note: Intergenerational transmission in turnout propensities across child age at election (the leftmost quartet of bars) and consistency in parental cues (the rightmost quartet of bars). The height of the bars corresponds to the size of the transmission coefficient. 95% confidence intervals are included.

transmission obtained by applying equation 3 to the combined non-adoptee and adoptee MCTFR sample is equal to 0.092 ($p = 0.352$). These estimates are obviously rather imprecise, most likely due to the small sample size. More importantly, however, the results suggest that the magnitudes and relative importance of the pre- and post-birth effects are very similar in the Swedish and the MCTFR samples.[20]

[20]It is also worth noting that related research on the genetic heritability of political traits based on the classical twin design provides no evidence that behavior genetic parameters obtained from Swedish data vary systematically from those obtained from other countries. For example, Klemmensen et al. (2012) and Dawes et al. (2014) reported heritability estimates for voter turnout and political participation that are very similar in Sweden, Denmark, and the US. However, some caution is needed when discussing the pre-birth and post-birth effects in terms of genetic versus environmental effects. Above all, the pre-birth effect as captured by birth mother turnout in the adoption sample reflects both genetic effects and the influence of the uterine environment whereas genetic factors alone account for any influence of the birth father. We argue, however, that any prenatal environmental effects on turnout propensities will be small in magnitude. Since it is reasonable to assume that the genetic endowments and the prenatal environment are positively related such prenatal effects should result in significant differences in maternal versus paternal pre-birth effects, a pattern of results that is not borne out by the evidence presented in Table 2.

6 Conclusion

Differences in political participation related to family background carry special weight because they speak to the issue of the equality of political opportunity. According to this cornerstone of democracy, political influence should not depend on the socioeconomic status or political activity of ones parents. Indeed, as Putnam (2016) has pointed out, inherited political inequality brings us uncomfortably close to the type of political regimes against which democratic revolutions were once fought. Political mobility within and between generations, thus, is an important quality of a well-functioning democracy, facilitating the equalization of political influence across individuals and families. However, as lamented by Brady et al. (2015), much research on social and economic mobility exists, but less is known about the transmission of political inequality within and between generations.

Against this background, the aim of this study has been to increase our understanding of the mechanisms causing persistent intergenerational transmission in voter turnout. First of all, we report an average parent-child link in turnout propensities equal to 0.26. That is, having parents who voted in previous elections boosts the offsprings likelihood of voting in the current election by 26 percentage points. Moreover, this figure is on par with the overall transmission coefficient we report for four other samples in two other countries. Second, we show that the overall transmission link can be decomposed into a pre- and a post-birth effect. We find that that the effect of post-birth factors, such as parental socialization, is, on average, twice the size of the effects of pre-birth factors, which are comprised of genes and pre-natal environment. These results corroborate the findings reported in Cesarini et al. (2014) using a partly overlapping sample (the native adoption sample) but also an indepent one (the foreign adoption sample). The size of the samples used in this study enabled us to provide much more precise estimates of both the overall transmission rate and the pre- and post-birth effects. Moreover, our follow-up analyses using the MCTFR data suggest that the relative importance of pre-birth and post-birth factors in explaining intergenerational associations in turnout behavior is similar in a sample of US parent-child pairs.

Our most important finding and contribution, however, concerns the conditional nature of the pre- and post-birth mechanisms. Above all, we show that condtions that are conducive to stronger social transmission will dampen any pre-birth effects on offspring turnout. Thus, when the child has just reached voting eligibility, has not left the nest and the parents send clear behavioral cues the overall parent-child link in turnout behavior is fully accounted for by post-birth factors. On the other hand, when these social conditions are absent, it allows for "biology to shine through" (Raine, 2002).

These findings are important for several reasons. Above all, we believe that our study consitute a small but fruitful step towards integrating the traditional social learning and the more recent behavior genetics approaches to understanding parent-child concordance in political traits. For decades the metaphor of the blank slate, stating that we are born as empty canvases and socialized by family and society into complex social beings, in large part guided mainstream research on political behavior in general and political participation in particular. However, in addition to social determinants, recent research shows decisively that almost all political traits are to some degree also influenced by genetics (Alford et al., 2005; Fowler et al., 2008; Hatemi and McDermott, 2012; Hatemi et al., 2014; Klemmensen et al., 2012; Dawes et al., 2014; Oskarsson et al., 2015). Against this backdrop a consensus is steadily growing that the assumptions imbued in the classic blank slate metaphor need to be replaced by a more nuanced account of the social and genetic origins of complex political behavior.

Furthermore, omitting the genetic part of inter-generational transmission that is, failing to take into account that we are not only raised by our parents, but we also inherit a combination of their DNA neglects an integral part of the explanation of political outcomes because genetic differences between individuals not only add to social and environmental influences but also co-vary and interact with them in complex ways (Spinath and Bleidorn, 2017). Studying either factor in isolation therefore necessarily paints an incomplete picture. Consequently, considering genetic influences by no means negates social influences, but rather provides an additional layer of explanation that can substantially improve our understanding of how they work.

These so-called gene-by-environment effects (G$\times$E) are widely believed to be pervasive for behavioral traits (Conley and Rauscher, 2013). They arise when the type or magnitude of the effect of a genetic factor depends on the environmental conditions in which it is expressed. In this study, for example, we have shown that pre-birth factors only matter under the right social and environmental circumstances. The adage that genetics loads the gun, but environment pulls the trigger, is an apt summary.

A central task for future research on political participation should therefore be to increase our understanding on how the interplay between genetic and social factors accounts for individual differences in political particpation. Two challenges are important in this quest. First, the bulk of previous studies on the heritability of political traits, including the current study, rely on indirect methods, such as the classical twin design or adoption designs, to capture the effects of genetic factors. As of yet no study has been able to credibly link particular genetic markers with any political trait. The few studies that have attempted to do so have failed due to being severely underpowered (Hatemi et al., 2014) or resting on heroic assumptions about the magnitude of potential genetic effects (Fowler and Dawes, 2008; Settle et al., 2010). However, since single genetic markers are bound to account for only a very small amount of the variation in any complex human trait a more promising avenue is to make use of so called polygenic scores that summarize the variation in multiple genetic loci in one number (Dudbridge, 2013). For example, REF and REF show that a polygenic score capturing the genetic predisposition for educational attainment, a trait closely related to political participation, significantly predicts voter turnout in US and Danish samples.

The second challenge concerns how to identify causal GxE interactions (Barcellos et al., 2018). The key here is to find instances of exogenous environmental variation that is not correlated with genetic factors (otherwise, any observed gene-environment interaction might simply reflect an underlying gene-gene interaction) or other relevant environmental factors (possibly rendering the interaction with the environmental stimulus of interest spurious). A potential candidate are policy reforms that give rise to exogenous variation in schooling. Political scientists have traditionally placed great hopes in the equalizing potential of education (Wolfinger and Rosenstone, 1980; Nie et al., 1996). In a recent study Lindgren et al. (2019) put this assertion to test and showed that a reform of Swedish upper secondary education contributed to narrowing the turnout gap between individuals of different socioeconomic backgrounds. An important extension to these results is to examine if the equalizing influence of schooling is mediated through decreased genetic and/or social intergenerational transmission. Another possibility would be to conduct get-out-the-vote experiments in genetically informative samples in order to examine treatment heterogeneity across genetic predispositions.

So far data limitations has precluded such studies. However, given the decreasing costs of genotyping and the increasing availability of samples including information on both genetic markers and political traits such studies are now, or will soon be possible. We firmly believe that integrating both genetic and social factors in our models on political behavior is crucial in order to more fully understand and account for the processes that give rise to individual differences in political participation. As such, a research agenda along these lines can also aid in developing more effective policies that deal with the underlying causes and consequences of persistent inequalities.

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