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Parental background and other-regarding preferences in children

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Abstract Other-regarding preferences are important for establishing and maintaining cooperative outcomes. In this paper, we study how the formation of other-regarding preferences during childhood is related to 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 the children of parents with low education are less altruistic, more selfish, and more likely to be weakly spiteful. This link is robust to controlling for a rich set of children's characteristics and class fixed effects. It also stands out against the overall development of preferences, as we find children to become more altruistic, less selfish, and less likely to be weakly spiteful with increasing age. The results, supported by a complementary analysis of World Values Survey data, suggest an important role of socialization in the formation of other-regarding preferences.

Keywords Other-regarding preferences · Altruism · Selfishness · Children · Family background · Field experiment

JEL Classification C93 · D03 · D64 · I24

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1 Introduction

Whether individuals are motivated purely by their self-interest or whether they have other-regarding preferences has an 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, and efficiency concerns—helps to establish and maintain cooperative and fair group outcomes even in situations with a limited scope for reputation-building (Bowles 2006; Fehr and Fischbacher 2003), while spitefulness leads to the deterioration of cooperation (Falk et al. 2005; Herrmann et al. 2008). Other-regarding preferences are therefore recognized as important for a range of economic and social outcomes, including market performance (Leibbrandt 2012), public life and politics (Fong et al. 2006), and cooperation in the workplace (Fehr and Fischbacher 2002).

In a 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 the prevalence of the positive side of other-regarding preferences increases with age. Harbaugh et al. (2003a) observe that sharing in a dictator game increases between seven and 18 years of age. Fehr et al. (2008) find that selfishness dominates among 3–4-year-old children and inequality aversion strongly develops 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 the development of more complex notions of fairness. These results suggest that people are not born with unchangeable behavioral traits but acquire part of their other-regarding preferences during childhood and adolescence.[1]

While the existing literature studies the development of preferences with age, little is known about whether the formation of other-regarding preferences during childhood is affected by parental socio-economic status. *A priori*, there are several plausible reasons why parental socio-economic status may matter. First, parental background has been found to be related to child's cognitive and non-cognitive skills (Almås et al. 2012; Aughinbaugh and Gittleman 2003; Bartling et al. 2012; Cunha et al. 2006) and the composition of peers and teachers with whom children interact in schools (Case and Katz 1991). To the extent that these factors play a role in the formation of preferences towards others, perhaps by affecting the ability to imagine the perspective of others, the developmental paths of these preferences may vary with parental socio-economic status. Second, parental background may be related to differences in socialization practices (Evans 2004) and values that parents want to instill in their children (Bisin and Verdier 2001;

[1] Indirect evidence for childhood being a sensitive period in the development of other-regarding preferences is also provided by Bauer et al. (unpublished results) who find that exposure to warfare intensifies in-group egalitarianism, and that these effects are particularly enduring if warfare is experienced during childhood or adolescence. Researchers have also studied the development of other types of preferences: risk aversion (Eckel et al. 2011; Sutter et al. 2013), time discounting (Bettinger and Slonim 2007; Sutter et al. 2013), and trust (Harbaugh et al. 2003b; Sutter and Kocher 2007). Sutter et al. (2013) and Castillo et al. (2011) also show that experimental measures of preferences predict the field behaviour of children.

Dixit 2009). If parents from disadvantaged backgrounds believe their children are less likely to be involved in settings where cooperation is crucial, such as the labor market, they may have lower incentives to instill preferences that enhance cooperation. Third, growing up in poverty may result in a higher marginal utility of income, which could make it more costly to act un-selfishly for children from poor families. Last, recent research has shown that altruistic behavior has a genetic component (Cesarini et al. 2008) indicating a possibility that parents pass genetic predispositions to acquire social norms onto their children.

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 socio-economic status 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 the possible mechanisms behind the relationship between parental socio-economic status and other-regarding preferences in children, we also collect data about child cognitive and non-cognitive skills, health, and siblings, and study the importance of peers at school. To explore the role of the values of parents and their willingness to instill unselfish behaviors, we complement our own data with an analysis of the World Values Survey data collected on a different sample of adults in the same country.

Our research is motivated by two streams of literature. First, a well-established relationship between parental background and the fundamental life outcomes of children (for a review see, for example, Bowles and Gintis 2002) 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 the 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 the timing of policy interventions targeting children from disadvantaged environments (Bowles et al. 2008; Heckman 2006). While existing research has focused on cognitive and non-cognitive skills that directly affect *individual* performance, the role of parental background 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). Henrich et al. (2005) find more altruism and preferences to be fair among adult populations in communities with a higher level of market integration and speculate that in societies with greater returns to cooperation adults are more likely to socialize their children to display altruistic behavior. 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 neighborhoods in the United Kingdom are less likely to share in a dictator game as compared to children from richer neighborhoods, 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.

We find that low family socio-economic status is associated with gaps in cooperation-enhancing types of other-regarding preferences already in childhood. Chil-

dren of less-educated parents are more selfish, less altruistic, and more likely to exhibit a weak form of spite. The relationship is robust to controlling for measures of children's cognitive and non-cognitive skills, sibling composition, class fixed effects, maternal employment status, whether both parents live together or separately, and measures of child health. The complementary analysis of World Values Survey (WVS) data, collected on a different sample of parents in the same area, reveals that less-educated parents are less likely to consider unselfishness as an important quality to be instilled in children and are less likely to be involved in volunteer activities.

The rest of the paper is organized as follows. In Sect. 2 we describe the experimental design and the sample. In Sect. 3 we present and discuss the results. Section 4 concludes.

2 Experimental and survey design

2.1 Eliciting other-regarding preferences

2.1.1 Games

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 him/herself and a partner. From different combinations of choices across these four games, we can classify subjects into mutually exclusive preference types as predicted by theory: altruistic, inequality averse, spiteful, and selfish. These are one-shot experiments without repeated interactions and partners are always anonymous. Thus, the experimental design rules out the potential for future reciprocal behavior and isolates other-regarding preferences from strategic behavior.

In the costly prosocial game, a subject chooses between allocation $(1, 1)$, one token for him/herself and one for a partner, and allocation $(2, 0)$, both tokens for him/herself. This game measures the preference for reducing 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 basic prosociality because it is costless to increase a partner's payoff, and it is consistent with models of inequality aversion, maximization of efficiency (Charness and Rabin 2002), and pure altruism. In the costless envy game, the decision-maker can choose between $(1, 1)$ and $(1, 2)$. Choosing the $(1, 1)$ option indicates an aversion to disadvantageous inequality or spitefulness (minimization of the 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. $(1, 2)]$, similar to how 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 a disadvantageous inequality for the decision-maker. Because the egalitarian allocation is costly for the decision-maker, it indicates a strong preference to reduce inequality or spitefulness.

2.1.2 *Classification of other-regarding types*

Pooling choices across all four games allows for the classification of subjects according to their preference type. We denote children as altruistic if they maximize the payoff of their partner in all four games, as inequality averse if they minimize differences in payoffs by always choosing the egalitarian option, and as spiteful if they always minimize their partner's payoff. We denote children as selfish if they maximize their own payoff in the costly prosocial and the costly envy games (in the remaining two games the payoff of the decision-maker is the same in both options). The classification results in four mutually exclusive preference types: selfish and three strong other-regarding types (those who are willing to sacrifice their payoff to alter the recipient's payoff). For completeness we further sub-classify the selfish group into behavioral types with weak other-regarding preferences. These types maximize their payoff in the costly games, but behave according to the predictions of the other-regarding models in the two costless games, i.e. when it does not cost them anything to alter the partner's payoff. The selfish group is thus sub-classified into selfish-weakly altruistic, selfish-weakly inequality averse, selfish-weakly spiteful group, and a group with selfish preferences without a consistent other-regarding component (selfish-other). The payoffs in all four games and the classification into types are summarized in Table S1 in the Electronic Supplementary Material (ESM).

Note that while this approach is simple, intuitive, and leads to a classification into mutually exclusive types, there is a methodological trade-off. First, since this classification assumes that subjects act according to their types in all four games, we are not able to classify those subjects whose decisions do not exactly follow any of the choice patterns listed in Table S1 (29 % of the sample). To complement the main analysis, we use an error-rate analysis (following Costa-Gomes et al. 2001 and Sutter et al. 2010) as an alternative method of assigning other-regarding types to individual subjects. We assume that each child's type is drawn from a common distribution over seven types analyzed in this paper: altruistic, inequality averse, spiteful, selfish-weakly altruistic, selfish-weakly inequality averse, selfish-weakly spiteful, and selfish-other. Although a child's type does not change from game to game, the choices made by her might not always be consistent with their type due to errors in decision making. Following the literature, we model this situation with a likelihood function taking type-specific error probabilities and prior distribution of types as parameters. Using the observed distribution of individual decisions across games, we estimate these parameters. The estimates and observed decisions in games are further used to calculate individual-specific probabilities of being each of the seven types. The resulting aggregate frequency of types is very similar to the raw distribution of types defined in the standard way (Table S8). A detailed description of this approach is presented in the ESM. The individual-specific probabilities of being a certain type estimated on the basis of an error-rate model are used as dependent variables in a regression analysis of the relationship between parental background and the prevalence of other-regarding preferences.

Second, the choice pattern of the altruistic type is also consistent with an individual who seeks to maximize the total payoff, i.e. an individual who has efficiency-seeking preferences (Charness and Rabin 2002). The only game in which the predictions

for altruistic and efficiency-seeking types differ is the costly prosocial game [(1, 1) vs. (2, 0)]. Since both options in this game have the same total payoff, efficiency-seekers should be indifferent, while altruists should choose the equal split. When assessing whether changes in the prevalence of the altruistic type are due to altruism or efficiency seeking, we focus on changes in choices in this game.

2.1.3 Experimental procedure

The two mutually exclusive options in each game were represented on two cards (Fig. S1). On each card there were two circles, each 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.

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 part of the Electronic Supplementary Material). 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 (there were four experimenters), and the type of partner 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 (Table S2).

The children were paid according to their choices in each of the four games to ensure their motivation and concentration (as in e.g. Fehr et al. 2008, 2011).[2] During the experiments children received tokens according to their choices and these were placed in a paper bag with their name. The children were informed that the tokens for the partner, which were put in a separate paper bag, would be anonymously delivered later and this promise was implemented in practice. After the experiments were completed, children exchanged their tokens for various kinds of sweets, pencils, erasers, stickers, and small toys in an experimental shop that we set up on site (Fig. S2). For simplicity, the price was always one token for one item. To increase the salience of rewards, each child received one token as a show-up fee and exchanged

[2]While the usual practice in experiments with adult subject pools is to pay for one randomly selected task, paying for each task is common in experiments with children because it is simpler to understand. A legitimate concern with paying for each task is that children may think about the total allocations resulting from the four choices instead of considering payoffs in each individual game separately. This is unlikely in our sample, since the children made choices sequentially, they did not know how many choices were to come, and they did not know what the allocations in subsequent tasks would be. Furthermore, we tested whether different combinations of choices that result in the same total payoff for the self and for the partner were chosen with different probabilities. There are four pairs of such combinations: in two of them their frequencies are significantly different at the 1 % level, in one at the 5 % level, and in one at the 12 % level (available upon request).

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 that was then sealed. We requested the children to not open the bag before the end of the school day, so that other classmates could not observe its content before participating in the experiments, and the teachers were asked to monitor compliance.

In order to make explanation simple, the anonymous recipient was the same across all tasks. One out of four different types of recipients was randomly assigned to each decision-maker, who learned the type of the recipient prior to making choices. The recipient was a classmate, an unknown child from a different school, or a child from a minority group (Vietnamese or Roma).[3] In the in-group condition subjects could potentially expect to act both as a dictator and as a recipient because all children from each class participated in the experiment (a request of the headmasters). It can be argued that the expectation of additional rewards in the position of a recipient may affect choices in the position of a dictator (Rigdon and Levine, unpublished results) and thus potential heterogeneity in choices can be due to preferences as well as expectations. We note, however, that in the three out-group conditions, in which the recipient was not from the same class as the dictator, dictators did not expect to receive tokens twice, once as a dictator and once as a recipient, and our main results are not specific for either in-group or out-group conditions (Table S3). Interestingly in this context, Fehr et al. (2011) found no significant differences between the choices of children who were both dictators and recipients and those who were only dictators.

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 and two tokens tomorrow. The same binary choice was offered in a future time frame: we asked the subjects whether they preferred one token in seven days or two tokens in eight days. The first choice measures Current patience, while the second choice measures Future patience. Both are binary variables equal to one if a child chooses two tokens with a one-day delay. The two mutually exclusive options were again represented by two cards, each illustrating the length of the delay with pictures of a moon (see Fig. S3). Current rewards were paid immediately after the experiments, similarly as in other-regarding choices. Teachers then delivered the paper bags with future rewards on the predetermined future date.

2.3 Sample and non-experimental data

Our subjects come from four kindergartens (typically attended by children 3–6 years old) and seven primary schools located in Prague, the capital city of the Czech Republic, 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

[3]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.

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.[4] The experiments took place in schools and kindergartens during normal school days, to mimic an environment natural for the subject pool and to limit the problem of self-selection into participation in our experiments.

We first collected experimental data among 438 children attending kindergartens and primary schools (grades 1, 2, 3, 4, and 5). The participation rate was relatively high, 85 % (approximately 10 % were absent from school on the day of the experiment, and the remaining 5 % did not have parental consent). As a second step, a questionnaire was sent to the parents of participating children to collect information about their family background. The parental response rate was 63 % and we exclude children whose parents did not fill out the questionnaire from the analysis. Thus, in this paper we study a sample of 275 children who participated in the experiments and whose parents answered our survey questionnaire.[5] Table 1 provides the 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 measured on a scale ranging from 1 (excellent) to 5 (poor) and is available for all pupils except kindergarteners (200 children). A grade in mathematics is 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 the 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, 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 five years old and not all parents gave their consent to participation in the test. Table S6 compares the sub-samples of children for whom we have the IQ measure with children for whom we do not.

We use two measures of children's health—height and absence from school. The variable "Low height" equals one if the child's height is below the average height for the same age and gender in the Czech population (National Institute of Public Health 2001). The variable "High absence" is equal to one if the child missed more school hours due to health reasons than the median number of hours absent due to health reasons in our sample.

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

[5]None of the choices in the games differs significantly between the sub-sample of children included in and excluded from the analysis (Table S4). Children whose parents filled out the questionnaire are on average younger and have better teacher evaluations of their performance compared to children whose parents did not fill the questionnaire. We perform several robustness checks (e.g. the Heckman sample selection model, see Table S5) and conclude that our results are unlikely to be affected by patterns in parental non-response.

Table 1 Summary statistics

	Mean	SD
Panel A: Child and family characteristics		
Age (years)	7.829	(2.116)
Female (dummy)	0.505	(0.501)
Low parental education (dummy)	0.262	(0.440)
Parents separated (dummy)	0.193	(0.395)
Mother not working full-time (dummy)	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 (dummy)	0.316	(0.467)
Share of good answers in IQ test	0.709	(0.141)
Low height (dummy)	0.441	(0.497)
High absence (dummy)	0.427	(0.497)
Panel B: Experimental measures		
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)
Altruistic	0.156	(0.364)
Inequality averse	0.089	(0.286)
Spiteful	0.063	(0.244)
Selfish	0.398	(0.490)
Selfish—weakly altruistic	0.108	(0.311)
Selfish—weakly inequality averse	0.115	(0.320)
Selfish—weakly spiteful	0.100	(0.301)
Selfish—other	0.074	(0.263)
Ambiguous	0.294	(0.456)
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 (dummy)	0.316	(0.465)
Cooperation	5.123	(2.698)
Volunteering (dummy)	0.302	(0.459)
Sample size	275	

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. A bad math grade is equal to 1 if the grade is worse than A. Low height is equal to 1 if the child's height is below the average height for the same age and gender in the Czech population. High absence is equal to 1 if the absence is above the median. Unselfishness is equal to 1 if a parent reports "unselfishness" as one of the most important qualities that 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". Volunteering is equal to 1, if an individual is a member of a voluntary organization (e.g. a charitable, church, or sports organization)

To measure parental socio-economic status and family environment, we carried out a survey of the parents of the participating children. The variable "Low parental education" is equal to one if the highest obtained qualification of both parents is either primary school or secondary school without a graduation exam, and is equal to zero if at least one parent has completed secondary school with a graduation exam.[6,7] The employment status of the mother, whether the child lives with both parents, the number of siblings, and the birth order of the child constitute proxies for the intensity of parental care and social interaction during childhood.

3 Results

3.1 Does family background matter?

We start the analysis by studying how children's choices in the games and other-regarding types relate to parental background. We use a logit model for the analysis of choices in the games because each game represents an independent binary choice between an egalitarian and not egalitarian allocation of rewards. For the analysis of behavioral types, we use a multinomial logit model to account for the fact that types are determined simultaneously and they are mutually exclusive.[8]

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 2, Panel A, Column 1 demonstrates this relationship in a regression framework in which the dependent variable equals one if option (1, 1) was chosen in the costly prosocial game and where we control for age, gender, whether the mother works full time, and whether the parents live together. Qualitatively similar results are obtained in the costless prosocial game [(1, 1) vs. (1, 0)], although the coefficient is smaller and not significant statistically (Column 2). We find no link between parental education and choices in the envy games [(1, 1) vs. (2, 3) and (1, 1) vs. (1, 2)]. Interestingly, the fact that parents live separately or that the mother has a full-time job do not correlate with choices in any of the four games.

Next, we analyze how low parental education is related to the prevalence of other-regarding types. Of the children, 71 % made choices consistent with one of the mutually exclusive preference types defined in Sect. 2.1 and summarized in Table S1.

[6] Passing a school graduation exam is considered a sign of an educated person in the Czech Republic. It is a prerequisite for applying to a college, university, or other higher education institution. Secondary education without the school graduation exam corresponds to level 3c of the International Standard Classification of Education (ISCED), while secondary school with graduation exam corresponds to levels 3a and 3b.

[7] 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 link with overall parental education since education levels of mothers and fathers in our sample are highly correlated and the results are robust to using the mother's or father's education instead of parental education (Table S7).

[8] The results are robust to using OLS and probit models (available upon request).

Table 2 Family background and choices in games

Dependent variable: Egalitarian choices in...	Costly prosocial game (1, 1) vs. (2, 0) (1)	Costless prosocial game (1, 1) vs. (1, 0) (2)	Costly envy game (1, 1) vs. (2, 3) (3)	Costless envy game (1, 1) vs. (1, 2) (4)
PANEL A: WHOLE SAMPLE				
Low parental education	−0.165**	−0.072	−0.044	0.018
	(0.074)	(0.078)	(0.052)	(0.069)
Parents separated	0.001	0.013	−0.013	−0.064
	(0.085)	(0.068)	(0.063)	(0.076)
Mother not working full-time	0.076	−0.037	−0.019	−0.014
	(0.063)	(0.059)	(0.067)	(0.063)
Age	0.085***	0.080***	0.017	−0.005
	(0.015)	(0.014)	(0.015)	(0.018)
Female	0.132*	0.008	−0.004	−0.032
	(0.068)	(0.048)	(0.064)	(0.059)
Observations	267	267	264	265
PANEL B: KINDERGARTEN CHILDREN				
Low parental education	−0.115	0.087	−0.132	−0.071
	(0.105)	(0.164)	(0.081)	(0.119)
Age	0.059	−0.044	0.074	0.215**
	(0.045)	(0.067)	(0.053)	(0.097)
Observations	75	75	74	74
PANEL C: PRIMARY SCHOOL CHILDREN				
Low parental education	−0.166*	−0.111	−0.032	0.035
	(0.087)	(0.076)	(0.062)	(0.089)
Age	0.089***	0.083***	−0.008	−0.026
	(0.030)	(0.026)	(0.026)	(0.027)
Observations	192	192	190	191

Notes: Marginal effects from logit estimation, standard errors in parentheses, clustered at the teacher level. *** denotes significance at the 1 % level, ** at the 5 % level, and * at the 10 % level. In Panels B and C we control for the same set of variables as in Panel A

The fact that the majority of children can be classified into these types reassures us that they did not make their choices randomly. Had they acted randomly, we would expect only 44 % to be classified into the types that cover seven out of the 16 possible combinations of choices. In Panel A of Table 3, we find that children of less-educated parents are by 11 percentage points less likely to be altruistic (Column 1) and by 15 percentage points more likely to be selfish (Column 4). The magnitude of these associations is large (in the whole sample 16 % of children are altruistic and 40 % are selfish). We find no relationship between parental education and the prevalence of inequality-aversion and spitefulness (Columns 2 and 3). In Panel D we sub-classify the selfish group further and find that the children of less-educated parents are more

likely to be weakly spiteful and more likely to be weakly altruistic. Together, the results show that the low education of parents is associated with a lower intensity of altruism and also more spite (but only when it is not costly to be spiteful).

The results are robust to taking into account the possibility that children make errors during decision-making. As noted, we use a maximum likelihood error-rate analysis (following Costa-Gomes et al. 2001 and Sutter et al. 2010) as an alternative method of classifying subjects into types. As the dependent variables are continuous on the $(0, 1)$ interval, we use OLS as the estimation method. The resulting relative frequency of types is very similar to the raw distribution of types in our sample and the link with parental education follows a similar pattern as in the baseline analysis (Table S8).[9]

Although the choice pattern of altruistic type is consistent both with altruism and efficiency-seeking motives, two observations support the interpretation that the observed correlation with parental education is due to differences in altruism. First, we find a strong positive link between parental education and sharing in the costly prosocial game, a game in which efficiency-seeking motives should not play a role, while altruism should. Second, we do not find any link between parental education and the total sum of tokens children allocate to themselves and their partner during all four games (Column 1 of Table S10), while we find that the children of less-educated parents allocate a significantly smaller share of the total payoff to a recipient (Column 2 of Table S10).

In summary, other-regarding preferences of children vary systematically with the education level of their parents. Low parental education is associated with more selfishness, less altruism, and a greater prevalence of a weak form of spitefulness. In the next section, we explore developmental patterns of other-regarding preferences and study whether the gaps identified among children from disadvantaged backgrounds emerge later in childhood or whether there are differences already for small children. In Sects. 3.3 and 3.4 we explore several mechanisms that could explain why parental background matters.

3.2 Development of other-regarding preferences

Our sample covers children from kindergarten to grade 5 in primary school (age 4–12 years), which allows us to study which types of preferences become more prevalent with age and compare the patterns observed in our sample with previous studies.

We find strong age effects in both prosocial games. In the costly prosocial game, the relative frequency of choosing the $(1, 1)$ option over $(2, 0)$ is 67 % among 10–12-year-old children, while it is only 22 % among 4–5-year-old children. Table 2, Panel A shows this age pattern in a regression framework. The prevalence of egalitarian choices in the costly prosocial game increases by 8.5 percentage points with

[9] We obtain similar results when using yet another classification into types, based on information from choices in the two costly games and disregarding choices in the costless games in which the decision-maker's payoff is unaffected by his/her choice (Table S9). Such a classification does not allow for making combinations of choices that are inconsistent with any of the four preference types: altruistic, inequality averse, spiteful, or selfish.

Table 3 Family background and other-regarding types

Dependent variable	Altruistic (1)	Inequality averse (2)	Spiteful (3)	Selfish (4)	Ambiguous (5)
PANEL A: WHOLE SAMPLE					
Low parental education	−0.113***	−0.048	−0.029	0.154***	0.036
	(0.040)	(0.039)	(0.032)	(0.057)	(0.075)
Parents separated	0.004	−0.039	0.063	0.001	−0.028
	(0.046)	(0.032)	(0.058)	(0.073)	(0.073)
Mother not working full-time	0.017	−0.005	0.018	−0.023	−0.005
	(0.043)	(0.044)	(0.033)	(0.055)	(0.058)
Age	0.043***	0.012	−0.006	−0.092***	0.043***
	(0.012)	(0.009)	(0.007)	(0.016)	(0.016)
Female	−0.026	0.051*	−0.040	−0.069	0.084
	(0.032)	(0.030)	(0.030)	(0.074)	(0.055)
Observations	262	262	262	262	262
PANEL B: KINDERGARTEN CHILDREN					
Low parental education	0.000	0.000	−0.080**	0.217*	−0.138*
	(0.001)	(0.004)	(0.031)	(0.104)	(0.083)
Age	0.000	0.001	0.002*	−0.117	0.114
	(0.001)	(0.001)	(0.001)	(0.082)	(0.083)
Observations	73	73	73	73	73
PANEL C: PRIMARY SCHOOL CHILDREN					
Low parental education	−0.176***	−0.067	−0.008	0.127*	0.125
	(0.054)	(0.054)	(0.031)	(0.065)	(0.096)
Age	0.037***	0.004	−0.020	−0.081***	0.060**
	(0.054)	(0.016)	(0.013)	(0.029)	(0.030)
Observations	189	189	189	189	189

PANEL D: SUB-CLASSIFICATION OF SELFISH TYPE (WHOLE SAMPLE)

Dependent variable	Selfish-weakly altruistic	Selfish-weakly inequality averse	Selfish-weakly spiteful	Selfish-other
Low parental education	0.121**	−0.055	0.124**	−0.023
	(0.049)	(0.050)	(0.049)	(0.017)
Age	−0.015	−0.018	−0.025***	−0.026***
	(0.012)	(0.012)	(0.007)	(0.006)
Observations	262	262	262	262

Notes: Marginal effects from multinomial logit, standard errors in parentheses, clustered at the teacher level. In Panel D we sub-classify the selfish group and run a similar regression as in Panel A, but report only coefficients for the new types (the estimates for the other types are very similar to those reported in Panel A). *** denotes significance at the 1 % level, ** at the 5 % level, and * at the 10 % level. In Panels B, C, and D we control for the same set of variables as in Panel A

each additional year of age, and the relationship is significant at the 1 % level (Column 1). A similar increase in the frequency of prosocial choices can be observed in the costless prosocial game [(1, 1) vs. (1, 0)] (Column 2). Here, the likelihood of an egalitarian choice increases from 49 % for the 4–5-year-olds to 91 % among 10–12-year-olds (Fig. S4). As noted, our experimental design is most comparable to Fehr et al. (2008) who implemented similar tasks among 3–8-year-old children in Switzerland. In the prosocial games the developmental pattern is similar in both countries: the likelihood of choosing (1, 1) increases monotonically with age and is of comparable magnitude. Our results are also consistent with Harbaugh et al. (2003a) and Benenson et al. (2007), who find that older children share more than the younger children in a standard dictator game.

We do not find a linear relationship between age and the frequency of egalitarian choices in the costly or costless envy games (Table 2, Columns 3–4 and Fig. S5). Motivated by Fehr et al. (2008), who observes that egalitarian behavior in the costless envy game increases between 3–8 years, and other studies (Almås et al. 2010; Fehr et al. 2011; Martinsson et al. 2011) indicating a diminishing importance of egalitarian motives among adolescents, we study whether there is an inverted u-shape relationship between age and egalitarian choices, peaking around eight years of age. In the costless envy game, the prevalence of egalitarian choices increases with age for a sub-sample of children attending kindergarten, i.e. children 4–6 years old (Column 4, Panel B of Table 2 and Fig. S5). It does not increase further during the 7–8-year period, in contrast to Fehr et al. (2008), but remains stable or slightly decreases between 7 and 12 years (Panel C). As a consequence, the prevalence of egalitarian choices around the age of 7–8 years is lower in our sample (57 %) than in the Fehr et al. (2008) study (84 %). In the costly envy game, the pattern is qualitatively similar as in the costless envy game but less statistically significant (Column 3 and Fig. S5).

The analysis in Panel A of Table 3 reveals a clear shift in the composition of behavioral types with age. Older children become significantly less selfish and more altruistic.[10] Using the more detailed classification of the selfish group (Panel D), we find that older children are also less likely to be weakly spiteful. We do not find any clear age effect on the prevalence of inequality aversion. Overall, the observed diminishing importance of selfish preferences and increasing importance of cooperative types of other-regarding preferences with age is in line with the existing literature, suggesting that the sensitive age in the development of other-regarding preferences is not country-specific.

Interestingly, children of parents with low education levels lag behind in precisely those preferences that children, on average, acquire as they grow up. It is thus natural to ask whether the gaps emerge later in childhood or whether there are already differences for small children. We divide the sample into two groups—children who attend a kindergarten and children who attend a primary school (in terms of age, this division is very close to the division into 4–6- and 7–12-year-old groups)—and repeat the analysis from Sect. 3.1 where we study the link with parental background. We find

[10] Interestingly, older children are also more likely to fall into the ambiguous category, suggesting that instead of behaving selfishly some older children started forming their own fairness ideals and have not yet developed a specific theory-predicted notion of fairness.

evidence for the identified gaps among older children: children of parents with low education share less in the costly prosocial game (Panel C of Table 2, Column 1), and are more selfish and less altruistic (Panel C of Table 3, Columns 1 and 4). We do not find conclusive evidence for gaps among children attending kindergarten. In this subsample, we also observe that children of less-educated parents share less in the costly prosocial game, although this relationship is not statistically significant (Panel B of Table 2, Column 1), and that they are significantly more likely to be selfish (Panel B of Table 3, Column 4). On the other hand, we find that they are less spiteful and that there is no relationship with altruism (Panel B of Table 3, Columns 1 and 3).

3.3 The role of cognitive and non-cognitive skills, health, siblings, and peers

In this section we explore whether parental background influences the other-regarding preferences of children via their cognitive and non-cognitive skills, health, sibling structure, or peer effects in school. 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 prosocial behavior, which might explain the link between parental education and children's 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 the child's other-regarding preferences diminishes once we control for additional variables. In the first step we find that a child's cognitive skills, measured by overall school performance and grade in mathematics, are positively related to parental education (Table S11, Columns 1 and 2), which is in line with much of the previous literature. Less parental schooling also predicts higher 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, height, or number of siblings (Columns 3, 4, 5, 7, and 8).

In Table 4 we report the second step of the analysis. We repeat the main estimations from Tables 2 and 3 and add a set of controls for children's characteristics: school performance as a measure of cognitive skills, current patience as a measure of non-cognitive skills, height as a measure of health, and number of siblings and birth order to capture social interaction within the family. Overall, the main result is robust: low parental education still predicts less sharing in the costly prosocial game, less altruism and (marginally significantly) more selfishness. A similar picture emerges when we separately control for each variable (one in each Panel of Table S12). This allows us to fully exploit the unusually rich data about child characteristics (those in Table 4 plus math grade, IQ, future patience, and school absence) and at the same time to avoid a reduction of the sample size due to the fact that different variables are available for different sub-samples.

Next, in a detailed way we control for the potential role of different characteristics of the child's classmates and teachers by controlling for class fixed effects (30 dummies indicating distinct classes, one for each class). Note that class fixed effects absorb any variation in parental education across classes so that the remaining variation distinguishes children within the same class. We find that the link between parental

Table 4 The role of skills, health, and siblings

Dependent variable	Egalitarian choices in games				Other-regarding types				
	Costly prosocial game (1, 1) vs. (2, 0) (1)	Costless prosocial game (1, 1) vs. (1, 0) (2)	Costly envy game (1, 1) vs. (2, 3) (3)	Costless envy game (1, 1) vs. (1, 2) (4)	Altruistic (5)	Inequality averse (6)	Spiteful (7)	Selfish (8)	Ambiguous (9)
Low parental education	−0.185**	−0.099	−0.013	0.034	−0.197***	−0.061	−0.009	0.115	0.152
	(0.083)	(0.073)	(0.074)	(0.095)	(0.066)	(0.052)	(0.032)	(0.072)	(0.102)
Parents separated	0.070	0.046	0.077	−0.045	0.060	−0.027	0.096	−0.117	−0.013
	(0.115)	(0.107)	(0.096)	(0.091)	(0.086)	(0.036)	(0.094)	(0.084)	(0.088)
Mother not working full-time	0.122	−0.047	0.036	0.065	−0.018	0.043	0.039	−0.047	−0.016
	(0.080)	(0.067)	(0.096)	(0.085)	(0.063)	(0.063)	(0.039)	(0.079)	(0.077)
School performance	0.019	0.024	−0.039	−0.028	0.024	−0.007	0.002	−0.014	−0.006
	(0.048)	(0.035)	(0.026)	(0.051)	(0.033)	(0.015)	(0.012)	(0.046)	(0.042)
Current patience	−0.121	−0.050	−0.078	−0.057	−0.031	−0.033	−0.020	0.155	−0.072
	(0.077)	(0.060)	(0.082)	(0.075)	(0.066)	(0.043)	(0.037)	(0.079)	(0.058)
Low height	0.041	−0.035	0.021	−0.072	0.033	0.000	−0.013	−0.043	0.024
	(0.066)	(0.066)	(0.074)	(0.056)	(0.057)	(0.046)	(0.032)	(0.074)	(0.082)
Number of siblings	0.093	−0.033	−0.032	−0.047	0.045	−0.075*	0.020	−0.101	0.111
	(0.081)	(0.039)	(0.078)	(0.074)	(0.069)	(0.043)	(0.025)	(0.090)	(0.073)
Birth order	0.007	−0.010	−0.025	0.038	0.015	0.071	−0.016	0.057	−0.127
	(0.105)	(0.082)	(0.084)	(0.089)	(0.053)	(0.049)	(0.046)	(0.087)	(0.098)
Age	0.089***	0.089***	−0.015	−0.007	0.029	0.002	−0.015	−0.074***	0.058*
	(0.025)	(0.029)	(0.025)	(0.027)	(0.028)	(0.015)	(0.015)	(0.025)	(0.031)

Table 4 (*Continued*)

Dependent variable	Egalitarian choices in games				Other-regarding types				
	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)	Altruistic	Inequality averse	Spiteful	Selfish	Ambiguous
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	0.124	0.001	−0.026	0.007	−0.064	0.043	−0.034	−0.044	0.099
	(0.076)	(0.040)	(0.085)	(0.079)	(0.040)	(0.042)	(0.030)	(0.038)	(0.074)
Observations	184	184	182	183	181	181	181	181	181

Notes: Columns 1–4 marginal effects from logit estimates, Columns 5–9 marginal effects from multinomial logit estimates, standard errors in parentheses, clustered at the teacher level. *** denotes significance at the 1 % level, ** at the 5 % level, and * at the 10 % level

education and the child's other-regarding preferences is present even in a within-class setting (Panel J of Table S12).

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

3.4 Supporting evidence from the World Values Survey

The degree to which parents instill other-regarding attitudes in their children may differ across socio-economic groups. To test whether such a link exists in the population we study, we turn to the World Values Survey (WVS) data from the last wave collected in the Czech Republic and focus on a question that asks about the qualities that children should acquire at home, a question about competition vs. cooperation within a society, and a question about the volunteer activities of the respondents (a proxy for altruistic behavior).[11] We restrict the WVS sample to individuals who report having at least one child, to focus on responses of actual parents.

In Column 1 of Table 5 we analyze the 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. The dependent variable is a dummy variable indicating whether an individual chooses "unselfishness" and thus we use a logit model to analyze the relationship between parental characteristics and the answer to this question. Less-educated individuals are identified in the same way as in our experimental data and we control for age, gender, being married, being employed, and for regional fixed effects. We find 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 responsibility, tolerance, and determination, while they are more likely to report thrift, religious faith, and obedience; Table S13).

In Column 2 of Table 5 we analyze the responses to a question that distinguishes individuals who consider achieving material success as a zero-sum competition between members of a society from individuals who believe in living in a more harmonious place with a scope for beneficial cooperation. Specifically, people respond to the following pair of statements: "People can only get rich at the expense of others" and "Wealth can grow so there is enough for 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 he/she definitely agrees with the second statement. These views may affect child-rearing practices. We find that less-educated individuals consider society as less cooperative (marginally significant, p-value $= 0.104$). In Column 3 we find that a low education level also predicts individual (self-reported)

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

Table 5 Parental values—World Values Survey

Dependent variable	Whole sample			Prague only		
	Unselfishness (1)	Cooperation (2)	Volunteering (3)	Unselfishness (4)	Cooperation (5)	Volunteering (6)
Low education	−0.064*	−0.331	−0.068**	−0.142	−1.206**	−0.204**
	(0.034)	(0.203)	(0.034)	(0.114)	(0.599)	(0.097)
Married or couple	−0.062*	0.210	0.053	−0.058	−0.178	0.061
	(0.037)	(0.228)	(0.040)	(0.127)	(0.666)	(0.110)
Employed	0.001	−0.177	0.080**	−0.139	−0.619	−0.043
	(0.036)	(0.216)	(0.037)	(0.128)	(0.696)	(0.110)
Age	0.001	0.005	0.002	−0.004	−0.050**	−0.001
	(0.001)	(0.007)	(0.001)	(0.004)	(0.022)	(0.003)
Female	0.043	0.002	−0.112***	−0.082	−1.463**	−0.106
	(0.035)	(0.202)	(0.033)	(0.126)	(0.674)	(0.099)
Number of qualities chosen	0.125***			0.123		
	(0.026)			(0.081)		
Region fixed effects	Yes	Yes	Yes	No	No	No
Observations	864	833	867	78	74	78

Notes: Columns 1, 3, 4, and 6: logit, marginal effects, standard errors in parentheses. Columns 2 and 5: OLS, standard errors in parentheses. *** denotes significance at the 1 % level, ** at the 5 % level, and * at the 10 % level. In Columns 1 and 4 the dependent variable is equal to 1 if a parent reports "unselfishness" as one of the most important qualities that children should learn at home. In Columns 2 and 5 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". In Columns 3 and 6 the dependent variable is equal to 1 if an individual is a member of a voluntary organization (e.g. a charitable, church, or sports organization). Respondents who do not have any children and who were reported as not being interested in the interview were excluded from the sample

altruistic behavior. Less-educated respondents are significantly less likely to volunteer for an organization.

As mentioned, the WVS data is collected in the whole country, while our experimental data was collected in and around Prague. As a robustness check we run the same set of regressions on a much smaller WVS sub-sample of respondents from Prague (Columns 4–6 of Table 5). We find larger coefficients for all three variables but due to much smaller sample size these are not always statistically significant.

The relationship between low education level and a lower importance attributed to unselfish behavior mimics the observation from our experiments, in which children from disadvantaged backgrounds make more selfish and less altruistic choices. Nevertheless, while the correlations observed in the WVS might be suggestive of the potential mechanism behind the differences in other-regarding preferences in children, they need to be interpreted with caution because WVS and our data come from different samples. Testing for a link between parental values and child preferences directly may be an interesting avenue for future research.

4 Conclusions

In this paper, we study the link between family background and the formation of preferences towards others during childhood. Understanding this relationship is important because altruism and inequality aversion help to establish and maintain cooperative outcomes, while spitefulness and selfishness can undermine cooperation, and thus, these preferences are of relevance for society's welfare and, potentially, for individual success as well. The existing literature finds that older children take the welfare of others more into account (Fehr et al. 2008; Harbaugh et al. 2003a); this result is confirmed by our study, too. This paper takes one step forward by studying the role of family background in this process.

The main finding is that children of less-educated parents are more selfish, less altruistic, and more likely to exhibit a weak form of spite. In terms of mechanisms that could explain the link, our study provides a few interesting results, but these should be taken as suggestive and perhaps as a motivation for future research. The relationship with parental education is robust to controlling for a large set of child characteristics—age, gender, patience, cognitive skills, and health—as well as sibling 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, or worse health. Using the WVS data coming from the same population but a different sample from ours, we find that for less-educated parents it is less important to instill unselfish behaviors in their offspring and that they are less likely to volunteer, suggesting that differences in parental values and socialization could explain heterogeneity in child preferences. It is noteworthy that this type of mechanism has been highlighted by recent theories of endogenous social preferences (Adriani and Sonderegger 2009; Dixit 2009). Finally, it is also possible that the poverty associated with low education makes children more constrained in terms of material resources, which could explain why they are less altruistic and more selfish, but it is harder to explain why they are also more likely to be weakly spiteful.

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 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 in the lifecycle (Cunha et al. 2006).

Demonstrating that the formation of other-regarding preferences is related to disadvantaged socio-economic backgrounds 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 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 in the acquisition of preferences that are helpful for promoting efficient social interactions in groups, a process that may reinforce 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 United States. Schweinhart et al. (2005) show that 40 years later the adults who were treated during childhood have higher rates of school graduation, a 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).

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All authors have approved the final article.

References

Adriani, F., & Sonderegger, S. (2009). Why do parents socialize their children to behave pro-socially? An information-based theory. *Journal of Public Economics*, *93*(11), 1119–1124.

Almås, I., Cappelen, A. W., Salvanes, K. G., Sørensen, E. O., & Tungodden, B. (2012). *Willingness to compete: family matters*. Norwegian School of Economics, Discussion Paper No. 24/2012.

Almås, I., Cappelen, A. W., Sørensen, E. O., & Tungodden, B. (2010). Fairness and the development of inequality acceptance. *Science*, *328*(5982), 1176–1178.

Aughinbaugh, A., & Gittleman, M. (2003). Does money matter? A comparison of the effect of income on child development in the United States and Great Britain. *The Journal of Human Resources*, *38*(2), 416–440.

Barr, A., Burns, J., Miller, L., & Shaw, I. (2011). *Individual notions of distributive justice and relative economic status*. University of Oxford Discussion Paper No. 2011005.

Bartling, B., Fehr, E., & Schunk, D. (2012). Health effects on children's willingness to compete. *Experimental Economics*, *15*(1), 58–70.

Bauer, M., Cassar, A., Chytilová, J., & Henrich, J. (unpublished results). *Warfare experience during ontogeny increases egalitarian and parochial motivations*. CERGE-EI.

Benenson, J. F., Pascoe, J., & Radmore, N. (2007). Children's altruistic behavior in the dictator game. *Evolution and Human Behavior*, *28*(3), 168–175.

Bettinger, E., & Slonim, R. (2007). Patience among children. *Journal of Public Economics*, *91*(1–2), 343–363.

Bisin, A., & Verdier, T. (2001). The economics of cultural transmission and the dynamics of preferences. *Journal of Economic Theory*, *97*(2), 298–319.

Bolton, G. E., & Ockenfels, A. (2000). ERC: a theory of equity, reciprocity, and competition. *The American Economic Review*, *90*(1), 166–193.

Bowles, S. (2006). *Microeconomics: behavior, institutions, and evolution*. Princeton: Princeton University Press.

Bowles, S., & Gintis, H. (2002). The inheritance of inequality. *The Journal of Economic Perspectives*, *16*(3), 3–30.

Bowles, S., Gintis, H., & Osborne Groves, M. (2008). *Unequal chances: family background and economic success*. Princeton: Princeton University Press.

Carneiro, P., & Heckman, J. J. (2002). The evidence on credit constraints in post-secondary schooling. *The Economic Journal*, *112*(482), 705–734.

Case, A., & Katz, L. F. (1991). *The company you keep: the effects of family and neighborhood on disadvantaged youths*. NBER Working Paper No. 3075.

Castillo, M., Ferraro, P., Jordan, J., & Petrie, R. (2011). The today and tomorrow of kids: time preferences and educational outcomes of children. *Journal of Public Economics*, *95*(11–12), 1377–1385.

Cesarini, D., Dawes, C. T., Fowler, J. H., Johannesson, M., Lichtenstein, P., & Wallace, B. (2008). Heritability of cooperative behavior in the trust game. *Proceedings of the National Academy of Sciences of the United States of America*, *105*(10), 3721–3726.

Charness, G., & Rabin, M. (2002). Understanding social preferences with simple tests. *The Quarterly Journal of Economics*, *117*(3), 817–869.

Cunha, F., Heckman, J. J., Lochner, L., & Masterov, D. V. (2006). Interpreting the evidence on life cycle skill formation. In E. Hanushek & F. Welch (Eds.), *Handbook of the economics of education* (Vol. 1, pp. 697–812). Amsterdam: North Holland.

Costa-Gomes, M., Crawford, V. P., & Broseta, B. (2001). Cognition and behavior in normal-form games: an experimental study. *Econometrica*, *69*(5), 1193–1235.

Dixit, A. (2009). Governance institutions and economic activity. *The American Economic Review*, *99*(1), 5–24.

Eckel, C. C., Grossman, P. J., Johnson, C. A., De Oliveira, A., Rojas, C., & Wilson, R. K. (2011). *On the development of risk preferences: experimental evidence*. CBEES Working Paper No. 2008-5.

Evans, G. W. (2004). The environment of childhood poverty. *The American Psychologist*, *59*(2), 77.

Falk, A., Fehr, E., & Fischbacher, U. (2005). Driving forces behind informal sanctions. *Econometrica*, *73*(6), 2017–2030.

Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature*, *454*(7208), 1079–1083.

Fehr, E., & Fischbacher, U. (2002). Why social preferences matter: the impact of non-selfish motives on competition, cooperation, and incentives. *The Economic Journal*, *112*, C1–C33.

Fehr, E., & Fischbacher, U. (2003). The nature of human altruism: Proximate patterns and evolutionary origins. *Nature*, *425*, 785–791.

Fehr, E., & Hoff, K. (2011). Introduction: tastes, castes and culture: the influence of society on preferences. *The Economic Journal*, *121*(556), F396–F412.

Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, *114*(3), 817–868.

Fehr, E., Rützler, D., & Sutter, M. (2011). *The development of egalitarianism, altruism, spite and parochialism in childhood and adolescence*. IZA Discussion Paper No. 5530.

Fong, C. M., Bowles, S., & Gintis, H. (2006). Strong reciprocity and the welfare state. In S. C. Kolm & J. M. Ythier (Eds.), *Handbook on the economics of giving, reciprocity and altruism* (pp. 1439–1464). Amsterdam: North-Holland.

Harbaugh, W. T., Krause, K., & Liday, S. J. (2003a). *Bargaining by children*. University of Oregon Economics Department Working Paper No. 2002-04.

Harbaugh, W. T., Krause, K., Liday, S. J., & Vesterlund, L. (2003b). Trust in children. In E. Ostrom & J. Walker (Eds.), *Trust and reciprocity: interdisciplinary lessons from experimental research* (pp. 302–322). New York: Russell Sage Foundation.

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, *312*(5782), 1900–1902.

Henrich, J., Boyd, R., Bowles, S., Gintis, H., Fehr, E., Camerer, C., McElreath, R., Gurven, M., Hill, K., Barr, A., Ensminger, J., Tracer, D., Marlow, F., Patton, J., Alvard, M., Gil-White, F., & Henrich, N. (2005). "Economic man" in cross-cultural perspective: behavioral experiments in 15 small-scale societies. *Behavioral and Brain Sciences*, *28*(06), 795–815.

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world. *Behavioral and Brain Sciences*, *33*(2–3), 61–83.

Herrmann, B., Thoni, C., & Gächter, S. (2008). Antisocial punishment across societies. *Science*, *319*(5868), 1362–1367.

Jakiela, P., Miguel, E., & TeVelde, V. L. (2010). *You've earned it: combining field and lab experiments to estimate the impact of human capital on social preferences*. NBER Working Paper No. 16449.

Leibbrandt, A. (2012). Are social preferences related to market performance? *Experimental Economics*, *15*(4), 589–603.

Loehlin, J. C. (2008). Resemblance in personality and attitudes between parents and their children: genetic and environmental contributions. In S. Bowles, H. Gintis, & M. Osborne Groves (Eds.), *Unequal chances: family background and economic success* (pp. 192–207). Princeton: Princeton University Press.

Martinsson, P., Nordblom, K., Rützler, D., & Sutter, M. (2011). Social preferences during childhood and the role of gender and age: an experiment in Austria and Sweden. *Economics Letters*, *110*(3), 248–251.

National Institute of Public Health (2001). 6th nation-wide anthropological survey of children and adolescents 2001: Czech Republic.

Rigdon, M., & Levine, A. S. (unpublished results). *The role of expectations and gender in altruism*. Rutgers University.

Schweinhart, L. J., Montie, J., Xiang, Z., Barnett, W. S., Belfield, C. R., & Nores, M. (2005). *Lifetime effects: the High/Scope Perry Preschool study through age 40*. Ypsilanti: High/Scope Press.

Sutter, M., & Kocher, M. G. (2007). Trust and trustworthiness across different age groups. *Games and Economic Behavior*, *59*(2), 364–382.

Sutter, M., Feri, F., Kocher, M. G., Martinsson, P., Nordblom, K., & Rützler, D. (2010). *Social preferences in childhood and adolescence: a large-scale experiment*. University of Gothenburg Working Papers in Economics No. 454.

Sutter, M., Kocher, M. G., Glätzle-Rützler, D., & Trautmann, S. (2013). Impatience and uncertainty: experimental decisions predict adolescents' field behavior. *The American Economic Review*, *103*(1), 510–531.