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ScienceDirect
Games and Economic Behavior 59 (2007) 364–382
GAMES and Economic Behavior
www.elsevier.com/locate/geb

Trust and trustworthiness across different age groups

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Received 20 June 2005

Available online 13 November 2006

Abstract

We examine the degree of trust and trustworthiness in an experimental trust game with 662 participants from six different age groups, ranging from 8-year-olds to retired persons. Although both trust and trustworthiness have been identified as fundamental pillars for efficient economic interactions, economic research has devoted little attention to measuring their strength in different age groups. In our experiment subjects interact with members of the same age group. We find that trust increases almost linearly from early childhood to early adulthood, but stays rather constant within different adult age groups. Trustworthiness prevails in all age groups.

JEL classification: C72; C91

Keywords: Trust; Trustworthiness; Age; Experiment; Reciprocity; Inequity aversion

1. Introduction

Trust and trustworthiness are fundamental pillars for smooth and efficient interactions when complete contracts are not feasible or available. This is true not only within families, in neighborhoods, or schools, but also in larger public and private organizations, markets, or politics (Alesina and La Ferrara, 2002; Bewley, 1999; Fehr and Falk, 1999; Fehr et al., 1993, 1997; Glaeser et al., 2000). It is obvious that many economic interactions are characterized by an exchange of favors

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0899-8256/$ – see front matter
doi:10.1016/j.geb.2006.07.006

or goods and services, where the quality or quantity of the exchange cannot be enforced strictly. Without mutual trust and trustworthiness, most of these exchanges would not take place, much to the detriment of the involved parties in particular and of society in general (Knack and Keefer, 1997; Zak and Knack, 2001).

Despite a rapidly increasing general interest of economists in the determinants and economic benefits or consequences of trust and trustworthiness, there is little evidence on the degree of trust and trustworthiness across different age groups. We present a comprehensive experimental study in which we examine trust and trustworthiness in six different age groups: 8 year old second graders in primary school, 12-year-old sixth graders, 16-year-old tenth graders in secondary school, students in their early twenties, working professionals in their mid thirties, and retired persons in their late sixties. 662 subjects participated in an identical laboratory trust game, which allowed us to assess possible differences in trust and trustworthiness across age groups.

The scarcity of studies on the differences in economic decision making across different age groups is somewhat surprising since most of the currently prominent models of economic decision making under the influence of social preferences—like trust, trustworthiness, reciprocity or inequity aversion (see e.g. Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Charness and Rabin, 2002; Dufwenberg and Kirchsteiger, 2004; Falk and Fischbacher, 2006)—are heavily rooted in experimental studies of 20-year-old students. Little is known, however, whether these models are able to account for the behavior of subjects from different age groups, such as children, teens, or older adults. Besides its possible relevance for the modeling of behavior in economics in general, our study has a practical significance by addressing the economic behavior of several age groups with important stakes in industrialized societies. For instance, studying the behavior of children, and especially of adolescents, is interesting for economists because the purchasing power of children and adolescents has increased significantly over the past few decades, at least as far as highly developed countries like the US or the EU are concerned (McNeal, 1992). The behavior of older adults, like retired persons, may seem worthwhile to examine because this group typically controls the largest part of a society's wealth.

In contrast to the usual survey questions on trust, trustworthiness, and reciprocity (see Durlauf, 2002; Glaeser et al., 2002), we prefer to measure trust and trustworthiness in an experimental setting mainly for two reasons. First, decisions have clear monetary consequences and, second, it is much easier to explain a simple game to young children than a set of hypothetical questions that adults are usually asked in those surveys. The experimental trust game that we apply in our experiment has been used in numerous studies to measure trust and trustworthiness (see Camerer, 2003; Gächter et al., 2004). In this paper, we use a slightly modified version of the trust game, which was introduced in the literature by Berg et al. (1995). Player A, the trustor, has an initial endowment $X > 0$ and can send an amount x to player B, the trustee, with $0 \leqslant x \leqslant X$. Player B receives $3x$ and can return any amount y, with $0 \leqslant y \leqslant 3x$. The final payoff for player A is $X - x + y$, and for player B is $3x - y$.

The amount x can be used as a measure for the trustor's trust in an anonymous interaction partner. In our setting, trust is the willingness to transfer a positive amount ($x > 0$) to the other person in the hope that this person will reciprocate at her own cost. This comes close to a widespread definition of trust to be the deliberate willingness of a decision maker to making himself vulnerable to the actions of another party (Mayer et al., 1995; Rousseau et al., 1998).

The return y, in relation to the received amount $3x$, is typically considered as an indicator for a subject's trustworthiness. Evidently, trust and trustworthiness are intimately related as trusting

behavior can only be rewarded in the presence of trustworthiness and as trust itself may elicit trustworthiness.

The results of our experiment indicate that trust in strangers increases almost linearly from our group of primary school children to the group of students, but stays more or less the same in our adult population of students, working professionals, and retired persons. Trustworthiness is found across all age groups, with older subjects typically less self-regarding in their decisions as trustees. It turns out that trustee behavior can be well explained by the assumption of inequity aversion. In fact, average payoffs for both trustors and trustees are rather similar in each single age group.

The rest of the paper is organized as follows: Section 2 introduces evidence from economics and developmental psychology as well as our hypotheses that are derived from the large body of work in developmental psychology. Section 3 describes our experimental design and procedure. Results are presented in Section 4. Section 5 discusses our results and possible future extensions of our work.

2. Evidence from economics and hypotheses from developmental psychology

2.1. Evidence from economics

Only recently, the influence of age on economic decision making has caught some attention in economics. Basically, there are two strands of literature closely related to our paper. The first strand examines the economic behavior of children, and the second concentrates on behavioral differences in the adult population.

Harbaugh, Krause, and co-authors are the most prominent contributors to the first strand of literature.[1] Harbaugh et al. (2003) present—to the best of our knowledge—the only experimental trust game with children of different age, ranging from 8-year-olds to 17-year-olds. They do not find any significant influence of age on trustors' or trustees' decisions, which might be a consequence of the applied strategy vector method, as they mention themselves.[2] In particular, they note that children might have found it very difficult to understand how the strategy vector method protocol is implemented. In addition to possible confusion, the potential lack of salience associated with the strategy vector method might have been more important for children than for adults.

Inspired by the work of Harbaugh et al. (2003), we extend and modify their approach in three notable dimensions: First of all, due to the possible problems with the strategy vector method, we elicit only a single, unconditional choice from every participant, thereby making it much easier, in particular for children, to understand the structure of the game. Second, we extend their study by covering a much broader spectrum of subjects with respect to age, including children, adolescents, students, working professionals, and retired persons. To the best of our knowledge, we are the first to run a controlled laboratory experiment with subjects from such diverse age

[1] They have also studied many other aspects of children's decision making. In the concluding section we will relate in particular their papers on children's altruism (Harbaugh and Krause, 2000) and on lottery choices (Harbaugh et al., 2002) to the results of our paper.

[2] In the experiment of Harbaugh et al. (2003), trustors had to make their decisions for five different trustees, each from a different age group (aged 8, 11, 14, 17 years or an adult). Trustees had to indicate their conditional return for each of five possible decisions of the trustor who could choose a transfer x in integer amounts from zero to four tokens.

groups. Third, our experimental study will be based on two fully specified hypotheses from theoretical work in developmental psychology.

The second strand of literature, addressing the influence of age on trust, has emerged only recently. Both Fehr et al. (2003) and Bellemare and Kröger (2006) have included an experimental trust game in a representative survey of German, respectively Dutch, households. Both studies find that income and gender are insignificant determinants for behavior in the trust game. However, age is clearly an important factor, such that relatively older subjects (in particular those over 65) show less trust by choosing lower transfers x than subjects in their thirties and forties. The degree of trustworthiness (i.e., returns y) seems to increase with age. However, concerning the absolute quantities, the differences in trust and trustworthiness between various adult age groups are rather small, even though statistically significant.[3]

Our study provides clear evidence that the most notable behavioral differences in the trust game can be observed in the range from childhood to early adulthood and that there are only minor differences within the adult age groups (i.e. students, working professionals and retired persons). Experiments based on representative surveys must necessarily miss the economically substantial changes in trust and reciprocity from childhood to student age because, generally, subjects aged below 18 are excluded from the samples.

Another, possibly confounding factor in the studies of Fehr et al. (2003) and Bellemare and Kröger (2006) is the fact that participants had no information on the age of their interaction partners. Consequently, the experimenters lost control, because subjects' behavior might actually depend on their (uncontrolled) expectation about the age of the interaction partner. This lack of control, which is especially important in cases where the difference in age is potentially large, might bias results if subjects actually behaved differently toward members of different age groups. In fact, there is some evidence by Holm and Nystedt (2005) that subjects have a strong preference to play a trust game with members of their own age cohort. In order to avoid potentially confounding factors arising from not knowing the age of the interaction partner, subjects in our experiment were informed that they interact with members of their own age cohort.

2.2. The limits of economic theory and the relevance of developmental psychology

Obviously, traditional economic theory with the assumption of rational, money-maximizing agents is unable to explain trusting and trustworthy behavior in the trust game, because it predicts subjects to play the subgame-perfect Nash equilibrium of transferring nothing ($x = 0$). Of course, several economic models have been developed lately (e.g., Bolton and Ockenfels, 2000; Charness and Rabin, 2002; Fehr and Schmidt, 1999) that take other-regarding preferences into account and are therefore much better able to account for the existence and stability of trust and trustworthiness in human interactions. However, none of these models on social preferences would predict any influence of age, as the models assume the extent of trust and trustworthiness as given.

Given the lack of guidance from economic theory, we resort to a field that deals primarily with changes in human behavior in the course of the life cycle. In developmental psychology, examining trust and its determinants has been part of a much broader research agenda on the development of 'prosocial' behavior. Basically, the latter term captures behavior which is not purely self-interested, but intends to benefit others as well (at varying costs to oneself). The study

[3] In a mail-based semi-experimental trust game, Holm and Nystedt (2005) find a similar effect of older adults showing less trust when comparing the behavior of 70-year-old retired persons with the one of 20-year-old students.

of prosocial behavior is an outgrowth of Piaget's (1965) and Kohlberg's (1969) research on the development of moral judgment. Whereas Piaget and Kohlberg were mainly interested in the development of cognitive abilities and the stages of increasing sophistication of moral reasoning, the research on prosocial behavior links moral reasoning and cognitive or mental processes to actual behavior. Since behavior is strongly influenced by cognitive processes, it is no surprise that prosocial behavior and the development of moral reasoning are closely related. Consequently, as moral reasoning advances with age (Eisenberg et al., 1985; Boom et al., 2001), the frequency of prosocial behavior generally also increases (Eisenberg and Mussen, 1989; Eisenberg and Fabes, 1998).

2.3. Hypotheses from developmental psychology

The socialization of trust has been shown to start in the first few years of a person's life and works through parents instilling in their children trust in parents, relatives, and friends by letting children experience that they can rely on others (Rotenberg, 1995). Trust in strangers develops when children interact more frequently with strangers, which is typically the case when they enter kindergarten and school later on (Krebs and van Hesteren, 1994; Langford, 1997). Hence, trust is closely related to the number of contacts with others, which typically increases from childhood to the time of entering a working career, and stays more or less constant from that period on, with possibly a small decline in retirement (Kail and Cavanaugh, 2004). This leads us to our first hypothesis:

Hypothesis 1. Trust increases with age from childhood to (early) adult age. Hence, we expect the amount x to increase with age.

The concepts of trustworthiness and reciprocity are not disentangled clearly in the field of developmental psychology. Most humans have been shown to rely on a material tit-for-tat strategy already at the age of 5 to 6 (Youniss, 1980, 1986), meaning that they are trustworthy in the sense of returning material rewards to interaction partners who provided them with material benefits in the first place. Hence, we would expect to observe trustworthiness, i.e. a dependence of returns y on transfers x, in all age groups. Therefore, we can formulate our second hypothesis:

Hypothesis 2. Trustworthiness is already prevalent at an early age. Therefore we expect a significantly positive relation between y and x irrespective of age.

It is important to note here that, even though developmental psychology can provide useful insights into the development of trust and trustworthiness with age, it has had at best marginal influence on the economics literature so far. The reasons for this are manifold. First, developmental psychology does not provide rigorous (mathematical) theories or clear theoretical benchmarks. Second, the experiments run in developmental psychology are, typically, not interactive and do not involve real money, but have only hypothetical consequences. However, economists believe in the value of material, mostly monetary, incentives for studying real behavior. Third, developmental psychology is by definition not primarily interested in the economic relevance of the development of human behavior in the course of a life cycle, but focuses on the psychological causes and consequences of these developments. Despite of these differences, we think that the insights from developmental psychology may be helpful to derive testable predictions for eco-

nomic experiments in cases where the evolution of concepts affecting economic decision making is concerned.

3. Experimental design

3.1. Parameters and protocol of decision making

In our trust game, the trustor received 10 units of money ($X = 10$). The amount x, sent by the trustor to the trustee, was tripled. The trustee could then send back $y \leqslant 3x$, yielding final payoffs of $10 - x + y$ for the trustor, and $3x - y$ for the trustee, respectively.[4]

The experiment was always run as a paper and pencil experiment where participants had to indicate their decision on a decision form (which is available upon request from the authors). In our experiment, the trustor was called "John/Joanna" and the trustee "Michelle/Michael." We opted for using female and male names (in the German instructions they were "Johann/Johanna" and "Michaela/Michael," respectively) instead of the neutral labels 'person A' and 'person B' for two reasons. First, teachers of our younger participants strongly recommended avoiding neutral labels, because children could in that case perceive the interaction as unreal. By using a real name (even though a fictitious one) teachers expected children to better understand the interactive nature of the decision making situation. Since we decided to use names for our young participants, we did not change this design feature for adults. Second, we chose two similar and well-known female and male names for each player in order to remain neutral with respect to gender.[5]

We always started with one group (that is one class when running the experiments in schools) in which all subjects acted in the role of the trustor. They were given the instructions and told that they were to interact with some person of about the same age from another group, but that the identity of the other person would not be revealed. After having read the instructions aloud, we answered all remaining questions in private. Then participants were asked to make their decision. They had to take their decision form out of an envelope, which also contained a paper slip with a code for later identification in order to be able to distribute profits. Trustors had to put back the decision form into the envelope after having marked their decision. In a second group, all participants acted in the role of trustees. They were also informed that the decision of the trustor had been made by a person of about the same age in another (unidentified) group or class. After going through the instructions and answering questions in private, they had to draw one of the envelopes, take out the paper slip with their identification code—which was put into the envelope after trustors had finished their part—and fill in their decision on the decision form.

662 subjects from six different age groups participated in our trust game: (i) 8-year-old second graders in primary school, (ii) 12-year-old sixth graders, and (iii) 16-year-old tenth graders in secondary school, (iv) students (22 years on average, standard deviation of 2.8), (v) working professionals (32 years, std. dev. 6.3), and (vi) retired persons (68 years, std. dev. 8.6). Table 1

[4] When we started the project with students, we allowed them to transfer and return also non-integer amounts. Since 86% of students chose only integer amounts, we restricted the choice set to the integer numbers in all subsequent sessions with other age groups.

[5] The data in Bolle (1998) seem to suggest that different labels might influence behavior. However, in our experiment the chosen names were the same for all 662 participants (contrary to Bolle's experiment), and the names were very common ones (contrary to "Frankenstein," for instance, in the paper of Bolle). Hence, we are confident that our choice of names has no impact on our results.

Table 1
Number of pairs per age group

Age group	Number of pairs	Women (in %)	Date of experiment	Institution	Place
8 years (2nd graders)	45	51	11/02	primary school	Salzburg
12 years (6th graders)	61	50	06 + 10/02 + 09/03	secondary school	Bregenz/Landeck/ Schwaz
16 years (10th graders)	50	56	06 + 10/02 + 09/03	secondary school	Bregenz/Landeck/ Schwaz
Students (avg. age 22)	110	48	01/02 + 10/03	university	Innsbruck
Professionals (avg. age 32)	31	34	03 + 04/03	university of applied sciences	Innsbruck/Kufstein
Retired persons (avg. age 68)	34	76	03 + 07/03	adult education	Innsbruck
Total	331	51			

reports the number of pairs (of one trustor and one trustee), the proportion of women, and the dates and places of the sessions in each age group.[6]

3.2. Notes on our subject pool

We ran the experimental sessions in various educational institutions in the western part of Austria, in particular in a primary school in Salzburg (with about 300 pupils), in secondary schools in Bregenz (1000 pupils), Landeck (800 pupils), and Schwaz (400 pupils) and at the University of Innsbruck (25 000 students). The working professionals were enrolled in a part-time (weekend) program for real estate and facility management at the Universities of Applied Sciences in Innsbruck and Kufstein (with 1000 students at each institution). Regarding our pool of retired persons, we recruited the participants from athletic courses for retired persons at the Department of Sports of the University of Innsbruck and from the Tiroler Bildungsinstitut, an adult education institution, which organizes seminars on various topics and for various age groups.

Of course, running experiments with subjects from very diverse age groups bears some general problems in controlling for socio-demographic variables. If we had only adult participants (like it is the case in the representative studies of Bellemare and Kröger, 2006 and Fehr et al., 2003), it would be rather easy to study the impact of age, gender, income, religion, education, size of family, personal height or marital status, to name but a few. When *comparing* children and adults, it is much more problematic to get comparable data that may be used in econometric estimations.

Age and gender are, of course, variables that are easy to obtain, and they will also be used as controls in our study. Income is obviously much more difficult to assess in a comparable way across the different age groups. If we used parental income as a proxy for children's income (provided that one could get that information easily), then one would have to rely on the strong assumption that children's behavior is contingent on their parents' income. Besides, in regressing income on the behavior of our various age groups one would, then, mix 'real' income of adult age groups with the proxy for income of our children and adolescents. Weekly allowance of children and adolescents provides no remedy, because it would not be comparable to adult income figures. Of course, it would be desirable to control for income in a study like ours, but given the

[6] Due to different class sizes, it was not always possible to match exactly the number of trustors with the one of trustees. In this paper, we report only data for 'complete' pairs.

difficulties in measuring it adequately when the subject pool covers the whole range from children to retired persons, we have decided against controlling for it. The results of Bellemare and Kröger (2006) and Fehr et al. (2003) suggest anyway that income is not a significant determinant of the behavior of adult age groups in a trust game. Contrary to these two studies, we even try to control for possible endowment effects (see Section 3.3.2), which might serve as a substitute for income controls.

Controlling for education constitutes a similar problem like controlling for income. Parental education may provide a proxy for their children, but its use would lead to the same confounds as discussed above.[7] The variable religion has much too little variance in our data set of subjects from the western part of Austria, which is predominantly (about 90%) Roman Catholic. Family size can be easily controlled for, but previous experimental research did not establish any relation between the number of siblings and economic behavior. Furthermore, family size or the number of siblings might—at best—be able to account for differences *within* a given age group, but not *between* age groups.

3.3. Some further specific features of running experiments with subjects from different age groups

3.3.1. Explaining the game (to children)

Since running experiments with 8-year-old children in primary school involves the risk of difficulties in understanding, we were particularly careful to make sure there was full understanding of the experimental rules. For that purpose, we separately presented to each child in the role of trustor a table which indicated the amount of disposable money for the trustor and the trustee for each possible transfer x. Children in the role of trustee were told how much money (out of the ten units of money) the trustor had sent to them and how much the trustor and the trustee would earn for each possible return y. We opted for this procedure after having sought advice from class teachers on how to present the possible states of the game. The teachers suggested presenting all possible distributions and not only two or three examples, because in the latter case decisions might be focused on the examples. The 8-year-olds had to fill in their decision on the decision form. Before collecting the decision forms, we asked them about the distribution of money between trustor and trustee implied by their decision. In the few cases of wrong answers we clarified the distribution and allowed children to reconsider their decision.

The sessions with 8-year-olds lasted about 50 minutes. Those with 12- and 16-year-olds were a bit shorter because we did not go through each possible distribution, but only read the instructions aloud and gave subjects plenty of time to ask questions. The sessions with students, professionals, and retired persons lasted only 30 minutes, although the procedure was identical.

3.3.2. Possible endowment effects

In each experimental session, the trustor received an endowment of 10 units of money. Since we wanted to create identical conditions in all age groups, we initially kept the money value of

[7] However, the schools we selected for experiments with 8- to 16-year-old children have a high percentage (of 40 to 60%) of graduates that enroll at universities after their school-leaving exam. Given the relatively high drop-out rate of 50% at Austrian universities, one can reasonably expect about one quarter of our children and adolescents to end up with a university degree, which is slightly higher than the 20% of retired persons with an academic degree (according to a post-experimental questionnaire). Therefore, our participants from schools and our adult age groups seem to have at least a similar background with respect to prospective or actual academic education.

the endowment constant across age groups. To be precise, we set an exchange rate of 50 euro cent per unit of money, yielding a total endowment of €5 for the trustor. There is one notable exception, though. The school board of the primary school determined that we should use only €2 as endowment (instead of €5 or other rewards such as candies, which are often used). €2 is equivalent to the average weekly allowance of 8-year-old children and therefore still a reasonable monetary incentive for them.

An obvious argument against our constant stakes (of €5 for all age groups except primary school kids) would be that they imply different relative stakes for different age groups. What is a considerable amount of money for young children is a relatively small amount for working professionals. Although experimental economics has gathered ample evidence that higher than usual stakes affect behavior only marginally,[8] we tested for stake effects by conducting several additional experimental sessions in which participants' endowment was worth either €2 or €8. It turned out that—within a given age group—the degree of trust and trustworthiness does not depend on the monetary value of the endowment. Therefore we decided to pool the data within a given age group and present our results on an aggregate level. Disaggregated results with regard to different endowment levels can be found in Table A.1 in the appendix, where we also present statistical evidence for our claim that relative stakes do not play a role in our experiment. However, note already at this point that all results to be reported in the following would also hold true if we restricted our data to the sessions with €5 as the trustor's endowment.

4. Experimental results

In Table 2, we present an overview of our results. Aggregating over all age groups and endowments, trustors send on average 5.11 out of 10 units of money to trustees. Trustees return on average only slightly more (5.37) than they have received, implying that, on average, trust does not increase a trustor's payoff by much, compared to a situation where the trustor keeps the whole endowment for himself. Overall, average earnings of trustors and trustees are remarkably close to each other (10.14 vs. 10.08).

Table 3 presents separate data for male and female participants in order to address the issue of possible gender differences. Looking at transfers x one can see that the averages for male and

Table 2
Average transfers, returns and profits

Age group	Trustor's transfer x	Trustee's return y	Relative return $y/3x$	Trustor's profit	Trustee's profit	Pairs (N)
8 years (2nd graders)	2.00	0.66	0.10	8.64	5.36	45
12 years (6th graders)	3.61	2.04	0.15	8.22	9.00	61
16 years (10th graders)	5.46	5.16	0.32	9.70	11.22	50
Students (avg. age 22)	6.56	7.06	0.31	10.49	12.63	110
Professionals (avg. age 32)	6.58	9.03	0.39	12.16	11.00	31
Retired persons (avg. age 68)	5.38	8.65	0.57	13.26	7.50	34
All observations	5.11	5.37	0.29	10.14	10.08	331

A comprehensive table with disaggregated averages for different endowments can be found in Appendix A.

[8] See Camerer (2003) or Camerer and Hogarth (1999) for an overview of the influence of stake sizes on behavior in experiments.

Table 3
Transfers, absolute and relative returns, and gender

Age group	Trustor's transfer x		Trustee's return y		Relative return $y/3x$	
	Male	Female	Male	Female	Male	Female
8 years (2nd graders)	1.84 (19)	2.12 (25)	0.32 (22)	1.22 (18)	0.05	0.18
12 years (6th graders)	3.48 (33)	3.78 (27)	1.68 (28)	2.23 (33)	0.13	0.16
16 years (10th graders)	6.11 (18)	5.09 (32)	5.64 (25)	5.23 (22)	0.37	0.30
Students (avg. age 22)	7.00 (59)	6.12 (50)	7.18 (55)	6.90 (54)	0.32	0.31
Professionals (avg. age 32)	6.75 (24)	6.00 (7)	7.75 (16)	10.50 (14)	0.38	0.41
Retired persons (avg. age 68)	5.60 (5)	5.34 (29)	9.55 (11)	8.59 (22)	0.67	0.51

Notes. A few data points on gender are missing which is due to subjects who did not indicate their gender. Therefore, the number of subjects in each role need not add up to the number of pairs in Table 2.

female participants are rather close to each other. In fact, checking for gender differences in each single age group by a Mann–Whitney U-test, we cannot reject the null hypothesis of no gender differences ($p > 0.15$ in each single age group). Similar results are obtained with respect to absolute and relative returns. Only for the group of 8-year-olds we find that male trustees return significantly less than female trustees ($p < 0.05$ for both absolute and relative returns). For all other age groups we find that absolute and relative returns are not significantly different between men and women ($p > 0.2$ in all cases). Hence, we will work with the aggregate data from Table 2 in our analysis.

4.1. Trust and age: trustor behavior

Figure 1 shows marked differences in trustor behavior across the six age groups. In particular, we find that transfers x increase monotonically from 8-year-old children to students, ranging from 2.0 for primary school children to about 6.6 out of 10 units of money for students.[9] Within our adult groups of students, professionals, and retired persons, we find that average transfers are almost identical for students and professionals, and (insignificantly) lower in our group of retired persons. The latter group constitutes the only case where transfers *de*crease with higher age. In all other cases, transfers increase monotonically—and significantly—with increasing age, which is strongly supported by a non-parametric Jonckheere-test ($p < 0.01$).

Result 1. The transfer x increases monotonically and significantly from 8-year-old children to students in their early 20s.[10] Transfers are not significantly different between our adult groups of students, working professionals and retired persons.

[9] Looking at individual data we find that 8-year-olds and 12-year-olds show the highest frequencies of sending nothing ($x = 0$; $N = 5$ or 11% for 8-year-olds; $N = 6$ or 10% for 12-year-olds). Only 4 out of 110 student trustors send nothing, and only 1 trustor in each of the other three age groups. We find the highest relative frequency of transferring the full endowment ($x = 10$) in the group of students (40%), and the second highest in the group of working professionals (32%). 16-year-olds transfer the full endowment in 16% of cases. In all other age groups this happens in less than 10% of cases.

[10] Note that there is a perfect correlation of transfer levels and relative efficiency in the trust game. Thus, we can conclude that efficiency increases with age as well.

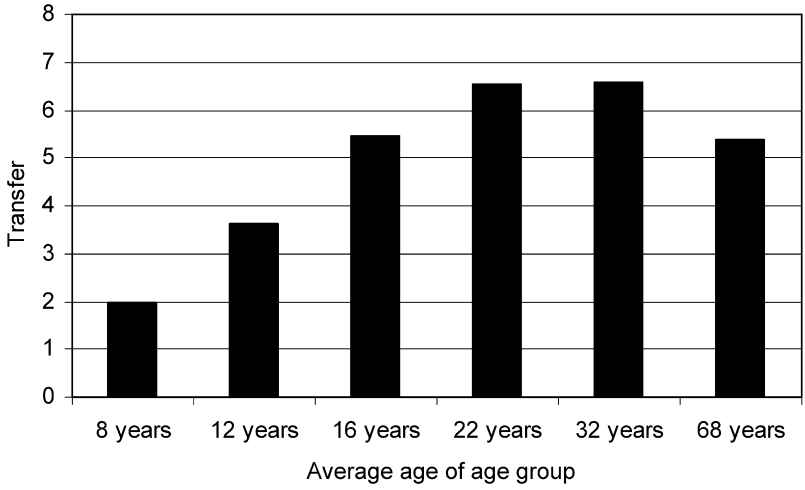

Fig. 1. Average transfers x.

4.2. Trustworthiness and age: trustee behavior

The second column in Table 2 reveals that absolute returns y increase with age ($p < 0.001$; Kruskal–Wallis test). Given that transfers x differ significantly across age groups, the latter finding is, of course, no surprise. Therefore, it is straightforward to look at relative returns $y/3x$, where we also find significant differences across age groups ($p < 0.001$). Yet, we can distinguish three sets of age groups with respect to relative returns, as can also be discerned from Fig. 2. The first set is the group of 8- and 12-year-old children with the comparatively lowest relative returns (ranging from 10 to 15%). The second set comprises 16-year-old children, students, and professionals, who return between 31 and 39% of the received money.[11] The third set are the retired persons who return on average more than half of the received amount (57%), which is significantly higher than the relative return of any other age group ($p < 0.05$ in any pairwise comparison; two-sided U-test).

As claimed by Hypothesis 2, we expect a significantly positive dependence of the return y on the transfer x irrespective of age. In order to test this hypothesis rigorously, we use a two-sided, flexibly censored tobit-model to regress returns y on transfers x. The left-hand side censoring is zero, and the right-hand side censoring has been set at $3x$, which allows for a flexible right-hand side upper level of returns, depending on the specific transfer x. All observations with transfers of $x = 0$ ($N = 18$ in total) are discarded from the tobit regression since the trustee had no choice but to return $y = 0$ in these cases.

[11] There is no statistically significant difference between relative returns within the second set, but any age group of the second set returns significantly higher relative amounts ($y/3x$) than 8- and 12-year-old children ($p < 0.05$ in any pairwise comparison; two-sided U-test). Looking at the relative frequency of zero returns (i.e. $y = 0$, given that $x > 0$) confirms that there are strong differences between the three sets of age groups. 58% of 8-year-olds return nothing, and 31% of 12-year-olds do so. However, only 10 to 19% of 16-year-olds, students and working professionals return zero. The group of retired persons is again distinct as none out of 33 trustees who has received a positive transfer returns nothing. All individual data are available upon request.

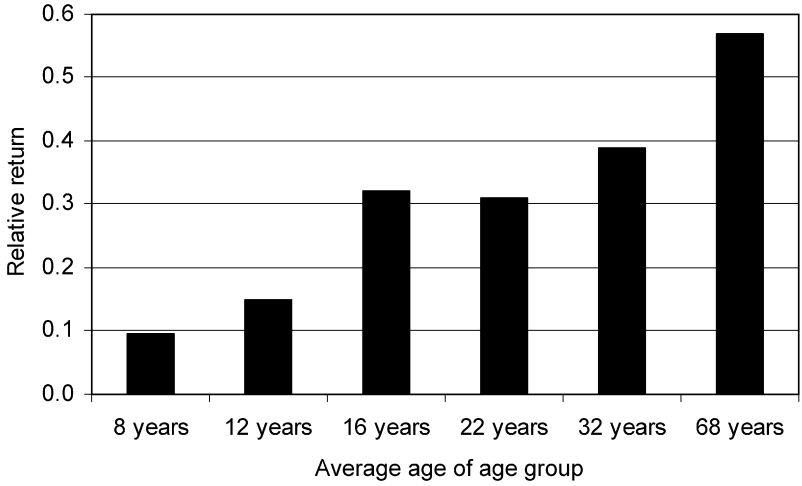

Fig. 2. Average relative returns $y/3x$.

Table 4
Tobit regression of return y on transfer x

Age group	Intercept	Slope	Marginal effect[a]	Adjusted R^2	$N(x > 0)$	# Left-censored	# Right-censored
8 years (2nd graders)	−1.92**	0.74**	0.31**	0.56	40	23	0
12 years (6th graders)	−2.44**	1.00**	0.69**	0.54	55	17	0
16 years (10th graders)	−0.18	0.97**	0.81**	0.33	49	5	3
Students (avg. age 22)	−4.26**	1.61**	1.25**	0.48	106	20	4
Professionals (avg. age 32)	−6.43	2.26**	1.73**	0.35	30	3	4
Retired persons (avg. age 68)	4.12	0.94*	0.79*	0.20	33	0	5
Overall	−3.96**	1.62**	1.19**	0.49	313	67	16

* Significantly different from zero at the 5% level.
** Idem, 1%.
[a] Marginal effects of x on y (for cases where y is uncensored, i.e., $y > 0$ and $y < 3x$) are computed by multiplying the slope with the ratio of the number of uncensored observations to the number of total observations.

In each single age group, the slope of the censored regression, and thus the marginal effect of the transfer x on the return y (given that y is not censored), is significantly positive, as can be seen in Table 4. The marginal effect is increasing with age from 8-year-olds to the group of working professionals. The latter react strongest to an increase in transfers by returning an estimated 1.7 units of money for one additional unit of transfers (which, of course, is tripled for the trustee). The marginal effect for professionals is (for some comparisons, weakly) significantly larger than for any other age group, except for students.

Result 2. Returns y depend positively and significantly on the transfer x in each single age group. Hence, trustworthiness is found already at an early age. However, its degree increases with age.

4.3. Inequity aversion as an organizing pattern of trustee behavior

So far, our examination of trustworthiness has neglected the ensuing distribution of final payoffs for both trustor and trustee. In the following, we are going to argue that the return y does not only depend on the trustor's transfer x (as has been argued in the previous subsection), but also on the final distribution of payoffs, resulting from both x and y. Hence, distributional concerns, such as inequity aversion, play a role.

We start by establishing the relation between the transfer x and the return y which minimizes inequity or equivalently ensures total equality in final payoffs. If $x \leqslant 2.5$, a trustee motivated by inequity aversion should not return anything (i.e. should choose $y = 0$), because each unit of money returned increases inequity in terms of final payoffs at the trustee's disadvantage. Only with transfers of $x > 2.5$, an inequity averse trustee should send a positive amount to the trustor in order to reduce inequity. Perfect equality in payoffs implies a slope of $+2$ for y as a function of x (given that $x > 2.5$). A flatter, yet positive, slope could be interpreted as self-centered inequity aversion. The closer the slope is to $+2$, the lower the degree of self-centered concerns.

Note that these predictions differ partly from what one would expect if reciprocity were the driving force of behavior. Reciprocity would imply that trustees condition their return positively on the transfer x even for transfers $x \leqslant 2.5$. However, for this range of transfers an inequity averse trustee would not choose higher returns y for higher transfers x. Note also that for $x > 2.5$ both inequity aversion and reciprocity would predict a significantly positive relation between transfers and returns, meaning that both concepts cannot be distinguished for this range of transfers.

Table 5 reports the results of a tobit regressions. For the case of $x \leqslant 2.5$ neither the intercepts nor the marginal effects are significantly different from zero in any age group for which we have enough observations to run a regression. This result confirms that inequity aversion plays an important role for trustee behavior. Reciprocity, however, cannot explain our data, at least for small transfers. Interestingly, the results for $x \leqslant 2.5$ also imply that trustee behavior does not differ across age groups for transfers below 25% of the trustor's endowment.

Turning to cases with $x > 2.5$, our regressions confirm a significantly positive influence of the transfer x on the return y in any age group. The significantly positive marginal effects range from 0.56 (8-year-olds) to 1.74 (professionals). For all age groups except students and professionals we find that the marginal effect is not significantly different from $+1$, indicating that trustees essentially compensate the trustor for the transfer. Only students and working professionals over-

Table 5
Inequality aversion and reciprocity

Tobit regression: Age group	$0 < x \leqslant 2.5$			$x > 2.5$		
	Intercept	Marginal effect	$R^2(N)$	Intercept	Marginal effect	$R^2(N)$
8 years (2nd graders)	0.69	0.12	0.01 (27)	-4.22^{**}	0.56^{**}	0.92 (13)
12 years (6th graders)	0.59	−0.14	0.01 (17)	-3.84^{**}	0.99^{**}	0.50 (38)
16 years (10th graders)	–	–	– (4)	−0.37	0.81^{**}	0.33 (45)
Students (avg. age 22)	1.16	−0.16	0.00 (17)	-6.16^{**}	$1.50^{**,\#}$	0.41 (89)
Professionals (avg. age 32)	–	–	– (2)	−6.09	$1.74^{**,\#}$	0.36 (28)
Retired person (avg. age 68)	–	–	– (3)	4.21	0.80^{*}	0.19 (30)

* Significantly different from zero at the 5% level.
** Idem, 1%.
$^{\#}$ Significantly different from one at the 10% level.

compensate the trustor, because their marginal effects are significantly larger than +1, although smaller than +2 (which would yield perfect equality of payoffs). Combining the finding that the marginal effect is significantly larger than zero with the additional result that it is significantly smaller than +2, we may summarize this subsection in

Result 3. Trustee-behavior in all age groups is consistent with the existence of self-centered inequity aversion, with the degree of self-centered concerns least pronounced in our groups of students and working professionals.

4.4. Transfers, returns, and profits—A final assessment from the trustor's point of view

Having analyzed trustee behavior in detail, we would like to come back to the behavior of trustors by addressing briefly the implications of trust for the trustor's payoff. For that purpose, we calculate the ex post expected profits of trustors, given the actual average returns for each possible transfer.

As can be discerned from Fig. 3, the ex post payoff-maximizing strategy for the group of 8- and 12-year-old children is to transfer nothing ($x = 0$). For 8-year-old children, the ex post expected profit is even monotonically decreasing with transfers from $x = 0$ to $x = 5$.[12] From this perspective, the very low transfers of 8-year-olds and 12-year-olds can be rationalized ex post, in the sense that they were payoff-maximizing. Only for 16-year-old trustors, there are—ex post—more profitable alternatives than choosing $x = 0$. However, the series of ex post expected profits is rather unsteady and shows no clear pattern.

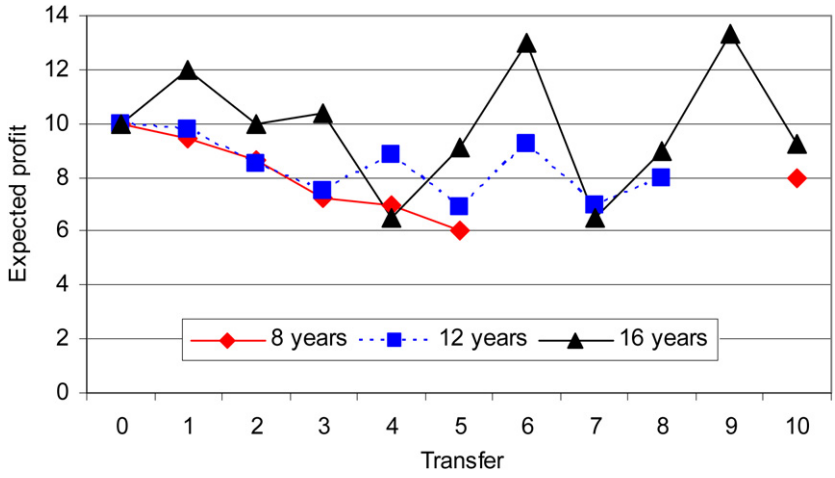

Fig. 3. Expected profit of trustor—children.

[12] There is just a single observation for $x = 10$, which yielded a return of only 8 units of money. From $x = 6$ to $x = 9$, the series for 8-year-old children is broken because there were no such transfers. Similarly, there are missing points in other age groups where we had no observations of the respective transfer. Furthermore, the number of observations for each possible transfer varies considerably since we deliberately have chosen not to apply the strategy vector method. The peak in our group of retired persons for $x = 7$, for instance (see Fig. 4), is a single observation.

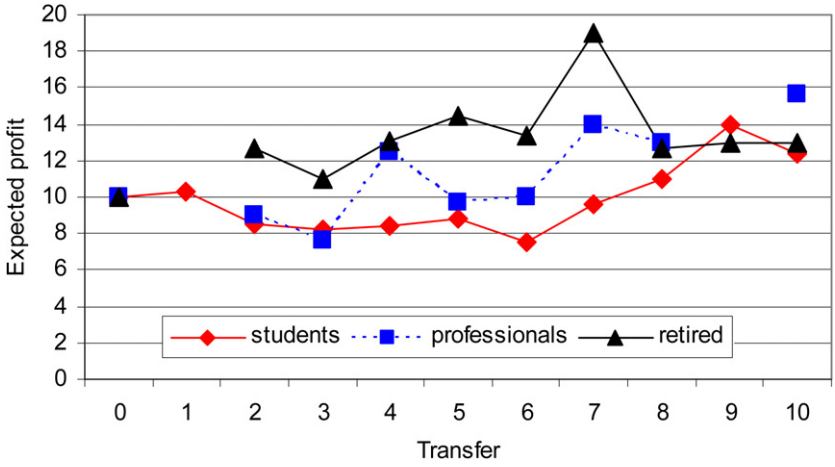

Fig. 4. Expected profit of trustor—adults.

Figure 4 shows that high transfers (with $x \geqslant 8$) raise trustors' ex post expected profits above 10 units of money in any adult age group. Actually, for retired trustors any positive transfer raises ex post expected payoffs as compared to sending nothing. In our groups of students and professionals, one can see that showing 'a little bit of trust' (choosing low to intermediate transfers) rather seems to be perceived as a signal of 'mistrust' and is therefore not fully rewarded by the trustee.[13] Very high levels of trust ($x \geqslant 9$), however, raise final ex post expected payoffs for the trustor on average by 30 to 50% above his initial endowment.

Result 4. Full trust is ex post most profitable for trustors in the adult population. On the contrary, no trust at all (i.e. $x = 0$) is the payoff maximizing strategy for children and young adolescents. Partial trust is typically not fully compensated.

5. Discussion and conclusion

Trust is significantly higher in adult age groups than in the groups of children and adolescents. Trustworthiness is prevailing in all age groups, but its degree seems to increase with age. Consequently, trust is, on average, profitable for trustors only in the adult population and when trustors show full trust. Trustee behavior is consistent with the concept of self-centered inequity aversion. These are the key results of our experimental study on the existence and extent of trust and trustworthiness across different age groups.

Our findings are completely in line with predictions derived from theory and existing evidence in developmental psychology. The novel feature here—compared to developmental psychology—is the fact that we have studied an interactive decision-making task with real, monetary incentives instead of asking children or adults hypothetical questions on their preferred allocation of money in relevant dilemma situations. A further unique characteristic of our study—compared to existing economic contributions—is that we ran identical experimental sessions with participants ranging in age from childhood to retirement.

[13] The finding that 'partial' trust usually does not pay off, whereas (almost) full trust is profitable for the trustor seems to be typical for student subject pools (see Bolle, 1998; Pillutla et al., 2003).

In the trust game, it is difficult to disentangle the influence of various factors, like trust, trustworthiness, efficiency preferences, inequity aversion, altruism, reciprocity or fairness preferences. With respect to the behavior of trustees we have argued in Section 4.3 that for small transfers (with $x \leqslant 2.5$) the concept of inequity aversion is a much better predictor than reciprocity. Actually, this distinction between reciprocity and inequity aversion would not have been possible if we had used the original design of Berg et al. (1995) where both the trustor and the trustee receive an identical initial endowment. Efficiency concerns cannot play a role for trustee behavior since returns y are a mere redistribution of money without any efficiency gains. With respect to the trustor's behavior, for the sake of succinctness of language, we have interpreted x as a measure of trust throughout this study, bearing in mind that other factors may have an influence as well. However, Cox (2004), for instance, has shown with his triadic game design that it is justified to regard a considerable part of the transfer x as a measure for trust. In the following, we would like to discuss two other possible determinants of the behavior of trustors, namely altruism and risk aversion.

Harbaugh and Krause (2000) have found no differences in altruistic preferences between 6- to 12-year-old children and adults in the first round of a public good game or in a dictator game.[14] Their finding implies that there does not seem to be an increase in unconditional altruistic preferences with age, which could have provided an alternative explanation for the increase in transfers x with age in our experiment. Thus, we might tentatively conclude that the increase in transfers with age seems to be rather attributable to an increase in trust than to an increase in altruism. In fact, developmental psychology is quite explicit on the increase of trust with age, whereas it does not provide any unambiguous hypothesis on the development of pure altruism (as a special form of prosocial behavior) with age (Buss, 1999).

Harbaugh et al. (2002) have studied children's choices in risky lotteries, showing that children are more likely to choose risky lotteries than adults. The trustor's decision on the transfer x in a trust game is obviously risky since the return y from 'investing' x is uncertain ex ante. The difference between lotteries and the trust game is, of course, that lotteries are non-interactive and have a fixed probability of winning, whereas in the trust game the trustor's payoff depends on another subject's decision. Whereas children choose the same risky lotteries *more* often than adults, children choose higher risks (that is a higher x) *less* often than adults in our trust game. This indicates that our results are probably not driven by differences in risk attitudes between subjects of different age.[15]

Though our study is able to provide a comprehensive empirical assessment on the level of trust and reciprocity across different age groups, it must leave some questions open for future research and poses a few further questions itself. Given the lack of control for income we cannot rule out that income effects explain the shifts we observe. We have argued, however, that previous studies using adult population samples (Bellemare and Kröger, 2006; Fehr et al., 2003) have not found income to play a significant role in trust games. Furthermore, our controls for behavior under different endowments are not supportive of income effects.

[14] Note that the trustee's decision on y in the trust game is strategically equivalent to a dictator game.

[15] In order to add further substance to our claim that the different behavior of different age groups in our trust game is not likely to be driven by differences in risk attitudes we would like to refer to a paper by Eckel and Wilson (2004) where they show that there is no statistical relationship between several behavioral risk measures and the decision to trust in an experimental trust game. Bohnet and Zeckhauser (2004) address the relation between the trust game and risky bets yet from another perspective by showing that the trust game—compared to risky bets—entails an additional risk premium in order to balance the costs of possible trust betrayal.

One straightforward extension of our experimental design would be a treatment in which two subjects from different age groups interact with each other directly, knowing the age of the interaction partner. Holm and Nystedt (2005) have found a strong preference of subjects to play the trust game with members of their own age cohort. Even though this endogenous selection does not immediately imply that subjects trust members of other age cohorts less, it is an indication that social capital could be larger within a given age group than between different age groups.

The slight decrease of trust from working professionals to retired persons in our data is an interesting phenomenon in itself and deserves deeper analysis. It seems to be the case that the level of trust is not monotonically increasing across the full age spectrum, but reaches a peak somewhere around the age of 30 or 40, as the findings of Fehr et al. (2003) or Fehr and List (2004) suggest. For the moment, it remains an open question why the level of trust seems to decrease beyond the age of 40, in particular in retirement and whether this can be explained by a decrease in personal contacts and encounters or by an increase in risk-aversion, for instance.

Finally, a long-term research project, which seems promising in the light of our results, would be to examine the development of trust and trustworthiness in a panel study by observing subjects for several years, thereby taking them as their own control. The level of trust and trustworthiness might not only differ across different age groups at a given point in time—as we have been able to show—but also across time within a given age group. Future research might find it worthwhile to substantiate this conjecture.

Acknowledgments

We would like to thank Simon Gächter, Werner Güth, Hakan Holm, Rupert Sausgruber, Christiane Schwieren, two anonymous referees and an associate editor for helpful comments on this paper. Financial support from the *Center of Experimental Economics* at the University of Innsbruck (sponsored by Raiffeisen-Landesbank Tirol) and the Austrian Science Foundation (*FWF Project P16617*) is gratefully acknowledged.

Appendix A. Examining endowment effects

In Table A.1, we present an overview of our results with different endowments. In particular, we display for each age group and value of the trustor's endowment (€2/€5/€8)

(a) the trustors' average transfers x in units of money (with the number of observations, i.e., pairs, in brackets),
(b) trustees' average absolute (y),
(c) relative ($y/3x$) returns, and
(d) the respective profits.

A variation in endowments allows us to compare the behavior under different endowments *within* a given age group and to keep the relative stakes sufficiently constant *across* different age groups, for instance by comparing 12-year-olds with €2 endowment to 16-year-olds with €5 endowment and to 22-year-old students with €8 endowment.

Our results do not show any sign of a relative endowment effect, regardless whether we compare transfers x, returns y, and relative returns $y/3x$ of different age groups at a given endowment level or with rising absolute endowment with age. For instance, we can apply a Jonckheere-test

Table A.1
Average transfers, returns, and profits for different endowments and age groups

Age group:	8 years	12 years	16 years	Students (avg. age 22)	Professionals (avg. age 32)	Retired persons (avg. age 68)
(a) Transfer x(N)—maximum: 10 for all treatments						
€2	2.00 (45)	3.91 (22)	5.72 (18)	6.55 (19)		
€5		3.44 (39)	5.31 (32)	6.57 (59)	6.58 (31)	5.38 (34)
€8				6.55 (32)		
Aggregated	*2.00 (45)*	*3.61 (61)*	*5.46 (50)*	*6.56 (110)*	*6.58 (31)*	*5.38 (34)*
(b) Return y						
€2	0.66	2.76	5.11	8.50		
€5		1.64	5.19	7.42	9.03	8.65
€8				5.52		
Aggregated	*0.66*	*2.04*	*5.16*	*7.05*	*9.03*	*8.65*
(c) Relative return y/3x						
€2	0.10	0.16	0.29	0.36		
€5		0.15	0.34	0.33	0.39	0.57
€8				0.25		
Aggregated	*0.10*	*0.15*	*0.32*	*0.31*	*0.39*	*0.57*
(d) Profits (trustor/trustee)						
€2	8.64/5.36	8.23/9.59	9.39/12.06	11.95/11.16		
€5		8.21/8.67	9.88/10.75	10.85/12.29	12.16/11.00	13.26/7.50
€8				8.97/14.13		
Aggregated	*8.64/5.36*	*8.22/9.00*	*9.70/11.22*	*10.49/12.63*	*12.16/11.00*	*13.26/7.50*

to check for a significant increase of transfers with age in three different ways: for transfers with €2-endowments ($p < 0.001$), transfer with €5-endowments ($p < 0.001$), and, finally, when we try to account for the effects of relative stakes and compare 12-year-olds with €2, 16-year-olds with €5, and students with €8 ($p < 0.01$).[16]

Of course, we could not gather data for all possible endowment combinations, but the results in Table A.1 provide solid evidence that our results are not driven by a relative endowment effect.

References

Alesina, A., La Ferrara, E., 2002. Who trusts others? J. Public Econ. 85, 207–234.

Bellemare, C., Kröger, S., 2006. On representative social capital. Europ. Econ. Rev. In press.

Berg, J., Dickhaut, J., McCabe, K., 1995. Trust, reciprocity, and social history. Games Econ. Behav. 10, 121–142.

Bewley, T.F., 1999. Why Wages Don't Fall During a Recession. Harvard Univ. Press.

Bohnet, I., Zeckhauser, R., 2004. Trust, risk and betrayal. J. Econ. Behav. Organ. 55, 467–484.

Bolle, F., 1998. Rewarding trust: An experimental study. Theory Dec. 45, 83–98.

Bolton, G.E., Ockenfels, A., 2000. ERC—A theory of equity, reciprocity and competition. Amer. Econ. Rev. 90, 166–193.

Boom, J., Brugman, D., van der Heijden, P.G.M., 2001. Hierarchical structure of moral stages assessed by a sorting task. Child Devel. 72, 535–548.

Buss, D.M., 1999. Evolutionary Psychology. The New Science of the Mind. Allyn & Bacon, Boston.

Camerer, C.F., 2003. Behavioral Game Theory. Experiments in Strategic Interaction. Princeton Univ. Press.

[16] Additional support with respect to controlling for relative stakes is provided by the fact that transfers of 8-year-olds with €2 as endowment are significantly smaller than those of 12-year-olds with €5 (Mann–Whitney U-test, $p < 0.05$).

Camerer, C.F., Hogarth, R.M., 1999. The effects of financial incentives in experiments: A review and capital–labor-production framework. J. Risk Uncertainty 19, 7–42.
Charness, G., Rabin, M., 2002. Understanding social preferences with simple tests. Quart. J. Econ. 117, 817–869.
Cox, J.C., 2004. How to identify trust and reciprocity. Games Econ. Behav. 46, 260–281.
Dufwenberg, M., Kirchsteiger, G., 2004. A theory of sequential reciprocity. Games Econ. Behav. 46, 268–298.
Durlauf, S.N., 2002. On the empirics of social capital. Econ. J. 112, F459–F479.
Eckel, C.C., Wilson, R.K., 2004. Is trust a risky decision? J. Econ. Behav. Organ. 55, 447–465.
Eisenberg, N., Fabes, R.A., 1998. Prosocial development. In: Damon, W. (Ed.), Handbook of Child Psychology. Wiley.
Eisenberg, N., Mussen, P., 1989. The Roots of Prosocial Behavior in Children. Cambridge Univ. Press.
Eisenberg, N., Boehnke, K., Schuhler, P., Silbereisen, R.K., 1985. The development of prosocial behavior and cognitions in German children. J. Cross Cult. Psychol. 16, 69–82.
Falk, A., Fischbacher, U., 2006. A theory of reciprocity. Games Econ. Behav. 54, 293–315.
Fehr, E., Falk, A., 1999. Wage rigidity in a competitive incomplete contract market. J. Polit. Economy 107, 106–134.
Fehr, E., List, J.A., 2004. The hidden costs and returns of incentives—Trust and trustworthiness among CEOs. J. Europ. Econ. Assoc. 2, 743–771.
Fehr, E., Schmidt, K., 1999. A Theory of fairness, competition, and cooperation. Quart. J. Econ. 114, 817–868.
Fehr, E., Kirchsteiger, G., Riedl, A., 1993. Does fairness prevent market clearing? An experimental investigation. Quart. J. Econ. 108, 437–460.
Fehr, E., Gächter, S., Kirchsteiger, G., 1997. Reciprocity as a contract enforcement device. Econometrica 65, 833–860.
Fehr, E., Fischbacher, U., von Rosenbladt, B., Schupp, J., Wagner, G.G., 2003. A nationwide laboratory. Examining trust and trustworthiness by integrating behavioral experiments into representative surveys. Working paper 141. Institute for Empirical Research in Economics. University of Zurich.
Gächter, S., Herrmann, B., Thöni, C., 2004. Trust, voluntary cooperation, and socio-economic background: Survey and experimental evidence. J. Econ. Behav. Organ. 55, 505–531.
Glaeser, E.L., Laibson, D., Scheinkman, J.A., Soutter, C.L., 2000. Measuring trust. Quart. J. Econ. 115, 811–846.
Glaeser, E.L., Laibson, D., Sacerdote, B., 2002. An economic approach to social capital. Econ. J. 112, F437–F458.
Harbaugh, W.T., Krause, K., 2000. Children's altruism in public good and dictator experiments. Econ. Inquiry 38, 95–109.
Harbaugh, W.T., Krause, K., Vesterlund, L., 2002. Risk attitudes of children and adults: Choices over small and large probability gains and losses. Exper. Econ. 5, 53–84.
Harbaugh, W.T., Krause, K., Liday, S.G. Jr., Vesterlund, L., 2003. Trust in children. In: Ostrom, E., Walker, J. (Eds.), Trust, Reciprocity and Gains from Association: Interdisciplinary Lessons from Experimental Research. Russell Sage Foundation, New York.
Holm, H., Nystedt, P., 2005. Intra-generational trust—A semi-experimental study of trust among different generations. J. Econ. Behav. Organ. 58, 403–419.
Kail, R.V., Cavanaugh, J.C., 2004. Human Development: A Life-Span View. Wadsworth Publishing.
Knack, S., Keefer, P., 1997. Does social capital have an economic payoff? Quart. J. Econ. 112, 1251–1273.
Kohlberg, L., 1969. Stage and sequence: The cognitive-developmental approach to socialization. In: Goslin, D.A. (Ed.), Handbook of Socialization Theory and Research. Rand McNally.
Krebs, D.L., van Hesteren, F., 1994. The development of altruism: Toward an integrative model. Devel. Rev. 14, 103–158.
Langford, P.E., 1997. Separating judicial from legislative reasoning. Child Devel. 68, 1105–1116.
Mayer, R.C., Davis, J.H., Schoorman, F.D., 1995. An integrative model of organizational trust. Acad. Manage. Rev. 20, 709–734.
McNeal, J.U., 1992. The littlest shoppers. Amer. Demographics 14 (2), 48–53.
Piaget, J., 1965. The Moral Judgment of the Child. Free Press (Original work published 1932).
Pillutla, M.M., Malhotra, D., Murnighan, J.K., 2003. Attributions of trust and the calculus of reciprocity. J. Exper. Soc. Psychol. 39, 448–455.
Rotenberg, K.J., 1995. The socialisation of trust: Parents' and children's interpersonal trust. Int. J. Behav. Devel. 18, 713–726.
Rousseau, D.M., Sitkin, S.B., Burt, R.S., Camerer, C.F., 1998. Not so different after all: A cross-discipline view of trust. Acad. Manage. Rev. 23, 393–404.
Youniss, J., 1980. Parents and Peers in Social Development. Univ. of Chicago Press.
Youniss, J., 1986. Development in reciprocity through friendship. In: Zahn-Waxler (Ed.), Altruism and Aggression: Biological and Social Origins. Cambridge Univ. Press.
Zak, P.J., Knack, S., 2001. Trust and growth. Econ. J. 111, 295–321.