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DISCUSSION PAPER SERIES

IZA DP No. 17818

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ABSTRACT

Political Socialization and Social Networks

The literature on political socialization highlights the importance of parents and friends, but it is rare to find studies analyzing these socializing agents in the same model. In contrast, friends are often limited to one or a few friends that may not account for the actual effect of friends. The reason is that standard datasets do not collect information on the entire network of people's friends. Importantly, having an incomplete network can lead to biased estimates of network effects. To overcome this problem, we surveyed 419 students who recruited an additional 4500 social contacts who answered a shorter survey. Controlling for potentially endogenous network formation and using second-order peers to instrument for direct network effects, we find important political socialization from parents and friends on anti-immigrant sentiment and voting intentions among the students we survey. We also show that results differ if we only examine the impact of classroom peers, as is typically done in the literature. Surveying social contacts is a promising way to reach a complete social network, which overcomes data limitations in the current political socialization literature.

Keywords: political socialization, social interactions, anti-immigrant sentiments, authoritarianism, voting intentions

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1. Introduction

Seminal research on political and social attitudes pinpoint adolescence as a critical period for forming attitudes and political values (Krosnick & Alwin, 1989; Alwin & Krosnick, 1991). Moreover, attitudes developed during the formative years are difficult to change (e.g., Newcomb, 1967; Grasso et al., 2019; Kiley & Vaisey, 2020). A critical question has been who and what influences such attitudinal formation. (Neundorf & Smets, 2017). Children and adolescents learn from socializing agents, such as family, peers, school, and media, where they observe and imitate behavior to adopt similar political values later.

Nevertheless, due to methodological challenges, previous research has struggled to account for key socializing agents, like parents and friends. In particular, it is difficult to collect data on an individual's entire network of friends in a survey setting, and previous research has shown that respondent-reported measures can lead to biased results (Westholm, 1999; Boonen et al., (2017). For this reason, past studies have typically examined a small part of an individual's social network, for example, the impact of parents, a best friend, or classmates (Van Ditmars, 2023; Tyler & Iyengar, 2023; Kuhn, 2004; Tedin, 1980).

In this paper, we overcome these previous limitations by designing a survey that attempts to capture a complete social network for a non-random sample of students. In particular, we recruited students in a first-year statistics course at the University of the Balearic Islands (UIB), Spain, to participate in a survey. Four hundred nineteen (72% out of 582) students completed the survey and were instructed and incentivized to send invitations to friends, parents, and siblings to complete a shorter survey. The invitation procedure resulted in 4,559 responses from social contacts: 3,751 friends, 529 parents, and 279 siblings.

We then use this data to examine the effect of friends and parents on three key attitudes among sample students: anti-immigrant sentiment, authoritarianism, and voting intentions. While our surveying approach allows us to measure an approximation of each individual's entire friendship network, in order to estimate peer effects, we need to account for the fact that friendship networks are not exogenously formed and that friends influence each other in a circular way (the famous reflection problem highlighted in Manski, 1993). We do this using a two-step process. First, we estimate the likelihood of friendship formation, focusing on the role of homophily in personality traits, age, gender, nationality, and language in explaining the presence of friendships. Then, we estimate a linear-in-mean model of peer effects that accounts for the endogeneity of networks using a control function approach and the reflection problem by instrumenting direct network effects using second-order peers (i.e., friends of friends and parents of friends).

We find important political socialization from parents and friends on anti-immigrant sentiment and voting intentions among our survey students. A standard deviation increase in parents' anti-immigrant sentiments increases the students'

corresponding sentiments by 0.20. The effect from friends is even more prominent, with a magnitude of 0.33. A percentage increase in voting intention on PP (a conservative right-wing party) or Vox (a far-right nationalist party) of the parents increases the student's probability to declare voting intentions on the same parties by 0.0045. The effect from friends on the same probability is 0.0053.

Our paper contributes to a large literature on political socialization. Several papers focus only on intergenerational influences as data is more straightforward to collect and endogeneity problems less (e.g., Van Ditmars, 2023; Tyler & Iyengar, 2023; Kuhn, 2004). Others examine pre-defined limited friendship networks, for example, Van Zalk et al. (2013) used longitudinal data for a community sample from 7 high schools in a mid-sized city in Sweden, where up to 13 friends were allowed to be nominated, Miklikowska (2017) collected data from three Swedish high schools where up to eight best friends were nominated. A subset of papers examines exogenous but limited friends' networks, for example, from the random assignment of college roommates (Strother et al., 2021) or to a university preparation class (Algan et al., 2020).

Strother et al. (2021) find that students move towards their roommates' political ideology during the first year of college, but they find no effect on students turning politically more liberal. Algan et al. (2020) conclude that "friendships cause a substantial reduction in the gap between students' political views." Van Zalk et al. (2013) report that friends' xenophobia was found to increase adolescents' xenophobia, and the corresponding result was found for tolerance. Miklikowska (2017) finds that parents and peers predict adolescent anti-immigrant sentiment changes. Peers were limited to one nominated friend, and the effect was only found in early adolescence. Tedin (1980) finds stronger influences from parents concerning partisanship, concluding that the friend's effect is "essentially spurious." Only the best friend was, however, used in the analysis. Concerning one particular issue (marijuana laws), the influence of parents and the best friend was found to be "moderately high and virtually identical." It is difficult to compare the magnitude of the effects in the literature because of differences in estimation technique, variable definitions, and availability of socializing agents.

The past literature has rarely examined an individual's complete socialization network. Even when data is collected on parents and friends, only one or a limited number of friends are often included, leaving out large parts of the friendship network. Our findings show that having information on only a limited part of the network of friends can lead to biased results. Using only one friend as a proxy for all friends' political values introduces a measurement error problem, which, in our cases, underestimates the effect by 9%, 27%, and 28% for voting intentions, anti-immigrant sentiments, and authoritarianism, respectively. When the collected data does not include friends' friends, who are not the respondent's friends, it is not possible, unless an alternative instrumental variable is introduced, to consider the endogeneity of the friends' political values. We emulate this situation by estimating models assuming exogeneity, and we find that this underestimates the effect by 25% for anti-immigrant sentiments. For voting intentions, assuming exogeneity implies underestimating the effect by 32%.

These results indicate that measurement error is an important concern. Assuming exogenous friendship ties have, in our cases, an insignificant influence on the effects of friends' political values.

While the friendship networks on which we collect data are self-recruited and the survey self-administered, this process has three potential advantages over other potential approaches for collecting information from social networks. First, it simplifies the data collection as we do not need to approach the social network connections. Second, it should provide better coverage of each individual's friends network. Third, the trustworthiness of the friendship connections should increase the willingness of friends to dedicate a short time to answering a survey, increasing the response rate.

Section 2 presents the survey procedure and data we used. Section 3 provides the methodology. Section 4 includes the results, while section 5 provides conclusions.

2. Data

2.1 Our Survey

All students in the first-year statistics course "Analysis of Economic Data" (at the University of the Balearic Islands (UIB), Spain) were invited to participate in the survey at the initiation of the semester in February 2024. They could answer the survey during or outside class hours using published instructions. Students were incentivized to participate, and 419 out of 582 (72%) completed the survey. Participants were asked to name (using a 4-digit ID code) their friends within the same course, whom we call *nominated* peers, and invite parents, siblings, and peers outside the course to answer a shorter survey (about 12 minutes). The invitation process was also incentivized, resulting in 4,559 responses from social contacts: 3,751 friends, 529 parents, and 279 siblings. On average, each student recruited nine friends.[1] *Invited* peers refer to friends outside the subject.

2.2 Main Variables and Descriptive Statistics

Our survey collected information on demographics, personality characteristics, and political variables. In this paper, we examine the impact of socialization on anti-immigrant sentiments, authoritarianism, and voting intentions. These were chosen to provide evidence of socialization effects for an important social/political attitude (immigration), a core value/personality characteristic (authoritarianism), and vote choice.

[1]The link to the survey was made available on the project's web page, and sharing the survey was made easy with a WhatsApp icon. Most students answered the survey and accessed the project web page from their smartphone, which made it very easy to share the survey. It was also possible to make invitations by e-mail. In this course, 10% of the final grade is from individual assignments. Individuals who participated in the survey received bonus points based on the number of social contacts recruited.

Anti-immigrant sentiment was measured with three questions where the respondents were asked to what extent they agree (on a Likert-scale) with the following statements: 1) Immigrants often come here just to take advantage of welfare in Spain, 2) It happens too often that immigrants have customs and traditions that do not fit into Spanish society, 3) Immigrants often take jobs from people who are born in Spain. Hjerm et al. (2018), Bohman et al. (2019), and Miklikowska et al. (2019) used these questions to measure anti-immigrant sentiments but referred to different countries. The answering options that we used were "strongly disagree", "disagree", "partially disagree", "neutral", "partially agree", "agree", and "strongly agree" and these categories were assigned values from 1 to 7. We measure anti-immigrant sentiments with the average from the three numerical representations of the variables.

We use a childrearing scale to measure authoritarianism. The respondents are presented with pairs of qualities for a child, and they are asked to select the most desirable value in each pair. We build on Englehardt et al.'s. (2023) version of the scale including the following pairs: "independence or *respect for elders*," "*obedience* or self-reliance," "curiosity or *good manners*," and "being considerate or *well-behaved*" "*orderly* or imaginative," "adaptable or *disciplined*," "*loyal* or open-minded," "free-spirited or *polite*." The pairs are then coded as dummy variables, and authoritarianism is measured as the sum, implying a scale from 0 to 8, where higher numbers indicate stronger authoritarianism. The formulation of the childrearing questions was slightly different for the parents compared to the students and their peers because of their young ages (as recommended in Stenner, 2005, pages 24-25). Traditionally, childrearing questions are formulated concerning the preferred characteristics of children. However, as the students themselves and their peers are young, we refer instead to "most appealing characteristics" without mentioning children.

Voting intention was collected with the question, "Assuming that general elections were held tomorrow, that is, for the Spanish Parliament, which party would you vote for?". A list of all parties currently available in the Spanish Parliament followed, with the addition of an option with an open answer of "other" (and the possibility to fill in any political party). The Spanish Socialist Workers' Party (PSOE), Sumar, People's Party (PP), and Vox are the largest parties, but the parliament also includes representation from eight smaller political parties. The current government consists of PSOE, a center-left party, and Sumar, a left-wing party, with support from the smaller parties, and the opposition is found in PP, a conservative right-wing party, and Vox, a far-right nationalist party. We formalize the dependent variable as voting intentions on PP or Vox because the opposition is more homogeneous than the government with its supporting heterogeneous parties. In addition, there is a clear majority of opposition among the students in our data, and it is interesting to evaluate the effects of friends in this setting. 38.6% of the students supported PP and 18.7% Vox. PSOE had support from 23.0% and Sumar by only 3.6% of the students. 16.1% was found among the group "other," which includes blank votes.

Our analysis also controls for typical background characteristics, including age, gender, and language spoken at home. We also measure the school environment and collect the big-5 personality traits using a 10-item short version as in Rammstedt & John (2007). We constructed a measure on an authoritarian school environment by using a list of qualities children can be encouraged to learn, and we asked the students for the perception of how important each was for teachers and adults at the school to educate the students following the characteristics. Details concerning the exact questions in the survey and further calculations in preparing the variables can be found in the Appendix.

In our models below, we use information on students' direct social networks (their parents and friends) and indirect networks, e.g., friends of friends and parents of friends. While the total number of social contacts that answered the survey is very high, not all students nominated other students in the subject as friends or had social contacts that answered. The model requires key variables from nominated peers, parents, and invited friends. For example, 189 (45.1%) of the students did not nominate friends, or the nominated friend(s) did not answer the questions related to anti-immigrant sentiment. It is unclear if they did not consider themselves to have a friend in the subject or if the need to look for the friend(s) four-digit ID code was considered too demanding. Moreover, 147 (35.1%) had no parent who answered this question. 165 (39.4%) of the 419 students had answers from at least one nominated friend (inside the subject) and at least one invited parent. These and other non-response patterns imply that the analyzed sample for most models is below 165, depending on the variables. Sample attrition due to non-response on other variables is generally small but slightly reduces the sample. The situation is similar to the authoritarianism scale, which includes 167 (39.9%) students with answers from at least one parent and at least one nominated friend. The corresponding sample size for the voting intention is 155 (37.0%).

Table 1 presents descriptive statistics for the full sample of students and the subsamples used in our primary analysis. While the sample size is substantially reduced in the estimated models, the descriptive statistics for the samples are very similar. The only variable that is an exception is age. The average age among the students is 19.7 in the whole sample, while about 19.0-19.1 in the analyzed samples. In the Appendix, we include formal models of data retention, and we confirm that age has an effect significantly different from zero. This conclusion can be explained by the fact that older students tend to nominate fewer or no friends, which is key for sample retention. However, the overall conclusion from that analysis is that there should be low concerns for bias due to the reduced samples.

Interestingly, the support for PP and Vox in the entire sample is much stronger among the students (57.3%) than among the parents (47.0%) and the invited friends (48%). A similar percentage is found for the analyzed sample. 41.5% of the entire sample is female, and the percentage is slightly higher for the analyzed samples.

Table 1. Descriptive statistics

	Full sample			Anti-immigrant sentiment			Childrearing scale			Voting intentions on PP or Vox		
	Obs.	Mean	St.d.	Obs.	Mean	St.d.	Obs.	Mean	St.d.	Obs.	Mean	St.d.
Anti-immigrant sentiment	412	3.630	1.442	148	3.617	1.506	149	3.606	1.507	132	3.662	1.524
Friends' anti-immigrant sentiments	230	3.611	1.187	148	3.608	1.229	151	3.596	1.224	133	3.620	1.232
Parents' anti-immigrant sentiments	272	3.327	1.279	148	3.200	1.243	150	3.213	1.241	132	3.181	1.245
Friends' friends' anti-immigrant sentiments	206	3.318	0.637	148	3.312	0.593	151	3.306	0.592	133	3.344	0.581
Friends' parents' anti-immigrant sentiments	188	3.263	1.127	136	3.252	1.052	139	3.258	1.042	121	3.336	1.022
Childrearing scale	419	4.723	1.846	148	5.034	1.700	151	5.000	1.705	133	5.053	1.662
Friends' childrearing scale	231	4.937	1.480	148	4.956	1.456	151	4.908	1.483	133	4.965	1.475
Parents' childrearing scale	280	4.634	1.781	148	4.726	1.729	151	4.748	1.718	133	4.749	1.715
Friends' friends' childrearing scale	206	4.748	0.619	148	4.837	0.570	151	4.826	0.571	133	4.849	0.563
Friends' parents' childrearing scale	190	4.969	1.385	137	4.865	1.305	140	4.889	1.307	122	4.931	1.215
Voting intention on PP or Vox	391	0.573	0.495	140	0.571	0.497	142	0.577	0.496	133	0.579	0.496
Friends' voting intention on PP or Vox	226	0.573	0.408	145	0.577	0.398	148	0.572	0.401	133	0.569	0.402
Parents' voting intention on PP or Vox	264	0.470	0.455	139	0.432	0.448	142	0.444	0.451	133	0.440	0.453
Friends' friends' voting intention on PP or Vox	206	0.481	0.209	148	0.491	0.199	151	0.489	0.201	133	0.500	0.199
Friends' parents' voting intention on PP or Vox	185	0.416	0.352	135	0.444	0.356	138	0.442	0.360	121	0.442	0.356
Authoritarian school environment	412	0.100	0.983	148	0.062	0.968	151	0.040	0.995	133	0.012	1.006
Age	416	19.707	3.196	148	19.115	2.308	151	19.113	2.294	133	19.023	2.009
Female	419	0.415	0.493	148	0.453	0.499	151	0.457	0.500	133	0.429	0.497
Home language is foreign	416	0.099	0.298	148	0.074	0.263	151	0.073	0.261	133	0.068	0.252

Extraversion	419	5.938	1.801	148	6.047	1.864	151	6.020	1.871	133	6.045	1.930
Agreeableness	419	6.246	1.414	148	6.412	1.419	151	6.397	1.415	133	6.361	1.463
Conscientiousness	419	6.100	1.574	148	6.142	1.485	151	6.126	1.480	133	6.143	1.488
Neuroticism	419	6.005	1.956	148	6.027	2.003	151	6.033	1.988	133	6.015	2.011
Openness	419	6.382	1.745	148	6.230	1.711	151	6.238	1.719	133	6.263	1.696

Notes: If the number of observations is lower than the sample size for the analyzed sample, the model did not use the specific variable. Friends refer to nominated friends within the subject, while friends' friends are the friends' invited friends. The voting intention for the student is a binary variable, while the friends' and parents' corresponding variables are the shares. Each student has a calculated share, which could have been calculated from one parent or more (and equally for friends). This means that the parents' and friends' voting intention indicates the average share, not the proportion of the total.

3 Empirical Approach

Peer effects are commonly analyzed with the linear-in-means models (Kline & Tamer, 2020). Here we model the outcome (Y_i) as a linear function of the average of peers' outcomes ($\bar{Y}_{-i}$) and background factors (X_i).

$$Y_i = \alpha + \beta \bar{Y}_{-i} + \gamma X_i + \epsilon_i \quad (1)$$

β captures endogenous peer effects. In our application, one key element of X_i is the average political opinion of the parents. The model could be expanded by including the average of peers' characteristics ($\bar{X}_{-i}$), where its corresponding coefficient captures the contextual effect. Initially, we assume that $E(\epsilon_i|x) = 0$, which implies that no unobserved characteristics impact individual outcomes and are correlated with peer outcomes. In other words, there are no correlated effects as labeled in the peer effects literature. We will relax this assumption below.

An obstacle to identifying the parameters above is the reflection problem (Manski, 1993). This problem occurs when the average behavior of individuals in a group is assumed to affect the behavior of those forming the group. As for the reflection in a mirror, we need additional knowledge to infer who is moving, i.e., who affects whom? This can be considered as a type of endogeneity problem. Bramoullé et al. (2009) show that when peer groups only partially overlap, the network structure can be used to identify the model. More specifically, peers of one's peers who are not connected to the individual can be used in an instrumental variable framework to identify the impact of peer outcomes. The key assumption here is that the exogenous characteristics of these excluded peers affect the group's average behavior but do not directly affect the individual's behavior. For this identification strategy to succeed, it is necessary to have information on the entire network so that excluded friends are, in fact, not friends and that there are only social interactions within friendship connections. For example, there could be more general social interactions within a classroom, while the individual only self-reported his/her closest friends.

As described earlier, we distinguish between nominated peers within the course and invited peers who are friends from secondary school, sports, and hobby activities or formalized through other social networks. We expect these social contacts to be

disconnected from the often more recent friends that have been formalized in course activities at the university. The outcome average for these second-order friends is used to instrument the outcomes of nominated peers.

As discussed above, correlated effects are present when network participants share unobserved factors, and these factors matter for the outcome. If the unobserved factors are shared on the group level, such as a school class, a group fixed effect will remedy the problem. Correlated effects can also occur due to a non-random formation of peer groups. For example, friendships can emerge due to similarities (or differences) in personality characteristics, preferences, and interests. Goldsmith-Pinkham and Imbens (2013) show that one can solve this problem by jointly modeling network formation and social interactions.

We write $\epsilon_i = \beta_\xi \xi_i + \eta_i$ in equation (1), where ξ_i is an unobserved individual-specific covariate, which is assumed not to be affected by peer effects. We assume that the utility for individual i due to a link to friend j can be written as,

$$U_i(j) = \alpha_0 + \alpha_x |X_i - X_j| + \alpha_\xi \left|\xi_i - \xi_j\right| + u_{ij} \qquad (2)$$

In other words, friends are likelier to have similar observed and unobserved characteristics (e.g., homophily). Hence, friendships with significant differences in observed characteristics must be similar in unobserved characteristics ξ. On the other hand, individuals who are not friends despite being similar in observed characteristics are expected to be very different in the unobserved component.

This implies that the residual from a model on friendship formation will contain helpful information on the unobserved component, which can be included in the outcome equation. This control function approach considers endogenous network formation and requires the modeling of friendship connections in an initial step. The assumption is that the absolute difference in the pair's characteristics contributes to explaining whether a friendship link is present. Specifically, we use the similarity of personality traits, similarity in age, gender, nationality, and language to explain the presence of friendships. We follow Diemer (2022), who considers all possible pairwise combinations of students within the classroom and calculates an average of the residuals for the identified friendship pairs. Once we have obtained $\widehat{\xi}_i$, which approximates the unobserved heterogeneity, this is added to the outcome equation.

$$Y_i = \alpha + \beta \bar{Y}_{-i} + \gamma X_i + \beta_\xi \widehat{\xi}_i + \eta_i \qquad (3)$$

We obtain the standard errors for the coefficients with 1000 bootstrap replications, where both steps are included in the algorithm.

The empirical analysis covers three dependent variables: two continuous and one discrete dependent variable with only two categories. We start the analysis with our preferred specification, which takes advantage of the available data and applies the least restrictive model assumptions. Then, we estimate several models where we remove variables, use less information, or add model specification assumptions, simplifying the

estimation procedure but potentially introducing bias. We are interested in evaluating how sensitive the results from our primary models are to these data or model limitations often present in other studies. Specifically, the second model we estimate removes the information on parents to emulate a situation where parents are never surveyed. The third model removes the information on friends and only includes parents' political values as the key explanatory variable. Model four emulates a situation where information on only one friend is available, and no second-order friends can be used to handle the endogeneity problem. Model five includes all nominated friends, but we estimated the model without taking advantage of second-order friends, and hence, no instrumental variable is available. Model six assumes that friendship formations are exogenous, and we omit the control function in the specification. We restrict the sample for all models to use the same data in our preferred specification to avoid differences due to sample selection.

4 Results

4.1 Anti-immigrant sentiments

Table 2 displays the results for anti-immigrant sentiments. Column (1) shows the results when we use the friends' friends' anti-immigrant sentiment as an instrumental variable. The identifying assumption is that friends' friends affect their friends' opinions but that there is no direct effect on the student. The friends' friends are invited peers who can be found in other social networks, such as high school and social and sports activities. The first stage F-statistic is 42.16, which indicates that the instrumental variable is strong. We also performed a Sargan over-identification test on a model that included the additional instrumental variable in friends' parents' anti-immigrant sentiment. The validity of the instrumental variables is confirmed with a p-value of 0.467.

A standard deviation increase in the nominated friends' anti-immigrant sentiments increases the student's anti-immigrant sentiments by about 0.33, significantly different from zero at a 10% significance level. The corresponding effect from the parents is about 0.20, significantly different from zero at a 5% significance level. In Column (2), we show the results from a model that omits parents' anti-immigrant sentiments. The effect of the nominated friends' anti-immigrant sentiments increases by about 6%, and we also note that the coefficient for the control function now has a significant effect. In Column (3), we instead remove the friends from the model to evaluate how the effect from parents would change. The coefficient for the parents' anti-immigrant sentiments increases by about 36%. Hence, the coefficient is substantially overestimated in this model. In Columns (4) and (5), we estimate models without using instrumental variables, and we would like to compare the importance of having a complete set of nominated friends instead of only using the first friend. Only including one nominated friend instead of all nominated friends underestimates the coefficient of about 27%. This underestimated effect is expected because using only one

friend's anti-immigrant sentiment is a weaker proxy for the anti-immigrant sentiments of the friends, and the difference is a consequence of measurement error. The coefficient for the nominated friends' anti-immigrant sentiments is in Column (5), about 25% below the coefficient in our preferred specification in Column (1). This result suggests that the measurement error problem leads to a more considerable bias than the reflection problem. In Column (6), we include the results where we omit the control function in the specification, and we assume that the friendship ties are exogenous. This change implies an overestimation of the coefficient for the nominated friends' anti-immigrant sentiments with 7%; hence, it is a minor concern in this case.

Table 2. Anti-immigrant sentiment

	(1) Anti-immigrant sentiment IV CF	(2) Anti-immigrant sentiment IV CF	(3) Anti-immigrant sentiment IV	(4) Anti-immigrant sentiment OLS	(5) Anti-immigrant sentiment OLS	(6) Anti-immigrant sentiment IV
Friends' anti-immigrant sentiments	0.328*	0.347**			0.247***	0.351**
	(0.175)	(0.163)			(0.0821)	(0.170)
First friend's anti-immigrant sentiment				0.181**		
				(0.0834)		
Parents' anti-immigrant sentiments	0.195**		0.265***	0.240***	0.219***	0.192**
	(0.0839)		(0.0830)	(0.0868)	(0.0820)	(0.0847)
Authoritarian school environment	-0.0129	-0.00632	-0.0269	-0.0208	-0.00797	-0.000269
	(0.0819)	(0.0767)	(0.0803)	(0.0794)	(0.0747)	(0.0780)
Female	-0.149	-0.195	-0.306*	-0.192	-0.169	-0.110
	(0.162)	(0.177)	(0.160)	(0.169)	(0.161)	(0.175)
Age	0.0556	0.0716	-0.0227	-0.00118	-0.00709	-0.000515
	(0.0925)	(0.0909)	(0.0766)	(0.0789)	(0.0734)	(0.0779)
Home language is foreign	-0.779***	-0.927***	-0.639**	-0.637*	-0.662**	-0.673***
	(0.242)	(0.278)	(0.305)	(0.327)	(0.294)	(0.229)
$\hat{\xi}_i$	-0.144	-0.228***				
	(0.0905)	(0.0824)				
Constant	0.108	0.186	0.155	0.0897	0.0872	0.0819
	(0.115)	(0.122)	(0.106)	(0.111)	(0.104)	(0.122)
Observations	148	148	148	136	148	148
Adjusted R-squared	0.178	0.169	0.126	0.131	0.173	0.163

Notes: Standard errors are found in parentheses. Bootstrap standard errors are found in Columns (1), (2) and (6). The observations in Column (4) are less due to missing values for the first friend on this specific question.

4.2 Childrearing scale

Table 3 includes the results for authoritarianism, measured with the childrearing scale. In Column (1), we consider the possible problem of an endogenous explanatory variable, using the nominated friends' invited friends' childrearing scale as an instrumental variable. The first step F-statistic is 32.03, confirming that the instrument is relatively strong. The Sargan test for over-identification was impossible to implement due to the absence of a secondary instrumental variable, as the friends' parents' childrearing scale was not sufficiently correlated with the endogenous explanatory variable. Neither the coefficient for nominated friends' childrearing scale nor the corresponding coefficient for parents' childrearing scale are significantly different from zero.

Table 3. Childrearing scale

	(1) Childrearing scale IV CF	(2) Childrearing scale IV CF	(3) Childrearing scale IV	(4) Childrearing scale OLS	(5) Childrearing scale OLS	(6) Childrearing scale IV
Friends' childrearing scale	0.234	0.198			0.285***	0.243
	(0.205)	(0.200)			(0.0787)	(0.189)
First friend's childrearing scale				0.204**		
				(0.0785)		
Parents childrearing scale	0.102		0.0963	0.0929	0.100	0.104
	(0.0822)		(0.0753)	(0.0771)	(0.0746)	(0.0820)
Authoritarian school environment	0.103	0.108	0.128*	0.139*	0.0942	0.103
	(0.0913)	(0.0883)	(0.0738)	(0.0775)	(0.0755)	(0.0878)
Female	-0.160	-0.138	-0.195	-0.227	-0.137	-0.151
	(0.173)	(0.181)	(0.147)	(0.156)	(0.154)	(0.173)
Age	0.00276	0.00680	-0.0407	-0.0331	-0.0123	-0.0176
	(0.0964)	(0.0950)	(0.0756)	(0.0763)	(0.0735)	(0.0899)
Home language is foreign	-0.728**	-0.742**	-0.754***	-0.733**	-0.682**	-0.713**
	(0.321)	(0.313)	(0.281)	(0.294)	(0.293)	(0.313)
$\hat{\xi}_i$	-0.0484	-0.0357				
	(0.0942)	(0.0843)				
Constant	0.134	0.122	0.266***	0.212**	0.158	0.129
	(0.110)	(0.114)	(0.0989)	(0.106)	(0.102)	(0.106)
Observations	151	151	151	144	151	151
Adjusted R-squared	0.133	0.123	0.067	0.123	0.140	0.138

Notes: Standard errors are found in parentheses. Bootstrap standard errors are found in Columns (1), (2), and (6). The observations in Column (4) are fewer due to missing values for the first friend on this specific question.

Column (2) removes the parents' childrearing scale from the model. This change implies an underestimated coefficient for the friends' childrearing scale with about 15%. Removing the friends' childrearing scale would underestimate the coefficient for parents' childrearing scale by about 6%, as indicated by comparing the coefficients in columns (3) and (1). In Columns (4) and (5), we estimate the model without using instrumental variables for *one* nominated friend and *all* nominated friends. Using only one friend underestimates the coefficient by 28%. Notice that these coefficients are significantly different from zero. The coefficient for the nominated friends' childrearing scale in Column (5) *over*estimates the coefficient in Column (1) by 22%. Hence, the reflection problem is more important than the measurement error problem. Finally, removing the control function, as in Column (6), only overestimates the coefficient by about 4%.

4.3 Voting intentions on PP or Vox

The final dependent variable we analyze is voting intentions on PP or Vox, which is a binary variable, and the models are, accordingly, discrete choice models, where we rely on the Probit model for the analysis. The results are available in Table 4. We include the nominated friends' invited friends' voting intentions on PP or Vox as an instrumental variable. The first step F-statistic (36.653) confirms a relatively strong instrument. We use the additional instrumental variable of friends' parents' voting intentions to be able to perform the Amemiya-Lee-Newey statistic (p-value 0.212), which confirms the validity of the used instruments. In Column (1), we find the marginal effect of 0.53 for nominated friends' voting intention on PP or Vox, significantly different from zero at a 5% significance level. The corresponding marginal effect for parents' voting intention on PP or Vox is 0.45, significantly different from zero at a 1% significance level. A one-unit increase in the proportion of friends who would vote on PP or Vox would increase the probability that the student would vote for these parties by 0.53. If we rescale the marginal effects to correspond to a percentage point increase, these effects would be 0.0053 and 0.0045, which are substantial. Column (2) removes the parents' voting intention from the model. This change implies that the marginal effect of friends' voting intention on PP or Vox is underestimated by 16%. In Column (3), we omit the friends' voting intention, which would imply underestimating the effects of parents by about 8%. In Columns (4) and (5), the model is estimated without an instrumental variable using only one nominated friend, respectively, using all friends. Using only one friend underestimates the effect by about 9%. Not dealing with endogeneity problems would underestimate the marginal effect by 32%. The effect of measurement error is, accordingly, important. Column (6) estimates the model without the control function, which hardly changes the marginal effect of nominated friends' voting intention on PP or Vox.

Table 3. Voting intentions on PP or Vox

	(1) PP+Vox Probit IV CF	(2) PP+Vox Probit IV CF	(3) PP+Vox Probit	(4) PP+Vox Probit	(5) PP+Vox Probit	(6) PP+Vox Probit IV
Friends' voting intentions on PP or Vox	0.530**	0.443			0.360***	0.531**
	(0.264)	(0.276)			(0.0806)	(0.253)
First friend's voting intentions on PP or Vox				0.326***		
				(0.0645)		
Parents' voting intentions on PP or Vox	0.451***		0.416***	0.477***	0.443***	0.451***
	(0.0776)		(0.0610)	(0.0575)	(0.0578)	(0.0724)
Authoritarian school environment	-0.0249	-0.0122	-0.0298	-0.0340	-0.0254	-0.0248
	(0.0367)	(0.0416)	(0.0370)	(0.0349)	(0.0339)	(0.0353)
Female	-0.0587	-0.0997	-0.144**	-0.0475	-0.0902	-0.0584
	(0.101)	(0.102)	(0.0697)	(0.0707)	(0.0675)	(0.0950)
Age	-0.0259	0.0157	-0.0319	-0.0287	-0.0264	-0.0262
	(0.0589)	(0.0605)	(0.0418)	(0.0334)	(0.0326)	(0.0562)
Home language is foreign	-0.197	-0.341*	-0.438**	-0.304*	-0.255	-0.196
	(0.126)	(0.177)	(0.189)	(0.158)	(0.174)	(0.120)
$\hat{\xi}_i$	-0.000852	-0.0241				
	(0.0436)	(0.0490)				
Observations	133	133	133	119	133	133

Notes: Standard errors are found in parentheses. Bootstrap standard errors are found in Columns (1), (2) and (6). The observations in Column (4) are less due to missing values for the first friend on this specific question.

5 Conclusions

In this study, we show that using self-administered survey invitations of social contacts works well in reaching out to a complete social network that is usually left out from the study despite their importance for analyzing political socialization. Accounting for endogenous friendships and reflection, we find statistically significant and large effects of both parents and friends on anti-immigrant sentiments and voting intentions, where the effect is larger for friends compared to parents. A standard deviation increase in friends' anti-immigrant sentiment increases a student's anti-immigrant sentiment by 0.33 standard deviations. The corresponding effect from parents is 0.20 standard deviations. An increase of a percentage point of friends' voting intentions on PP or Vox would increase the probability that the student would have voting intentions on the same parties by about 0.0053. The corresponding effect from parents would imply an increased probability of about 0.0045.

We estimated these models with instrumental variables and a control function to account for non-random friendship ties. We estimated several additional models using

less information or stricter assumptions to determine the sensitivity to restrictions on the data or methodological decisions. Using only one nominated friend instead of all increases measurement error and implies an underestimated effect. The absence of invited friends, which contains second-order friends, implies estimating the model with an additional assumption of exogeneity (and no measurement error). This specification mistake underestimates the effect of the nominated friends' anti-immigrant sentiments by 25%. Not dealing with the endogeneity problem implies an underestimated marginal effect of friends' voting intentions on PP or Vox by 32%. Measurement error is more important than the reflection problem for these political attitudes. There are several reasons why measurement error can be introduced in the relevant explanatory variables. First, the political value could be measured with imprecision due to using limited questions to measure the construct. This measurement error is reduced by averaging over several friends, but it may still remain relevant. Second, when students nominate their friends, we cannot guarantee that all friends are, in fact, nominated. Third, even if a friend is nominated, it is not necessary for him/her to provide an answer for that particular political value. The conclusion that measurement error is more important than the reflection problem cannot be generalized; instead, we underline the importance of collecting data, which allows for the implementation of instrumental variable techniques. Hence, we stress the importance of collecting information from the friends' friends who are not directly connected to the primary respondent.

Estimating the model without considering endogenous friendship ties implies no effect difference. Diemer (2022) also found this conclusion. While this is encouraging for the large literature that assumes exogenous friendship ties, our recommendation is to collect data that enables this more complete model to avoid uncertainties in the conclusion.

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Appendix

Anti-immigrant sentiment

Immigrants often come here just to take advantage of welfare in Spain.

It happens too often that immigrants have customs and traditions that do not fit into Spanish society.

Immigrants often take jobs from people who are born in Spain.

(7-point Likert scale).

Childrearing scale. Englehardt et al. (2023).

Although there are a number of qualities that people think children should have, every person thinks that some are *more important* than others. Although you may feel that both qualities are important, please tell me which one of each pair you think is *more important* for a child to have.

1. Would you say it is *more important* for a child to be INDEPENDENT or RESPECTFUL OF THEIR ELDERS?
2. Would you say that it is *more important* for a child to be OBEDIENT or SELF-RELIANT?
3. Would you say it is *more important* for a child to be WELL-BEHAVED or CONSIDERATE?
4. Would you say it is *more important* for a child to be CURIOUS or GOOD MANNERED?
5. Would you say it is *more important* for a child to be ORDERLY or IMAGINATIVE?
6. Would you say it is *more important* for a child to be ADAPTABLE or DISCIPLINED?
7. Would you say it is *more important* for a child to be LOYAL or OPEN-MINDED?
8. Would you say it is *more important* for a child to be FREE-SPIRITED or POLITE?

The question is formulated differently for the students (as recommended in Stenner, 2005, page 25).

Please choose the word that you find most appealing among the following pairs. Although you may feel that both express important qualities, please tell me which one of each pair you think is *more appealing*.

1. INDEPENDENT or RESPECTFUL OF ELDERS?
2. OBEDIENT or SELF-RELIANT?
3. WELL-BEHAVED or CONSIDERATE?
4. CURIOUS or GOOD MANNERED?
5. ORDERLY or IMAGINATIVE?

6. ADAPTABLE or DISCIPLINED?
7. LOYAL or OPEN-MINDED?
8. FREE-SPIRITED or POLITE?

Voting intentions

Assuming that general elections were held tomorrow, that is, for the Spanish Parliament, which party would you vote for?

Authoritarian school environment

"Here is a list of qualities that children can be encouraged to learn. Please rate each quality on a scale from 1-7 to indicate *your perception* of how important it was for the *teachers and adults at the school* (primary and secondary stages) to educate the students in accordance with the characteristics.

1 - Not important at all,
2 - Hardly ever considered important
3 - Slightly important
4 - Moderately important
5 - Important
6 - Very important
7 - Absolutely Essential,

Independence, hard work, feeling of responsibility, imagination, tolerance and respect for others, thrift and saving money, determination and perseverance, religious faith, unselfishness, and obedience.

An authoritarian school environment is calculated by subtracting the average of the numerical values of "independence," "imagination," and "tolerance and respect for others" from "obedience." Notice that the list of qualities can be found in World Values Survey, but there, the respondents were only asked to mention up to five of the qualities, and the question was unrelated to the school environment.

Personality traits (The Big Five Inventory 10 Item Scale, Rammstedt & John (2007)).

I see myself as someone who ...

is reserved
is generally trusting
tends to be lazy

is relaxed, handles stress well
has few artistic interests
is outgoing, sociable
tends to find fault with others
does a thorough job
gets nervous easily
has an active imagination

[strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose]

Extraversion: 1R, 6
Agreeableness: 2, 7R
Conscientiousness: 3R, 8
Neuroticism: 4R, 9
Openness to experience: 5R; 10

In our data, we coded "can't choose" as "neither agree nor disagree" to maintain the most observations. "R" indicates that the scale is reversed.

Friendship selection

Table A1. Friendship selection

	(1) Are friends
Same gender	0.0372***
	(0.00396)
The absolute difference in age	-0.00766***
	(0.00140)
Both Spanish	0.00508
	(0.00377)
Same language (Catalan or Mallorquin)	0.00989**
	(0.00405)
Same language (Spanish)	-0.00139
	(0.00393)
Both with other language	0.00184
	(0.00440)
The absolute difference in extraversion	-0.000500
	(0.000894)
The absolute difference in agreeableness	0.00132
	(0.00110)
The absolute difference in conscientiousness	-0.00237**
	(0.000980)
The absolute difference in neuroticism	0.000912
	(0.000765)
The absolute difference in openness	-0.000819
	(0.000982)
Observations	20240

Notes: The binary dependent variable indicates that the students are friends. The proportion of observations that are friends is 0.0295 in the data. The table includes marginal effects and cluster robust standard errors, which can be found in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Sample retention

Table A2. Sample retention

	(1) Anti-immigrant sentiment	(2) Childrearing scale	(3) Voting intentions on PP or Vox
Anti-immigrant sentiment	-0.0213	-0.0251	-0.0174
	(0.0277)	(0.0277)	(0.0277)
Childrearing scale	0.0470*	0.0462*	0.0513**
	(0.0250)	(0.0251)	(0.0242)
Voting intentions on PP or Vox	-0.0189	-0.0106	-0.0166
	(0.0545)	(0.0545)	(0.0539)
Female	0.0563	0.0638	0.0483
	(0.0541)	(0.0541)	(0.0536)
Age	-0.0730***	-0.0739***	-0.0656***
	(0.0255)	(0.0251)	(0.0224)
Home language is foreign	-0.130	-0.136	-0.0974
	(0.0936)	(0.0937)	(0.0922)
Authoritarian school environment	-0.0263	-0.0353	-0.0344
	(0.0241)	(0.0247)	(0.0247)
Extraversion	0.0260	0.0217	0.0197
	(0.0258)	(0.0262)	(0.0265)
Agreeableness	0.0451*	0.0429*	0.0356
	(0.0248)	(0.0248)	(0.0253)
Conscientiousness	0.0163	0.0156	0.0190
	(0.0249)	(0.0249)	(0.0247)
Neuroticism	0.0167	0.0152	0.0127
	(0.0273)	(0.0269)	(0.0271)
Openness	-0.0106	-0.0108	0.000657
	(0.0254)	(0.0255)	(0.0250)
Observations	375	375	375

Notes: Columns 1-3 evaluate sample retention for column 4 in Tables 1-3, respectively. The binary dependent variable indicates that the observation was used in the estimated model in Tables 1-3. The table includes marginal effects and standard errors, which can be found in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A2 includes three models where sample retention is analyzed. Age is the most critical variable in explaining the observation usage in the final model. An increased age reduces the probability of being found in the final sample. The result is expected due to the skewed distribution of age in our sample, where 68% of the students are 18 or 19 years old, and the effect of the absolute difference in age on the probability of a friendship tie that we found in Table A1. Hence, older students are less likely to have friends nominated, and the probability of dropping out from the analyzed sample is, accordingly, increased. Most of the other variables are, however, not significantly different from zero, which is reassuring because the attrition from the sample does not

appear to be particularly systematic. In the model for anti-immigrant sentiment, the retention model can correctly classify 62.4% of the observations, but this should be compared to the naïve model that classifies 62.7% correctly simply by assigning all observations to the largest group. Hence, the naïve model correctly classifies a higher percentage. The corresponding comparisons for the childrearing scale are 63.2% and 62.4%. The correctly classified for retention in the voting intentions model is 65.6%, which should be compared to 64.8%. Notice that the correctly classified evaluation is done in the same sample as the estimation, which implies an overestimation of the accuracy compared to unseen data. We are, accordingly, confident that while the reduced sample implies reduced precision, there should be low concerns for bias.