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How successfully do immigrant parents transfer their voting behavior to their offspring?

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This study integrates political socialization theory and behavioral genetics to disentangle the mechanisms underlying differences in the intergenerational transmission of voter turnout in majority and immigrant families. The pathways shaping the intergenerational transmission of electoral participation are examined through variations in political exposure within families, offspring's social engagement in the host country, and the socioeconomic status of the family. We base our analysis on data from the German TwinLife study, comparing majority adolescents with first-generation, second-generation and 2.5th generation immigrants using a genetically sensitive multilevel research design. Focusing on electoral participation, we find that within-family transmission is disrupted for second-generation and 2.5-generation immigrants, whereas there is no difference between native citizens and first-generation immigrants. Taken together, within-family political exposure, social engagement and socioeconomic status only weakly explain the observed gap in intergenerational transmission.

KEYWORDS

turnout, immigrants, intergenerational transmission, political socialization, twin studies

1 Introduction

Studies on immigrants' electoral participation highlight not only differences between citizens of immigrant origin and natives (Bird et al., 2010, pp. 25–64) but also reveal systematic variations in turnout across different generational statuses of immigrants (André et al., 2014; Qi and Gonzalez, 2021; Ramakrishnan and Espenshade, 2001; Bevelander and Hutcheson, 2022). While the identified turnout gap between first- and second-generation immigrants may indicate a disruption in the intergenerational transmission of turnout in immigrant families, current studies predominantly explain the variations in the electoral participation of immigrants using traditional variables for turnout or migration-specific variables such as experience with discrimination, identity and networks (e.g., Spies et al., 2019). Although scholars have made significant progress in understanding predictors of immigrant turnout (Bevelander and Pendakur, 2009; Cho, 1999; Kranendonk et al., 2018; de Reguero and Finn, 2023; Strijbis, 2021), little to no attention has been paid to the impact of immigrants' formative experiences on their electoral behavior. This study seeks to close this gap by examining how migration background influences the intergenerational transmission of electoral participation in Germany, offering unique insights into the role of formative experiences on immigrants' electoral behavior.

Research in political socialization demonstrates that family plays a crucial role in shaping political orientations (Beck and Jennings, 1975; Jennings et al., 2009; Rico and Jennings, 2016), with parents significantly influencing their children's electoral participation (Gidengil et al., 2016; Kudrnáč and Lyons, 2017). Limited research suggests that, while political learning

typically flows from parents to children in native families, this dynamic may differ in immigrant families, where parents might exert less influence on their children's political behaviors (Bloemraad and Trost, 2008; Borkowska and Luthra, 2024; Terriquez and Kwon, 2015; Wong and Tseng, 2008). Despite limitations in existing studies on the intergenerational transmission of political behavior within immigrant populations, they raise an important question that has not been properly addressed in the literature: Are immigrant parents less influential in their offspring's electoral participation, and if so, how does the intergenerational transmission of turnout differ between immigrant and native families?

To address this question, we tackle a major limitation of intergenerational transmission studies, namely that within-family similarities in attitudes and behaviors can arise not only from social learning but also from genetic similarity. Political behaviors and attitudes have often been shown to have substantial genetic components (Charney and William, 2012; Dawes et al., 2014; Fowler et al., 2008; Fowler and Dawes, 2008; Smith et al., 2011), which can therefore play an important role in forming intergenerational correlations—even in the absence of social learning. Genetically sensitive data and research designs are thus necessary to assess whether, and to what extent, intergenerational correlations are shaped by social learning within and outside the family. It is important to note that this issue is a general concern in intergenerational transmission studies and is not specific to our focus on the transmission of political participation or differences between majority and immigrant families.

Building on knowledge from political socialization theory and behavioral genetics (Fowler et al., 2008; Fowler and Dawes, 2008; Jennings et al., 2009), this study examines the factors underlying cross-generational turnout similarities and proposes that a migration background may reduce the extent of parental influence on children's electoral participation. Specifically, this study (1) compares patterns of intergenerational transmission of voter turnout between native citizens and individuals with a migration background, and (2) examines how migration status—differentiating between first-generation immigrants (adolescents born abroad), second-generation immigrants (adolescents with both parents born abroad), and 2.5-generation immigrants (adolescents with one native-born parent and one first-generation immigrant parent)—moderates the transmission of electoral turnout from parents to children.

To analyse the mechanisms through which migration status may affect the intergenerational transmission of turnout, this study draws on previous research underscoring the significance of parental political behavior, children's exposure to socialization agents outside the family, and family socioeconomic status (Beck and Jennings, 1975; Jennings et al., 2009; Schlozman et al., 2012; Verba et al., 2003; Vedder et al., 2009). More specifically, this study (2) examines the mediating effects of political exposure within the family, offspring's social engagement, and family socioeconomic status on the strength of this intergenerational transmission. These variables are evaluated as key factors that may explain differences in transmission strength between native citizens and across immigrant generations. By doing so, this study aims to disentangle the mechanisms behind the intergenerational transmission of turnout and provide unique insights into the factors that explain the electoral participation of citizens of immigrant origin.

Basing this analysis on a sample from the genetically sensitive German TwinLife study, we focus on Germany, a country with a growing number of immigrants and an increasing electoral body of

citizens of immigrant origin, which shows differences in turnout across first- and second-generation immigrants (Statistisch, 2023; Strijbis, 2021). Beyond its contextual relevance, this study makes a significant contribution to understanding how migration experiences influence the process of political socialization and the role of parents in shaping the electoral participation of their offspring.

The main findings of this study indicate that intergenerational transmission of electoral participation is disrupted among second-generation and 2.5-generation adolescents of immigrant origin, while no significant interruptions are observed between native-born adolescents and first-generation immigrant adolescents. Furthermore, the results demonstrate that the political exposure in the family, the level of social engagement exhibited by the offspring in the host country and the socioeconomic status of the family provide only minimal explanatory power for the identified disparities in intergenerational transmission.

2 Theoretical framework: intergenerational transmission of turnout

Political socialization theory explains the development of political behavior through political learning from multiple socialization agents, such as family, schools, peers, major societal events, media or political institutions (Neundorf and Smets, 2017; Rolfe and Chan, 2017; Wasburn and Covert, 2017). Consistently high correlations between parents' and children's party affiliation (Achen, 2002; Aggeborn and Nyman, 2021; Beck and Jennings, 1975), political values (Jennings and Niemi, 1968), political identities (Rico and Jennings, 2016), electoral preferences (Hooghe and Boonen, 2015), electoral participation (Gidengil et al., 2016; Kudrnáč and Lyons, 2017;) and in general political orientations (Jennings et al., 2009) have underscored the family's role as a central agent of political socialization. While these studies on intergenerational transmission employ various political outcomes and explanatory factors, they consistently rely on social learning theory to explain the mechanisms underlying variations in intergenerational transmission effects. Thus, social learning theory offers a framework for analysing the political orientations and behaviors shared within families over generations.

According to social learning theory, children tend to imitate the behaviors they observe in their parents (Bandura, 1977). Research on intergenerational transmission within general populations has primarily utilized the 'direct transmission' approach, which highlights reported similarities between generations and suggests that transmission occurs through unidirectional learning from parents to children (Hooghe and Boonen, 2015; Jennings and Niemi, 1968; Jennings et al., 2009; Rico and Jennings, 2016). According to social learning theory, 'exposure' serves as a key mechanism for transferring political behavior from parents to offspring (Bandura, 1977). Two critical factors explain how exposure influences the family's ability to transmit political behaviors: (1) the consistency of the attitudinal signal and (2) the degree of exposure children have to this signal. These factors pertain to the effectiveness of transmission, indicating how closely parental behaviors align with those of their children. For example, parents who share similar political views and actively engage in political discussions and activities provide a strong signal, thereby enhancing the effectiveness of this transmission (Beck and Jennings, 1975; Jennings et al., 2009; Jennings and Niemi, 1981).

Recent research on political socialization within families reveals that the simplistic one-step model of intergenerational

transmission—where parental behavior directly influences offspring’s behavior—fails to capture the full complexity of the underlying dynamics. Hatemi and Ojeda (2021) propose a more nuanced model, suggesting that two crucial steps occur between the intergenerational transmission of political orientations: (1) the child’s perception of the parental political orientations, and (2) the child’s decision to either accept or reject what has been perceived, both steps being integral to the success of the transmission process. Factors such as parenting style, the connections parents build with their children (Kitamura et al., 2009; Weiss, 2023), family structures (van Ditmars and Bernardi, 2023), cultural differences in family traditions (Kagitçibasi, 2017) and the gender of parents (Gidengil et al., 2010; Hooghe and Boonen, 2015) can influence the similarities across generations within a family. Thus, while parents play a central role in shaping the political behaviors of their children, the strength of intergenerational transmission can be influenced by a complex set of factors that extend beyond the simple reproduction of modelled behavior (Schönpflug and Bilz, 2008).

Findings on political socialization in families have been challenged by studies that examine turnout differences while accounting for biological factors. Research in behavioral genetics suggests that intra-household similarities in turnout are influenced by genetic similarity between parents and their children (Dawes et al., 2014; Fowler et al., 2008; Fowler and Dawes, 2008). These findings do not argue that environmental factors are irrelevant; rather, they demonstrate that about half of the variance in turnout is attributable to genetic factors, while the other half primarily stems from environmental differences individuals experience outside the family (Fowler et al., 2008). Research in behavioral genetics does not advocate for a “turnout gene” that deterministically influence electoral participation. Instead, these studies propose that variations in voter turnout are explained through complex interactions between specific genotypes and individual experiences within the broader social environment (Fowler and Dawes, 2008). Additionally, the high predictive value of certain standard correlates of political participation, such as political efficacy, has been attributed to shared latent genes underlying these predictors of political participation (Klemmensen et al., 2012). While there has been debate over which genotypes predict turnout and the methods for identifying these genotypes (Charney and William, 2012; Deppe et al., 2013), there is compelling evidence suggesting that genetic factors are a significant component of electoral participation.

Against this theoretical background, it can be inferred that the intergenerational transmission of voter turnout, irrespective of migration background, is influenced by a complex interplay of factors, including genetic predispositions, family experiences, and individual experiences beyond the family context. Building on this theoretic framework, we conduct comprehensive analysis whether the migration background—a specific life experience—affects the strength of the intergenerational transmission of electoral participation and examine factors that may account for variations in this process.

3 How migration status may influence the intergenerational transmission of turnout?

Research has demonstrated that the intergenerational transmission of political participation in immigrant families can be disrupted, highlighting the challenges that first-generation

immigrant parents face in transferring their political orientation to the next generation (Bloemraad and Trost, 2008; Terriquez and Kwon, 2015; Wong and Tseng, 2008).

Studies on political integration show that first-generation immigrants face the greatest barriers to political participation, with these barriers typically reduce over time (Adman and Strömlad, 2018). While immigrant voter turnout is influenced by various factors (Druetz, 2022), the most significant gaps in electoral participation are observed between first-generation immigrants and native-born citizens, with these disparities generally narrowing by the second generation (Ramakrishnan and Espenshade, 2001) and nearly disappearing by the third generation (Borkowska and Luthra, 2024). Consequently, it can be expected that the migration background will have the most substantial impact on the intergenerational transmission of electoral participation for first-generation immigrant parents.

The family of first-generation immigrant parents may consist of: first-generation immigrant children (those born abroad and raised in the country of residence), second-generation immigrant children (those born and raised in the country of residence to two first-generation immigrant parents) and 2.5-generation immigrant children (those born and raised in the country of residence with one non-immigrant parent). While differences between first- and second-generation immigrant children may depend on various factors, the duration of residence and the age of migration for first-generation children can influence the extent of similarities and differences between these two groups (Li and Bradley, 2020). Although the intergenerational transmission effect for 2.5-generation immigrants may be less influenced by migration background compared to other immigrant generations, it may still play a role in shaping the strength of the transmission. Hence, we hypothesize that:

H1: Compared to native citizens, first-, second-, and 2.5-generation immigrant adolescents have lower levels of intergenerational transmission of voter turnout.

In the next sections, we elaborate on the factors that can explain why first-generation immigrant parents may face challenges in transferring their electoral participation to their first-, second-, and 2.5-generation immigrant children.

3.1 Political exposure in the family

Differences in political exposure across families reflect varying levels of parental political interest, as seen in the salience of politics within the family, the frequency of political discussions, and the level of political participation modeled by the parents (Bacovsky and Fitzgerald, 2023; Jennings et al., 2009). Such factors shape the political experiences that children have and learn from within the family. For immigrant-origin families, political exposure is often more complex due to involvement in transnational politics (Finn, 2020; Yildirim-Sungur and Schwarz, 2021), as well as and the challenges of political integration in the country of residence (Terriquez and Kwon, 2015).

Through sustained cross-border ties with their country of origin, immigrant parents can transmit competencies, loyalties, and connections to their country of origin to their children (Soehl and Waldinger, 2010, 2012). Immigrant parents can actively convey political information about their country of origin to their children (Wong and

Tseng, 2008), and with that contribute to the diversity of political learning in the family. However, according to social learning theory, this heterogeneity of political socialization in the family may obscure the signals that immigrant children receive at home, thereby weakening the effectiveness of intergenerational transmission of electoral participation.

Transnational electoral participation, unlike informal political engagement and political identities, is primarily tied to citizenship policies and voting rights (Finn, 2020; Itzigsohn, 2000; Yildirim-Sungur and Schwarz, 2021). Immigrants' voting eligibility varies by citizenship status. Immigrant origin citizens without citizenship from their country of origin can vote only in their country of residence; non-naturalized immigrants may vote only in their country of origin; and naturalized citizens with dual citizenship may vote in both their country of origin and country of residence. While there is limited knowledge on the intergenerational transmission of transnational electoral participation, research on Turkish immigrants in Europe suggests that this transmission does not occur across state boundaries (Spierings, 2016). Specifically, parental electoral participation in the country of origin does not appear to influence the electoral participation of their children in the country of residence, and vice versa (Spierings, 2016). Therefore, even if children with immigrant origin observe their parents participating in elections in their country of origin, it may not affect their own electoral participation in their country of residence.

First-generation immigrants, even when granted voting rights, tend to have lower voter turnout in their country of residence. Factors such as limited resources, lack of political information, language barriers, political efficacy (Ramakrishnan and Espenshade, 2001; Kranendonk et al., 2018; Verba et al., 1993) contribute to reduced likelihood of voting. Consequently, children of first-generation immigrant parents are less likely to observe active electoral participation from their parents. Research in California highlights how barriers faced by first-generation immigrant parents can limit political socialization within families, reducing civic engagement and voter registration among youth born abroad and raised in the country of residence and second-generation youth (Terriquez and Kwon, 2015). Moreover, the reduced political participation of first-generation immigrant parents can diminish the family's role in mobilizing electoral turnout (Burden et al., 2014).

That being said, immigrant children, in their family experience either political information and participation related to both their country of origin and their country of residence (heterogeneous political exposure) or, on average, see their parents as less politically active in the country of residence compared to the parents of native children (reduced political exposure). Therefore, following the "exposure mechanism" in social learning theory, we hypothesize that the intergenerational transmission of voter turnout in immigrant families is weakened.

H2: Differences in political exposure within families partially mediate the differences in the strength of intergenerational transmission of electoral participation between native citizens and immigrant generations, including first, second, and 2.5-generation immigrants.

3.2 Social engagement

With respect to the "consistency of the signal" mechanism in social learning theory, differences between native and immigrant

families may arise due to potentially competing attitudes and behaviors exhibited by the social environment in the country of residence and the family, particularly for those from culturally distant origin countries (Borkowska and Luthra, 2024). An essential component of social learning theory is that consistency over time and across socialization agents enhances the effect of political socialization (Bandura, 1969). Thus, the strength of the intergenerational transmission process might not solely depend on the consistency of attitudes within the parental dyad, it may also be influenced by both the consistency and exposure of attitudes signalled by parents, as well as by signals from the broader social context of the destination country.

Exposure to socialization agents in the country of residence, such as education (Doerschler, 2004), media (Chaffee et al., 1990), political institutions (Neundorf and Smets, 2017), civic organizations (Terriquez and Lin, 2020), and social networks (Vedder et al., 2009), significantly impacts the political socialization of immigrants. Social engagement—such as involvement in local communities, volunteer work, and membership in organizations—has been shown to enhance political skills, increase political participation among citizens with an immigrant background, and boost their electoral turnout (Voss et al., 2011; Ramakrishnan and Bloemraad, 2008; Fennema and Tillie, 1999; Jacobs and Tillie, 2004; Gherghina and Tseng, 2016). Immigrant children who are more socially engaged (e.g., participating in or being members of various initiatives, organizations, or clubs) are more likely to be exposed to political learning outside the family. However, it remains unclear to what extent political learning from socialization agents outside the family influences political learning within the family, and the extent to which immigrant parents are able to transfer their electoral behaviors to their children.

Intergenerational discrepancies in values between first- and second-generation immigrants can be attributed to exposure to the dominant values in the country of residence (Spierings, 2015). Vedder et al. (2009) found that the more time second-generation immigrant children spend with non-immigrant peers, the greater the effort their parents must make to instill family values. Consistent with the findings on the intergenerational transmission of values, research identifying the bidirectional transmission of political participation in immigrant families—where offspring are more likely to explain political concepts and mobilize their parents into political action—is explained by the knowledge and skills that second-generation immigrant children acquire from socialization agents in the country of residence, including civil society organizations (Bloemraad and Trost, 2008; Terriquez and Kwon, 2015). Similarly, Li and Bradley (2020) demonstrate that when immigrants spend their formative years with socialization agents from the country of residence, there are no systematic differences in participation between immigrants and natives.

These findings suggest that exposure to socialization agents in the country of residence during the formative years of first- and second-generation immigrants can enhance the overall political learning the offspring receive and shape the intergenerational transmission of behaviors and values between parents and children. Thus, we hypothesize, that: differences in the offspring's social engagement partially mediate the differences in the strength of intergenerational transmission of electoral participation between native citizens and immigrant generations, including first, second, and 2.5-generation immigrants. (H3).

3.3 Socioeconomic status of the family

Beyond direct modelling, parents influence their children's political behaviors by shaping their environment and opportunities (Nesbit, 2012). In particular, through their socioeconomic status, parents indirectly influence the political orientations and behaviors their children develop (Neundorf and Smets, 2017).

Parents with high socioeconomic status (SES) pass on advantages to their children, increasing the likelihood that their children will also attain high SES later in life (Brady et al., 2015). In the literature on political participation, it is well established that individuals with more resources—such as income, education, and time—are more likely to engage in politics and vote (Brady et al., 1995; Verba et al., 1993). Therefore, children from affluent backgrounds are more likely to participate in elections. In status transmission theory has been highlighted the key role of the parents' education levels in the intergenerational transmission of political activity (Schlozman et al., 2012; Verba et al., 2003). The transfer of resources between generations has been shown to reinforce political activity. For instance, Plutzer (2002) found that parental socioeconomic and political resources predict turnout among young voters. Similarly, Glass et al. (1986) argued that the transfer of socioeconomic status between generations significantly contributes to parent-child similarity.

Nevertheless, the influence of socioeconomic status (SES) on the intergenerational transmission of turnout may vary across contexts. For instance, Gidengil et al. (2016) found that status transmission theory has limited applicability in countries where children often exceed their parents' educational attainment. Additionally, Humphries et al. (2013) showed that while parental education influences voter registration and party affiliation among non-immigrant adolescents, immigrant-origin adolescents are more influenced by their own projected socioeconomic outcomes than by family SES. Thus, while SES plays a significant role in voter turnout transmission, its impact can differ across countries and citizen groups.

Focusing on citizens with immigrant origin, extensive research reveals that immigrants, particularly first-generation immigrants, often face socioeconomic disadvantages (Duncan and Trejo, 2015). Immigrant-origin individuals, on average, report lower incomes, lower-skilled employment, and lower educational attainment compared to native-born citizens (Eurostat, 2023; Schnepf, 2007). While these SES gaps tend to decrease over time, disparities between immigrant-origin families and native-born families can remain (Cadena et al., 2015; Hermansen, 2016). Given the influence that parental socioeconomic status (SES) can have on electoral participation, socioeconomic disadvantages of first generation immigrant parents may explain potential differences in the intergenerational transmission of electoral participation between natives and immigrants.

That being said, we hypothesize that: *Differences in the socioeconomic status within families partially mediate the differences in the strength of intergenerational transmission of electoral participation between native citizens and immigrant generations, including first, second, and 2.5-generation immigrants.* (H4).

4 Methodology

4.1 Data

We base our analysis on the first wave of the German TwinLife dataset (Diewald et al., 2016). Given the ample evidence that a

significant portion of intergenerational correlations in turnout is due to the genetic similarity between parents and their offspring (Charney and William, 2012; Dawes et al., 2014; Fowler et al., 2008; Fowler and Dawes, 2008), the twin data we use allow us to address the limitations of prior studies on the intergenerational transmission of turnout. It also enables us to examine the impact of social learning within the family while accounting for genetic similarities between parents and their offspring.

The data include information on approximately 8,000 twins aged 4 to 25 as well as data on their parents and siblings. Twin methods rely on differences in genetic relatedness between two types of twins: monozygotic (MZ) twin share 100 percent of their segregating genes while dizygotic (DZ) twins share on average 50 percent similar to non-twin siblings. To ensure a representative sample of the total German population, as opposed to volunteer-based samples, data collection was based on a stratified random sample of administrative data (Lang and Kottwitz, 2017). For the first wave in 2016, a total of 1,878 MZ and 2,212 same-sex DZ twin pairs, along with their parents, were surveyed through in-person interviews. We restricted the analytical sample to twins aged 16 and older because our key measures of voting and intention to vote are not applicable to younger respondents. This restriction reduces the sample by half, leaving 1,953 twin pairs for analysis. The sample includes 428 twins of immigrant origin. We also incorporate data from the parents of each twin pair included in the sample. The unit of analysis is the twins, irrespective of their migration status. According to German law (Article 20 of the Basic Law), foreign nationals do not have the right to vote in federal elections, state elections, or referendums at the federal or state level. Therefore, all participants in the sample are German citizens and are eligible to vote in Germany.

4.2 Measures

Our dependent variable measures whether twins voted in the most recent federal parliament election (for participants aged 18 and older) or, for those who were not yet eligible to vote (respondents aged 16 to 17), whether they would vote in the next election¹. The main independent variable measures the twins' migration generation status.

We differentiate between twins with no migration background, twins who migrated themselves (first generation), twins born in Germany to parents born abroad (second generation), and twins born in Germany where one parent was born abroad (2.5th generation). This definition aligns with findings that demonstrate structural differences between the second and 2.5th generations (Ramakrishnan, 2004). Direct social transmission is captured using information on whether the mothers and fathers participated in the most recent federal parliament election (1) or not (0).

To account for differences in voting patterns, we include the following mediators based on theoretical arguments. First, political

¹ Bearing in mind the findings that identify differences between intention to vote and actual voting behavior, with intentions being more prevalent than actual votes (e.g., Achen and Blais, 2015), we conducted robustness checks (see Appendix 2) by testing our models with a sample focusing exclusively on reported votes. The results from these robustness checks are largely consistent with the previously discussed findings. The observed differences are attributed to a loss of statistical power due to the sample size being effectively halved.

exposure in the family is measured by: (a) the mother's and father's political interest, captured with the question, "Generally speaking, how interested are you in politics?" (from 1 = not at all to 4 = very interested), and (b) the mother's and father's informal political participation, captured with the question, "Which of the following activities did you take part in within the last 12 months? (e.g., attending a political meeting, discussion event, or demonstration)" (0 = no, 1 = yes). These variables are not country-specific and may reflect political interest and informal participation in both the country of origin and Germany, thereby capturing the overall political exposure within the family.

Second, the variable social engagement is based on averaging individual responses regarding the extent to which twins participate in various social organizations or groups (see [Appendix 3](#)). We argue that higher social engagement correlates with greater exposure to socialization agents in the country of residence.

Third, we measure the family's socioeconomic background using parental educational attainment and occupational status. Educational attainment is measured using the 7-category International Standard Classification of Education (ISCED) 1997 scale, ranging from 1 ('primary education') to 10 ('bachelor's degree or higher'). Occupational status is measured using ISEI (International Socio-Economic Index of Occupational Status) scores, which range from 12 to 90, with higher values indicating higher occupational status. Unemployed parents are assigned a score of 0 to avoid losing these observations to non-response. Therefore, we include an additional dummy variable indicating whether both parents were unemployed (1) or working (0). For educational attainment and occupational status, we use the maximum value from the two parents to reflect the overall parental status.

In line with research highlighting the impact that the country of origin may have on voting behavior and intergenerational transmission ([André et al., 2014](#); [Ciornei and Østergaard-Nielsen, 2020](#); [Van Ditmars, 2022](#)), all models also control for the origin group. For first-generation immigrants, this corresponds to their country of birth; for all other immigrant groups, it refers to the parental country of birth. This measure includes the following categories: Germany, Turkey, Africa, the Arabic-Islamic world, Asia, Latin America and North America, Western Europe, Eastern Europe, Southern Europe, the Western Balkans, and the Former Soviet Union.

Finally, we control for the twins' age (in years) and gender (0 = male, 1 = female). Missing information was imputed using multiple imputation with chained equations ($m = 50$), incorporating all model variables and predictive mean matching.

4.3 Method

In general, twin studies rely on specific circumstances of twin families to estimate genetic and environmental contributions to individual differences. What sets families with twins apart from non-twin families is that due to the essentially simultaneous birth, twins are assumed to fully share their environment. In non-twin families, at least several months elapse between births giving parents time to learn from experiences with the first child and consequently treating the second child differently. In addition, whereas siblings in non-twin families always share on average 50 percent of their segregating genes, twins come in one of two forms: they are either

monozygotic (MZ) and share 100 percent of their genes or they are dizygotic (DZ) and share on average 50 percent of their genes like non-twin siblings. Combining these two special characteristics of twin families (fully sharing their environment from birth and differences in the genetic resemblance between MZ and DZ twins) enables researchers to decompose the variance in some outcome into the relative contributions of genetic (A), shared environmental (C) and non-shared environmental (E) factors to these differences. For example, the heritability estimate gives the fraction of the variance that is attributable to genetic differences between individuals. The shared environment refers to all aspects of a family that make its members more similar to each other and thus represents the main social transmission pathway within the family. The non-shared environment captures all aspects of a family that make its members more dissimilar to each other. This can encompass friends that one member has but not others, random encounters but also includes measurement error and any individual differences not explained by genes or the shared family environment.

Twin models rely on additional assumptions to generate valid estimates including (1) random mating, (2) that MZ and DZ twins share their environment to an equal extent, (3) additive genetic effects, and (4) the absence of gene-environment correlations and interactions. Assumptions (1) and (3) can be tested empirically prior to modelling and are not violated in our study. The so-called equal environments assumption (2) has been supported by prior evidence ([Conley et al., 2013](#); [Polderman et al., 2015](#)). Prior political science studies have relied on this type of twin modelling to estimate the genetic contributions to differences in political participation and turnout ([Fowler et al., 2008](#); [Fowler and Dawes, 2008](#); [Dawes et al., 2014](#); [Klemmensen et al., 2012](#)) or to demonstrate that the evidence for political socialization within families is weak when relying on genetically sensitive data ([Hatemi et al., 2010](#)).

In this study, we use variant of the classic behavior genetics ACE models that relies on multilevel modelling techniques. This approach to variance decomposition offers the advantage of incorporating independent variables to model mean differences in outcomes by including additional random effects ([Rabe-Hesketh et al., 2008](#)). The multilevel models we use here are a three-level parameterization, with individual twins nested within families and further nested within an artificially created twin level. Additionally, the model includes constraints on the covariance terms to ensure that the variance terms themselves are uncorrelated. This model is expressed as:

$$(y_{ijk} = b_0 + \left\{ a_{jk} \left[\sqrt{\frac{1}{2}} \overline{MZ}_k \right] + a_k \left[MZ_k + \sqrt{\frac{1}{2}} \overline{MZ}_k \right] \right\} + c_k + \varepsilon_{ijk})$$

where MZ_k represents a dummy variable taking the value 1 for MZ twins, and 0 for DZ twins (corresponding to \overline{MZ}_k). This dummy variable is modelled only as random slopes at the corresponding level, but not as a main effect. The variance of c_k represents the shared environment component (C), whereas the variance of ε_{ijk} represents the non-shared environment component (E). All variance components are set up in such a way as to be mutually uncorrelated. In addition, the random slopes a_{jk} and a_k are constrained to have equal variances. The variance of a_{jk} or a_k represent the additive genetic component (A). We relied on the Stata ado implementation of these models 'ACELONG' to estimate linear probability models ([Lang and Kottwitz, 2017](#)).

One important aspect of this type of modelling is that both variance decomposition and mean modelling provide valuable insights, but they address different aspects of individual differences. Variance decomposition reveals the sources of individual differences, while mean modelling offers regression-based insights into the relationship between independent variables and political participation, as well as their influence on mean differences. Our empirical strategy involves two broad steps. First, we seek to establish whether the strength of transmission varies between majority and immigrant families. We therefore interact generational status and mother's turnout. Our second goal is to understand what can account for the observed differences in the transmission strength as expressed by the interactions. To investigate this, we rely on the procedure to model mediated moderation outlined by Hayes (2021). Specifically, we residualized all mediators by regressing them on the control variables and the interaction terms (i.e., immigrant status and parental turnout) in order to reduce issues regarding collinearity of the mediators. Note that the mediators therefore enter the analyses in their residualized form and not as the raw scores.

5 Results

We begin our results by presenting descriptive findings on general group differences, as shown in Table 1.

While 80% of native adolescents voted in the last election (or intended to vote in the next election), these figures are 73% for both first- and second-generation immigrants. Consistent with earlier studies measuring differences between actual and reported turnout, the reported turnout in this sample is higher than the actual turnout for both native citizens and citizens of immigrant origin (Goerres et al., 2018). Nevertheless, these findings align with previous research in Germany that identifies lower reported electoral participation among citizens of immigrant origin compared to native citizens (Spies et al., 2019; Diehl and Wüst, 2011; Wüst, 2004).

For both first- and second-generation immigrant adolescents, there is a within-family gap, with mothers reporting lower electoral

participation than their offspring. This gap is as small as 9 percentage points for second-generation immigrant adolescents and their mothers and nearly 20 percentage points for first-generation immigrant adolescents and their mothers. Fathers of first-generation immigrant adolescents show slightly lower turnout than their children, while fathers of second-generation immigrant adolescents have turnout rates that are 11 percentage points lower than those of their children. In contrast, native adolescents have lower turnout rates than their parents.

The parents of second-generation immigrant adolescents are the least politically interested and less politically active. The family socioeconomic background follows predictable patterns: the difference in socioeconomic status is largest between natives and first-generation immigrant families and decreases in the second generation. For the 2.5th generation, there is even an advantage in measures of socioeconomic background. Overall, there are few differences in social participation across groups, with most adolescents rarely participating in organized clubs and associations. Only first-generation immigrants stand out for participating in these clubs even less.

Next, we will present findings aimed at investigating to what extent these patterns persist in multivariate models. In the first part of the analysis, we present models that examine the variation in the impact of intergenerational transmission on turnout for families with and without migration status. In the second part of the analysis, we present models that identify the factors mediating the intergenerational transmission effect in immigrant families. Earlier studies have provided inconclusive evidence regarding the differences in intergenerational transmission between mothers and fathers (Boonen, 2017; Gniewosz et al., 2009; Weiss, 2023). In this study, the interaction results using fathers' turnout or both parental interactions in the same model produced similar conclusions to those using mothers' turnout (see Appendices 4, 5). We focus our analysis on mothers' turnout since there is considerably more missing information for fathers.

We begin our analysis by describing the variance in the turnout variable using the ACE model. The results in Table 2 provide a descriptive baseline for the heritability of voting: among the twins in our data, 49 percent ($0.079/[0.079 + 0.000 + 0.082]$) of the differences in voting are attributed to genetic differences, none to differences in

TABLE 1 Descriptive statistics (means and proportions) for native and immigrant adolescents.

Measure	Natives	Citizens with immigrant origin		
		First generation	Second generation	2.5th generation
Turnout offspring	0.80	0.73	0.73	0.82
Mother's turnout	0.87	0.54	0.64	0.71
Father's turnout	0.93	0.75	0.62	0.74
Mother's political interest	2.34	2.13	1.99	2.37
Father's political interest	2.77	2.79	2.36	2.75
Mother's political participation	0.15	0.17	0.07	0.14
Father's political participation	0.24	0.46	0.21	0.21
Parents' education (ISCED)	7.36	6.35	6.64	8.09
Parents' occupational status	46.11	29.11	33.11	54.34
Unemployed	0.14	0.29	0.15	0.07
Child's social engagement	3.64	3.74	3.64	3.66
N	3,345	94	143	176

*Higher values of child's social engagement indicate lower participation.

the shared environment, and the remaining 51 percent to non-shared environmental differences (Model 0). These results are very similar to those from other studies analysing turnout for adults using the same method (Fowler et al., 2008; Hatemi et al., 2010; Klemmensen et al., 2012), as well as other commonly studied individual attributes (Cesarini et al., 2009; Weinschenk et al., 2019).

To establish a baseline for discussing the variation in the strength of intergenerational transmission of turnout by migration status, we extend the analysis by including generational status and measures of parental turnout (Models 1 and 2). This basic model reveals no statistically significant difference in turnout likelihood between adolescents with no migration background and those from first-, second-, and 2.5th-generation. Additionally, in line with previous studies identifying a significant correlation between parental and offspring electoral behavior (Hooghe and Boonen, 2015; Kudrnáč and Lyons, 2017), the findings from Model 2 show a direct effect of parental turnout: both mothers' and fathers' turnout positively influence their offspring's likelihood of voting. However, the effects are relatively modest: children of mothers (or fathers) who voted are 9 (or 5) percentage points more likely to vote compared to children whose parents did not vote.

Model 3 in Table 2 introduces interaction effects between maternal turnout and generational status to explore differences in transmission conditions between native and immigrant families. The results indicate that the transmission of turnout is not significantly different in native families compared to those with first-generation immigrant families (where both children and parents were born abroad). Readers should note that although the sample of first generation immigrants is fairly small and a statistically insignificant finding is therefore unsurprising, the size of the interaction effect is close to zero. However, the within-family transmission is significantly disrupted in families with second-generation immigrant twins ($0.11-0.11 \approx 0$) and 2.5th-generation immigrant twins ($0.11-0.07 \approx 0.04$). This result suggests that

intergenerational transmission beyond the first generation in immigrant families is disrupted, which supports the first hypothesis (H1).

These findings support earlier exploratory studies that challenge the traditional model of intergenerational transmission of political behavior in immigrant families (Bloemraad and Trost, 2008; Wong and Tseng, 2008; Spierings, 2016; Schönplugg and Bilz, 2008) and suggest that the interruption effect may vary, potentially having less impact in families with first-generation immigrant parents and first-generation immigrant adolescents.

Next, we develop three models to identify factors that mediate intergenerational transmission in immigrant families. These models test whether political exposure in the family (measured by parental political interest and participation), the offspring's social engagement in the country of residence and the family's socioeconomic status mediate the transmission effect of electoral participation within immigrant families.

The findings from Model 4 indicate that parents with a strong political interest significantly increase the likelihood of their offspring's electoral participation. In contrast, parental political participation does not show a significant relationship with child turnout. The interaction effects representing generation-specific parental transmission of turnout remain virtually unchanged with the addition of the mediator 'political exposure'. The strength of intergenerational transmission of electoral participation, regardless of migration status, does not significantly change with increased political exposure. Therefore, these results do not support the second hypothesis (H2). These results challenge the concept of direct transmission (Hooghe and Boonen, 2015; Jennings and Niemi, 1968; Jennings et al., 2009) and support recent studies that emphasize the importance of individual and contextual factors within the family (Hatemi and Ojeda, 2021; Kitamura et al., 2009; Weiss, 2023; Kagitçibasi, 2017).

Model 5 in Table 3 examines whether differences in social engagement among the offspring mediate the influence their parents have on their electoral participation. We hypothesized that children of first-generation immigrant parents who are more socially active are more exposed to political learning from socialization agents in their country of residence, thereby reducing the strength of intergenerational transmission. However, the results presented in Table 3 do not support this hypothesis. While social engagement significantly increases the likelihood of voting, it does not mediate any part of the interaction effect. These findings align with robust research emphasizing the importance of social engagement, particularly membership in civil organizations, on political participation, including voting (Gherghina and Tseng, 2016; Jacobs and Tillie, 2004; Quintelier, 2013). However, contrary to the findings of studies that explain bidirectional transmission through the experiences second-generation immigrants gain from networks in their country of residence (Bloemraad and Trost, 2008; Terriquez and Kwon, 2015), our results demonstrate that membership in various social organizations does not significantly affect the strength of the intergenerational transmission of electoral participation. Hence, our results do not support the third hypothesis (H3).

Model 6 in Table 3 examines whether the socioeconomic status of families can explain the identified differences in intergenerational transmission. Our findings indicate that socioeconomic status differences account for a small part of the interruptions faced by 2.5-generation immigrants. The corresponding interaction effect is reduced by approximately 15 percent, suggesting that part of the difference in transmission is attributable to variations in social background. However, there is limited evidence suggesting that

TABLE 2 Multilevel model for twin data predicting voter turnout among native and immigrant adolescents ($N = 3,756$).

Measure	Model 0	Model 1	Model 2	Model 3
Constant	0.80*	0.68*	0.70*	0.70*
Age		0.01*	0.01*	0.01*
Female		-0.04*	-0.03*	-0.03*
First gen.		-0.07	0.04	0.05
Second gen.		-0.07	0.02	-0.04
2.5th gen		0.01	0.04	0.02
Mothers turnout			0.09*	0.11*
Fathers turnout			0.05*	0.05*
First gen. * Mothers turnout				0.01
Second gen. * Mothers turnout				-0.11*
2.5th gen* Mothers turnout				-0.07*
A	0.079	0.078	0.060	0.059
C	0.000	0.000	0.000	0.000
E	0.082	0.082	0.085	0.085

* $p < 0.05$, includes controls for origin group.

transmission gaps are significantly influenced by socioeconomic differences between majority adolescents and those of immigrant origin. Earlier studies suggest that parental socioeconomic status (SES) does not always strongly predict the intergenerational transmission of political behaviors, a trend that may be particularly relevant for immigrant families and countries with greater access to education (Gidengil et al., 2016; Humphries et al., 2013). Hence, while the lower socioeconomic status of first-generation immigrant parents may disadvantage their second-generation children, it does not significantly impact the intergenerational transmission of turnout. Hence, our results do not support the fourth hypothesis (H4).

6 Discussion

Employing genetically-informed research methodology, this article aimed to examine whether migration status influences the intergenerational transmission of electoral participation and, if so, to elucidate the underlying mechanisms of intergenerational transmission in families of immigrant origin in Germany.

The primary contribution of this paper is the demonstration that significant disruptions exist in the intergenerational transmission of voter turnout among second-generation and 2.5-generation immigrant adolescents. These results suggest that the mechanisms shaping electoral behaviors in second-generation immigrants may

systematically differ from those in other groups, even when their turnout rates are similar to those of native-born individuals.

In contrast, no significant disruptions are observed in the intergenerational transmission of electoral participation among native families and first-generation immigrant families (where both children and parents were born abroad). These findings suggest that the migration experience, along with any associated disadvantages for first-generation immigrant parents, does not necessarily hinder the intergenerational transmission of electoral participation. The strong transmission within first-generation immigrant families could result from both parents and children experiencing life in the country of residence as first-generation immigrants, which includes feelings of alienation that may strengthen within-family ties (Safipour et al., 2011). Additionally, first-generation immigrant adolescents may primarily socialize within networks from their ethnic background (Reynolds and Crea, 2017; Valenta, 2009), leading to types of exposure that align with those experienced within the family. This alignment may reduce competing socialization pressures between the external environment and the family, in contrast to what second-generation immigrants might experience. By comparison, intergenerational disruptions occur in families where parents were born in a different country than their children. Research on intergenerational transmission suggests that discontinuities in the socio-cultural context across generations may contribute to disruptions in this transmission process (Millová et al., 2023). From this perspective, the transmission from first- to second-generation immigrants, seen as a discontinuity in socio-cultural context across generations, may help explain the observed disruptions in the transmission of electoral participation.

Among the hypothesized mediators, results indicate that parents' political participation, parents' political interest, adolescents' social engagement, and the socio-economic background of the family increase the likelihood of voter turnout but do not mediate the intergenerational transmission of turnout nor explain the identified transmission gap. Consequently, this study leaves us with the question: why is the intergenerational transmission of electoral participation uninterrupted for first-generation adolescents, while the transmission of turnout is disrupted for second-generation and 2.5-generation immigrant adolescents, as well as what are the underlying mechanisms behind the intergenerational transmission in immigrant families? Although political exposure, social engagement, and socioeconomic status did not mediate the transmission gaps, their association with turnout suggests complex interdependencies requiring further theoretical elaboration.

The genetically sensitive research design enabled us to explore the origins of the observed similarities within families. Consistent with earlier studies (Fowler et al., 2008; Hatemi et al., 2010; Klemmensen et al., 2012), our results indicate that individual experiences within the broader social environment, along with genetic factors, account for most of the variance in voter turnout. As demonstrated in the literature on behavioral genetics, genes alone do not causally affect prosocial behavior, including voter turnout. Instead, genetic predispositions interact with environmental factors to influence the likelihood of turnout (Fowler and Dawes, 2008). Therefore, the identified disruption in transmission for second-generation immigrants is likely due to the individual experiences they accumulate from non-shared environments (experiences outside the family). Our measurement of the non-shared environment, or socialization agents outside the family, does not capture all the relevant phenomena experienced by second-generation immigrants. While some have argued that non-shared environmental

TABLE 3 Multilevel model for twin data predicting voter turnout among native and immigrant adolescents ($N = 3,756$).

Measure	Model 4	Model 5	Model 6
Constant	0.70*	0.69*	0.69*
Age	0.01*	0.01*	0.01*
Female	-0.03*	-0.03*	-0.03*
First generation	0.05	0.07	0.06
Second generation	-0.05	-0.03	-0.06
2.5th generation	0.02	0.03	0.03
Mother's turnout	0.11*	0.11*	0.11*
Father's turnout	0.05*	0.05*	0.05*
First gen. * Mother's turnout	0.02	0.03	0.03
Second gen. * Mother's turnout	-0.11*	-0.11*	-0.11*
2.5th gen * Mother's turnout	-0.07*	-0.07*	-0.06*
Mother's political interest	0.05*	0.04*	0.03*
Father's political interest	0.03*	0.03*	0.02*
Mother's political participation	0.04	0.03	0.03
Father's political participation	0.01	-0.00	-0.00
Child's social engagement		-0.14*	-0.12*
Parental education			0.01*
Parental employment			0.03
Parental occupation status			0.00*
A	0.058	0.055	0.054
C	0.000	0.000	0.000
E	0.085	0.085	0.084

* $p < 0.05$.

effects are notoriously difficult to capture in survey-based research (Knopik et al., 2017), unpacking the concept of exposure to different socialization agents might be key to understanding how second-generation immigrants develop their political behavior. In addition to external environmental events, factors embedded at the individual level, such as perceptions and motivations (Hatemi and Ojeda, 2021), which can explain the internalization of external experiences, may play a vital role in understanding how second-generation immigrants develop their electoral behavior. Therefore, future research that includes data enabling a direct representation of competing socialization pressures, individual experiences, and psychological traits may offer further insights into the research questions addressed in this paper and improve upon the current study.

Although the data used were well-suited to address issues of biological similarity within families, they have limitations in capturing migrant-specific variables that could clarify the circumstances immigrants experience and that may contribute to the observed patterns. Another limitation of this study is the relatively small sample size of citizens of immigrant origin, which constrains our ability to examine differences within the immigrant-origin subsamples. Hence, data that include a larger sample of citizens of immigrant origin and encompass a broader range of variables capturing the systematic differences between first- and second-generation immigrant children are crucial for understanding the observed intergenerational transmission gap. Furthermore, incorporating cross-national data could enhance our understanding of differences across national contexts.

To our knowledge, this paper is the first empirical study to examine the impact of immigration on the intergenerational transmission of voter turnout while accounting for both social learning and genetic similarities within families. Although there is still much to learn about how immigrants develop their political orientations and behaviors, our findings suggest that an immigration background may systematically influence the process of political socialization.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: <https://www.twin-life.de/twinlife-series>.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and

institutional requirements. Written informed consent from the participants or participants legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

ML: Writing – original draft, Writing – review & editing. CS: Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpos.2024.1472040/full#supplementary-material>

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