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Working Paper

Parental background and other-regarding preferences in children

IES Working Paper, No. 10/2012

Provided in Cooperation with:
Charles University, Institute of Economic Studies (IES)

Suggested Citation: Bauer, Michal; Chytilová, Julie; Pertold-Gebická, Barbara (2012) : Parental background and other-regarding preferences in children, IES Working Paper, No. 10/2012, Charles University in Prague, Institute of Economic Studies (IES), Prague

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Bibliographic information:
Bauer, M., Chytilová, J., Pertold-Gebicka, B. (2012). "Parental Background and Other-Regarding Preferences in Children" IES Working Paper 10/2012. IES FSV. Charles University.

This paper can be downloaded at: http://ies.fsv.cuni.cz

Parental Background and Other-Regarding Preferences in Children

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April 2012

Abstract:
Other-regarding preferences are important for establishing and maintaining cooperative outcomes. In this paper, we study how formation of other-regarding preferences during childhood is affected by parental background. Our subjects, aged 4-12 years, are classified into other-regarding types based on simple binary choice dictator games. The main finding is that children of parents with low education are more spiteful, more selfish and less altruistic. This link is robust to controlling for a rich set of child characteristics and class fixed effects. The parental effects stand out against the overall development of preferences, as we find children to become less spiteful and more altruistic with increasing age. Our findings, complemented by an analysis of the World Values Survey data, suggest that low socio-economic status affects parental effort invested in instilling other-regarding preferences into children, making them less likely to acquire cooperative types of preferences.

Keywords: other-regarding preferences, altruism, spite, children, family background, field experiment

JEL: C93, D03, D64, I24

Acknowledgements:
The research was supported by a grant from the CERGE-EI Foundation under a program of the Global Development Network, by an institutional grant 0021620841 of the Ministry of Education of the Czech Republic and by the Czech Science Foundation (P402/10/P103, P402/12/G130). All opinions expressed are those of the authors and have not been endorsed by any of the organizations with which we are affiliated or which sponsored the research. We thank K. Báťa, J. Cahlíková, J. Hercher and J. Palguta for excellent research assistance. We are grateful to principals of cooperating schools and kindergartens for their support.
The research reported in this paper is not the result of a for-pay consulting relationship. Nor the authors neither their employers have a financial interest in the topic of the paper which might constitute a conflict of interest.

1. Introduction

Whether individuals are motivated purely by their self-interest or have other-regarding preferences has important influence on society's ability to solve collective action problems, and thus to achieve higher social welfare. A positive spectrum of other-regarding preferences – altruism, inequality aversion, or efficiency concerns – helps to establish and maintain cooperative and fair group outcomes even in situations with limited scope for reputation-building (Bowles, 2006; Fehr and Fischbacher, 2003), while spitefulness, observed among a non-negligible proportion of adult subjects, motivates punishment of cooperative group members and leads to deterioration of co-operation (Falk et al., 2005; Herrmann et al., 2008). Other-regarding preferences are therefore recognized to be important for a range of economic and social outcomes, including public life and politics, willingness to pay taxes or cooperation in workplace (Fehr and Fischbacher, 2002; Fong et al., 2006).

In quest to establish when other-regarding preferences are formed, experimental tools have been increasingly used to study their development during childhood and adolescence. Research has shown that young children behave mostly selfishly, while prevalence of positive side of other-regarding preferences increases with age[1,2]. These results suggest that people are not born with unchangeable behavioural traits but acquire part of their other-regarding preferences during childhood and adolescence.

[1] In recent years economists have begun to investigate formation of other-regarding preferences during childhood and adolescence, building on findings of Harbaugh et al. (2003) who observe that sharing in the dictator game increases between 7 to18 years. Fehr et al. (2008) find that selfishness dominates among the 3-4 years old children and inequality aversion develops strongly up to the age of eight years. Using the same methodology, Fehr et al. (2011) find that a weak form of altruism develops during the age range of 8-17 years, while spiteful motives diminish during this period. Almås et al. (2010) document development of more complex notions of fairness. Bauer et al. (unpublished results) find that exposure to warfare intensifies in-group egalitarianism, and that these effects are particularly enduring if warfare is experienced during childhood or adolescence. A comprehensive survey of related work in development psychology is in Eisenberg and Fabes (1998). Most of the psychological studies report development of prosocial behavior with age during childhood, but the evidence remains more inconclusive due to variations in methods - in particular, they typically do not isolate pro-social behavior motivated by other-regarding preferences from selfish preferences.

[2] Researchers have also studied development of other types of preferences: risk aversion (Eckel et al., 2011, Sutter et al., in press), time discounting (Bettinger and Slonim, 2007, Sutter et al., in press) or trust (Harbaugh et al., 2003, Sutter and Kocher, 2007). Sutter et al. (in press) also show that the experimental measures of preferences predict field behavior of the children.

However, little is known about how formation of other-regarding preferences during childhood is affected by parental background. A priori, there are several plausible reasons why parental background may matter: parents may differ in socialization practices or values, they may affect child's individual characteristics – such as cognitive and non-cognitive skills or health - that could facilitate formation of preferences, pass genetic predispositions to acquire social norms or their choices may determine characteristics of peers and teachers with whom a child interacts at home and in school.[3]

To the best of our knowledge, this is the first paper that combines experimental measures of other-regarding preferences among children and parental survey data to study the link between parental background and other-regarding preferences in children. Our experiments allow us to classify subjects into different other-regarding types, as defined by theory: altruistic, inequality averse, spiteful and selfish. To understand possible pathways, we further collect data about child cognitive and non-cognitive skills, health, and siblings, and complement the analysis by exploring values and willingness to instill other-regarding preferences reported in the World Values Survey data.

Our research is motivated by three streams of literature. First, strong relationship between parental background and fundamental life outcomes of children is a well-established empirical observation (for a review see, for example, Bowles and Gintis, 2002). This inter-generational link in success is too strong to be explained solely by differences in financial resources (Carneiro and Heckman, 2002). Thus, identifying the effects of parental socio-economic background on formation of skills and preferences during childhood has become a central issue for understanding the sources of persistent inequality across social groups and has important implications for timing of policy interventions targeting children from disadvantaged environment (Bowles et al., 2008; Heckman,

[3] Parental background has been found to be related to child cognitive and non-cognitive abilities (Aughinbaugh and Gittleman ,2003; Bartling et al., 2012; Cunha et al., 2006), child health (Case et al., 2002; Currie, 2009), school quality, and associated effects of peers or teachers (Case and Katz, 1991). In addition, recent research has shown that altruistic behaviour has a genetic component (Cesarini et al., 2008) indicating a possibility that parents pass genetic predispositions to acquire social norms on their children.

2006). While existing research has focused on understanding the role of parental background on formation of cognitive and non-cognitive skills that directly affect *individual* performance, its role in the formation of preferences that facilitate cooperation with *others* has not been explored yet.

Second, research has identified differences in preferences for fairness among adults across societies or even across groups within a society (for related surveys see Fehr and Hoff, 2011 or Henrich et al., 2010). In an influential cross-cultural study, Henrich et al. (2005) show that altruism and preferences to be fair in anonymous transactions among adult populations are stronger in communities with higher level of market integration. Although their data do not allow to identify the underlying causal effect, the authors speculate that in societies with greater returns to cooperation adults are more likely to socialize their children to display more altruistic behaviour towards anonymous others. In two different countries Barr et al. (2011) find that individual notions of distributive justice are associated with relative (within-society) economic status. Perhaps closest to our study, Benenson et al. (2007) find that children from impoverished neighbourhoods in the UK are less likely to share in a dictator game as compared to children from richer neighbourhoods, but the data do not allow them to test whether the difference in preferences is related to parental characteristics or some features of the environment.

Third, researchers started using economic tools to analyse parental choice concerning how to raise children and which values and norms to pass on them (Bisin and Verdier, 2001). Lindbeck and Nyberg (2006) model parental incentives to instil work norms and Tabellini (2008) studies honesty in economic transactions. In particular, Adriani and Sonderegger (2009) and Dixit (2009) argue that some aspects of social preference-formation process are likely to be an outcome of conscious decisions of parents and schools about socialization of children, in order to enhance their ability to cooperate and overcome problems with collective action. Such considerations might be important for explaining differences in socialization practices across social groups. If parents from disadvantaged backgrounds believe their children are less likely to be involved in settings where

cooperation is crucial, such as labour market, they will have lower incentives to teach and internalize preferences that are individually costly, but enhance cooperation.

We find that children from families where both parents have low education lag behind their peers in acquisition of other-regarding preferences. This result suggests that parental socio-economic status affects the emergence of gaps in cooperation-enhancing preferences already in childhood. Our rich data set allows us to partially open the "black-box" of these parental effects and to test some of the possible pathways between low parental education and less prosocial preferences of children. The measured relationship between parental education and children's other-regarding preferences is robust to controlling for measures of children's cognitive and non-cognitive skills, siblings' composition, class fixed effects, maternal employment status, whether both parents live together or separated, and measures of child health, suggesting that our results are not driven by peer effects associated with parental choice of school, the intensity of parental care, or differences in child skills and health. We complement these findings with an analysis based on the World Values Survey (WVS). Using the data collected on a sample of Czech adults, we show that low educated parents less often consider unselfishness as an important quality to be instilled in children compared to more educated parents. Taken together, our results suggest that low education of parents, or perhaps low socio-economic status more broadly, affects parental effort invested in instilling other-regarding preferences onto children, making them less likely to acquire cooperative types of preferences.

The rest of the paper is organized as follows. In section II we describe the experimental design and the sample. In Section III we present and discuss the results. Section IV concludes.

2. Experimental and Survey Design

2.1. Eliciting Other-Regarding Preferences

We measure other-regarding preferences using a series of four binary choice dictator games, inspired by the protocol of Fehr et al. (2008). In each game, a subject has to select between two alternative allocations of tokens for herself and a partner. From different combinations of choices across these four games, we can classify subjects into six mutually exclusive types of other-regarding preferences as predicted by theory: altruistic, inequality-averse and spiteful. We distinguish between a weak and a strong form of these preferences, depending on whether a subject is willing to sacrifice individual payoff to alter the payoff of her partner. Further, we distinguish a selfish type which is not mutually exclusive with the other types. Note that these are one-shot experiments without repeated interactions and partners are always anonymous. Thus, the experimental design rules out the potential for future reciprocal behaviour and isolates other-regarding preferences from strategic behaviour.

In the costly prosocial game, a subject chooses between the allocation (1,1) ---one token for herself and one for a partner--- and the allocation (2,0) ---both tokens for herself. This game measures preference to reduce inequality (Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999) or altruism. Because choosing the egalitarian option (1,1) provides a benefit to an anonymous partner at a cost to oneself, a purely selfish subject should never make the egalitarian choice. In the costless prosocial game, the subjects can choose between (1,1) and (1,0). Choosing the (1,1) option indicates the basic prosociality because it is costless to increase a partner's payoff, and choosing the (1,1) option is consistent with models of inequality aversion, maximization of efficiency (Charness and Rabin, 2002) or pure altruism. In the costless envy game, the decision-maker can choose between (1,1) and (1,2). Choosing the (1,1) option indicates aversion to disadvantageous inequality or spitefulness (minimization of partner's payoff). Relative to Fehr et al. (2008), we enrich the experimental setup by the costly envy game [(1,1) vs. (2,3)] which is a natural complement to the

costless envy game [(1,1) vs. (1,2)], similarly as the costly prosocial game [(1,1) vs. (2,0)] complements the costless prosocial game [(1,1) vs. (1,0)]. In this game, the unequal choice leads to a higher reward for both players, but it also creates disadvantageous inequality for the decision-maker. Thus, because the egalitarian allocation is costly for the decision-maker, it indicates strong preference to reduce inequality or spitefulness. The payoffs of all four games are summarized in Table 1.

The two mutually exclusive options in these games were represented on two cardboards (Supplementary material, Figure S1). On each cardboard there were two circles, each one with one arrow directed either to the decision-maker or to an anonymous partner coming from a pool of children displayed on a laptop screen. We placed the tokens inside the circles. An arrow directed towards the decision-maker illustrated that (s)he would be the recipient of the tokens placed inside that circle, whereas the tokens in the other circle, with an arrow towards the laptop picture, illustrated how much the partner of a similar age would receive.[4]

Pooling choices across all four games allows for the classification of subjects according to their type of other-regarding preferences into six groups (detailed in Table 1). We classify them to be Strongly altruistic if they maximized the payoff of their partner in all four games, including the costly prosocial game when increasing a partner's payoff is costly. Weakly altruistic children maximize the payoff of their partner in all games except the costly prosocial game. Strongly inequality-averse children minimize differences in payoffs by choosing the egalitarian option in all four games. Weakly inequality-averse children choose the egalitarian option only in the costless prosocial and costless envy games and maximize their payoff in the costly games. Strongly spiteful children minimize their partner's payoff in all games, while Weakly spiteful children minimize their partner's payoff only when it is not costly for them, thus in all games except the costly envy game.

[4] Children were randomly assigned to one of four treatments which differed in terms of their partner's identity (a classmate, an unknown partner from an unknown class, a Vietnamese child or a Roma child). The design allows assessing whether other-regarding preferences vary with the familiarity and ethnicity of the recipient. Such an analysis is beyond the scope of this paper.

Note that these six other-regarding types are mutually exclusive. Given the theoretical importance of selfish preferences, we further classify children as selfish if they maximize their payoffs in the costly prosocial and the costly envy game. We don't impose any restrictions on behaviour in costless games, where decision-makers payoff is the same in both options. Note that the selfish category overlaps with weakly other-regarding types.

The choices were made privately and only the experimenter could observe the subject's decision (it is nearly impossible to conduct a double blind protocol with small children). The experimenters explained to each child that nobody, including their parents and teachers, would be informed about their choices (experimental instructions are available upon request). Prior to making choices in each task, the children had to correctly answer a set of questions about the payoff consequences of each option to ensure their understanding. The order of the games, the allocation of the egalitarian option on either the right hand side or the left hand side, the experimenter (out of four), and the treatment were randomly determined before the actual experiment. The results reported in this paper are robust to controlling for order effect, spatial allocation of the egalitarian option, the experimenter effect and the identity of an always anonymous partner (Supplementary material, Tables S1-S2).

The children were motivated to reveal their preferences. During the experiments they received tokens according to their choices. The tokens for a partner were put aside in a paper bag and anonymously delivered later. After the experiments were completed, children exchanged tokens for various kinds of sweets, pencils, erasers, stickers and small toys in an experimental shop which we set up at the site (Figure S2). For simplicity, the price was always one token for one item. To increase the salience of rewards, each subject received one token as a show-up fee and exchanged it for a reward prior to making experimental choices. All rewards were given to the children immediately after the experiment and placed into a paper bag. We requested the children not to open the bag before the end of the school-day so that other classmates could not observe its content before participating in the experiments.

2.2. Eliciting Patience

To measure patience and self-control, important components of non-cognitive skills, we used two simple binary choice tasks. Children were first asked to choose between receiving one token "today" or two tokens "tomorrow". The same binary choice was offered at a future time frame – the only difference is that (both earlier and delayed) rewards are shifted to the future by one week. Here we asked the subjects whether they prefer one token "in seven days" or two tokens "in eight days". The first choice measures current patience, while the second choice measures future patience. The two mutually exclusive options were again represented by two cardboards, each illustrating the length of the delay with pictures of a moon (see Figure S3). Current rewards were paid immediately after the experiments, similarly as in other-regarding choices. Paper bags with future rewards were delivered by teachers on predetermined date in the future.[5]

2.3. Sample and Non-Experimental Data

The experiments took place in the Czech Republic. Our subjects come from seven primary schools and four kindergartens located in Prague, the capital city, and villages close to Prague. The headmasters of participating schools were provided with explanations of the experiments and gave official permission to conduct the experiments. The headmasters informed parents about the study which was described as a research project in decision-making without referencing any details about the actual experiments. In several cases, when schools had previous experience with researchers, headmasters did not ask for parental consent for this particular project.[6] The experiments took place in schools and kindergartens during usual school days, to mimic an environment natural for this

[5] In practice, children selected the items in the experimental shop for future rewards immediately after the experiments, we placed them into a new paper bag with a name and date written on it, and gave the bag to a school teacher who promised to distribute the bags on respective days. This procedure was explained before making choices in the experiment.

[6] The experiments were also approved by the Director of the Institute of Economic Studies, Faculty of Social Sciences at Charles University, to substitute for lacking Human Subject Review Boards in the Czech university system.

subject pool and to limit the problem of self-selection into participation in our experiments. In this paper we study a sample of 275 children who participated in the experiments and whose parents answered our survey questionnaire.[7] Table 2 provides summary statistics of the sample.

Besides the experimental measures, we collected data about children's age, gender, cognitive skills, health and family background. Age is measured in years. We use three measures to proxy cognitive skills. Teacher assessment of individual school performance is a scale ranging from 1 (excellent) to 5 (poor) and is available for all pupils except kindergarteners (200 children). Grades in mathematics are available for most of the children in the 2nd to 5th grade (133 children) and it is a binary variable equal to one if a child achieved grade worse than A at the end of the year preceding the experiment. IQ is measured as a share of correct answers in a test administered by Mensa Czech Republic – a branch of Mensa International – several weeks after the experiments. The test consists of a set of Raven's Progressive Matrices (Raven 1948), a widely used nonverbal test of intelligence. The IQ measure is available for a sub-sample of 140 children because the test is designed for children who are at least 5 years old and not all parents gave their consent to participation in the tests.[8]

[7] We collected experimental data among 438 children attending kindergartens and lower level of primary schools (up to grade 5). We believe this sample is largely representative of the area we study. A questionnaire was sent to the parents of these children to collect information about their family background. Parental response rate was 64% and we excluded children whose parents did not fill out the questionnaire. Two parents filled the questionnaire but did not provide information about their education level and were also excluded from the analysis. Sample selection due to parental non-response is unlikely to affect our main estimates. None of the choices in the games is significantly different between the sub-sample of children included in and excluded from the analysis (Table S3). Children whose parents filled the questionnaire are on average half a year younger and have better teacher evaluation of their performance compared to children whose parents did not fill the questionnaire. We perform several robustness checks (e.g. Heckman sample selection model, see Table S4) and conclude that our results are not affected by patterns in parental non-response.

[8] Mensa requested consents specific for the IQ tests because IQ is particularly sensitive personal information. Half of the parents of children eligible for the test agreed with the test. None of the individual and family characteristics reported in Table 2 differs significantly between the sub-samples of children for whom we have the IQ measure and for whom we do not have it (Table S5).

We use two measures of children's health – height and absence at school. The variable "Low height" equals to one if the child's height is below the median height of the children in our sample of the same age and gender. The variable "High absence" is equal to one if the child missed more school hours than is the median absence in our sample.[9]

To measure parental socio-economic status and family environment, we carried out a survey among parents of the participating children. The collected data include their education level, employment status of mother, whether the child lives with both parents, the number of child's siblings and birth order of the child. These measures constitute proxies for the intensity of parental care and social interaction during childhood. In the data analysis, the major variables of interest is "Low parental education" which is equal to one if both parents have either primary school or secondary school without leaving exam, and is equal to zero if at least one parent has completed secondary school with leaving exam.[10] Previous research has shown that in the intergenerational transmission of personality and attitudes, the mother's characteristics often play a more important role than the father's characteristics (for a review see Loehlin 2008). We focus on the overall effect of parental education since education levels of mothers and fathers in our sample are highly correlated and the results are robust to using mother's and father's education instead of parental education (Table S6).

[9] Schools report two types of absence of students: missing school hours that are ex post approved by their teacher, typically for health reasons after showing a confirmation from a doctor, and missing school hours that are not approved. In the analysis we use "approved absence", because this information captures more closely a child's health status, while unapproved absence is most likely driven by a child's misbehavior. The measure of absence at school is available for 117 children.

[10] The school leaving exam – called the maturity exam – is considered as a label of an educated person. It is a prerequisite for applying to a college, university, or other higher education institution. Secondary education without school leaving exam corresponds to level 3c of the International Standard Classification of Education (ISCED), while secondary school with leaving exams corresponds to level 3a and 3b.

3. Results

3.1. Development of Other-Regarding Preferences

Since our sample covers children from kindergarten to grade 5 in primary school (age 4-12 years), we start the analysis by studying which other-regarding preferences become more prevalent with age and compare patterns observed in our sample with previous studies.

We find strong age effects in both costly and costless prosocial games (Figure 1, Table 3). The prevalence of egalitarian choices in the costly prosocial game [(1,1) vs. (2,0)] is 26% for the youngest group (4-6 years), it increases to 45% for the 7-9 years old group and reaches 67% for the oldest group (10-12 years). Similar increase in prosocial choices can be observed in the costless prosocial game [(1,1) vs. (2,0)], where the youngest children choose the egalitarian option in 47% of cases,[11] while the prevalence increases to 91% for the oldest children. Note that children of all ages take into account the costs of increasing partner's payoff: they are more likely to choose the egalitarian option in the costless prosocial game relative to the costly prosocial game. In the regression framework in which age is measured in years we find a highly statistically significant linear relationship between egalitarian choices in prosocial games and age (Table 3, columns 1-2). Observed positive age effects on sharing are in line with findings of the previous studies (Benenson et al., 2007; Fehr et al., 2008; Harbaugh et al., 2003).

We do not find a linear relationship between age and the frequency of egalitarian choices in the costly and costless envy games (Table 3, columns 3-4 and Figure 2). Previous studies suggest a

[11] Note that the frequency of egalitarian choices in the costless prosocial game among youngest children is not statistically different from 50% and therefore is consistent both with purely random choice and with pure selfishness since selfish individuals should be indifferent between both choices. However, the frequency of egalitarian choices in the costly prosocial game among youngest children equals 26% which is statistically different both from 50% (consistent with random choice) and 0% (consistent with selfish choice). The likelihood of sharing is around 20 percentage points greater in the costless prosocial game than in the costly prosocial game also for older children. Based on these results, we are confident that children in each age group do not decide randomly.

possibility of an inverted u-shape relationship: small children become less tolerant towards disadvantageous inequality which peaks around 7-8 years (Fehr et al., 2008), and then more complex norms of fairness such as efficiency become more important (Almås et al. 2010; Fehr et al., 2011; Martinsson et al., 2011). In our sample, 7-9 yr-olds are indeed the group with greatest likelihood of choosing the egalitarian option in the costless envy game and the prevalence of these choices slightly decreases with age, in line with the previous findings, but the pattern is not statistically significant in any of the two envy games.

Next, we analyse the prevalence of other-regarding types, as defined in Section II.A based on choices across the four games (see Table 1). The analysis reveals a clear shift in composition of other-regarding types. Older children become significantly more altruistic, less spiteful and less selfish (Figure 3, Panel A of Table 4), while there is no monotonic age effect on the prevalence of inequality aversion. Overall, the age effects are in line with the existing literature, suggesting that the identified patterns in other-regarding behaviour are not country-specific.

3.2. Does Family Background Matter?

We find children of less educated parents to be less willing to share. While the proportion of children who decide to share by choosing the egalitarian option in the costly prosocial game is 33% for the children of less educated parents, it is 49% for the children from more educated families. Table 3, column 1 demonstrates this effect in a regression framework, where we control for age, gender, whether mother works full time and whether parents live together. Qualitatively similar effects of parental education are obtained in the costless prosocial game [(1,1) vs. (1,0)], although the coefficient is smaller and statistically insignificant (column 2). We find no effect on choices in the envy games [(1,1) vs. (2,3), and (1,1) vs. (1,2)]. The results are robust to replacement of parental education by mothers' and fathers' education (Table S6). Interestingly, the facts that parents live separated and mother has a full-time job do not correlate with choices in any of the four games.

In Panel A of Table 4 we analyze the effects of parental education on prevalence of other-regarding types and show that children of less educated parents are less likely to exhibit cooperative types of other-regarding preferences. First, in columns 1 and 2 we observe that the intensity of altruistic motives is smaller for children of less educated parents: they are less likely to be strongly altruistic (column 1) but more likely to be weakly altruistic (column 2). Second, children of less educated parents are more likely to be weakly spiteful, i.e., to minimize the payoff of their partner unless it reduces their payoff, and they are also more likely to be selfish. The effects are statistically significant (columns 6, 7). We find no relationship between parental education and prevalence of inequality-averse types (columns 3, 4).

Since children from disadvantaged background lag behind in precisely those preferences that children, on average, acquire as they grow up, it is natural to ask whether parental effects emerge later in childhood or whether there are differences already for small children. We divide the sample into younger children (4-7 years old) and older children (8-12 years old) and repeat the analysis of behavioural types. We find a clear evidence for gaps among older children: children of parents with low education are more spiteful and less altruistic (Panel C of Table 4). We do not find conclusive evidence for gaps among younger children: low parental background predicts more selfishness, less weak altruism and no effects on strong altruism and spite (Panel B of Table 4).

In summary, other-regarding preferences of children vary systematically with education of their parents. Low parental education is associated with more spite, more selfishness and less altruism. These parental effects stand out against the overall development of preferences, as we find children to become less spiteful, less selfish and more altruistic with increasing age. In the next two sections we explore several mechanisms that could explain why parental background matters.

3.3. Parental Education and Desired Qualities of Children

The degree to which parents want to instil other-regarding attitudes in their children may differ across socio-economic groups. To explore this possibility, we use the World Values Survey (WVS)

data from the last wave collected in the Czech Republic. The WVS includes a set of questions monitoring the values and beliefs of respondents. Two of these are especially relevant for our study: a question that specifically asks about qualities which children should acquire at home and a question about competition vs. cooperation within a society.[12] The dataset also contains information about demographics (sex, age, education, etc.) of the surveyed individuals. This allows us to identify low-educated individuals in precisely the same way as we do in our data and restrict the WVS sample to individuals who report having at least one child, to focus on responses of actual parents (the results do not change for the whole sample, not reported).

We first analyze responses to the question: "Please look at the following list of qualities that children may be encouraged to learn at home. Which do you consider to be especially important? You can choose up to 5 qualities." The list of qualities consists of: independence, good manners, hard work, imagination, tolerance and respect for other people, determination, religious faith, thrift, obedience, feeling of responsibility, and unselfishness. We regress a dummy variable indicating whether an individual chooses "unselfishness" on her education and a set of control variables such as gender, age and marital and employment status. The results reported in column 1 of Table 5 show that individuals who have low education levels are significantly less likely to choose unselfishness as the desired value to be instilled in children, relative to more educated individuals (they are also less likely to report tolerance and determination, while more likely to report obedience and thrift; Table S7).

Second, we analyse responses to a question that distinguishes individuals who consider achieving material success as a zero sum competition between members of society, from individuals who believe to live in a more harmonious place with scope for beneficial cooperation. These views may affect child-rearing practices. Specifically, people respond to the following paired statements: "People can only get rich at the expense of others." or "Wealth can grow so there is enough for

[12] Our parental questionnaire does not contain such questions, because asking them could significantly decrease the response rate.

everyone.“ A ten point scale is used to measure their agreement, where 1 means that a person definitely agrees with the first statement, while 10 means that she definitely agrees with the second statement. We refer to this response as “the degree of cooperation” and in column 2 of Table 5 we show that less educated individuals consider the society as less cooperative (more competitive).

The relationship between a low education level and a lower importance attributed to teaching children unselfish behaviours mimics the findings from our experiments, in which children from disadvantaged backgrounds make more selfish and more spiteful choices. Together, these results support the interpretation that it is the low priority of parents with low education to instil other-regarding preferences in their children that drives the observed link between parental education and children preferences.

3.4. The Role of Cognitive and Non-Cognitive Skills, Siblings, Health and Peers

In this section we explore other potential channels through which parental background may influence other-regarding preferences of children: cognitive and non-cognitive skills, health, peer effects in school and siblings’ structure. As noted in the introduction, some of the existing studies have identified links between parental education and the above-mentioned factors. At the same time these factors might influence children prosocial behavior, which might generate an indirect link between parental education and children other-regarding preferences.

We conduct the analysis in two steps. We first test which of the above-mentioned factors are predicted by parental education, and then study whether the correlation between parental background and child other-regarding preferences diminishes once we control for additional variables. The first step of this analysis is reported in Table S8. We find that child cognitive skills, measured by overall school performance and grade in mathematics, are positively related to parental education (columns 1 and 2), which is in line with much of the previous literature. Less parental schooling also predicts more child school absence (column 6), although this correlation is only

marginally significant. On the other hand, low parental education does not predict child IQ, patience[13], height, and number of siblings (columns 3,4,5,7 and 8).

In Table 6 we report the second step of the analysis. We repeat the main estimations from Table 4 and add controls, one in each panel, from the following set of variables: school performance, grade in mathematics, IQ, current patience, future patience, school absence, height, number of siblings, birth order and class fixed effects. Overall, controlling for additional variables does not affect the main result: low parental education still predicts less altruism, more spite and (insignificantly) more selfishness.[14] Child characteristics predict very little variation in other-regarding types.

We find no relationship between other-regarding preferences and cognitive skills, measured as child school performance, math grades and IQ (Panels B-D), suggesting that there is no direct link between cognitive skills and other-regarding preferences. Other-regarding preferences are correlated with neither current nor future patience, measured in experiments (Panels E-F, the only exception is a weak positive correlation between future patience and being weakly inequality averse). This is an interesting finding on its own, because it indicates that children correctly understood the one-shot and anonymous nature of the other-regarding tasks. If altruistic choices were driven by expectation of receiving favours in the future, more patient children would behave more altruistically. Similarly, child health, height and siblings do not turn out to be important (Panel G-J).

Finally, we control in a detailed way for the potential role of different characteristics of child's classmates and teachers by controlling for class fixed effects (37 dummies indicating distinct classes, one for each class). Note that class fixed effects absorb away any variation in parental education across classes so that the remaining variation distinguishes children within the same class.

[13] An interesting result is that children become more patient with age, in line with Bettinger and Slonim (2007).

[14] In some cases the coefficient for Low education differs from the baseline regression estimate, but this is because of sample selection due to availability of respective control variables.

We find that the link between parental education and child other-regarding preferences is stable even in within-class setting.

Together, these results demonstrate that low parental education does *not* affect other-regarding preferences of children via lower cognitive abilities, lower patience, different characteristics of their peers and teachers, or worse health.

4. Conclusions

In this paper, we study how family background affects the formation of preferences towards others during childhood. Understanding these effects is important because altruism and inequality aversion help to establish and maintain cooperative outcomes, while spitefulness undermines cooperation, and thus, these preferences are of relevance for society's welfare and, potentially, for individual success as well. The existing literature finds older children to take the welfare of others more into account (Fehr et al., 2008; Harbaugh et al., 2003) and this result is confirmed by our data, too. This paper aims to be the first step towards understanding the role of family background in this process. To that end, we complement the experimental measures of children preferences with a survey instrument for parents, collect rich data about other child characteristics, and use World Values Survey data to understand differences in parental values across socio-economic groups.

The main finding is that children from families with low-educated parents are more spiteful, more selfish and less altruistic. Moreover, the effect of parental education is robust to controlling for a large set of child characteristics -- age, gender, patience, cognitive skills, and health – as well as siblings' composition and class fixed effects. Thus, parental background does not seem to affect other-regarding preferences via peer effects associated with school choice, lower child skills and worse health. We conclude that the most likely channel is the lower importance which less-educated parents give to instilling unselfish behaviours into their offspring. This conclusion is backed up by the analysis of WVS data which shows precisely such pattern. It is also noteworthy that such

mechanism, i.e. deliberate efforts to instil prosocial preferences, has been highlighted by recent theories of endogenous social preferences (Adriani and Sonderegger, 2009; Dixit, 2009).

Our work has two main limitations. First, while we find it intriguing that developmental gaps in other-regarding preferences emerge early in childhood and persist during the age range we study (4-12 years), it is an open question for further research whether the developmental gaps persist further into adulthood. It is noteworthy that gaps in other types of skills observed among children were found to be persistent and very hard to reduce later during the lifecycle (Cunha et al., 2006). Second, since this study is conducted within a single society we cannot distinguish whether it is an absolute level of education or a relative socio-economic position of the parents within a society that matters for formation of child preferences. Only future research can sort it out.

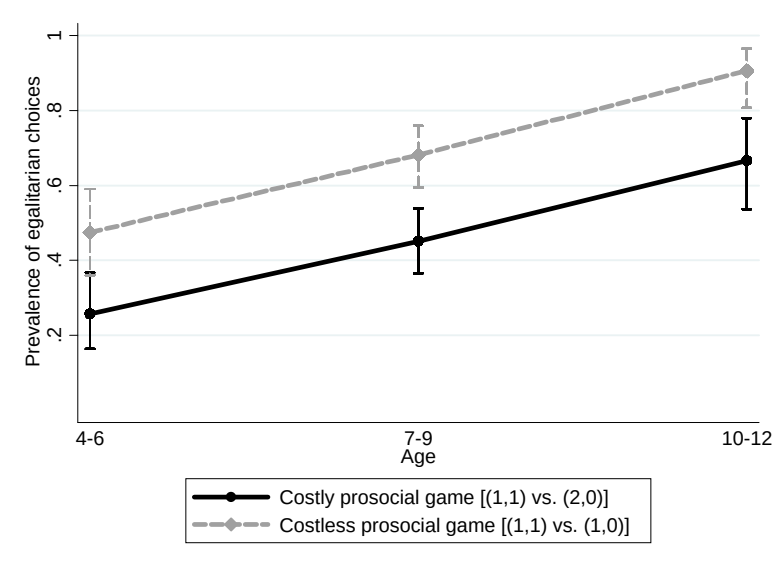
Demonstrating that formation of preferences is affected by disadvantaged socio-economic background has potentially important economic and social consequences (Fehr and Hoff, 2011). The existing evidence shows a strong relationship between low parental background and fundamental life outcomes such as greater participation in socially harmful activities such as crime or being unemployed (Bowles et al., 2008). Based on our findings, we speculate that part of the effect of family background could originate in differences how children are guided to conform to social norms and acquire preferences that are helpful for promoting efficient social interactions in groups, a process that may re-enforce the existing inequalities.

The findings may also be interesting for those who explore whether preferences can be shaped by policy. Interesting evidence is provided by the Perry Preschool Program, an experimental intervention for disadvantaged children aged 3-4 years in the US based on teacher visits at child homes. Schweinhart et al. (2005) show that 40 years later the adults who were treated during childhood have higher rates of school graduation, lower likelihood of being dependent on welfare assistance and fewer arrests than the control group. Our results open the possibility that there may be additional benefits of education interventions targeting disadvantaged children, via shaping their preferences. A more definitive answer requires randomized controlled trials combined with

experimental measures of preferences used as outcome variables. Initial steps in this direction are currently being taken by development economists (Jakiela et al., 2010).

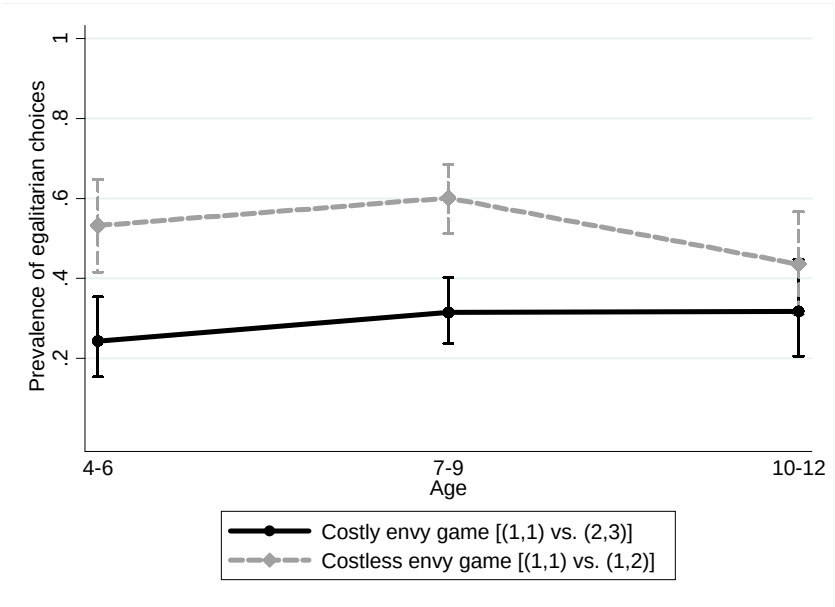
5. Figures and Tables

Figure 1. The Prevalence of Egalitarian Choices in Prosocial Games across Age Groups



Note: Error bars provide 95% exact confidence intervals.

Figure 2. The Prevalence of Egalitarian Choices in Envy Games across Age Groups



Note: Error bars provide 95% exact confidence intervals.

Figure 3. Composition of Other-Regarding Types Across Age Groups

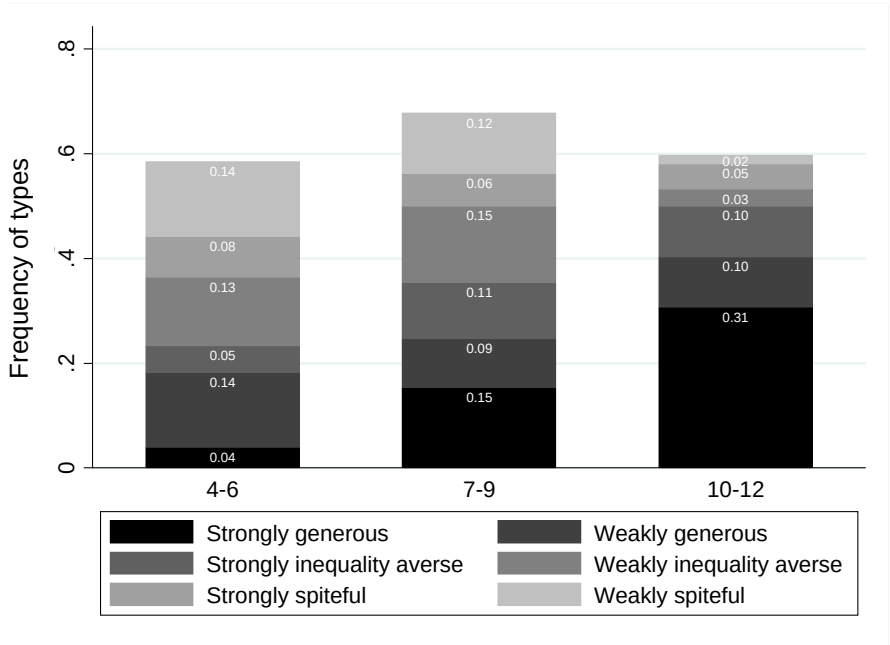


Table 1. Definition of Other-Regarding Types

	Egalitarian choice in:			
	Costly prosocial game (1,1) vs.(2,0)	Costless prosocial game (1,1) vs.(1,0)	Costly envy game (1,1) vs.(2,3)	Costless envy game (1,1) vs.(1,2)
strongly altruistic	1	1	0	0
weakly altruistic	0	1	0	0
strongly inequality averse	1	1	1	1
weakly inequality averse	0	1	0	1
strongly spiteful	0	0	1	1
weakly spiteful	0	0	0	1
selfish	0	0 or 1	0	0 or 1

Table 2. Summary Statistics

	Mean	SD
Panel A: Child and family characteristics		
Age (years)	7.829	(2.116)
Female	0.505	(0.501)
Low parental education	0.262	(0.440)
Parents separated	0.193	(0.395)
Mother not working fulltime	0.489	(0.501)
Number of siblings	1.062	(0.721)
Birth order	1.524	(0.500)
School performance	2.248	(0.940)
Bad math grade	0.316	(0.467)
Share of good answers in IQ test	0.709	(0.141)
Low height	0.533	(0.500)
High absence	0.427	(0.497)
Panel B: Choices in the experimental games		
Costly prosocial game (egalitarian choice)	0.445	(0.498)
Costless prosocial game (egalitarian choice)	0.675	(0.469)
Costly envy game (egalitarian choice)	0.295	(0.457)
Costless envy game (egalitarian choice)	0.544	(0.499)
Strongly altruistic	0.156	(0.364)
Weakly altruistic	0.108	(0.311)
Strongly inequality-averse	0.089	(0.286)
Weakly inequality-averse	0.115	(0.320)
Strongly spiteful	0.063	(0.244)
Weakly spiteful	0.100	(0.301)
Selfish	0.398	(0.490)
Current patience (today vs. tomorrow)	0.527	(0.500)
Future patience (in 7 days vs. in 8 days)	0.631	(0.483)
Panel C: World Values Survey		
Unselfishness	0.319	(0.466)
Cooperation	5.100	(2.701)

Notes: Means, standard deviations in parentheses. School performance is a number on a 1-5 scale, where 1 denotes excellent performance and 5 denotes poor performance. Low height is a dummy denoting children whose height is below median height for the same age and gender. High absence is a dummy denoting children whose absence is above the median. Unselfishness is equal to 1, if a parent reports "unselfishness" as one of the most important qualities which children should learn at home. Cooperation is a ten point scale, where 1 means that a person definitely thinks that "people can only get rich at the expense of others" and 10 that "wealth can grow so there is enough for everyone".

Table 3. Choices in the Games and Family Background

	Egalitarian choice in:			
Dependent variable:	Costly prosocial game	Costless prosocial game	Costly envy game	Costless envy game
	(1,1) vs.(2,0)	(1,1) vs.(1,0)	(1,1) vs.(2,3)	(1,1) vs.(1,2)
	(1)	(2)	(3)	(4)
Low parental education	-0.145**	-0.0630	-0.0432	0.0181
	(0.0625)	(0.0746)	(0.0496)	(0.0687)
Age	0.0771***	0.0744***	0.0171	-0.0053
	(0.0122)	(0.0118)	(0.0154)	(0.0178)
Female	0.119*	0.0059	-0.0031	-0.0316
	(0.0593)	(0.0446)	(0.0641)	(0.0594)
Parents separated	0.0021	0.0063	-0.0130	-0.0646
	(0.0749)	(0.0604)	(0.0626)	(0.0768)
Mother not working fulltime	0.0673	-0.0354	-0.0193	-0.0139
	(0.0547)	(0.0547)	(0.0673)	(0.0638)
Observations	267	267	264	265

Notes: OLS, standard errors in parentheses, clustered at teacher level. *** denotes significance at 1% level, ** at 5% level and * at 10% level. The findings reported in this table are robust to using probit and logit models (Supplementary material, Tables S9 and S10).

Table 4. Other-Regarding Types and Family Background

Dependent variable	Strongly altruistic	Weakly altruistic	Strongly inequality averse	Weakly inequality averse	Strongly spiteful	Weakly spiteful	Selfish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: WHOLE SAMPLE							
Low parental education	-0.114**	0.112**	-0.044	-0.046	-0.030	0.120**	0.138**
	(0.048)	(0.045)	(0.038)	(0.046)	(0.032)	(0.046)	(0.053)
Age	0.042***	-0.010	0.010	-0.012	-0.006	-0.022***	-0.081***
	(0.013)	(0.010)	(0.008)	(0.010)	(0.007)	(0.006)	(0.012)
Female	-0.029	-0.011	0.050*	-0.040	-0.038	-0.047	-0.058
	(0.032)	(0.033)	(0.029)	(0.039)	(0.031)	(0.036)	(0.064)
Parents separated	0.012	0.051	-0.040	0.010	0.055	-0.042	0.002
	(0.047)	(0.048)	(0.031)	(0.044)	(0.053)	(0.031)	(0.065)
Mother not working fulltime	0.020	0.034	-0.008	-0.036	0.018	0.038	-0.023
	(0.046)	(0.038)	(0.043)	(0.037)	(0.033)	(0.033)	(0.049)
Observations	262	262	262	262	262	262	262
PANEL B: YOUNGER CHILDREN (4-7 YEARS OLD)							
Low parental education	0.008	0.161*	-0.049	-0.018	-0.074	0.083	0.155*
	(0.059)	(0.087)	(0.040)	(0.051)	(0.046)	(0.058)	(0.080)
Observations	114	114	114	114	114	114	114
PANEL C: OLDER CHILDREN (8-12 YEARS OLD)							
Low parental education	-0.208***	0.067	-0.036	-0.059	-0.012	0.145*	0.119
	(0.061)	(0.053)	(0.065)	(0.073)	(0.033)	(0.076)	(0.082)
Observations	148	148	148	148	148	148	148

Notes: OLS, standard errors in parentheses, clustered at teacher level. *** denotes significance at 1% level, ** at 5% level and * at 10% level. In Panels B and C we control for the same set of variables as in Panel A. The findings reported in this table are robust to using probit and logit models (Supplementary material, Tables S9 and S10).

Table 5. Parental Values – World Values Survey

Dependent variable	Unselfishness	Cooperation
	(1)	(2)
Low education	-0.064*	-0.376*
	(0.033)	(0.196)
Age	0.001	0.007
	(0.001)	(0.008)
Female	0.056	0.127
	(0.035)	(0.209)
Married or couple	-0.068*	0.157
	(0.039)	(0.232)
Employed	0.012	-0.079
	(0.038)	(0.226)
Observations	823	787

Notes: OLS, standard errors in parentheses. In column 1 the dependent variable is equal to 1, if a parent reports "unselfishness" as one of the most important qualities which children should learn at home. In column 2 the dependent variable is a ten point scale, where 1 indicates that a respondent definitely thinks that "people can only get rich at the expense of others", whereas 10 indicates that (s)he definitely thinks that "wealth can grow so there is enough for everyone" *** denotes significance at 1% level, ** at 5% level and * at 10% level.

Table 6. Testing Indirect Effects of Parental Education

Dependent variable	Strongly altruistic	Weakly altruistic	Strongly inequality averse	Weakly inequality averse	Strongly spiteful	Weakly spiteful	Selfish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: BASELINE RESULTS							
Low parental education	-0.114**	0.112**	-0.044	-0.046	-0.03	0.120**	0.138**
	(0.048)	(0.045)	(0.038)	(0.046)	(0.032)	(0.046)	(0.053)
Observations	262	262	262	262	262	262	262
PANEL B: CONTROLLING FOR SCHOOL PERFORMANCE							
Low parental education	-0.183***	0.117***	-0.062	-0.09	-0.021	0.142**	0.152**
	(0.061)	(0.039)	(0.052)	(0.054)	(0.037)	(0.056)	(0.064)
School performance	0.022	0.011	-0.01	-0.002	0.008	-0.037	-0.027
	(0.028)	(0.020)	(0.015)	(0.023)	(0.012)	(0.026)	(0.038)
Observations	192	192	192	192	192	192	192
PANEL C: CONTROLLING FOR MATH GRADE							
Low parental education	-0.228**	0.051	-0.01	-0.06	-0.003	0.141	0.069
	(0.078)	(0.036)	(0.061)	(0.085)	(0.033)	(0.091)	(0.099)
Bad math grade	-0.03	0.129	-0.115**	0.084	0.003	-0.022	0.217***
	(0.052)	(0.081)	(0.046)	(0.062)	(0.047)	(0.057)	(0.067)
Observations	126	126	126	126	126	126	126
PANEL D: CONTROLLING FOR IQ							
Low parental education	-0.101	0.089	-0.091*	-0.034	-0.03	0.194***	0.169**
	(0.062)	(0.063)	(0.046)	(0.048)	(0.046)	(0.066)	(0.064)
Share of good answers in IQ test	0.011	-0.034	0.03	-0.009	0.258*	-0.184	-0.153
	(0.201)	(0.127)	(0.166)	(0.183)	(0.128)	(0.199)	(0.326)
Observations	138	138	138	138	138	138	138
PANEL E: CONTROLLING FOR CURRENT PATIENCE							
Low parental education	-0.114**	0.113**	-0.045	-0.047	-0.03	0.120**	0.139**
	(0.048)	(0.045)	(0.038)	(0.045)	(0.031)	(0.045)	(0.054)
Patient now	-0.016	0.023	-0.027	-0.013	0	0.03	0.054
	(0.046)	(0.030)	(0.029)	(0.029)	(0.037)	(0.041)	(0.071)
Observations	262	262	262	262	262	262	262
PANEL F: CONTROLLING FOR FUTURE PATIENCE							
Low parental education	-0.112**	0.115**	-0.046	-0.046	-0.029	0.106**	0.132**
	(0.049)	(0.046)	(0.039)	(0.047)	(0.032)	(0.049)	(0.055)
Patient in the future	0.015	0.029	0.011	0.052	-0.011	-0.022	0.037
	(0.063)	(0.037)	(0.037)	(0.036)	(0.032)	(0.038)	(0.067)
Observations	258	258	258	258	258	258	258

Table 6, continued. Testing Indirect Effects of Parental Education

Dependent variable	Strongly altruistic	Weakly altruistic	Strongly inequality averse	Weakly inequality averse	Strongly spiteful	Weakly spiteful	Selfish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL G: CONTROLLING FOR SCHOOL ABSENCE							
Low parental education	-0.247**	0.161**	-0.106	-0.105*	0.004	0.107	0.129
	(0.089)	(0.072)	(0.067)	(0.051)	(0.035)	(0.093)	(0.106)
High absence	0.044	-0.013	0.1	-0.034	-0.038	0.088	0.007
	(0.078)	(0.051)	(0.059)	(0.066)	(0.034)	(0.059)	(0.091)
Observations	110	110	110	110	110	110	110
PANEL H: CONTROLLING FOR HEIGHT							
Low parental education	-0.116**	0.109**	-0.058	-0.036	-0.023	0.108**	0.137**
	(0.052)	(0.044)	(0.040)	(0.049)	(0.033)	(0.047)	(0.055)
Low height	0.05	-0.005	-0.043	-0.042	0.019	0.057*	0.038
	(0.045)	(0.041)	(0.035)	(0.040)	(0.033)	(0.029)	(0.057)
Observations	248	248	248	248	248	248	248
PANEL I: CONTROLLING FOR NUMBER OF SIBLINGS							
Low parental education	-0.112**	0.102**	-0.046	-0.049	-0.028	0.121**	0.131**
	(0.049)	(0.045)	(0.039)	(0.045)	(0.032)	(0.048)	(0.055)
Number of siblings	0.022	0.021	-0.031	-0.046	0.017	-0.004	-0.041
	(0.043)	(0.027)	(0.023)	(0.036)	(0.020)	(0.025)	(0.057)
Observations	260	260	260	260	260	260	260
PANEL J: CONTROLLING FOR BIRTH ORDER							
Low parental education	-0.116**	0.109**	-0.044	-0.044	-0.031	0.117**	0.137**
	(0.049)	(0.045)	(0.037)	(0.045)	(0.032)	(0.045)	(0.053)
Birth order	0.031	0.054	-0.005	-0.042	0.026	0.039	0.009
	(0.036)	(0.038)	(0.035)	(0.044)	(0.033)	(0.034)	(0.052)
Observations	260	260	260	260	260	260	260
PANEL K: CONTROLLING FOR CLASS FIXED EFFECTS							
Low parental education	-0.131**	0.113**	-0.035	-0.034	-0.039	0.108**	0.141**
	(0.059)	(0.053)	(0.042)	(0.052)	(0.035)	(0.046)	(0.054)
Observations	262	262	262	262	262	262	262

Notes: OLS, standard errors in parentheses, clustered at teacher level. In some cases the coefficient by Low parental education differs from the baseline regression estimate. This is always driven by sample selection due to availability of respective control variables, some of which are only measured on different sub-samples of children. Repeating the baseline regression on restricted samples gives statistically the same estimates. *** denotes significance at 1% level, ** at 5% level and * at 10% level.

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Parental Background and Other-Regarding Preferences in Children

SUPPLEMENTARY MATERIAL

This file contains supplementary figures and tables

Figure S1: Choice Situation – Binary Choice Games

Figure S2: Experimental Shop

Figure S3: Choice Situation – Patience

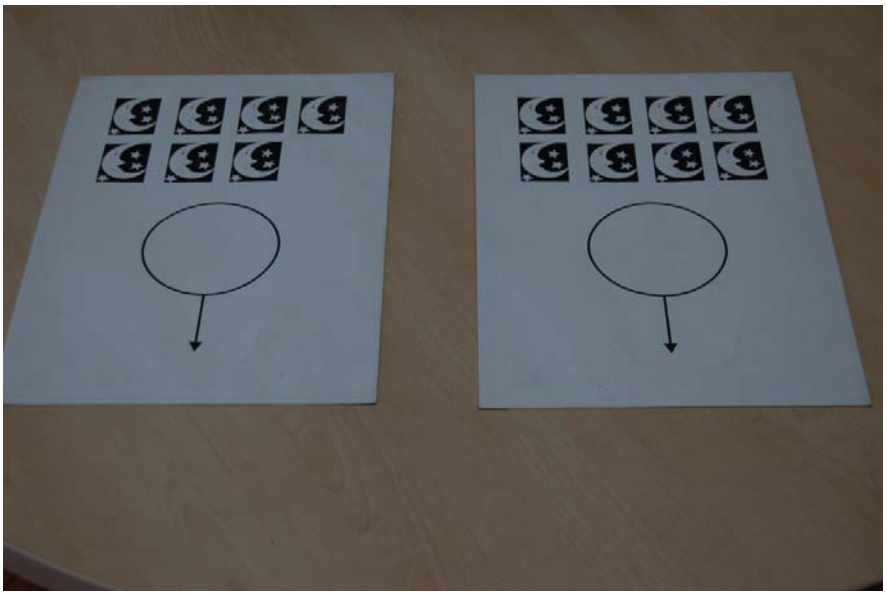
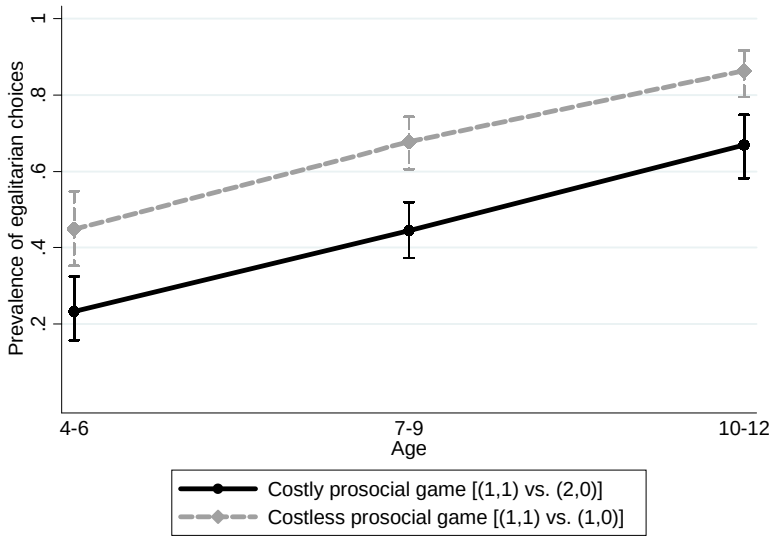
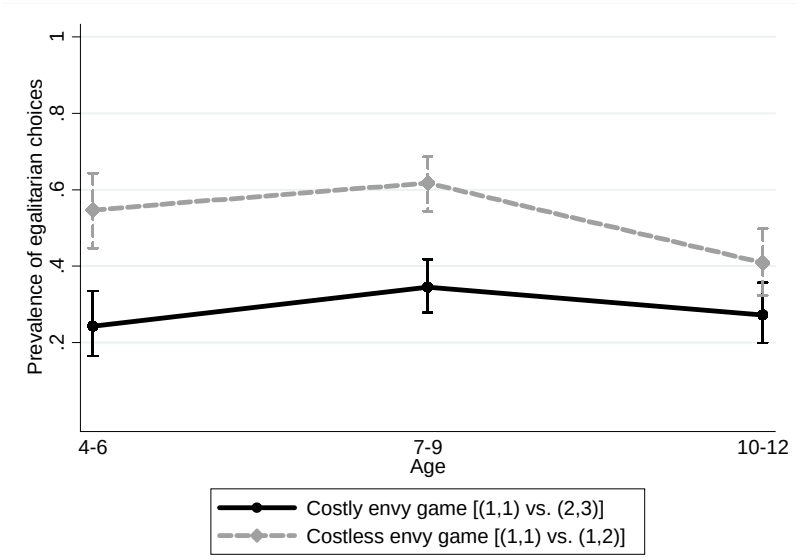


Figure S4. Choices in Prosocial Games across Age Groups – Full Sample (includes children whose parents have not responded to parental survey)



Note: Error bars provide 95% exact confidence intervals.

Figure S5. Choices in Envy Games across Age Groups – Full Sample (includes children whose parents have not responded to parental survey)



Note: Error bars provide 95% exact confidence intervals.

Figure S6. Composition of Other-Regarding Types across Age Groups – Full Sample (includes children whose parents have not responded to parental survey)

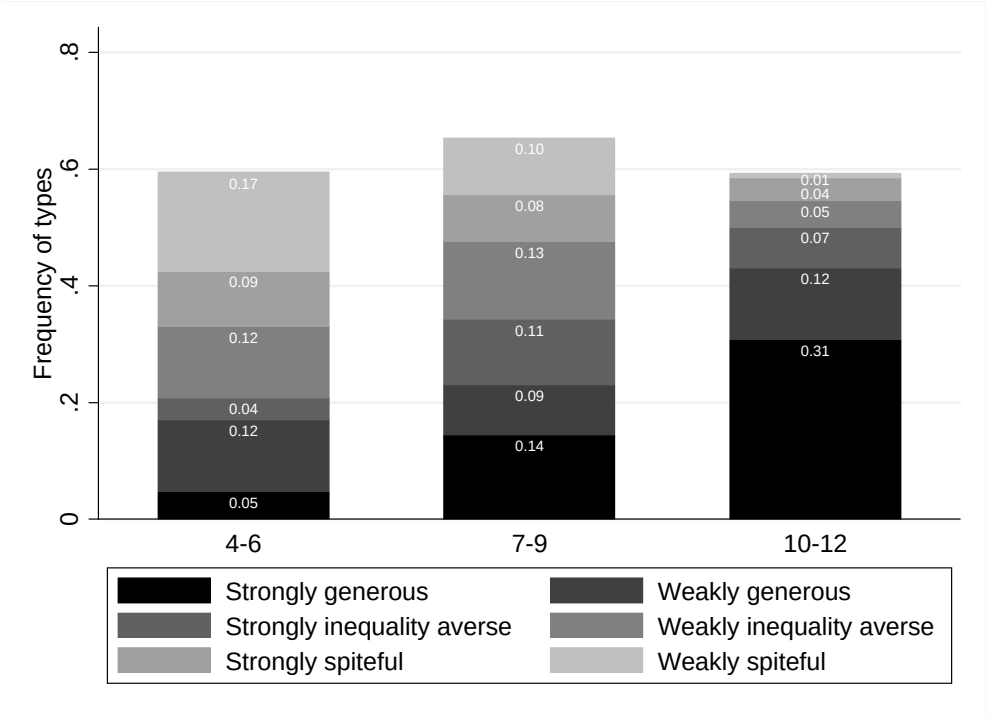


Table S1. Choices in the Games Controlling for Experimental Design Effects

Dependent variable	Costly prosocial game	Costless prosocial game	Costly envy game	Costless envy game
	(1)	(2)	(3)	(4)
PANEL A: TREATMENT EFFECTS				
Low parental education	-0.150**	-0.059	-0.042	0.027
	(0.066)	(0.075)	(0.048)	(0.068)
Observations	267	267	264	265
PANEL B: EXPERIMENTER EFFECTS				
Low parental education	-0.137**	-0.065	-0.029	0.004
	(0.063)	(0.074)	(0.049)	(0.065)
Observations	267	267	264	265
PANEL C: ORDER OF GAMES AND POSITION OF EGALITARIAN OPTION				
Low parental education	-0.136**	-0.049	-0.038	0.013
	(0.064)	(0.074)	(0.050)	(0.070)
Observations	264	264	261	262

Notes: OLS, standard errors in parentheses, clustered at teacher level. *** denotes significance at 1% level, ** at 5% level and * at 10% level. Panel A includes dummy variables for 3 out of 4 treatment types, Panel B includes dummy variables for 3 out of 4 experimenters, and Panel C includes dummy variables for which game was played first and the position of egalitarian option (1=left). Additionally, we control for the same set of variables as in Table 3.

Table S2. Other-Regarding Types Controlling for Experimental Design Effects

Dependent variable	Strongly altruistic	Weakly altruistic	Strongly inequality averse	Weakly inequality averse	Strongly spiteful	Weakly spiteful	Selfish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: TREATMENT EFFECTS							
Low parental education	-0.117**	0.113**	-0.049	-0.039	-0.027	0.120**	0.140**
	(0.049)	(0.046)	(0.039)	(0.046)	(0.032)	(0.046)	(0.056)
Observations	262	262	262	262	262	262	262
PANEL B: EXPERIMENTER EFFECTS							
Low parental education	-0.111**	0.112**	-0.035	-0.057	-0.035	0.115**	0.127**
	(0.048)	(0.047)	(0.037)	(0.045)	(0.031)	(0.046)	(0.055)
Observations	262	262	262	262	262	262	262
PANEL C: ORDER OF GAMES AND POSITION OF EGALITARIAN OPTION							
Low parental education	-0.107**	0.130***	-0.031	-0.047	-0.030	0.105**	0.140**
	(0.048)	(0.045)	(0.039)	(0.049)	(0.033)	(0.048)	(0.055)
Observations	262	262	262	262	262	262	262

Notes: OLS, standard errors in parentheses, clustered at teacher level. *** denotes significance at 1% level, ** at 5% level and * at 10% level. Panel A includes dummy variables for 3 out of 4 treatment types, Panel B includes dummy variables for 3 out of 4 experimenters, and Panel C includes dummy variables for which game was played first and for the position of egalitarian options (1=left). Additionally, we control for the same set of variables as in Table 4.

Table S3: Comparison of Samples Included in and Excluded from the Analysis

	Parental questionnaire			No parental questionnaire	
	Mean	SD		Mean	SD
Panel A: Child's characteristics					
Age (years)	7.829	(2.116)	***	8.682	(2.345)
Female	0.505	(0.501)		0.554	(0.499)
School performance	2.248	(0.940)	***	2.551	(0.965)
Bad math grade	0.316	(0.467)		0.418	(0.496)
Share of good answers in IQ test	0.709	(0.141)		0.735	(0.102)
High absence	0.427	(0.497)		0.434	(0.499)
Low height	0.533	(0.500)		0.540	(0.500)
Panel B: Choices in the experimental games					
Costly prosocial game (egalitarian choice)	0.445	(0.498)		0.490	(0.502)
Costless prosocial game (egalitarian choice)	0.675	(0.469)		0.684	(0.466)
Costly envy game (egalitarian choice)	0.295	(0.457)		0.301	(0.460)
Costless envy game (egalitarian choice)	0.544	(0.499)		0.522	(0.501)
Strongly altruistic	0.156	(0.364)		0.195	(0.397)
Weakly altruistic	0.108	(0.311)		0.104	(0.306)
Strongly inequality-averse	0.089	(0.286)		0.065	(0.247)
Weakly inequality-averse	0.115	(0.320)		0.084	(0.279)
Strongly spiteful	0.063	(0.244)		0.084	(0.279)
Weakly spiteful	0.100	(0.301)		0.065	(0.247)
Selfish	0.398	(0.490)		0.325	(0.470)
Patient (today vs. tomorrow)	0.527	(0.500)		0.497	(0.502)
Patient (in 7 days vs. in 8 days)	0.631	(0.483)		0.638	(0.482)
Observations	275			157	

Note: Means, standard deviations in parentheses. *** Difference in means significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table S4: Heckman Sample Selection Model (Correction for Parental Non-Response)

PANEL A: CHOICES IN THE GAMES

Dependent variable	Costly prosocial game	Costless prosocial game	Costly envy game	Costless envy game
	(1)	(2)	(3)	(4)
Low parental education	-0.161**	-0.054	-0.048	0.004
	(0.066)	(0.063)	(0.065)	(0.072)
Age	0.062**	0.053**	0.029	0.034
	(0.024)	(0.023)	(0.026)	(0.029)
Female	0.071	-0.047	0.033	0.057
	(0.073)	(0.072)	(0.076)	(0.091)
Parents separated	0.021	0.008	0.014	-0.082
	(0.074)	(0.070)	(0.073)	(0.080)
Mother not working fulltime	0.072	-0.034	-0.007	-0.012
	0.060)	(0.057)	(0.059)	(0.065)
Constant	-0.232*	0.090	0.216*	0.604***
	(0.133)	(0.133)	(0.131)	(0.161)
Observations (total)	404	404	404	404
Observations (uncensored)	253	253	250	251

PANEL B: OTHER-REGARDING TYPES

Dependent variable	Strongly altruistic	Weakly altruistic	Strongly inequality averse	Weakly inequality averse	Strongly spiteful	Weakly spiteful	Selfish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Low parental education	-0.118**	0.109**	-0.056	-0.034	-0.024	0.105**	0.136**
	(0.051)	(0.045)	(0.041)	(0.047)	(0.036)	(0.049)	(0.067)
Age	0.040**	-0.024	-0.000	0.008	0.003	0.007	-0.080***
	(0.019)	(0.018)	(0.016)	(0.020)	(0.014)	(0.023)	(0.025)
Female	-0.048	-0.052	0.014	0.020	-0.013	0.016	-0.052
	(0.059)	(0.056)	(0.049)	(0.060)	(0.042)	(0.071)	(0.076)
Parents separated	0.015	0.058	-0.033	-0.010	0.060	-0.058	-0.030
	(0.058)	(0.050)	(0.046)	(0.052)	(0.040)	(0.055)	(0.075)
Mother not working fulltime	0.014	0.034	-0.010	-0.026	0.019	0.027	-0.029
	(0.046)	(0.040)	(0.037)	(0.042)	(0.032)	(0.044)	(0.060)
Constant	-0.147	0.108	0.015	0.248**	0.112	0.300**	1.032***
	(0.099)	(0.094)	(0.082)	(0.100)	(0.071)	(0.118)	(0.129)
Observations (total)	404	404	404	404	404	404	404
Observations (uncensored)	248	248	248	248	248	248	248

Heckman 2-stage sample selection model, standard errors in parentheses. Selection variables are Female, Low height and Grade. Female and Grade are both negatively related to selection into the sample. The coefficient by the Mills ratio is insignificant in all regressions. *** denotes significance at 1% level, ** at 5% level and * at 10% level.

Table S5: Comparison of IQ and Non-IQ samples

	IQ sample			Non-IQ sample	
	Mean	SD		Mean	SD
Panel A: Child's and family characteristics					
Age (years)	7.804	(1.987)		7.856	(2.255)
Female	0.503	(0.502)		0.508	(0.502)
Low parental education	0.273	(0.447)		0.250	(0.435)
Parents separated	0.203	(0.403)		0.182	(0.387)
Mother not working fulltime	0.468	(0.501)		0.512	(0.502)
Number of siblings	1.091	(0.711)		1.031	(0.736)
Birth order	1.497	(0.502)		1.553	(0.499)
School performance	2.188	(0.946)		2.307	(0.935)
Bad math grade	0.297	(0.460)		0.333	(0.475)
Share of good answers in IQ test	0.709	(0.141)			
High absence	0.393	(0.493)		0.464	(0.503)
Low height	0.473	(0.501)		0.592	(0.493)
Panel B: Choices in the experimental games					
Costly prosocial game (egalitarian choice)	0.479	(0.501)		0.409	(0.494)
Costless prosocial game (egalitarian choice)	0.664	(0.474)		0.687	(0.465)
Costly envy game (egalitarian choice)	0.340	(0.476)	*	0.246	(0.432)
Costless envy game (egalitarian choice)	0.532	(0.501)		0.557	(0.499)
Strongly altruistic	0.171	(0.378)		0.140	(0.348)
Weakly altruistic	0.086	(0.281)		0.132	(0.340)
Strongly inequality-averse	0.093	(0.291)		0.085	(0.280)
Weakly inequality-averse	0.071	(0.258)	**	0.163	(0.371)
Strongly spiteful	0.064	(0.246)		0.062	(0.242)
Weakly spiteful	0.107	(0.310)		0.093	(0.292)
Selfish	0.336	(0.474)	**	0.465	(0.501)
Patient (today vs. tomorrow)	0.531	(0.501)		0.523	(0.501)
Patient (in 7 days vs. in 8 days)	0.640	(0.482)		0.621	(0.487)
Observations	143			132	

Note: Means, standard deviations in parentheses. *** Difference in means significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table S6: Choices in the Games and Other-Regarding Types with Mother's and Father's Education

PANEL A: CHOICES IN THE GAMES AND MOTHER'S EDUCATION				
Dependent variable	Costly prosocial game	Costless prosocial game	Costly envy game	Costless envy game
	(1)	(2)	(3)	(4)
Low parental education	-0.144**	-0.063	-0.045	0.021
	(0.063)	(0.075)	(0.049)	(0.069)
Observations	266	266	263	264
PANEL B: CHOICES IN THE GAMES AND FATHER'S EDUCATION				
Low parental education	-0.140**	-0.022	-0.053	0.023
	(0.066)	(0.068)	(0.046)	(0.076)
Observations	257	257	254	255

PANE C: OTHER-REGARDING TYPES AND MOTHER'S EDUCATION							
Dependent variable	Strongly altruistic	Weakly altruistic	Strongly inequality averse	Weakly inequality averse	Strongly spiteful	Weakly spiteful	Selfish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Low parental education	-0.116**	0.112**	-0.045	-0.047	-0.030	0.120**	0.137**
	(0.048)	(0.045)	(0.038)	(0.046)	(0.032)	(0.046)	(0.053)
Observations	261	261	261	261	261	261	261
PANE D: OTHER-REGARDING TYPES AND FATHER'S EDUCATION							
Low parental education	-0.107**	0.118**	-0.040	-0.045	-0.044	0.115**	0.141**
	(0.052)	(0.049)	(0.040)	(0.047)	(0.029)	(0.043)	(0.057)
Observations	252	252	252	252	252	252	252

OLS, standard errors in parentheses, clustered at teacher level. *** denotes significance at 1% level, ** at 5% level and * at 10% level. We control for the same set of variables as in Tables 3 and 4, i.e., age, gender, whether parents live together and whether mother works full time.

Table S7: World Values Survey – Full Set of Parental Values

Dependent variable	Good manners	Independence	Hard work	Responsibility	Imagination	Tolerance
	(1)	(2)	(3)	(4)	(5)	(6)
Low education	0.042	-0.037	-0.041	-0.052	-0.006	-0.063*
	(0.027)	(0.028)	(0.027)	(0.033)	(0.014)	(0.034)
Married or couple	0.014	-0.029	-0.007	-0.012	-0.002	0.022
	(0.032)	(0.033)	(0.032)	(0.039)	(0.017)	(0.041)
Employed	-0.060*	-0.055*	-0.038	0.015	-0.026	0.091**
	(0.031)	(0.032)	(0.031)	(0.038)	(0.016)	(0.039)
Age	0.002	-0.005***	0.001	0.000	-0.002***	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.001	-0.069**	-0.019	0.065*	-0.006	0.076**
	(0.029)	(0.030)	(0.029)	(0.035)	(0.015)	(0.037)
Observations	823	823	823	823	823	823

Dependent variable	Economy	Determination	Religious faith	Unselfishness	Obedience
	(7)	(8)	(9)	(10)	(11)
Low education	0.077**	-0.085***	0.031	-0.064*	0.042*
	(0.035)	(0.033)	(0.020)	(0.033)	(0.025)
Married or couple	0.030	-0.055	0.008	-0.068*	0.034
	(0.042)	(0.039)	(0.024)	(0.039)	(0.029)
Employed	-0.025	0.003	-0.001	0.012	0.017
	(0.040)	(0.037)	(0.023)	(0.038)	(0.028)
Age	0.003**	-0.005***	0.003***	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.042	-0.089**	0.045**	0.056	0.044*
	(0.037)	(0.035)	(0.021)	(0.035)	(0.026)
Observations	823	823	823	823	823

OLS, standard errors in parentheses. *** denotes significance at 1% level, ** at 5% level and * at 10% level.

Table S8: Child Characteristics and Parental Background

Dependent variable	School per-formance	Bad math grade	Share of good answers in IQ test	Patient now	Patient in the future	High absence	Low height	Number of siblings	Birth order
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low parental education	0.394***	0.247**	-0.003	-0.014	-0.009	0.125	-0.045	-0.081	0.061
	(0.138)	(0.094)	(0.028)	(0.080)	(0.071)	(0.080)	(0.060)	(0.090)	(0.056)
Age	-0.021	0.110***	0.008	0.033**	0.040**	0.041	-0.001	0.033*	-0.012
	(0.055)	(0.022)	(0.008)	(0.015)	(0.017)	(0.025)	(0.013)	(0.019)	(0.014)
Female	-0.118	-0.029	0.028	0.010	-0.011	0.135**	-0.078	0.037	0.051
	(0.090)	(0.072)	(0.023)	(0.065)	(0.068)	(0.060)	(0.056)	(0.097)	(0.073)
Parents separated	0.339	0.153	-0.022	0.139*	0.073	0.183*	0.064	-0.223	-0.144
	(0.220)	(0.121)	(0.022)	(0.075)	(0.084)	(0.086)	(0.072)	(0.161)	(0.090)
Mother not working full time	0.140	0.072	-0.027	0.069	0.066	0.062	-0.018	0.297***	-0.005
	(0.117)	(0.083)	(0.027)	(0.060)	(0.056)	(0.115)	(0.055)	(0.061)	(0.062)
Constant	2.225***	-0.844***	0.646***	0.209	0.285*	-0.117	0.588***	0.703***	1.597***
	(0.553)	(0.204)	(0.076)	(0.144)	(0.150)	(0.232)	(0.115)	(0.170)	(0.143)
Observations	196	129	141	268	264	114	254	266	268

OLS, standard errors in parentheses, clustered at teacher level. *** denotes significance at 1% level, ** at 5% level and * at 10% level.

Table S9: Choices in the Games and Other-Regarding Types (Probit Model)

PANEL A: CHOICES IN THE GAMES

Dependent variable	Costly prosocial game	Costless prosocial game	Costly envy game	Costless envy game
	(1)	(2)	(3)	(4)
Low parental education	-0.159**	-0.077	-0.045	0.018
	(0.069)	(0.068)	(0.062)	(0.070)
Age	0.005	0.009	-0.013	-0.065
	(0.081)	(0.076)	(0.072)	(0.080)
Female	0.075	-0.040	-0.019	-0.014
	(0.065)	(0.060)	(0.057)	(0.063)
Parents separated	0.083***	0.080***	0.018	-0.005
	(0.016)	(0.014)	(0.014)	(0.015)
Mother not working fulltime	0.131**	0.010	-0.003	-0.032
	(0.063)	(0.059)	(0.056)	(0.062)
Observations	267	267	264	265

PANEL B: OTHER-REGARDING TYPES

Dependent variable	Strongly altruistic	Weakly altruistic	Strongly inequality averse	Weakly inequality averse	Strongly spiteful	Weakly spiteful	Selfish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Low parental education	-0.103***	0.111**	-0.047	-0.049	-0.029	0.130***	0.151**
	(0.039)	(0.051)	(0.034)	(0.041)	(0.029)	(0.050)	(0.073)
Age	0.004	0.054	-0.038	0.009	0.061	-0.041	-0.003
	(0.055)	(0.055)	(0.037)	(0.052)	(0.049)	(0.034)	(0.082)
Female	0.023	0.037	-0.005	-0.037	0.017	0.039	-0.024
	(0.043)	(0.038)	(0.035)	(0.040)	(0.029)	(0.033)	(0.065)
Parents separated	0.041***	-0.009	0.010	-0.013	-0.007	-0.022***	-0.087***
	(0.010)	(0.009)	(0.008)	(0.010)	(0.007)	(0.008)	(0.016)
Mother not working fulltime	-0.026	-0.010	0.049	-0.039	-0.036	-0.048	-0.060
	(0.042)	(0.037)	(0.035)	(0.039)	(0.029)	(0.032)	(0.063)
Observations	262	262	262	262	262	262	262

Probit model, marginal effects calculated at sample means, standard errors in parentheses. *** denotes significance at 1% level, ** at 5% level and * at 10% level.

Table S10: Choices in the Games and Other-Regarding Types (Logit Model)

PANEL A: CHOICES IN THE GAMES

Dependent variable	Costly prosocial game	Costless prosocial game	Costly envy game	Costless envy game
	(1)	(2)	(3)	(4)
Low parental education	-0.165**	-0.072	-0.044	0.018
	(0.076)	(0.066)	(0.065)	(0.070)
Age	0.001	0.013	-0.013	-0.064
	(0.084)	(0.077)	(0.073)	(0.079)
Female	0.076	-0.037	-0.019	-0.014
	(0.067)	(0.060)	(0.058)	(0.063)
Parents separated	0.085***	0.080***	0.017	-0.005
	(0.017)	(0.015)	(0.013)	(0.015)
Mother not working fulltime	0.132**	0.008	-0.004	-0.032
	(0.066)	(0.059)	(0.056)	(0.062)
Observations	267	267	264	265

PANEL B: OTHER-REGARDING TYPES

Dependent variable	Strongly altruistic	Weakly altruistic	Strongly inequality averse	Weakly inequality averse	Strongly spiteful	Weakly spiteful	Selfish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Low parental education	-0.124**	0.090***	-0.046	-0.049	-0.029	0.088***	0.155**
	(0.054)	(0.034)	(0.043)	(0.048)	(0.035)	(0.029)	(0.072)
Age	0.005	0.043	-0.042	0.010	0.043	-0.040	-0.003
	(0.051)	(0.041)	(0.049)	(0.049)	(0.030)	(0.045)	(0.084)
Female	0.016	0.033	-0.006	-0.036	0.016	0.035	-0.025
	(0.040)	(0.036)	(0.034)	(0.040)	(0.028)	(0.031)	(0.066)
Parents separated	0.038***	-0.010	0.009	-0.012	-0.006	-0.019***	-0.089***
	(0.009)	(0.008)	(0.008)	(0.009)	(0.006)	(0.007)	(0.017)
Mother not working fulltime	-0.029	-0.013	0.046	-0.038	-0.035	-0.046	-0.064
	(0.040)	(0.035)	(0.033)	(0.039)	(0.028)	(0.030)	(0.065)
Observations	262	262	262	262	262	262	262

Logit model, marginal effects calculated at sample means, standard errors in parentheses. *** denotes significance at 1% level, ** at 5% level and * at 10% level.

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