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LIKE PARENT, LIKE CHILD: THE INTERGENERATIONAL TRANSMISSION OF OTHER-REGARDING PREFERENCES*

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Abstract

Using experimental data on children's and parents' behavior in four binary choice games, which allows for classifying subjects into altruistic, egalitarian and spiteful types, this paper explores the intergenerational relationship of other-regarding preferences. The results show that there is strong positive and significant correlation between children's and parents' other-regarding preferences. The results also indicate that parents' parochial preferences strongly influence children's in-group favoritism and out-group hostility. Analyzing the impact of family structure on the strength of transmission process it was found that children in large families and those born later tend to be more dissimilar with parents, while child's gender does not affect the strength of transmission. Finally, in line with the theory of intergenerational transmission the data analysis of parents' behavior exhibits the positive assortative nature of marriage based on other-regarding preferences. These findings provide a new perspective about where does other-regarding preferences come from. The findings also contribute to the literature of cultural transmission.

Keywords: Other-regarding preferences, parochialism, Intergenerational transmission, Cultural traits, Family economics, Assortative mating.

1. Introduction

Do parents, who care about the welfare of genetic relatives and strangers either positively or negatively, also have children with similar attitudes towards others? Do parents invest time and effort to endow offspring with other-regarding preferences similar to their own? If yes what is the nature of the transmission process? While there are numerous studies exploring the development of other-regarding preferences as well as intergenerational transmission of various personal, economic and socio-economic characteristics, there is no study up to date which combines two streams of literature and explores the intergenerational transmission of other regarding preferences. Using the experimental data on parents' and children's other regarding behavior, this paper attempts to provide such evidence.

For other-regarding preferences it has been well documented as to be an important ability of humans to interact with society, to cooperate and co evolve. Altruism and inequity aversion – a positive side of other regarding preferences has been found to be facilitating cooperation in social dilemma games and therefore to be important aspect of modern welfare state (Fehr and Fischbacher (2003); Milinsky et al. (2006); Bowles et al. (2006); Nowak and Sigmund (2005)). On the contrary, Gaechter and Herrmann (2006) and Herrmann et al. (2008) demonstrated that the societies, where the extent of spiteful behavior is large, tend to exhibit substantially low levels of cooperative behavior. Others (Spicer and Becker (1980); Fortin et al. (2004)) noted that egalitarian motives may play crucial role in tax evading decisions. Studies that emphasize the importance of other-regarding preferences on individual economic performance have found positive links between altruism and household welfare (Castillo and Carter (2002)) and productivity (Carpenter and Seki (2005)). On the other hand, Levine (1998) and Balafoutas et al. (2011) observed positive links between spite and success in competitive environments. Kocher et al. (2009) explored to what extent other-regarding preferences of team leaders (CEOs for example) shape their leadership styles and found that selfish leaders are more prone to autocratic decision making, which in turn could affect team productivity.

Recently, a large body of experimental literature emerged about the development of other-regarding preferences during childhood and teenage years. Harbaugh et al. (2003) conducted the dictator game experiment with children from seven to eighteen years and found that children's giving in dictator and ultimatum games increases with age. Benenson et al (2007) gathered experimental data on children's behavior aged from four to nine years and observed that altruistic

behavior increases with age and socioeconomic status of child's family. Age effects on children's egalitarian and efficiency motives were demonstrated by Almås et al. (2010) and Sutter et al. (2010). Fehr et al. (2008) study the emergence of altruistic, egalitarian and spiteful behavior for children aged three to eight years. They found that spitefulness decreases and inequity aversion increases with age. According to this study children's sharing behavior is also affected by sibling composition and birth order. In particular, children with no siblings tended to share more as well as firstborn children. Fehr et al. (2008) also demonstrated that boys exhibit significant parochial tendencies (resulting in either in-group favoritism or out-group hostility, or both), while girls seem not to differentiate between in-group and out group members. Subsequently, Fehr et al. (2011) studied the distribution of other-regarding preferences for children aged eight to seventeen and found that altruism becomes more prevalent with age, while older children tend to behave less selfishly. Interestingly, parochialism also becomes more prevalent with age. The authors also documented that girls are less altruistic and more egalitarian, while they found no gender difference for spiteful types. Bauer et al. (2011) studied the impact of parental education on children's preferences and found that less educated parents are less efficient in terms of endowing children with proper social norms which leads children to be less altruistic and more spiteful. Bügelmayer and Spiess (2011) found that higher cognitive skills are associated with more spiteful behavior for preschool children.

As the development as well as dependence on socio-economic background of children's other regarding preferences is relatively well studied, little, if not nothing, is known about the intergenerational transmission of other regarding preferences and the nature of transmission process, while the literature on cultural transmission of various attitudes, preferences, skills and economic outcomes is abundant. For example, a large body of psychology literature is devoted to show that parents and children exhibit similar personality traits (see Loehlin (2005) for an extensive review). In economics, various studies documented strong intergenerational correlation of cognitive skills (Black et al. (2009)), educational outcomes (Björklund et al. (2006)), welfare dependency (Mitnik (2010)), income (Solon (1992); Eisenhauer and Pfeiffer (2008); Black and Devereux (2010)) and wealth (Charles and Hurst (2003)). The researchers also demonstrated the similarity of parents' and children's relationship of food preferences (Collado et al. (2006), charity donations (Wilhelm et al. (2004), religious belief (Bisin et al. (2004)), risk and trust attitudes (Dohmen et al. (2011)) and impatience (Kosse and Pfeiffer (2012)).

The theoretical grounding of above mentioned studies is provided by Bisin and Verdier (2000, 2001), which extends earlier evolutionary model of cultural transmission of Cavalli Sforza and Feldman (1981). According to this theory parents willingly engage in direct socialization practices by instilling children with preferences similar to their own. The theory also assumes that parents who have dissimilar preferences have less chance to succeed in children's socialization (later documented by Dohmen et al. (2011)). Therefore, parents, who seek to maximize the probability of preference transmission to their children, marry those who exhibit similar preferences, thus engaging in positive assortative mating. This prediction was vindicated by Bisin et al. (2004) showing that marriage patterns across United States are indeed positively assortative with respect to religious belief. Dohmen et al. (2011) also found that there is positive and significant correlation between female and male spouse's risk and trust attitudes.

As it was noted earlier, there is no evidence in literature whether other regarding preferences are transmitted from parents to children. This paper provides experimental evidence for the intergenerational transmission of other-regarding preferences and offers a new insight about where do these preferences come from. Examining the experimental data on children's as well as their female and male parents' behavior in four binary choice games, which allows for classifying subjects into altruistic, egalitarian and spiteful types, reveals strong intergenerational correlation across these preference types. The results also indicate that parents' parochial preferences shape children's loyalty towards in-group members and hostility towards strangers. There is strong support of the hypothesis about positive assortative marriage along the dimension of other-regarding preferences. Finally, analyzing the relationship between family structure and the strength of transmission it was found that child's gender does not play a role, however there is some evidence that children who live in large families or were born later tend to be less similar to their parents in terms of other-regarding preferences. Later findings are in particular notable, because they indicate that the intergenerational correlation of other-regarding preference types is not solely due to genetic reasons in which case family structure should not have played a role. Rather, these results may suggest that parent's attempts, to socialize child by endowing social norms similar to their own, are of equal importance.

2. Experimental Design and Procedure

2.1 Design

In this experiment a modified version of Fehr et al. (2008) was used in order to elicit the other-regarding preferences of parents and children. The individuals were asked to make choices in four individual decision games (see an example of decision sheet in the Supplementary material section). Each participant made a decision regarding two person from his/her family and two person from other family. For example each child (parent) was paired with parent (spouse), sibling (child), parent from other family and child from other family. This particular design allows for studying the nature of intergenerational transmission of other-regarding preferences towards different type of opponents and more importantly it makes possible to observe intergenerational transmission of parochialism.

In the first game the participant chooses between (3, 3) and (4, 1). In this task choice of (3, 3) is egalitarian choice as well as family income maximizing choice, whereas choice of (4, 1) points on individual's selfish motives. In the next game participants was asked to choose among (3, 3) and (2, 5). In this game, strongly altruistic and family income maximizing would choose (2, 5) whereas choice of (3, 3) suggests behindness aversion (Fehr and Schmidt, (1999); Bolton and Ockenfels, (2000)). The third game where participant has to choose between (3, 3) and (5, 2) helps to contrast aheadness aversion and efficiency (Charness and Rabin (2002)). In the fourth game the pair of (3, 3) instead of (4, 5) may be chosen by a strong inequity averse or spiteful person. Whereas the choice of (4, 5) is again efficient choice. Based on these games the preference types were classified as strongly altruistic (if individual maximizes other person's payoff), efficient (if individual maximizes the pie size), strongly egalitarian (if individual chooses egalitarian allocation in all games), weakly egalitarian (if individual chooses egalitarian allocation unless it is too costly to do so), maximin (if individual maximizes the payoff of worse of person), selfish (if individual maximizes own payoff) and spiteful (if individual minimizes other person's payoff) (for detail definition of types see Table 1 in Appendix).

2.2 Experimental sample and procedure

The experiment itself took place from November to December 2011 in the Republic of Georgia. Subjects were recruited from six public schools of Tbilisi, the capital city of Georgia, and one

school of nearby Gori. The children from grades 1 to 11¹ as well as their parents were informed through teachers. For the purpose of experimental design it was stressed that two parents and two children had to be present from each family. Out of 87 families recruited, 6 came with one child only or only with one parent and others were fully represented. Those 6 families were excluded from the analysis.

The sessions took place in the evening, from about 5 p.m. to 6 p.m. when day schedule in school was over in order to avoid distraction and teachers' presence in the classroom during the experiment. Upon arrival the subjects were informed about the nature of the task and asked to fill the consent form. Only one parent refused to participate and the whole family was asked to leave. After filling the consent form the participants were placed in four different classrooms so to make sure that each family member was in different room and unable to communicate². In each room the experimenter was responsible for giving instructions (see Supplementary material) and addressing questions if raised. In order to make sure that subjects (especially young children) understood the nature of the task, they have been shown an example and were asked to answer a control question.

Since family members are engaged in life time interactions, the decisions made during the experiment may not truly reflect their motives towards each other. It could be the case that a child for example, is nice towards parents during the experiment and thus expecting a favor in future, or s/he behaves under the fear of future retaliation from parents. It also can be the case, that unlike usual experiments, the decisions made during experiments can be undone as family members go back home (Ashraf 2009) and could bias individual's behavior. To address the first issue it was carefully explained in instructions that the reward each participant gets from the experiment depends on the choices of four participants including their family member and therefore there is no way to intuit individual behavior. For clarity, this explanation was reiterated in words by experimenter. A care was taken to avoid future reallocation of experimental earnings within a family and to make sure that what participants allocated to themselves during the experiment indeed would accrue them. In particular, as a reward each person obtained a person specific gift cards³, which could be used in specific shops for the consumption good for self. This

¹ Children participating in this experiment age 6 to 17.

² The headmasters of the schools kindly provided the classrooms for sessions.

³ The gift cards were designed by local Liberty Bank. Because, ex-ante the value of each particular gift card was unknown they were ordered after the sessions and it took from 2 to 3 days until the gift card was actually delivered to the participant.

was also carefully explained before experiment so that subjects would not have any illusion of future undoing of experimental decisions.

After participants collected decision tasks, the parents were asked to complete questionnaire where they answered questions on various socio-demographic characteristics. The data about children's characteristics such as age, gender, sibling composition and birth order was also collected.

3. Results

3.1 Transmission of Other-Regarding Preferences

Table A1 in appendix A provides the first and general look at the relationship between children's and parents' other-regarding preferences. In particular, Table A1 shows correlation between children's and parents' total relative earnings and total gives. Relative earning is a very rough measure of other-regarding preferences. It is measured as a ratio of total number of experimental points across four games what person allocated to him/her self to number of points s/he gave to others. Likewise total gives is the sum of experimental points subject gave to others. All specifications of Table A1 show that there is also significant intergenerational correlation along this dimension of other-regarding preferences. Note that, children's relative earning decreases with age and giving increases with age. This is because relative earning is lowest for altruistic type and is highest for spiteful type, while the opposite is true for giving variable, and therefore this result is in line with already documented age effects on other-regarding preferences (Fehr et al. (2011) for example). The similar analysis was repeated by making regressions partner specific. The results again show that there is strong and significant intergenerational correlation between children's and parents' total relative earnings and total gives with respect to specific partner with age effects preserved (results not reported). In unreported analysis we also checked the relationships of children's and parents' behavior in single games. The results show that there are positive and significant correlations across all games and partners.

The results from Table A1 make a strong case to deepen analysis and explore the relationship between children's and parents' specific types of other-regarding preferences. As it was earlier emphasized experimental games allow classifying subjects' preference types as strongly altruistic, efficient, strongly and weakly egalitarian and maximin, selfish and spiteful. However, data analysis reveals that strongly altruistic, strongly egalitarian and selfish types are

uncommon and 77% of preference types fall on efficient, weakly egalitarian and spiteful in case of children (see Table2 in Appendix). Therefore these preference types were pooled in three general categories: altruistic (including strongly and efficient types), egalitarian (including strongly and weakly egalitarian and maximin types) and spiteful (including selfish and spiteful types).

In appendix A, Tables A2 to A5 report seemingly unrelated regression⁴ results. The dependent variable is children's other-regarding preferences (altruistic, egalitarian or spiteful). The explanatory variables of interest are mothers' and fathers' other-regarding preferences.

Columns (1), (4) and (7) in Tables A2 through A5 reveal that there is strong, positive and significant ($P < 0.01$) correlation of other-regarding preferences across parents and children. Parents who are either altruistic egalitarian or spiteful towards related children, related parents, non-related children and non-related parents also tend to have children with similar preferences towards others. Note also that coefficients on mothers' other-regarding preferences are always higher in magnitude in comparison with fathers (in some cases the difference is statistically significant ($P < 0.01$)). This evidence is in line with the hypothesis that mothers are more efficient in instilling social norms in children (Dohmen et al. (2011)).

From the perspective of socialization hypothesis, which implies that parents actively engage in instilling other-regarding preferences to children, it is notable that parents who are spiteful towards their offspring (spouses) do not have children with spiteful preferences towards siblings (parents) (columns (7), (8) and (9) in Table A2 show that coefficient estimates are insignificant and sometimes negative). The theory of intergenerational transmission (Bisin and Verdier (2000)) implies that the transmission occurs because parents care about the way their children behave and therefore devote time and resources to instill the attitudes in children what they think is best for them. In case of spiteful parents this is less likely to be so. Analogously, columns (7), (8) and (9) of Table A3 shows that the children of those parents who are spiteful towards their spouses do not have similar attitudes to them (coefficient estimates are not statistically significant). Obviously parents would not teach children to be spiteful towards them.

In columns (2), (5) and (8) of Tables A2-A5 the regressions include exogenous controls such as child's gender, child's age, mother's age and father's age. The relationship between

⁴ Given the multivariate nature of dependent variable the error terms across equations for different preference types may be correlated. Therefore seemingly unrelated regression was preferred over standard OLS procedure.

children's and parents preferences stay the almost identical in size as well as in significance. It is notable that the above results exactly mirror Fehr et al. (2011) findings regarding the development and gender composition of other-regarding preferences. In particular the estimates show that altruistic behavior increases with age, while older children are less spiteful. The results also indicate that girls are less altruistic and more egalitarian (similar to Fehr et al. (2011)). While there is no systematic gender difference in spiteful types the results in Tables A4-A5 show that girls are less spiteful.

Columns (3), (6) and (9) contain regression estimates of the same specification using additional controls such as logarithm of household wealth, mother's wage, father's wage, schooling in years of mother and father and years of marriage. Again the size and significance of the coefficients of interest do not notably change (except above considered cases) relative to first two specifications. The age and gender effect on children's other regarding preferences remains also the same.

The feature of the experimental design allows studying the relationship between children's and parents' parochial preferences. As before, instead of getting specific in terms of preferences we first provide a general look on the relationship. Parochialism is defined in terms of a difference between relative earnings and gives between family and non-family members. Table A6 in Appendix A shows strong positive and significant intergenerational relationship between children's and parents' parochial preferences. The Table A6 also demonstrates that age effects on parochialism are similar to those found by Fehr et al. (2011). In particular children get more discriminatory towards out-group members as they get older (they give less others and keep more for themselves see columns (2), (3), (5) and (6) of Table A6).

Now one can get specific and study the relationship between specific types of parochialism. It is defined in two ways: in-group favoritism and out-group hostility. Child's behavior is labeled as in-group favoritism if s/he acted altruistically only towards in-group member (sibling or parent). Similarly, a child is hostile to out-group if s/he behaved spitefully only towards out-group member (non-related child, non-related parent). Note that the parochial attitudes of egalitarian types are not studied here. It is simply because, as in Fehr et al. (2011) no behavioral difference towards in-group and out-group members for egalitarian types is observed. Tables A7-A8 show the relationship between children's and parents parochial preferences. In columns (1) and (8) of Tables A7-A8 the relationship between children's and parents' parochial

attitudes is displayed. The coefficient estimates of mothers' and fathers' parochial preferences are positive, of notable size and significant ($P < 0.01$). The results stay robust when including exogenous and additional controls (columns (2), (5) and (3), (6), Tables A7-A8). There is also some evidence that both forms of parochialism become apparent as children get older (similar to Fehr et al. (2011)). Fehr et al. (2008) found that girls are less parochial than boys. The gender coefficient in Tables A7-A8 is also found to be negative, nevertheless not significant. This could be the case because the Fehr et al. (2008) sample included children from 3 to 8 years old, whereas in this experiment children age 6 to 17. Therefore it could be the case that gender differences in spiteful type are evident in early childhood but disappear with age. Interestingly, Fehr et al. (2011), who experimented children with age range similar to this study, report no gender differences in parochialism.

3.2 Heterogeneity Analysis

So far it was documented that there is a significant intergenerational correlation between children's and parents' other-regarding preferences without being specific about the nature of transmission process. The observed correlation may be observed simply due to genetic reasons or the family environment or because of parents' deliberate determination to socialize their children by instilling other-regarding preferences similar to their own. While all channels of intergenerational transmission could be the main determinant of the observed correlations and the scope of this study is not to gauge which mechanism plays more important role, it does however provide suggestive evidence in favor of socialization hypothesis. In section 3.1 it was already noted that mothers have stronger impact on endowing children with other-regarding preferences, which should not be the case if only genetic channel was important but is perfectly plausible if direct socialization indeed takes place.

To explore potential sources of heterogeneity in transmission process mothers' and fathers' other-regarding preferences was interacted with gender, birth order and number of children. Appendix B reports estimation results. The specifications in Tables B1-B6 are similar to columns (2), (5) and (8) of Tables A2-A8 with additional explanatory variables being interaction terms.

Panel a through Tables B1-B6 shows no evidence that the transmission process is stronger or weaker for girls than boys. The result is similar to Dohmen et al. (2011) who find no gender difference in intergenerational transmission of risk and trust attitudes. This finding also echoes the World Values Survey (2008) data from Georgia. In particular when asked whether university education is more important for a boy than for a girl 76% of parents disagreed with the statement, indicating that parents are equally concerned about female and male children's education

Panel b and c of Tables B1-B6 show an impact of birth order and number of children on the strength of transmission process respectively. The results show that the birth order and number of children do not have significant effect on children's other-regarding preferences in case of mothers (coefficient estimates are sometimes negative, sometimes positive and never statistically significant). This means that mothers have equal impact on all children regardless of birth order and the number of children in the family, thus confirming the result shown in section 3.1 that mothers are more efficient in instilling social norms in children. While the coefficient estimates of the interaction terms (with birth order and number of children) are always negative and sometimes statistically significant in case of fathers' other-regarding preferences. The later results suggest that parents, in particular fathers are less efficient in instilling social norms in children in large families and to those who were born later, echoing theory of quantity-quality tradeoff in home production formulated by Becker and Lewis (1973) and later empirically documented by Horton (1986).

3.4 Evidence on Positive Assortative Mating

There is no empirical evidence whether assortative mating is positive or negative along the dimension of other-regarding preferences. The theory of attitude transmission implies that parents deliberately seek to marry those with similar attitudes of their own (Bisin and Verdier (2000)) in order make transmission process more efficient. Given that both parents influence children's other-regarding preferences it is worthwhile to investigate the nature of assortative marriage.

First of all we provide a general look on the relationship between female and male parents' other regarding preferences. Table C1 in appendix C shows that there is strong positive and significant correlation between female and male parents' total relative earnings and total gives. We also repeated the analysis by making regressions partner specific. The results again

show that there is strong and significant intergenerational correlation between children's and parents' total relative earnings and total gives with respect to specific partner (results not reported). It can be argued that the positive correlations observed between spouses' other-regarding preferences could be the result of parents influence on each other while living together during marriage. In unreported analysis we perform similar regressions for the early and late married couples. The coefficient estimates are not significantly different across two samples.

Now we can again proceed from general to more specific case. Columns (1), (4) and (7) of Tables C2-C5 in Appendix C show estimation results for the correlation of other-regarding preferences of the spouses. The dependent variable is mothers' other regarding preferences and explanatory variable of interest is fathers' preferences. The results indicate that there is positive and significant correlation between female and male spouses' other-regarding preferences. While looking on Table C2, it is evident that unlike in subsequent cases the relationship between female and male parents' other-regarding preferences is statistically insignificant. As it was noted earlier (in section 3.1) the theory of cultural transmission assumes that transmission occurs due to parental altruism and if parents are spiteful towards children, then according to theory, they will not be interested in instilling social norms in their offspring similar to their own. The fact, that the nature of assortative mating, based on parents' other-regarding preferences towards children, is not as clear as in other cases (see Tables C2-C5) and which is expected not to be so as it is predicted by the models of cultural transmission, could indicate that individuals seek partners with similar attitudes to their own in order to maximize the chances of preference transmission. Similarly the individuals who exhibit spiteful preferences towards spouses do not seek to marry those who will be spiteful in return to them and do not obviously intend to transmit similar attitudes to their children (coefficient estimates are negative, though not statistically different from zero see Columns (7)-(9) in Table C3). The later fact could also indicate that there is some premarital deliberation for transmitting or not transmitting particular types of other-regarding preferences to children.

Given the nature of the experimental design one can also explore the relationship between female and male parents' parochial preferences. As before, Table C6 provides a general look on the relationship as parochialism being defined in terms of a difference between relative earnings and gives between family and non-family members. Columns (1)-(3) in Table C6 show that there is positive relationship between spouses parochialism as defined in terms of relative giving

however coefficients are hardly significant. But Columns (4)-(7) show that there is positive and significant correlation between female and male parents parochialism defined in terms of gives. The Tables C6-C8 provide more detailed look on the relationship between female and male parents' parochial preferences. The results show that subjects' parochialism positively correlate with their spouses' in-group favoritism and out-group hostility⁵.

4. Conclusion

Other-regarding preferences proved to be important aspect of individual behavior. They shape the way how individual interacts with society and sometimes play a significant role in determining one's economic outcomes. However, there was no evidence up to date which explored the intergenerational transmission of other-regarding preferences and the nature of the transmission process. Neither there was any empirical evidence regarding assortative mating of parents based on other-regarding preferences.

This paper uses experimental data of children's and parents' behavior to document that that there is a strong intergenerational correlation in other-regarding preferences. The results also indicate that there is strong intergenerational correlation between children's and parents' parochial preferences. Analyzing the impact of family structure on the strength of transmission it was found that children in small families as well as firstborn children are more strongly influenced by their parents' preferences, while child's gender does not affect the strength of transmission. Finally there is evidence supporting parents' positive assortative mating based on other-regarding preferences, which could be an indication of the view, expressed in the cultural transmission models that individuals strategically marry in order to maximize the chances of preference transmission.

By documenting that children's other regarding preferences are strongly shaped by their parents' preferences, this study provides new perspective about where do these preferences come from. Even though the scope of this study is not to resolve the exact nature of transmission process, being it due to genetic reasons, family environment or due to socialization. However, this paper does provide some evidence that, along other mechanisms the socialization process may also take place.

⁵ For the sake of convenience we also checked the correlations across early and late marriages and the coefficient

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Appendix

Table 1

Definition of preference types given participants' actions in particular games

Type	(3,3) vs (4,1)	(3,3) vs (2,5)	(3,3) vs (5,2)	(3,3) vs (4,5)
Strongly altruistic	(3,3)	(2,5)	(3,3)	(4,5)
Efficient	(3,3)	(2,5)	(5,2)	(4,5)
Strongly egalitarian	(3,3)	(3,3)	(3,3)	(3,3)
Weakly egalitarian	(3,3)	(3,3)	(5,2)	(3,3)
Maximin	(3,3)	(3,3)	(3,3)	(4,5)
Selfish	(4,1)	(3,3)	(5,2)	(4,5)
Spiteful	(4,1)	(3,3)	(5,2)	(3,3)

Table 2

Frequency of other-regarding preference types

Type	Children	Parents
Strongly altruistic	0.040	0.070
Efficient	0.292	0.232
Strongly egalitarian	0.084	0.121
Weakly egalitarian	0.181	0.043
Maximin	0.026	0.034
Selfish	0.045	0.096
Spiteful	0.175	0.139
Observations	640	640

Appendix A

TABLE A1

The relationship between parents' and children's relative earnings and givings

Dependent Variable	Relative earning: child			Giving: child		
	(1)	(2)	(3)	(4)	(5)	(6)
Relative earning: mother	0.580*** (0.098)	0.519*** (0.094)	0.367*** (0.093)			
Relative earning: father	0.387*** (0.085)	0.441*** (0.081)	0.266*** (0.081)			
Giving: mother				0.633*** (0.093)	0.563*** (0.088)	0.422*** (0.092)
Giving: father				0.337*** (0.081)	0.354*** (0.076)	0.240*** (0.076)
1 if female		-0.040 (0.110)	-0.077 (0.103)		-12.255 (8.498)	-10.761 (8.117)
Age of child ^A		-0.315*** (0.058)	-0.354*** (0.063)		23.529*** (4.460)	27.518*** (0.019)
Age of mother		0.028** (0.013)	0.016 (0.013)		-2.310** (1.020)	-1.488 (1.052)
Age of father		-0.023** (0.012)	0.005 (0.012)		1.900** (0.931)	1.548* (0.895)
Constant	0.294** (0.414)	0.774 (0.514)	3.203*** (1.152)	0.002 (0.064)	6.736 (48.917)	0.001 (0.064)
Additional Controls	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160
R ²	0.424	0.521	0.625	0.477	0.570	0.645

Notes: Coefficients in all columns are OLS regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

Relative earning is a continuous measure of total number of experimental points the person earned in four binary choice games, relative to total number of points s/he gave to others. It is smallest for strongly altruistic type and largest for spiteful type.

Giving is a measure of total number of experimental points the person gave to others in four binary choice games. It is smallest for spiteful type and largest for strongly altruistic type.

TABLE A2

The relationship between parent's and children's preferences towards related children

Dependent Variable	Altruistic type: child			Egalitarian type: child			Spiteful type: child		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altruistic type: mother	0.407*** (0.076)	0.395*** (0.074)	0.292*** (0.075)	-0.123 (0.079)	-0.129* (0.077)	-0.174** (0.081)	-0.118* (0.063)	-0.090 (0.061)	0.010 (0.062)
Altruistic type: father	0.346*** (0.084)	0.336** (0.080)	0.263*** (0.081)	-0.032 (0.087)	-0.016 (0.084)	-0.022 (0.087)	-0.140** (0.070)	-0.139** (0.067)	-0.077 (0.066)
Egalitarian type: mother	-0.001 (0.094)	-0.045 (0.091)	0.004 (0.087)	0.306*** (0.097)	0.253*** (0.096)	0.232*** (0.094)	-0.113 (0.077)	-0.136* (0.076)	-0.101 (0.071)
Egalitarian type: father	-0.055 (0.090)	0.002 (0.087)	0.035 (0.090)	0.223** (0.093)	0.189** (0.091)	0.177* (0.097)	-0.070 (0.074)	-0.104 (0.072)	-0.085 (0.073)
Spiteful type: mother	0.210 (0.146)	0.248* (0.141)	0.207 (0.139)	-0.039 (0.151)	-0.103 (0.148)	-0.060 (0.150)	0.047 (0.121)	0.053 (0.117)	0.022 (0.113)
Spiteful type: father	0.175* (0.093)	0.136 (0.092)	0.084 (0.096)	-0.006 (0.096)	0.027 (0.097)	0.072 (0.103)	-0.046 (0.077)	0.005 (0.077)	0.044 (0.078)
1 if female		-0.163*** (0.059)	-0.146** (0.057)		0.181*** (0.062)	0.175*** (0.062)		-0.005 (0.049)	-0.012 (0.047)
Age of child ^A		0.100*** (0.033)	0.141*** (0.036)		-0.064* (0.033)	-0.038 (0.038)		-0.110*** (0.027)	-0.130*** (0.029)
Age of mother		-0.010 (0.007)	-0.004 (0.007)		0.007 (0.007)	0.007 (0.008)		0.001 (0.006)	-0.002 (0.006)
Age of father		0.009 (0.006)	0.007 (0.006)		-0.014** (0.006)	-0.013* (0.007)		0.001 (0.005)	0.003 (0.005)
Constant	0.047 (0.075)	-0.069 (0.224)	-1.042* (0.574)	0.243*** (0.078)	0.433* (0.232)	-0.019** (0.619)	0.267*** (0.062)	0.299 (0.186)	0.869* (0.470)
Additional Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160	160	160	160
R ²	0.372	0.436	0.501	0.205	0.268	0.312	0.073	0.159	0.278

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

TABLE A3

The relationship between parent's and children's preferences towards related parents

Dependent Variable	Altruistic type: child			Egalitarian type: child			Spiteful type: child		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altruistic type: mother	0.467*** (0.066)	0.424*** (0.068)	0.307*** (0.072)	-0.133* (0.069)	-0.105 (0.071)	-0.143 (0.079)	-0.132** (0.054)	-0.240*** (0.069)	-0.068 (0.059)
Altruistic type: father	0.336*** (0.068)	0.337*** (0.066)	0.221*** (0.069)	-0.004 (0.070)	-0.020 (0.069)	-0.017 (0.076)	-0.097* (0.053)	-0.220*** (0.066)	-0.060 (0.057)
Egalitarian type: mother	-0.071 (0.093)	-0.043 (0.091)	-0.072 (0.087)	0.403*** (0.097)	0.355*** (0.096)	0.329*** (0.095)	-0.100 (0.073)	-0.254*** (0.083)	-0.082** (0.071)
Egalitarian type: father	-0.055 (0.088)	0.043 (0.085)	-0.048 (0.082)	0.286*** (0.092)	0.244*** (0.090)	0.216** (0.090)	-0.074 (0.068)	-0.142* (0.083)	-0.073 (0.067)
Spiteful type: mother	-0.042 (0.110)	-0.076 (0.111)	-0.089 (0.107)	0.052 (0.115)	-0.015 (0.117)	-0.029 (0.085)	-0.020 (0.092)	0.067* (0.089)	0.068 (0.072)
Spiteful type: father	-0.052 (0.112)	-0.095 (0.114)	-0.104 (0.107)	0.028 (0.123)	0.044 (0.119)	0.049 (0.117)	0.069 (0.098)	0.100 (0.091)	0.110 (0.088)
1 if female		-0.079 (0.056)	-0.084 (0.054)		0.193*** (0.059)	0.192*** (0.058)		-0.079* (0.045)	-0.072 (0.050)
Age of child ^A		0.103*** (0.029)	0.131*** (0.033)		-0.002 (0.031)	-0.006 (0.036)		-0.122*** (0.023)	-0.152*** (0.027)
Age of mother		-0.008 (0.006)	-0.004 (0.007)		0.003 (0.007)	0.006 (0.007)		0.011** (0.005)	0.004 (0.005)
Age of father		0.006 (0.005)	0.002 (0.006)		-0.007 (0.006)	-0.006 (0.006)		-0.002 (0.004)	-0.001 (0.005)
Constant	0.171*** (0.054)	0.088 (0.199)	-0.973* (0.512)	0.185*** (0.056)	0.322 (0.209)	0.741 (0.559)	0.237*** (0.045)	0.130 (0.159)	0.368 (0.419)
Additional Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160	160	160	160
R ²	0.511	0.554	0.611	0.290	0.340	0.374	0.115	0.258	0.317

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

TABLE A4

The relationship between parent's and children's preferences towards non-related children

Dependent Variable	Altruistic type: child			Egalitarian type: child			Spiteful type: child		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altruistic type: mother	0.467*** (0.086)	0.449*** (0.082)	0.448*** (0.086)	-0.258** (0.108)	-0.224** (0.105)	-0.292*** (0.106)	-0.195** (0.091)	-0.229** (0.088)	-0.139 (0.087)
Altruistic type: father	0.316*** (0.083)	0.274*** (0.081)	0.229* (0.081)	-0.033 (0.104)	0.015 (0.104)	-0.049 (0.101)	-0.114 (0.087)	-0.081 (0.087)	-0.030 (0.082)
Egalitarian type: mother	-0.022 (0.077)	-0.031 (0.074)	-0.008 (0.078)	0.258*** (0.097)	0.241** (0.096)	0.173* (0.096)	-0.075 (0.081)	-0.023 (0.080)	0.025 (0.079)
Egalitarian type: father	0.091 (0.075)	0.075 (0.072)	0.010 (0.078)	0.172* (0.094)	0.221** (0.092)	0.165* (0.096)	-0.182** (0.079)	-0.212*** (0.077)	-0.159** (0.079)
Spiteful type: mother	-0.024 (0.099)	-0.003 (0.095)	-0.019 (0.100)	-0.088 (0.125)	-0.098 (0.122)	-0.076*** (0.124)	0.324*** (0.105)	0.304*** (0.102)	0.269*** (0.065)
Spiteful type: father	0.048 (0.079)	0.028 (0.074)	0.094 (0.077)	-0.187* (0.097)	-0.193** (0.095)	-0.053 (0.095)	0.240*** (0.082)	0.284*** (0.080)	0.166** (0.078)
1 if female		-0.156*** (0.051)	-0.165*** (0.052)		0.226*** (0.066)	0.220*** (0.064)		-0.118** (0.055)	-0.123** (0.052)
Age of child ^A		0.087*** (0.027)	0.070** (0.032)		-0.029 (0.035)	-0.053 (0.040)		-0.092*** (0.029)	-0.105*** (0.032)
Age of mother		-0.002 (0.006)	-0.001 (0.006)		-0.005 (0.008)	-0.006 (0.008)		0.007 (0.006)	0.001 (0.007)
Age of father		0.005 (0.005)	0.002 (0.006)		0.006 (0.007)	0.005 (0.007)		-0.005 (0.006)	-0.003 (0.006)
Constant	0.067 (0.044)	-0.160 (0.180)	0.295* (0.499)	0.337*** (0.055)	0.187 (0.232)	-0.255 (0.616)	0.252 (0.046)	0.414 (0.194)	0.342 (0.504)
Additional Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160	160	160	160
R ²	0.354	0.433	0.458	0.225	0.284	0.370	0.285	0.345	0.448

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

TABLE A5

The relationship between parent's and children's preferences towards non-related parents

Dependent Variable	Altruistic type: child			Egalitarian type: child			Spiteful type: child		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altruistic type: mother	0.331*** (0.089)	0.351*** (0.084)	0.312*** (0.092)	-0.122 (0.089)	-0.135 (0.089)	-0.299*** (0.094)	-0.149* (0.086)	-0.167* (0.086)	-0.017 (0.083)
Altruistic type: father	0.058 (0.090)	0.080 (0.090)	0.061 (0.090)	0.015 (0.090)	0.023 (0.096)	0.007 (0.092)	0.012 (0.088)	0.002 (0.093)	0.043 (0.081)
Egalitarian type: mother	-0.062 (0.084)	-0.049 (0.078)	-0.087 (0.079)	0.299*** (0.084)	0.276*** (0.083)	0.191** (0.081)	-0.045 (0.081)	-0.027 (0.080)	0.078 (0.071)
Egalitarian type: father	-0.140 (0.095)	-0.100 (0.094)	-0.124 (0.099)	0.286*** (0.095)	0.279*** (0.100)	0.195* (0.101)	-0.164* (0.092)	-0.178* (0.096)	-0.094 (0.089)
Spiteful type: mother	-0.011 (0.094)	0.025 (0.090)	-0.035 (0.094)	-0.097 (0.094)	-0.131 (0.095)	-0.154 (0.096)	0.265*** (0.092)	0.260** (0.094)	0.262*** (0.084)
Spiteful type: father	-0.132 (0.089)	-0.135 (0.087)	-0.101 (0.086)	0.024 (0.089)	0.039 (0.092)	-0.047 (0.088)	0.188** (0.086)	0.196** (0.089)	0.131* (0.077)
1 if female		-0.127*** (0.061)	-0.089 (0.061)		0.097 (0.065)	0.105* (0.063)		-0.062 (0.062)	-0.129** (0.055)
Age of child ^A		0.130*** (0.032)	0.120*** (0.037)		-0.047 (0.034)	-0.038 (0.038)		-0.061* (0.033)	-0.050 (0.033)
Age of mother		-0.019** (0.007)	-0.019** (0.008)		-0.001 (0.008)	0.002 (0.008)		0.018** (0.007)	0.017** (0.007)
Age of father		0.017** (0.007)	0.018** (0.007)		-0.003 (0.007)	-0.009 (0.007)		-0.013* (0.007)	-0.011* (0.006)
Constant	0.262*** (0.080)	0.037 (0.225)	0.065 (0.621)	0.199 (0.080)	0.476* (0.239)	-0.137 (0.637)	0.234 (0.077)	0.223 (0.230)	0.444 (0.560)
Additional Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160	160	160	160
R ²	0.194	0.314	0.352	0.264	0.289	0.378	0.206	0.246	0.449

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

TABLE A6

The relationship between parents' and children's parochialism given by relative earnings and givings

Dependent Variable	Relative earning: child's parochialism			Giving: child's parochialism		
	(1)	(2)	(3)	(4)	(5)	(6)
Relative earning: mother's parochialism	0.186*** (0.062)	0.195*** (0.063)	0.191*** (0.063)			
Relative earning: father's parochialism	0.186*** (0.068)	0.204*** (0.068)	0.159** (0.076)			
Giving: mother's parochialism				0.318*** (0.064)	0.319*** (0.064)	0.341*** (0.063)
Giving: father's parochialism				0.337*** (0.081)	0.214*** (0.074)	0.210*** (0.083)
1 if female		-0.068 (0.064)	-0.083 (0.065)		5.536 (5.032)	7.211 (5.085)
Age of child ^A		0.076** (0.034)	0.117*** (0.040)		-5.471*** (2.695)	-7.869** (3.170)
Age of mother		0.000 (0.007)	0.004 (0.008)		-0.164** (0.627)	-0.433 (0.671)
Age of father		-0.006 (0.007)	-0.008 (0.007)		0.588 (0.572)	0.947 (0.588)
Constant	0.114*** (0.036)	0.251 (0.218)	-0.466 (0.610)	-9.631 (2.890)	21.370 (17.227)	50.367 (47.562)
Additional Controls	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160
R ²	0.103	0.143	0.207	0.191	0.227	0.295

Notes: Coefficients in all columns are OLS regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

Relative earning is defined as a difference between points of total number of experimental points the person earned in four binary choice games, relative to total number of points s/he gave to others. It is smallest for strongly altruistic type and largest for spiteful type.

Giving is a measure of total number of experimental points the person gave to others in four binary choice games. It is smallest for spiteful type and largest for strongly altruistic type.

Parochialism in terms of relative earning is defined as a difference in subject's relative earnings between family and non-family members.

Parochialism in terms of giving is defined as a difference in subject's givings between family and non-family members.

TABLE A7

The relationship between parent's and children's parochial preferences towards children

Dependent Variable	In-group favoritism: child ^B			Out-group hostility: child ^C		
	(1)	(2)	(3)	(4)	(5)	(6)
In-group favoritism: mother ^B	0.323*** (0.063)	0.321*** (0.064)	0.330*** (0.064)			
In-group favoritism: father ^B	0.249*** (0.075)	0.227*** (0.077)	0.182** (0.085)			
Out-group hostility: mother ^C				0.303*** (0.096)	0.305*** (0.097)	0.255*** (0.101)
Out-group hostility: father ^C				0.257*** (0.080)	0.260*** (0.080)	0.181** (0.086)
1 if female		-0.033 (0.056)	-0.009 (0.056)		-0.043 (0.048)	-0.064 (0.048)
Age of child ^A		0.050 (0.030)	0.050 (0.036)		-0.001 (0.026)	0.008 (0.030)
Age of mother		-0.008 (0.007)	-0.010 (0.007)		0.000 (0.006)	0.000 (0.006)
Age of father		0.007 (0.006)	0.006 (0.006)		-0.000 (0.005)	0.000 (0.005)
Constant	0.059* (0.035)	-0.009 (0.196)	-0.893* (0.528)	0.073*** (0.025)	0.076 (0.166)	0.126 (0.463)
Additional Controls	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160
R ²	0.256	0.276	0.334	0.164	0.169	0.223

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

^B dummy variable which equals 1 if subject's behavior can be characterized as altruistic only towards related children.

^C dummy variable which equals 1 if subject's behavior can be characterized as spiteful only towards non-related children.

TABLE A8

The relationship between parent's and children's parochial preferences towards parents

Dependent Variable	In-group favoritism: child ^B			Out-group hostility: child ^C		
	(1)	(2)	(3)	(4)	(5)	(6)
In-group favoritism: mother ^B	0.348*** (0.076)	0.325*** (0.079)	0.271*** (0.081)			
In-group favoritism: father ^B	0.231*** (0.068)	0.248*** (0.071)	0.183** (0.076)			
Out-group hostility: mother ^C				0.305*** (0.072)	0.319*** (0.072)	0.241*** (0.072)
Out-group hostility: father ^C				0.281*** (0.063)	0.281*** (0.063)	0.214*** (0.061)
1 if female		-0.048 (0.060)	-0.039 (0.060)		-0.013 (0.053)	-0.047 (0.051)
Age of child ^A		0.001 (0.032)	0.003 (0.037)		0.035 (0.028)	0.064** (0.032)
Age of mother		0.006 (0.007)	0.004 (0.008)		0.009 (0.006)	0.013** (0.006)
Age of father		-0.001 (0.006)	-0.001 (0.006)		-0.009 (0.006)	-0.008 (0.005)
Constant	0.097*** (0.036)	-0.049 (0.213)	-1.295** (0.579)	0.055* (0.032)	0.159 (0.169)	0.274 (0.503)
Additional Controls	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160
R ²	0.209	0.216	0.259	0.188	0.213	0.219

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

^B dummy variable which equals 1 if subject's behavior can be characterized as altruistic only towards related parents.

^C dummy variable which equals 1 if subject's behavior can be characterized as spiteful only towards non-related parents.

Appendix B: Heterogeneity Analysis

TABLE B1

The relationship between parents' and children's preferences towards related children

Panel a: Gender			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*female	-0.015 (0.119)		
Altruistic type: father *female	-0.073 (0.126)		
Egalitarian type: mother *female		-0.233 (0.150)	
Egalitarian type: father *female		0.055 (0.135)	
Spiteful type: mother *female			0.124 (0.196)
Spiteful type: father *female			0.038 (0.110)
Observations	160	160	160
R ²	0.434	0.267	0.160
Panel b: Birth order			
Dependent variable	Altruistic type: child	Egalitarian type: child	Selfish type: child
	(1)	(2)	(3)
Altruistic type: mother*birth order	0.013 (0.101)		
Altruistic type: father * birth order	-0.084 (0.117)		
Egalitarian type: mother * birth order		0.045 (0.136)	
Egalitarian type: father * birth order		-0.209* (0.123)	
Selfish type: mother *birth order			0.005 (0.192)
Selfish type: father *birth order			0.132 (0.102)
Observations	160	160	160
R ²	0.441	0.297	0.328
Panel c: Number of Children			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*# of children	0.006 (0.105)		
Altruistic type: father *# of children	-0.223* (0.124)		
Egalitarian type: mother *# of children		0.013 (0.155)	
Egalitarian type: father *# of children		-0.143 (0.132)	
Spiteful type: mother *# of children			-0.001 (0.234)
Spiteful type: father *# of children			0.080 (0.105)
Observations	160	160	160
R ²	0.458	0.283	0.156

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. The set of explanatory variables in Panels a, b, and c is identical to that in Column (2) of Table A1. birth order=0 for firstborn children and birth order=1 for children who were born later. # of children=0 if there are only two children in the family and # of children=1 otherwise.

TABLE B2

The relationship between parents' and children's preferences towards related parents

Panel a: Gender			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*female	0.002 (0.111)		
Altruistic type: father *female	0.092 (0.107)		
Egalitarian type: mother *female		0.109 (0.154)	
Egalitarian type: father *female		0.211 (0.148)	
Spiteful type: mother *female			-0.240 (0.169)
Spiteful type: father *female			-0.151 (0.151)
Observations	160	160	160
R ²	0.558	0.355	0.255
Panel b: Birth order			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*birth order	-0.011 (0.104)		
Altruistic type: father * birth order	-0.102 (0.095)		
Egalitarian type: mother * birth order		-0.174 (0.140)	
Egalitarian type: father * birth order		-0.277** (0.131)	
Spiteful type: mother *birth order			0.222 (0.142)
Spiteful type: father *birth order			0.192 (0.144)
Observations	160	160	160
R ²	0.564	0.386	0.292
Panel c: Number of Children			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*# of children	0.199 (0.135)		
Altruistic type: father *# of children	-0.205** (0.094)		
Egalitarian type: mother *# of children		0.088 (0.144)	
Egalitarian type: father *# of children		-0.141 (0.140)	
Spiteful type: mother *# of children			0.111 (0.155)
Spiteful type: father *# of children			0.190 (0.145)
Observations	160	160	160
R ²	0.568	0.348	0.330

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. The set of explanatory variables in Panels a, b, and c is identical to that in Column (2) of Table A1. birth order=0 for firstborn children and birth order=1 for children who were born later. # of children=0 if there are only two children in the family and # of children=1 otherwise.

TABLE B3

The relationship between parents' and children's preferences towards non-related children

Panel a: Gender			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*female	-0.146 (0.175)		
Altruistic type: father *female	-0.045 (0.154)		
Egalitarian type: mother *female		-0.103 (0.61)	
Egalitarian type: father *female		0.179 (0.156)	
Spiteful type: mother *female			0.039 (0.178)
Spiteful type: father *female			-0.048 (0.143)
Observations	160	160	160
R ²	0.439	0.283	0.345
Panel b: Birth order			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*birth order	-0.066 (0.146)		
Altruistic type: father * birth order	-0.263** (0.132)		
Egalitarian type: mother * birth order		-0.075 (0.137)	
Egalitarian type: father * birth order		-0.215** (0.145)	
Spiteful type: mother *birth order			-0.229 (0.178)
Spiteful type: father *birth order			-0.016 (0.125)
Observations	160	160	160
R ²	0.465	0.308	0.394
Panel c: Number of Children			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*# of children	-0.135 (0.185)		
Altruistic type: father *# of children	-0.038 (0.180)		
Egalitarian type: mother *# of children		-0.166 (0.157)	
Egalitarian type: father *# of children		-0.448** (0.153)	
Spiteful type: mother *# of children			0.017 (0.207)
Spiteful type: father *# of children			-0.154 (0.180)
Observations	160	160	160
R ²	0.436	0.326	0.347

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. The set of explanatory variables in Panels a, b, and c is identical to that in Column (2) of Table A1. birth order=0 for firstborn children and birth order=1 for children who were born later. # of children=0 if there are only two children in the family and # of children=1 otherwise.

TABLE B4

The relationship between parents' and children's preferences towards non-related parents

Panel a: Gender			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*female	-0.035 (0.122)		
Altruistic type: father *female	0.086 (0.118)		
Egalitarian type: mother *female		0.105 (0.118)	
Egalitarian type: father *female		0.144 (0.129)	
Spiteful type: mother *female			-0.026 (0.126)
Spiteful type: father *female			-0.103 (0.116)
Observations	160	160	160
R ²	0.312	0.302	0.255

Panel b: Birth order			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*birth order	-0.033 (0.108)		
Altruistic type: father * birth order	-0.381*** (0.105)		
Egalitarian type: mother * birth order		0.070 (0.110)	
Egalitarian type: father * birth order		-0.262** (0.117)	
Spiteful type: mother *birth order			0.130 (0.117)
Spiteful type: father *birth order			-0.049 (0.102)
Observations	160	160	160
R ²	0.373	0.312	0.246

Panel c: Number of Children			
Dependent variable	Altruistic type: child	Egalitarian type: child	Spiteful type: child
	(1)	(2)	(3)
Altruistic type: mother*# of children	-0.085 (0.115)		
Altruistic type: father *# of children	-0.059 (0.114)		
Egalitarian type: mother *# of children		0.106 (0.116)	
Egalitarian type: father *# of children		-0.289** (0.127)	
Spiteful type: mother *# of children			0.124 (0.121)
Spiteful type: father *# of children			-0.041 (0.106)
Observations	160	160	160
R ²	0.332	0.297	0.252

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. The set of explanatory variables in Panels a, b, and c is identical to that in Column (2) of Table A1. birth order=0 for firstborn children and birth order=1 for children who were born later. # of children=0 if there are only two children in the family and # of children=1 otherwise.

TABLE B5

The relationship between parents' and children's parochial preferences towards children

Panel a: Gender		
Dependent Variable	In-group favoritism: child ^B	Out-group hostility: child ^C
	(1)	(2)
In-group favoritism: mother*female ^B	0.096 (0.130)	
In-group favoritism: father *female ^B	-0.024 (0.159)	
Out-group hostility: mother *female ^C		0.059 (0.193)
Out-group hostility: father*female ^C		-0.024 (0.166)
Observations	160	160
R ²	0.280	0.170

Panel b: Birth order		
Dependent Variable	In-group favoritism: child ^B	Out-group hostility: child ^C
	(1)	(2)
In-group favoritism: mother*birth order ^B	0.150 (0.113)	
In-group favoritism: father *birth order ^B	-0.204 (0.145)	
Out-group hostility: mother *birth order ^C		-0.211 (0.188)
Out-group hostility: father*birth order ^C		-0.468*** (0.150)
Observations	160	160
R ²	0.283	0.248

Panel c: # of children		
Dependent Variable	In-group favoritism: child ^B	Out-group hostility: child ^C
	(1)	(2)
In-group favoritism: mother*# of children ^B	-0.027 (0.112)	
In-group favoritism: father *# of children ^B	-0.329** (0.145)	
Out-group hostility: mother *# of children ^C		0.296 (0.218)
Out-group hostility: father*# of children ^C		0.078 (0.189)
Observations	160	161
R ²	0.312	0.182

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. The set of explanatory variables in Panels a, b, and c is identical to that in Column (2) of Table A5. birth order=0 for firstborn children and birth order=1 for children who were born later. # of children=0 if there are only two children in the family and # of children=1 otherwise.

^B dummy variable which equals 1 if subject's behavior can be characterized as altruistic only towards related children.

^C dummy variable which equals 1 if subject's behavior can be characterized as spiteful only towards non-related children.

TABLE B6

The relationship between parents' and children's parochial preferences towards parents

Panel a: Gender		
Dependent Variable	In-group favoritism: child ^B	Out-group hostility: child ^C
	(1)	(2)
In-group favoritism: mother*female ^B	0.099 (0.163)	
In-group favoritism: father *female ^B	0.149 (0.140)	
Out-group hostility: mother *female ^C		-0.147 (0.114)
Out-group hostility: father*female ^C		-0.141 (0.126)
Observations	160	160
R ²	0.225	0.227

Panel b: Birth order		
Dependent Variable	In-group favoritism: child ^B	Out-group hostility: child ^C
	(1)	(2)
In-group favoritism: mother*birth order ^B	-0.051 (0.145)	
In-group favoritism: father *birth order ^B	-0.303** (0.123)	
Out-group hostility: mother *birth order ^C		0.013 (0.086)
Out-group hostility: father*birth order ^C		0.030 (0.115)
Observations	160	160
R ²	0.255	0.214

Panel c: # of children		
Dependent Variable	In-group favoritism: child ^B	Out-group hostility: child ^C
	(1)	(2)
In-group favoritism: mother*# of children ^B	-0.041 (0.221)	
In-group favoritism: father *# of children ^B	-0.244* (0.125)	
Out-group hostility: mother *# of children ^C		0.167 (0.134)
Out-group hostility: father*# of children ^C		-0.063 (0.116)
Observations	160	160
R ²	0.239	0.222

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. The set of explanatory variables in Panels a, b, and c is identical to that in Column (2) of Table A5. birth order=0 for firstborn children and birth order=1 for children who were born later. # of children=0 if there are only two children in the family and # of children=1 otherwise.

^B dummy variable which equals 1 if subject's behavior can be characterized as altruistic only towards related children.

^C dummy variable which equals 1 if subject's behavior can be characterized as spiteful only towards non-related children.

Appendix C

TABLE C1

The relationship between female and male parents' relative earnings and givings

Dependent Variable	Relative earning: mother			Giving: mother		
	(1)	(2)	(3)	(4)	(5)	(6)
Relative earning: father	0.462*** (0.059)	0.474*** (0.060)	0.341*** (0.066)			
Giving: father				0.505*** (0.056)	0.514*** (0.057)	0.379*** (0.061)
Additional Controls						
Years married, age	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160
R ²	0.280	0.289	0.432	0.332	0.345	0.483

Notes: Coefficients in all columns are OLS regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

Relative earning is a continuous measure of total number of experimental points the person earned in four binary choice games, relative to total number of points s/he gave to others. It is smallest for strongly altruistic type and largest for spiteful type.

Giving is a measure of total number of experimental points the person gave to others in four binary choice games. It is smallest for spiteful type and largest for strongly altruistic type.

TABLE C2

The relationship between female and male parents' preferences towards related children

Dependent Variable	Altruistic type: mother			Egalitarian type: mother			Spiteful type: mother		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altruistic type: father	0.390*** (0.093)	0.384*** (0.092)	0.286*** (0.092)	-0.212*** (0.075)	-0.195*** (0.073)	-0.193** (0.079)	-0.012 (0.045)	-0.005 (0.045)	0.012 (0.047)
Egalitarian type: father	0.002 (0.104)	0.004 (0.104)	0.051 (0.104)	0.102 (0.083)	0.095 (0.082)	0.075 (0.089)	0.008 (0.050)	-0.009 (0.050)	0.076 (0.053)
Spiteful type: father	-0.162 (0.106)	-0.212* (0.113)	-0.211* (0.112)	-0.125 (0.085)	-0.030 (0.089)	-0.030 (0.095)	0.012 (0.051)	0.038 (0.055)	0.069 (0.056)
Additional Controls									
Years married , age	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160	160	160	160
R ²	0.189	0.213	0.330	0.104	0.146	0.159	0.002	0.022	0.106

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Other controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

TABLE C3

The relationship between female and male parents' preferences towards related parents

Dependent Variable	Altruistic type: mother			Egalitarian type: mother			Spiteful type: mother		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altruistic type: father	0.369*** (0.078)	0.391*** (0.076)	0.249*** (0.078)	-0.048 (0.055)	-0.066 (0.055)	-0.069 (0.063)	-0.086 (0.047)	-0.090* (0.046)	-0.079 (0.052)
Egalitarian type: father	-0.076 (0.102)	-0.099 (0.099)	-0.111 (0.092)	0.307*** (0.073)	0.304*** (0.072)	0.277*** (0.075)	0.038 (0.061)	0.016 (0.061)	-0.024 (0.062)
Spiteful type: father	-0.230* (0.137)	-0.228* (0.131)	-0.235** (0.117)	0.423*** (0.097)	0.413*** (0.095)	0.401*** (0.095)	-0.115 (0.082)	-0.122 (0.081)	-0.127 (0.079)
Additional Controls									
Years married , age	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160	160	160	160
R ²	0.204	0.268	0.426	0.220	0.253	0.265	0.041	0.076	0.124

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Other controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

TABLE C4

The relationship between female and male parents' preferences towards non-related children

Dependent Variable	Altruistic type: mother			Egalitarian type: mother			Spiteful type: mother		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altruistic type: father	0.445*** (0.066)	0.439*** (0.068)	0.389*** (0.067)	-0.176** (0.074)	-0.178** (0.076)	-0.181** (0.075)	-0.088 (0.057)	-0.062 (0.058)	-0.069 (0.057)
Egalitarian type: father	-0.088 (0.063)	-0.090 (0.064)	-0.146 (0.064)	0.352*** (0.071)	0.347*** (0.072)	0.371*** (0.078)	-0.088 (0.055)	-0.069 (0.055)	-0.102* (0.055)
Spiteful type: father	-0.016 (0.068)	-0.024 (0.068)	-0.034 (0.068)	-0.176** (0.076)	-0.166** (0.075)	-0.106 (0.076)	0.197*** (0.059)	0.207*** (0.058)	0.173*** (0.058)
Additional Controls									
Years married , age	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160	160	160	160
R ²	0.274	0.281	0.367	0.247	0.258	0.342	0.124	0.151	0.273

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Other controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

TABLE C5

The relationship between female and male parents' preferences towards non-related parents

Dependent Variable	Altruistic type: mother			Egalitarian type: mother			Spiteful type: mother		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altruistic type: father	0.218** (0.090)	0.182* (0.094)	0.136 (0.088)	-0.067 (0.094)	-0.006 (0.099)	0.007 (0.097)	-0.120 (0.084)	-0.083 (0.088)	-0.113 (0.084)
Egalitarian type: father	-0.157* (0.092)	-0.187* (0.095)	-0.273*** (0.092)	0.315*** (0.096)	0.369*** (0.100)	0.369*** (0.101)	-0.210** (0.086)	-0.176** (0.089)	-0.193** (0.088)
Spiteful type: father	0.027 (0.090)	0.021 (0.091)	-0.006 (0.085)	0.027 (0.094)	0.053 (0.095)	0.083 (0.093)	0.022 (0.090)	0.054 (0.085)	0.034 (0.081)
Additional Controls									
Years married , age	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160	160	160	160
R ²	0.098	0.126	0.278	0.105	0.128	0.211	0.057	0.093	0.234

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Other controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

TABLE C6

The relationship between female and male parents' parochialism given by relative earnings and givings

Dependent Variable	Relative earning: mother's parochialism			Giving: mother's parochialism		
	(1)	(2)	(3)	(4)	(5)	(6)
Relative earning: father's parochialism	0.118 (0.085)	0.088 (0.092)	0.116 (0.096)			
Giving: father's parochialism				0.201** (0.089)	0.200** (0.096)	0.222** (0.103)
Additional Controls						
Years married, age	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160
R ²	0.012	0.035	0.076	0.030	0.047	0.078

Notes: Coefficients in all columns are OLS regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Additional controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^A ordinal variable for the four different age groups (age 6-8 = 0, age 9-11 = 1, age 12-14 = 2, age 15-17 = 3)

Relative earning is defined as a difference between points of total number of experimental points the person earned in four binary choice games, relative to total number of points s/he gave to others. It is smallest for strongly altruistic type and largest for spiteful type.

Giving is a measure of total number of experimental points the person gave to others in four binary choice games. It is smallest for spiteful type and largest for strongly altruistic type.

Parochialism in terms of relative earning is defined as a difference in subject's relative earnings between family and non-family members.

Parochialism in terms of giving is defined as a difference in subject's givings between family and non-family members.

TABLE C7

The relationship between female and male parents' parochial preferences towards children

Dependent Variable	In-group favoritism: mother ^B			Out-group hostility: mother ^C		
	(1)	(2)	(3)	(4)	(5)	(6)
In-group favoritism: father ^B	0.423*** (0.086)	0.465*** (0.087)	0.498*** (0.096)			
Out-group hostility: father ^C				0.300*** (0.061)	0.281*** (0.061)	0.236*** (0.064)
Additional Controls						
Years married , age	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes
Observations	160	160	160	160	160	160
R ²	0.136	0.176	0.249	0.121	0.157	0.268

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Other controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^B dummy variable which equals 1 if subject's behavior can be characterized as altruistic only towards related children.

^C dummy variable which equals 1 if subject's behavior can be characterized as spiteful only towards non-related children.

TABLE C8

The relationship between female and male parents' parochial preferences towards parents

Dependent Variable	In-group favoritism: mother ^B			Out-group hostility: mother ^C		
	(1)	(2)	(3)	(4)	(5)	(6)
In-group favoritism: father ^B	0.232*** (0.068)	0.290*** (0.068)	0.245*** (0.070)			
Out-group hostility: father ^C				0.012 (0.069)	0.026 (0.068)	-0.017 (0.065)
Additional Controls						
Years married , age	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes
Observations	167	162	161	167	161	160
R ²	0.063	0.114	0.221	0.000	0.025	0.165

Notes: Coefficients in all columns are seemingly unrelated regression estimates, standard errors are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Other controls include log of household wealth, earnings of mother and father, schooling of mother and father and years of marriage.

^B dummy variable which equals 1 if subject's behavior can be characterized as altruistic only towards related parents.

^C dummy variable which equals 1 if subject's behavior can be characterized as spiteful only towards non-related parents.

Supplementary material

Instructions

Welcome to our experiment. Depending on your decisions in this experiment you will be rewarded certain kind of gift certificate for special good for self.

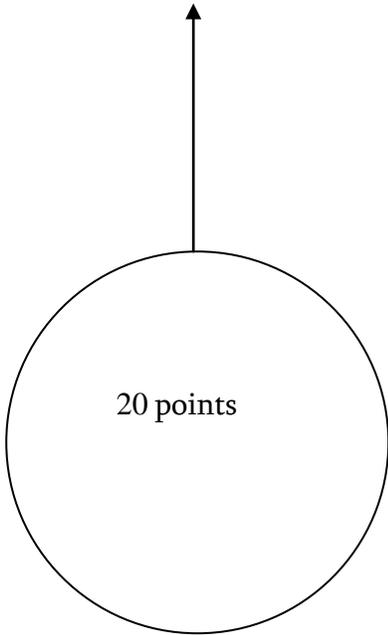
Before we start, we will explain the rules of experiment to you. It is important that you listen carefully now, to make sure that you understand the rules of our game. In case you may have questions, please rise your hand and an experimenter will assist you. We kindly ask you not to communicate with other participants.

You will play a game in which you have to decide how to divide money between yourself and the person you are paired with. You will be paired with four different participants about whom you will be informed during the experiment. Two of them will be your child (parent) and your spouse (sibling). Two others are anonymous people from other families. What you will know about them is that one is a child and another one is an adult. You will not be told who these persons are either during or after the experiment. Neither the persons you are paired with will be told, with whom he or she was paired. With each participant you will play four games. After you make all four choices you will switch to another one. How much money you and the participant you are paired with receive depends on your decisions. Other four participants (They may or may not be the same people you are making decisions about) will also make the same decisions regarding you and three other in the group. In this case you will receive the money which other participant decided to give to you. How much you receive depends on the other participant's choice.

Let us discuss an example:

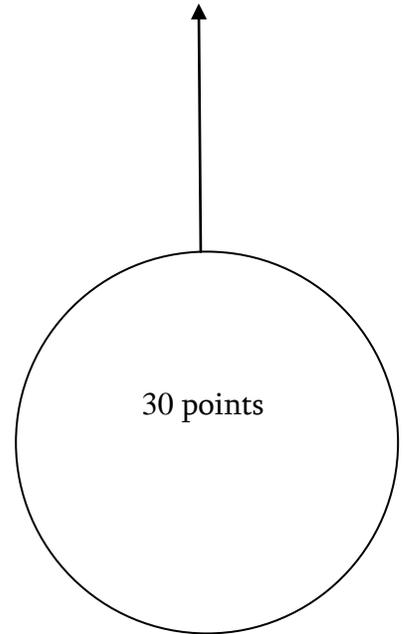
Option A

Other Person



Option B

Other Person



As you may see there are two possible ways to allocate the money: option A and option B. With option A you get thirty points and the participant you are paired with gets twenty points. With option B you get fifty points and the person you are paired with gets thirty points.

As we mentioned earlier, for each person you are paired with you make four decisions. The four decision sheets differ from each other in the amounts of money that can be divided. We also told you that other four participants will also make the same decisions regarding you. At the end of the experiment you will get a gift certificate for special good for self with monetary value depending on the total points you collected. The exchange rate will be set so that each gift certificate will have a monetary value of 25 GEL on average.

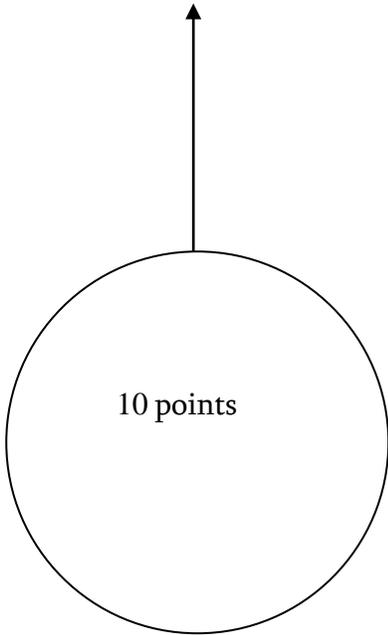
Each person you are paired with will get the sum of points from four particular decisions you made regarding to this person. Note that the other four people including your child (parent, spouse) will also receive points from other four participants of the experiments. They will get all the points together, without being told how much you or any other particular person has sent for them. The points earned during the experiment will be exchanged for gift certificate for special good, for your child (parent, spouse) as well as for other participants, which has the same monetary of 25 GEL on average.

Thank you for your attention,

Before proceeding to the experiment we ask you to answer on control question:

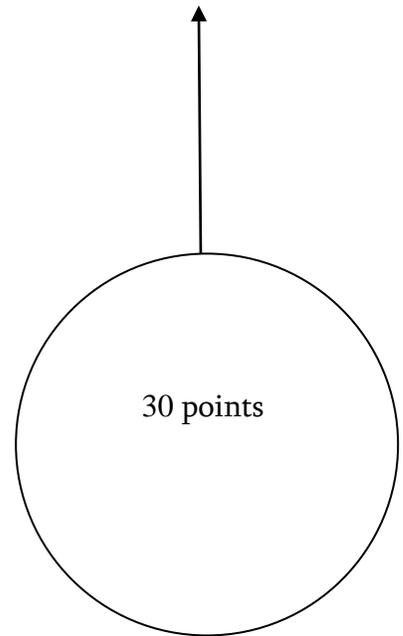
Option A

Other Person



Option B

Other Person



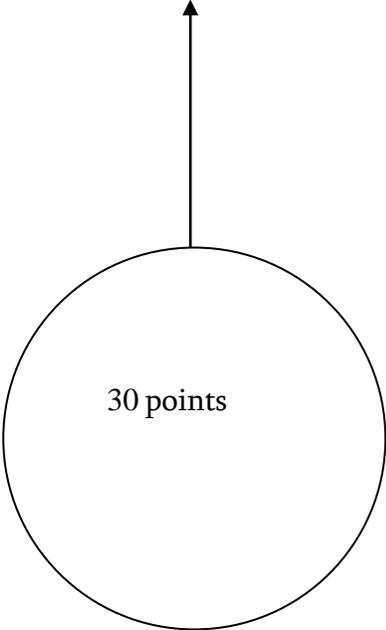
Please answer following questions:

1. If you choose an option A you will get ____ points.
2. If you choose an option A the other person will get ____ points.
3. If you choose an option B you will get ____ points.
4. If you choose an option A the other person will get ____ points.

Decision Sheet

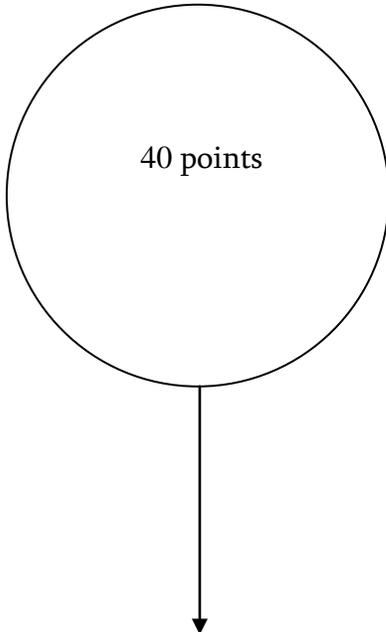
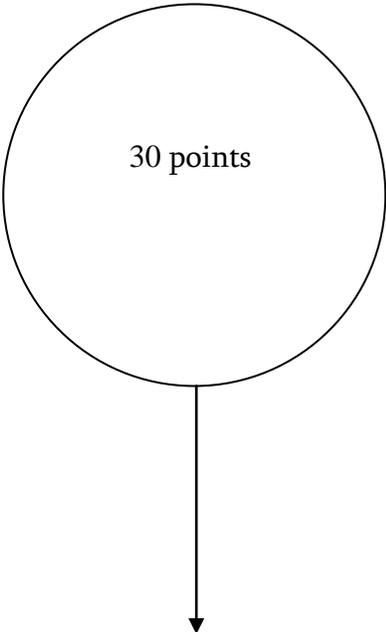
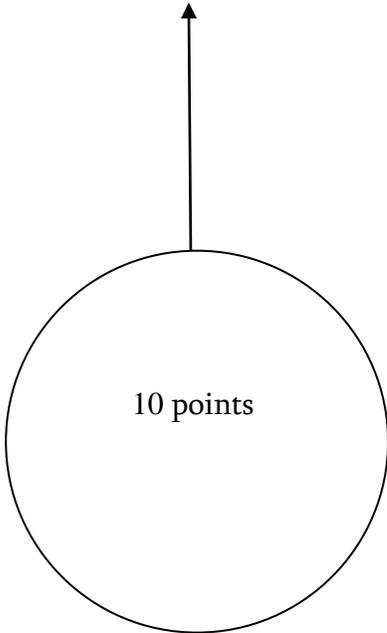
Option A

Other Person



Option B

Other Person



me

me