# RESEARCH NOTE 🕕 😋



# Parental income moderates the influence of genetic dispositions on political interest in adolescents

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#### Abstract

The political involvement of adolescents is characterized by a substantial socioeconomic gradient already at a young age with enduring effects into adulthood. This study investigates whether high parental income creates an enhancing environment that increases the influence of genetic dispositions on political interest using the German TwinLife study (2014–2020, age 10–29, n = 6,174, 54% female, 19% migration back-ground). While 30–40% of the total variance in political interest of twin adolescents (age 10–18) can be attributed to genetic influences, a gene–environment interaction model shows that this share is much lower among poor compared to rich families. Family fixed-effects models among early adults further show no significant effect of income differences on political interest after controlling for family background and genetic influences. This study suggests that the income gap in political participation cannot be fully understood without accounting for life cycle processes and genetic background.

Keywords: adolescence; genetic dispositions; income; political interest; twin research

# Introduction

The income participation gap is a stylized fact in political science. Citizens with higher income, on average, tend to be more politically engaged (Dalton, 2017; Gallego, 2015; Schlozman et al., 2012). Recent evidence shows, however, that differences between the rich and the poor are not due to changes in income among adults but are likely the result of different socialization experiences during childhood and adolescence (Jungkunz and Marx, 2022, 2024). Parental socioeconomic status is therefore often considered a prime reason for differences in political involvement.<sup>1</sup> These findings based on mean differences neglect, however, that variation in political traits is strongly influenced by genetic heritage (Alford et al., 2005; Fowler et al., 2008; Klemmensen et al., 2012b). In fact, genetic influences often explain a larger share of variance in various political attitudes and orientations than siblings' shared environmental experiences, for example, characteristics in the parental household (Dawes et al., 2014; Hatemi and McDermott, 2012). Furthermore, parental background might provide conditions that make it more or less favorable for genetic influences to affect the development of political involvement (Manuck and McCaffery, 2014; Shanahan and Hofer, 2005). Not accounting for genetic influences might therefore inflate the effect of circumstances in the parental household during political socialization.

<sup>1</sup> Chis article was awarded Open Data and Open Materials for transparent practices. See the data availability statement for details.

<sup>&</sup>lt;sup>1</sup>In the absence of a universally accepted terminology in the study of political behavior, we define "political involvement" broadly to include cognitive, emotional, and behavioral engagement with politics. Under this definition, political interest is a nonbehavioral aspect, whereas political participation is a behavioral component of political involvement.

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In this paper, we investigate the interplay of (parental) income and genetic dispositions in shaping of political involvement. Concretely, we address two question. First, how does the influence of genetic dispositions change across the income scale? And, second, does income retain any explanatory power after controlling for these dispositions? To do so, we use data from the German TwinLife study that sampled children, adolescents, and young adults along with information about their parents and siblings. Our results regarding the first research question show that the influence of genetic heritage on political interest increases substantially with parental income. This indicates that a favorable socioeconomic environment can enhance the impact of genetic dispositions to develop political involvement. Conversely, poverty may be such a powerful negative environmental influence that the effect of genes is suppressed. To address the broader implications of this result for the socialization process, we ask in a second step whether income differences matter above and beyond genetic disposition. This is done with family fixed-effects models among early adults. They support previous research and show no significant effect of income differences on political interest after controlling for family background and genetic influences. We therefore conclude that unequal political interest is primarily shaped by preadulthood influences.

#### The relationship between genetic influences, parental income, and political involvement

Genetic influences account for substantial variation in a large number or political traits such as interest in politics (Klemmensen et al., 2012b; Kornadt et al., 2018; Weinschenk et al., 2019; van Ditmars and Ksiazkiewicz, 2024), political efficacy (Klemmensen et al., 2012b), political knowledge (Arceneaux et al., 2012), political ideology (Alford et al., 2005; Funk et al., 2013; Hufer et al., 2020), strength of party identification (Hatemi et al., 2009a), and social and political participation and voting (Jæger and Møllegaard, 2022; Kornadt et al., 2018; Weinschenk et al., 2019, 2023). Typically, estimates range between 30 and 60% of explained variance of the respective attitude or behavior. In contrast, most studies find only a limited impact of shared environmental factors such as the parental household. At first sight, this contradicts many empirical findings in political science and sociology that assign a substantial role to parental background in shaping political socialization (e.g., Janmaat and Hoskins, 2022; Jungkunz and Marx, 2024; Lahtinen et al., 2019).

Both findings can, however, coexist if we consider the influence of genes not deterministically, but as dispositions interacting with environments. Genetic dispositions make it more likely to develop a certain political attitude or behavior (Suhay and Jayaratne, 2013). However, they usually require a favorable environment to unfold their impact (Manuck and McCaffery, 2014; Rabin, 2021; van Ditmars and Ksiazkiewicz, 2024). Similar genes may thus cause different political involvement depending on the social environment in which children are raised. Although previous research indicated that the effect of genetic influence may vary by context (Dinesen et al., 2016; Fazekas and Littvay, 2015; Klemmensen et al., 2012a), so-called gene–environment interactions (GxE) have rarely been used in political science thus far (but see van Ditmars and Ksiazkiewicz, 2024; Hatemi, 2013; Fazekas and Littvay, 2015; Smith et al., 2012; Verhulst and Hatemi, 2013). For instance, Hatemi (2013) found that life events can moderate the impact of genetic dispositions on economic attitudes like support for capitalism or socialism.

The few existing adoption studies further emphasize that both prebirth (i.e., genetic influences) and postbirth factors (i.e., environmental influences) play a substantial role in shaping the likelihood to vote. In particular, they find that the impact of the postbirth environment on turnout is higher among adoptees whose biological mothers do not vote, indicating that there are interactions between the preand postbirth influences (Cesarini et al., 2014; Oskarsson et al., 2022). As a result, the significance of environmental factors was probably understated in many previous studies that solely looked at the environment's direct effects and ignored how they may have a moderating role on genetic dispositions.

In theory, there are multiple possibilities *how* the environment can interact with genetic influences (Shanahan and Hofer, 2005; Reiss et al., 2013). For the present research question, there are two broad possibilities. First, the relevance of genetic disposition might increase with socioeconomic status. This could be the case if the effect of genetic dispositions requires an *enhancing context* to unfold, for example,

through the political stimulation in an educated and affluent household. Relatedly, poverty might be a *constraining context* that crowds out any favorable disposition, for example, through the stress that comes with economic worries. Also in this case, the weight of genetic factors should increase with income. Put differently, such an environment could then be a precondition for variation to occur. Second, socioeconomic status could have a *compensatory* function that corrects unfavorable dispositions. In this case, genetic differences would explain variation among the poor, but their influence should decline as income increases.

A priori, the first perspective seems a more reasonable expectation. In a related study, van Ditmars and Ksiazkiewicz (2024) find that genetic factors matter more for boys' than for girls' political interest, arguably because gendered socialization creates more favorable contexts for the former. For other dependent variables, the moderating influence of parental socioeconomic status also often takes the form of an enhancement process. Previous research has shown, for instance, that favorable socioeconomic conditions in childhood can provide an enriched environment in which children can better realize their genetic potential for IQ development (Scarr-Rowe hypothesis, see Rowe et al., 1999; Scarr-Salapatek, 1971; Bates et al., 2013) and other mental abilities (Tucker-Drob et al., 2011).

Thus, we would expect that higher parental income should also increase the effect of genetic dispositions on political interest, whereas unfavorable socioeconomic circumstances weaken the effect. The latter is particularly plausible in light of existing evidence. Much research has shown that childhood poverty is a highly constraining context for political socialization (see Jungkunz and Marx, 2024, for a discussion and an overview of the literature).

# **Research design**

To study the genetic foundations and contextual influences of adolescents, we use data from the German TwinLife project (Diewald et al., 2023), which is increasingly used in political psychology (van Ditmars and Ksiazkiewicz, 2024; Hufer et al., 2020; Weinschenk and Dawes, 2019). TwinLife is a panel study of same-sex twins that started in 2014 with four cohorts with an average age of 5, 11, 17, and 23 years. The study includes responses from twins and first-degree family members like parents and siblings, and the main question-naire is conducted via face-to-face interviews every 2 years. The TwinLife study and the respective experimental protocols received ethical approval from the German Psychological Association (protocol numbers: RR 11.2009 and RR 09.2013). Informed consent was obtained from all subjects and/or their legal guardian(s). Detailed information is provided by Mönkediek et al. (2019) and Lang and Kottwitz (2020).

What makes TwinLife such a unique and valuable twin study for political socialization research is the age composition of the sample. It samples a large number of twins at very young age and follows them throughout adolescence into early adulthood. Prior research has shown that adolescence is the time in which children's attitudes are particularly malleable before crystallizing in prime age (Deth et al., 2011; Dinas, 2013; Hatemi et al., 2009b). Thus, it is particularly important to study the influence of genetic dispositions at a time when they can (potentially) have the greatest effect on children's attitudes.

We capture political involvement through political interest, which was measured on a 4-point scale from no to very strong interest in politics. To investigate the moderating role of parental income on the development of political interest, we use the equivalized household income. A detailed summary of all variables and question wording can be found in the Supplementary Material.

We proceed in two steps. First, we decompose the variance of political interest of adolescents (cohort 2 and 3, starting age 11 and 17 years) into genetic and environmental influences using the Classical Twin Design (CTD; Medland and Hatemi, 2009). The CTD is based on a comparison between monozygotic twins (MZ) that share 100% of their genes and dizygotic twins (DZ) that share 50% of their genes. It allows us to decompose the variance of political interest into additive genetic influence (A), shared or common environment influences (C), and nonshared or unique environmental influences (E)<sup>2</sup>

 $<sup>^{2}</sup>$ We perform all analyses in *R* (R Core Team, 2023) via *umx* (Bates et al., 2019). Technically, we use structural equation modeling to estimate two-group ACE models based on variance in political interest.

(see Verhulst et al., 2019). Common environmental factors affect both twins similarly (e.g., parental education or wealth), whereas unique environmental influences are experiences that are individual to each twin (e.g., selection of partners or participation in social activities).

Four assumptions underlie such ACE models (Plomin et al., 2013): First, it is assumed that genetic effects are additive and do not interact with each other. The equal environment assumption assumes, second, that MZ and DZ twins are treated equally by their environment (Scarr and Carter-Saltzman, 1979). While this has been debated in the literature (Horwitz et al., 2003), current research assumes that different treatment between MZ and DZ twins is empirically either not the case or unrelated to the development of political attitudes (Conley et al., 2013; Littvay, 2012; Smith et al., 2012). Third, the model assumes that there is no assortative mating between parents of twins. Nonrandom mating would potentially increase the shared environmental influences in DZ twins. However, assortative mating is widespread, for example, based on education (Blossfeld, 2009). We therefore use a correction formula  $0.5 + 0.5 \times h_0^2 \times r_p$  where  $h_0^2$  indicates the relative share of variance of the genetic influences without assortative mating and  $r_p$  the correlation between the political interest of the mother and the father.<sup>3</sup> Fourth, the basic model assumes that there are no gene-environment interactions or correlations. This would imply that the genetic influence on political interest is independent of common or individual environmental circumstances. As we are interested in such a GxE, we relax this assumption throughout the analysis.

ACE models generally tell us how much variance can be attributed to genetic and environmental influences—and how the weight of these components varies across parental income. This is important information, for example, on the size of a potential omitted-variable bias in analyses of political socialization not accounting for genetic disposition. What ACE models do not tell us directly is how much explanatory power socioeconomic background, as a specific environmental factor, retains after accounting for genetic variation. In other words, we still do not know how *changes* in income affect *changes* in political interest when controlling for genetic dispositions. If we want to identify, with a higher degree of certainty, the causal influence of income or other socioeconomic factors, this ultimately is the key question. In a second step, we then use the cohort of early adults (starting age 23) to further test whether income differences result in different degrees of political interest after controlling for shared parental environment in childhood and shared genetic dispositions. Early adulthood is an interesting stage of the life course. It is the time when many young adults have already entered the labor market and earn their own personal income, but where political attitudes are still relatively malleable (Emmenegger et al., 2017).

We run family fixed-effects models to estimate the impact of personal income on political interest, which can more credibly be interpreted as causal. These models control for all aspects that are shared by twins and non-twin siblings, for example, their family background. Since previous research has shown that influencing factors of political participation (e.g., education) are not just confounded by characteristics in the family household but also substantially confounded by genetic dispositions (Ahlskog, 2021; Dinesen et al., 2016), we then restrict the sample further to DZ and MZ twins. This is sometimes called discordant twin design or co-twin control design (McGue et al., 2010; Weinschenk et al., 2021). Using MZ twins as counterfactuals eliminates potentially confounding genetic influences more effectively. We acknowledge that fixed-effects models have limitations of their own. They are still a correlational approach based on variation that is not shared across the siblings, even when they address common familial factors. Moreover, because the discordant twin design is a fixed-effects model, any issues with attenuation bias resulting from measurement error would be exaggerated. Therefore, attenuation bias, family confounding (genes, socialization, etc.), or a mix of the two may be responsible for the observed decline in effect estimates when comparing the naive ordinary least squares (OLS) models to the discordant twin models. That said, we want to underscore that our findings below are in

 $<sup>^{3}</sup>$ We find a weak correlation between the political interest of the father and the mother of the twins (*r* = 0.180), which results in an adjusted genetic correlation for political interest among DZ twins of 0.518. Empirically, this minor difference has no substantial effect on our results compared to models without assortative mating correction.

	Pooled Under 18		Wave 1						
			Cohorts 2 and 3		Cohort 2		Cohort 3		
A	0.385	(0.277; 0.494)	0.379	(0.241; 0.520)	0.375	(0.158; 0.593)	0.379	(0.185; 0.581)	
С	0.136	(0.046; 0.225)	0.137	(0.019; 0.251)	0.094	(0.000; 0.263)	0.121	(0.000; 0.286)	
E	0.479	(0.446; 0.515)	0.484	(0.443; 0.531)	0.531	(0.462; 0.613)	0.500	(0.445; 0.565)	
r(MZ)	0.525		0.526		0.462		0.522		
r(DZ)	0.331		0.327		0.295		0.305		
N <sub>MZ</sub>	1493		919		421		498		
N <sub>DZ</sub>	1991		1182		620		562		

Table 1. ACE model for political interest by cohort

Note. ACE model of political interest corrected for assortative mating. A indicates genetic influences, C influences of the shared environment, and E unique environmental experiences. The mean age is 11 for cohort 2 and 17 for cohort 3. Entries for A, C, and E refer to the percentage of variance as part of the total variance of political interest. r(MZ) and r(DZ) indicate the correlation in political interest among MZ and DZ twins. N refers to the respective number of twin pairs. Pooled results based on respondents under the age of 18, that is cohort 2 from all waves (starting age 11) and cohort 3 from the first wave (starting age 17).

line with a long list of previous evidence that points toward a strong influence of parental income on political socialization during adolescence (see further Jungkunz and Marx, 2024). Technically, we then assume that each twin is nested in a given twin pair and serves as control for the respective other twin. Thus, we can identify the effect of twin differences in unique environmental factors on political interest.

#### Results

Table 1 shows the results from the ACE models by cohort. The estimates in the left column are based on respondents under the age of 18 in the entire TwinLife data clustered in families and wave. The remaining columns show the results from the first wave, which provides the largest sample size of all waves and which is not subject to potential panel attrition. Overall, we find that about 38% of the variance of political interest of adolescents can be attributed to genetic dispositions, around 9–14% to shared environmental circumstances, and about 48–53% to unique environmental experiences. These estimates are quite similar across cohorts.<sup>4</sup>

These patterns have important implications for research on political involvement, namely that a substantial share of political interest in adolescents can be attributed to genes. For example, our genes may influence curiosity about complex processes or the willingness to engage in social exchange, which are essential for the acquisition of political sophistication. Although the larger share of variance can be attributed to environmental factors, researchers should keep in mind that the unique environment E is a residual category that includes measurement error and therefore might be inflated. Against this background, the influence of genetic factors is substantively large.

But our main question concerns the interaction of genetic factors with income. Figure 1 shows the results of the ACE decomposition by parental income for the pooled cohorts 2 (starting age 11) and 3 (starting age 17). We report full estimates and model comparison test in the Supplementary Material. In line with our expectation, genetic influences account for little variation when parental income is low ( $\beta_A = 0.446, 95\%$  CI [0.369, 0.523];  $\beta_{AXIncome} = 0.085, 95\%$  CI [0.022, 0.148]). For instance, when parental income is one standard deviation below the mean, genes account for only about 23% of the total variance in political interest. The shared/unique environment accounts for 24/53% ( $\beta_C = -0.258, 95\%$  CI [-0.372, -0.143];  $\beta_{CXIncome} = 0.108, 95\%$  CI [0.015, 0.200]). This observation is consistent with the

<sup>&</sup>lt;sup>4</sup>We provide additional model comparison tests in the Supplementary Material. In addition, we find that the influence of genetic dispositions increases somewhat but not significantly over time in cohort 2. This is in line, for example, with Hatemi et al. (2009b) who find that genetic influences on political ideology increase with age.



Figure 1. ACE decomposition by parental income. *Note:* Share of variance in twins' political interest that is explained by genetic (green), common environmental (orange), and unique environmental (purple) factors. Corrected for assortative mating. Pooled results based on respondents under the age of 18, that is, cohort 2 from all waves (starting age 11) and cohort 3 from the first wave (starting age 17). The model is based on 1,111 MZ twin pairs and 1,512 DZ twin pairs.

argument that poverty is such a detrimental environment for political socialization that favorable dispositions are constrained. The pattern changes substantially for children with parents of high income (one standard deviation above the mean). Here, genes account for 51% of the variance in political interest and the shared environment only for 4% (the share of the unique environment decreases slightly to 45%). Genetic dispositions for political engagement thus seem to require an enhancing socioeconomic environment to unfold their effect.

The results are fairly similar when analyzing only the first wave. However, while the effect on genetic dispositions is quite similar ( $\beta_A = 0.424, 95\%$  CI [0.304, 0.544];  $\beta_{AxIncome} = 0.129, 95\%$  CI [0.031, 0.228]), the negative effect on the shared environment is slightly stronger ( $\beta_C = -0.259, 95\%$  CI [-0.431, -0.087];  $\beta_{CxIncome} = 0.176, 95\%$  CI [0.057, 0.296]). Socioeconomic circumstances in the household hence seem to matter more in early adolescence (see Figure B.2 and Tables B.11 and B.12 in the Supplementary Material). Although the differences are not statistically significant, this is in line with previous research. Both social and biological factors, such as parental socioeconomic position and cognitive or personality traits (that are related to political interest), have heterogeneous impacts across the life cycle that are most noticeable in childhood and adolescence (see Reiss et al., 2013).

As discussed in the beginning of this paper, prominent perspectives in political science stipulate an influence of income and other socioeconomic factors on political involvement—be it directly or through unequal socialization experiences. What do our results mean for this assumption of a causal role of income in shaping political interest? While previous research found substantial differences between income groups, cross-sectional data usually does not allow controlling for a variety of aspects that shape political socialization. This includes parents' socioeconomic situation, parenting styles, and in particular the genetic heritage that we showed to matter above. The twin data allow us to account for all of these aspects. We can, hence, greatly reduce omitted variable bias and approximate a causal test of income effects on political interest.

A particularly suitable way to isolate income effects are family fixed-effects models. By exclusively leveraging variation within siblings (e.g., within a twin dyad), such models eliminate all factors the

	OLS	Family fixed-effects				
	All	All	DZ	MZ		
Income	0.113***	-0.001	-0.018	0.068		
	(0.018)	(0.039)	(0.069)	(0.063)		
Constant	2.045***	2.237***	2.278***	2.073***		
	(0.035)	(0.068)	(0.117)	(0.107)		
Ν	1825	1825	773	876		

Table 2. Family fixed-effects models of political interest on income

Note. Family fixed-effects models indicating the effect of income on political interest with standard errors in parentheses. Income is measured as equivalized gross household income in 1000 Euro. Models "All" include siblings and all forms of twins, "DZ" models include only dizygotic twins, and "MZ" models include only monozygotic twins. Results based on cohort 4 (early adulthood) and pooled waves 1–3. Respondents are nested in families and waves \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

respective siblings have in common as potential confounders. This includes the shared family environment for siblings in general; the timing of socialization for DZ twins; and, additionally, the genetic dispositions for MZ twins. Table 2 shows the family fixed-effects models from cohort 4 (early adulthood) across the pooled waves 1–3. We restricted the sample to families in which all siblings were employed, and none was currently in higher education or training (which might bias the effects of income differences).<sup>5</sup> The mean age of cohort 4 in the first wave is about 23 years in the first wave. Due to sample size, we combine all three waves and cluster respondents in families and waves. We report descriptive between- and within-variance of income in Table A.3 in the Supplementary Material. Furthermore, we omitted respondents with very low reported income (personal gross income below 450 euros), as these could stem from measurement error which could inflate within-variation. Robustness checks in Table C.2 including these respondents does not alter the main pattern of our findings.

Family fixed-effects certainly produce conservative models, as much variance in income is disregarded. Twins, and siblings in general, tend to make similar socio-economic experiences. A withinbetween decomposition of the variation in income (Table C.1 in the Supplementary Material) shows that the contribution of differences *across* families is, unsurprisingly, considerably larger than of difference *within* families. The standard deviation of the former is 922.17 euros compared to 359.20 euros for the latter. On the one hand, this is a restriction of our analytical leverage, which would be higher had we more identical twins with vastly different socioeconomic circumstances in our data set. On the other hand, this is a finding with real-world relevance in its own right. It reminds us that income and other socioeconomic factors, which are prominent variables in political behavior research, have been shaped by preadulthood forces that we often cannot include in our models.

Starting with the naive OLS model as a benchmark, we replicate the commonly observed income gap. Political interest is greater for respondents with higher income (b = 0.113, p < 0.001). In the most basic family fixed-effects model, twins and siblings are nested in families so that we can control for parental socioeconomic background. Restricting the model to only DZ twins further allows us to control for parental upbringing, whereas restriction to MZ twins also controls for genetic dispositions. We find no significant effects of income differences on political interest in early adulthood in any of the models. This likely means that the often-observed income gradient in political involvement is already caused by socioeconomic circumstances in childhood and adolescence. These results are basically identical when

<sup>&</sup>lt;sup>5</sup>We acknowledge that excluding cases in which one sibling pursues a form of higher education (roughly 25 percent) may lead to some sort of bias. However, we would assume that the effect of income on political interest should be particularly strong among respondents with lower education, as individuals with higher educational degrees (or seeking higher education) likely have higher levels of political interest to begin with. In our sample, the mean political interest of the sample used for the fixed-effects models is 2.235, whereas the mean is 2.432 for those excluded from the sample (mean difference: -0.197, p < 0.001). Thus, the exclusion should rather lead us to be able to detect effects more easily.

we operationalize socioeconomic factors differently, for example, as subjective income satisfaction or as being employed (see Tables C.3 and C.4 in the Supplementary Material).

# **Discussion and conclusion**

Previous research on the income-participation gap has paid little attention to genetic influences. Our results show that economic hardship undermines the influence of genetic dispositions on the development of political interest in adolescence, whereas favorable economic conditions in the parental household facilitate the relationship. These findings are in line with research that showed that parents' economic worries have a negative impact on family life and parenting styles (Mauno et al., 2017; Schenck-Fontaine et al., 2020; Voydanoff, 2004), which can hamper the development of cognitive and noncognitive skills in the long run (Clark et al., 2021; Dahl and Lochner, 2012; Gershoff et al., 2007). Because such skills have been shown to be crucial for the development of political involvement (Deary et al., 2008; Holbein, 2017), we find it plausible that poverty is so detrimental for political socialization that it impedes genetic variation to unfold.

A normative implication of this finding—and one that is often emphasized by social scientists—is that reducing child poverty should translate into a desirable increase of democratic engagement in the population. A less often considered implication is that poverty reduction would, at the same time, increase political inequality by genetic background. To better understand this tension between socio-economic and genetic inequality, the social sciences will have to overcome the still widespread aversion to biological explanations. We still have a lot to learn about how genetic factors interact with material living conditions in shaping political inequality over the life course.

An empirical implication of our findings is that income is a questionable predictor of political engagement when used in cross-sections of adults. When one accounts for the joint influence of socialization and genes, as we do with twin fixed-effects, there is no remaining effect of income. The socioeconomic gradient can arguably not be fully understood when life cycle processes and genetic background are ignored. Future research on this topic will have to a) spell-out more clearly which causal pathway is assumed to link income and politics and b) use suitable methods to identify these mechanisms.

Our findings come with some limitations. Most importantly, although core social inequality and sociodemographic indicators in the TwinLife are comparable to the official German Microcensus figures (Lang and Kottwitz, 2020), twins might still be different compared to nontwins in terms of other, less easily measurable characteristics (Hagenbeek et al., 2023). Such differences are not necessarily problematic if they are unrelated to political involvement, and it has also been shown that twins do not differ from singletons in terms of internalizing or externalizing problem behavior (Pulkkinen et al., 2003). It may, however, be the case that growing up with a sibling at the same age affects socialization behavior which can impact political socialization as well (Christensen and McGue, 2020). Future research should therefore connect findings from twin studies and larger, population-wide studies to increase the validity of the findings. We would like to emphasize, however, that our main finding highlighting poverty as a constraining context for political socialization is in line with previous results based on observational data on young citizens (Jungkunz and Marx, 2024; Abendschön and Tausendpfund, 2017) and natural experiments (Akee et al., 2020).

Supplementary material. The supplementary material for this article can be found at http://doi.org/10.1017/pls.2025.1.

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Competing interest. The authors declare no competing interests exist.

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