On the nature of fair behavior and its development with age*

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Abstract

Economic decisions have been shown to depend on actual outcomes as well as perceived intentions. In this paper, we examine whether and how the relative importance of outcomes or intentions for economic decisions develops with age. We report the results of ultimatum games with children, teens and students. We find that children and teens react systematically to perceived intentions, like students do. However, children and teens reject unequal offers much more often than students, indicating that outcomes are relatively more important than intentions for younger subjects.

JEL classification: D63, C78, C91

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1 Introduction

The nature of fair behavior has come under close scrutiny by economists in the past few years, because there is considerable evidence by now that fairness considerations and the perception of fairness affect economic behavior in many economically important situations, like in bargaining, on labor markets with incomplete contracts or, more generally, in principal-agent relationships. Whereas the standard economic approach would judge the fairness of an action by the outcome (or utility) of it, recent papers have stressed the role of intentions for judging fairness and that the perceived intentions of interaction partners may be equally important as the actual outcomes of partners' actions. This point has been made forcefully by Falk et al. (2003) and Nelson (2002), who have shown that *identical* offers in an ultimatum game generate significantly *different* rejection rates, depending on the available alternative offers. In particular, a given offer with an unequal distribution is much more often rejected in case the proposer could have proposed a more equitable offer than if only even more unequal offers had been available.

In this paper, we do not want to investigate whether outcomes *or* intentions are important for economic decision making, but take it for granted that *both* are important and driving forces of economic behavior. Rather, we examine whether the dependence of economic decisions on intentions as well as outcomes develops, respectively changes, with age. For this purpose, we have run experiments with children (aged 7 to 10 years), young teens (11 to 15 years) and students.

Tracking the development of fair behavior during childhood until early adulthood serves in particular two purposes. First, it may promote a better understanding of the nature of fair behavior of adults, especially of the relative importance of outcomes versus intentions. This will be useful especially in behavioral economics for advancing the modeling of the influence

of both forces – outcomes, respectively intentions – on (adult) economic decision making.[1] Given that children and young teens are possibly less accustomed to strategic thinking and, therefore, to interpreting bargaining partner's intentions, they might place more weight on outcomes associated with another subject's actions rather than on the intentions ascribed to the other subject. Therefore, it might well be the case that the consequentialist practice in economics to define the utility of an action only in terms of its consequences is more appropriate for children and teens, but fails to account fully for the behavior of adults. Second, since the purchasing power of children and teens has increased considerably over the past few decades and since children are much more often involved in economic transactions or in bargaining processes within families, studying their behavior has also merits for its own, because children and teens constitute a non-negligible fraction of economic agents, which makes it useful to know more about their behavior.

Previous studies on the development of bargaining behavior with age have produced partly inconclusive results, so far. Murnighan and Saxon (1998) have found younger children to make larger offers in the role of proposer in an ultimatum game than older participants. Harbaugh et al. (2002) report the opposite, i.e. that younger children make smaller offers. Responder behavior, however, seems to be rather similar in both studies, with younger children accepting more often smaller offers. Though these studies shed some light on the development of bargaining behavior, they are unsuitable to address the development of the relative importance of intentions, respectively real outcomes, because responders in both experimental studies had to react to a single proposal only. There were no alternative proposals available which could have served as a signal of the proposer's intentions.[2]

[1] Whereas some models have concentrated on either outcomes or intentions (like the ones of Fehr and Schmidt, 1999, or Bolton and Ockenfels, 2000, which stressed the role of outcomes; or the ones of Rabin, 1993, or Dufwenberg and Kirchsteiger, 2003, on intentions), there are some recent papers modeling the interaction of outcomes and intentions in economic decision making (see Falk and Fischbacher, 1998; Charness and Rabin, 2002).

[2] There are several other papers on the influence of age on economic decision making (see, for instance, Harbaugh and Krause 2000; Harbaugh et al., 2003; Sutter and Kocher, 2003). However, none of them has addressed the issue of the relative importance of intentions and outcomes.

Using the experimental design of Falk et al. (2003), we let proposers choose from different offers in an ultimatum game and transmit this information to responders. This procedure allows us to examine the importance of intentions, respectively outcomes, for bargaining behavior. Our results show that in each age group (children, teens, students) rejection rates of a given proposal depend systematically on the available alternative offers and, hence, the perceived intentions of the proposer. However, children and teens reject unequal offers much more often than students, revealing that for younger subjects equal distributions, i.e. fair outcomes, are relatively more important than the perception of fair intentions.

The rest of the paper is organized as follows: Section 2 introduces the experimental design. Results are presented in section 3, and section 4 concludes.

2 Experimental design

Each participant in our experiment played four different mini-ultimatum games. The structure of these games is shown in Table 1. The proposer had to choose between alternatives *x* and *y*. It should be noted from Table 1 that alternative *x* is always identical, allocating 8 out of 10 points to the proposer and the remaining 2 points to the responder. Alternative *y* is different in the four games. In Game [10/0][3], for instance, alternative *y* allocates all 10 points to the proposer and zero to the responder. Employing the strategy method, the responder had to indicate for both offers, alternative *x* and alternative *y*, whether to accept or reject it.[4]

[3] In the following "[x/y]" denotes one of the four mini-ultimatum games where the offer (x/y) is the alternative to the offer (8/2).

[4] There is still no consensus in the experimental community whether the strategy method induces different behavior relative to a situation where the responder has to decide whether to accept a given, already known, offer. Brandts and Charness (2000) and Charness and Rabin (2002) report evidence that the strategy method does not induce different behavior. McCabe et al. (2000, 2003) suggest the opposite. Both Nelson (2002) and Falk et al. (2003), which are closest to our study, have used the strategy method. Nelson (2002) provides a broad

Acceptance (of the actually chosen alternative) led to a payoff distribution according to the proposer's offer. Rejection implied zero payoffs for both players in the respective game.

Table 1: The four mini-ultimatum games

	Alternative *x*	Alternative *y*
Label	(proposer / responder)	(proposer / responder)
Game [10/0]	8 / 2	10 / 0
Game [8/2]	8 / 2	8 / 2
Game [5/5]	8 / 2	5 / 5
Game [2/8]	8 / 2	2 / 8

The four games were played in random order and with different pairs of proposers and responders in each game. However a subject's role (as proposer or responder) was fixed for all four games. Each subject was informed about the outcome of all four games only after all decisions in all games had been made. This procedure was chosen to avoid income effects and the possibility that current decisions are influenced by an opponent's previous decisions.

We had three groups of participants: 54 *children* of age 7 to 10 years (average age 9.2 years), 78 young *teens* from 11 to 15 years (average 12.1 years), and 68 *students* from 19 to 33 years (average 24.6 years).[5] The group of children and teens was recruited during a summercamp for kids near Innsbruck. Students were recruited from the e-mail list of experimental participants at the University of Innsbruck. All experiments were run in July 2003. The exchange of points into Euro was 0.2€ per point for children and teens, respectively

discussion why the strategy method should have no impact on the results of ultimatum bargaining in our context. For a general review of the advantages and disadvantages of the strategy method see Roth (1995).

[5] Unfortunately, due to a misunderstanding among experimenters, the number of subjects in the role of proposer, respectively responder, is not equal in our groups of children and teens (but in the group of students). We have 28 proposers and 26 responders in the group of 7-10 year old children, and 35 proposers and 43 responders in the group of 11-15 year old teens. For determining payments of proposers (responders) who were not matched with a real responder (proposer), we randomly drew a matched responder (proposer) whose decisions were then used twice.

0.3€ per point for students. The experiment was run as a paper and pencil experiment, since there were no computers available at the summercamp. The duration of the experiment was about 30 minutes for students, and about 45 minutes for children and teens.

3 Predictions and experimental results

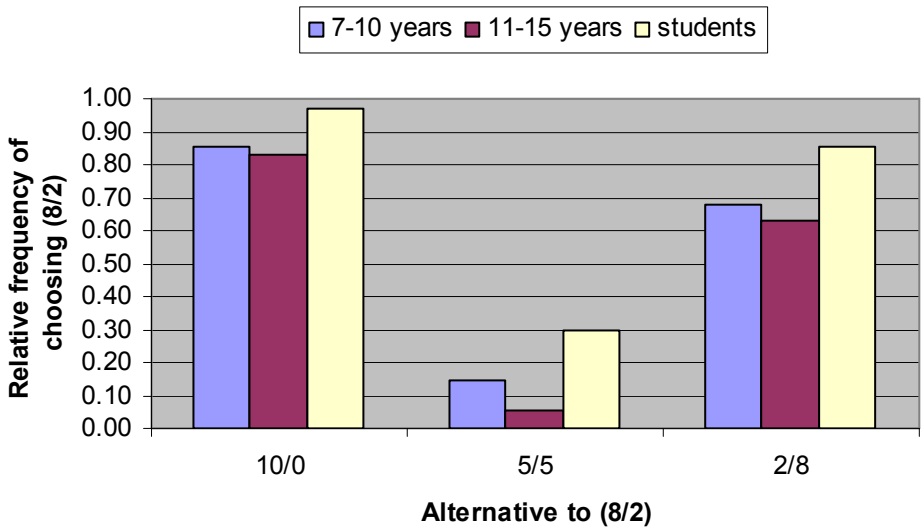
Even though alternative *x* of offering (8/2) is identical in all four mini-ultimatum games, rejection rates of alternative *x* might still be different because choosing alternative *x* conveys different signals and different attributions of intentional states to the proposer[6], depending on the available alternative *y*. Offering alternative *x* in Game [10/0] might be perceived by the responder as a friendly act, signaling good intentions, because the alternative *y*, i.e. offering (10/0), had been even worse for the responder. In fact, one should expect the lowest rejection rates of the offer *x* (8/2) in Game [10/0]. The highest rejection rates of offer (8/2) are to be expected in Game [5/5], because choosing alternative *x* in this game will almost surely be perceived as an unfriendly act, because the proposer has deliberately decided against proposing an equal distribution of (5/5), but has offered (8/2) instead. Offering (8/2) in Game [2/8] should yield lower rejection rates than in Game [5/5], because in Game [2/8] the proposer can only choose between two equally unequal distributions, one to his advantage (8/2), one to his disadvantage (2/8). Finally, rejection rates in Game [8/2] are likely to be lower than in Game [2/8], because the responder can infer no intentions of the proposer at all since the proposer had no choice, and higher than in Game [10/0], because choosing (8/2) in Game [10/0] is a rather friendly act, whereas it is rather neutral in the Game [8/2].[7]

[6] Such an attribution of intentional states to others is called *mentalizing* or *folk psychology* by cognitive scientists (Baron-Cohen, 1995).

[7] For a discussion concerning the predictions of different fairness models (like the ones of Bolton and Ockenfels, 2000; Dufwenberg and Kirchsteiger, 2003; Fehr and Schmidt, 1999 or Rabin, 1993) for behavior in the four mini-ultimatum games see section III of Falk et al. (2003).

Before turning to the main focus of our paper, i.e. responder behavior, we present the frequency of proposers offering alternative *x* (8/2) in the different games (see Figure 1).[8] In Game [10/0], offering (8/2) is most frequent, whereas in Game [5/5] it is least frequent. This holds for all three different age groups. Checking for differences in proposer behavior *across* age groups, we only find that teens (11-15 years) offer significantly less often (8/2) than students in Games [2/8] and [5/5], respectively ($p < 0.05$; χ^2-test). All other comparisons between different age groups (and a given game) yield insignificant differences, meaning that proposers of different age groups behave rather similarly in choosing an offer from two different alternatives. Checking for differences in the frequency of offering (8/2) across games *within* a given age group (using a McNemar change test), we find in all age groups that the frequency of offering (8/2) is significantly lower ($p < 0.05$) in Game [5/5] than in Games [10/0] or [2/8], but that there is no significant difference between Games [10/0] and [2/8].

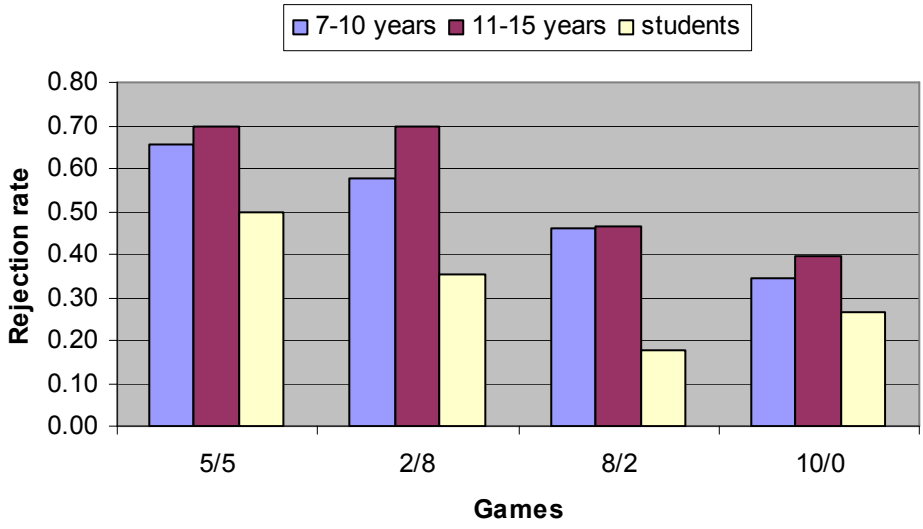
Figure 1. Frequency of offering (8/2) in different games



[8] Of course, in Game [8/2], all proposers must offer (8/2), because there is no alternative.

Responder behavior, i.e. rejection rates of the identical alternative x in our four different games, is displayed in Figure 2. Rejection rates of the offer (8/2) are highest in the Game [5/5], ranging from 50% with students to 70% with 11-15 year old teens. In our group of children and teens, rejection rates are lowest in the Game [10/0], where offering (8/2) can be perceived as a rather friendly action. Students have the lowest rejection rates in the Game [8/2], where the proposer obviously had no choice at all. It is noteworthy that even when the proposer had no choice at all, there are positive rejection rates (of 18% of students, respectively 46% and 47% of children and teens). This indicates the existence of pure aversion against inequitable outcomes, irrespective of the proposer's intentions.

Figure 2. Rejection rate of the (8/2)-offer across games



Applying a non-parametric Cochran Q-test confirms that the differences in rejection rates across games are highly significant in each single age group ($p < 0.01$). Given the fact that the rejection rates within any of the three age groups show a similar decline from left to right in

Figure 2, we can conclude that subjects of all age groups react systematically to their perception of proposer's intentions in the different games.[9]

However, we should stress that the offer (8/2) is in any game more often rejected in the younger age groups than in the age group of students. That implies that younger subjects care relatively more for the outcome of the game, meaning that they reject an unequal offer more often than students, irrespective of the available alternative. This claim is substantiated in particular in Games [8/2] and [2/8] where only unequal offers are available to the proposer. In these two games, rejection rates of both 7-10 year old children and 11-15 year old teens are significantly higher than rejection rates of students ($p < 0.05$, χ^2-test), showing that younger subjects have a stronger aversion against unequal outcomes.[10] Younger subjects reject even *favorable*, but unequal, offers more often than students. Children and teen responders reject the advantageous offer (2/8) in 23%, respectively 28%, of cases, which is significantly higher than the student rejection rate of 3% ($p < 0.05$).

In Game [5/5], 11-15 year old children have weakly significantly higher rejection rates of the offer (8/2) than students ($p < 0.1$). Only in Game [10/0], rejection rates of the (8/2)-offer are not significantly different between any of the three age groups. Likewise, rejection rates of the alternative offers in Games [10/0] or [5/5] are not significantly different between age groups, with rejection rates of offer (10/0) ranging between 91% (students) and 95% (teens). As regards the alternative offer of (5/5) in Game [5/5], there is a single (insignificant) rejection in the group of teens, but universal acceptance otherwise.

Based on actual responder behavior, we can show the *ex-post* expected payoffs from offering (8/2) or the alternative offer. Comparing Figures 3 and 4 reveals that in any age

[9] Looking at differences in rejection rates *within* a given age group we find the following (using a χ^2-test): Students reject the offer (8/2) more often in the Game [5/5] than in Games [8/2] or [10/0] ($p < 0.05$). Rejection rates in Game [2/8] are weakly significantly higher than in Game [8/2] ($p < 0.1$). 11-15 year old teens reject the offer (8/2) more often in Games [5/5] and [2/8] than in Games [8/2] or [10/0] ($p < 0.05$). 7-10 year old children reject the offer (8/2) more often in Games [5/5] and [2/8] than in Game [10/0] ($p < 0.1$).

[10] Comparing rejection rates of children and teens, we find no significant difference between these two age groups in any game.

group it is more profitable (in expected payoffs) for proposers to choose the offer (8/2) instead of the alternative offer in Games [10/0] and [2/8], but in Game [5/5] it is clearly more advantageous to offer (5/5) instead of (8/2). Note that these results are both compatible with a concern for payoff-maximization as well as for fairness. For instance, even if subjects cared *only* for fairness they would, of course, offer (5/5) in Game [5/5], but (8/2) in Game [10/0].

Figure 3. Expected payoffs of the (8/2)-offer

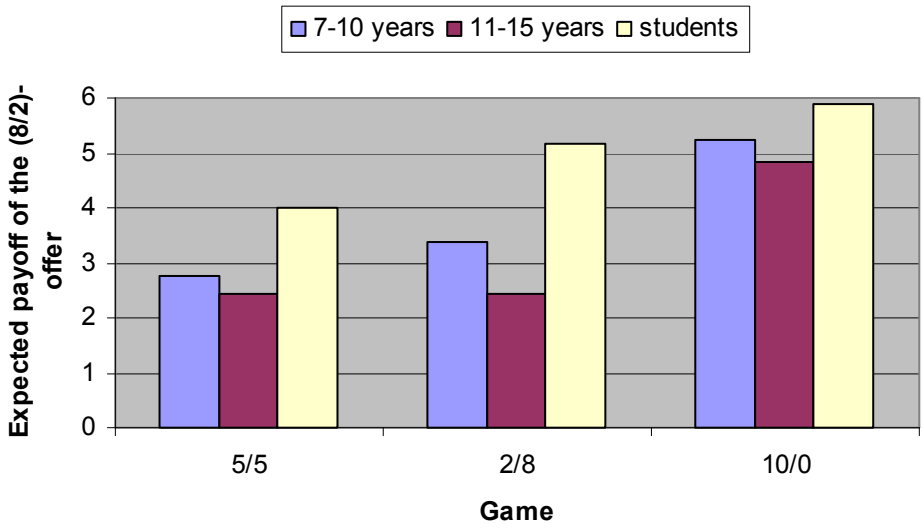
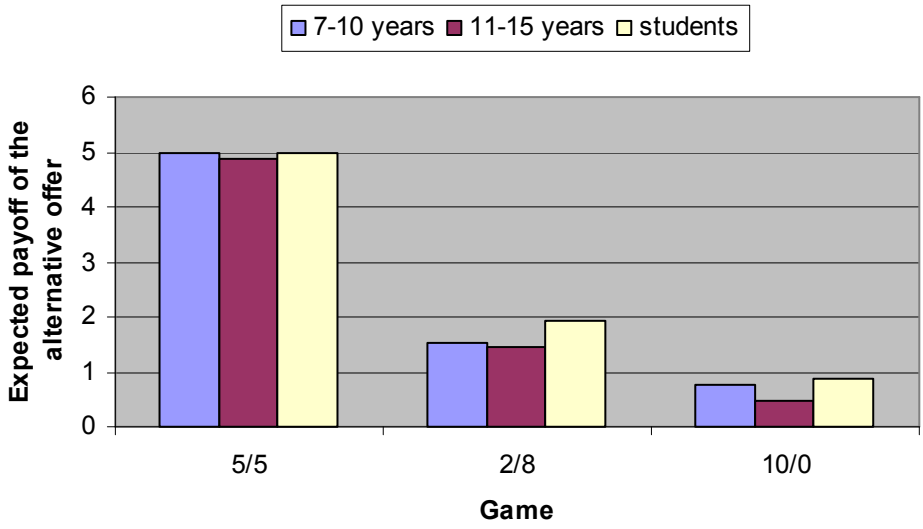


Figure 4. Expected payoffs of the alternative offers



4 Conclusion

Both intentions and outcomes play a role in economic decision making. Thus, the nature of fair behavior can only adequately be captured if both driving forces of behavior are taken into account. Our paper has shown that already young children and teens, aged 7 to 15 years, are influenced in their decisions both by the intentions ascribed to the proposer in an ultimatum game and by the actually proposed offer, i.e. the possible outcome of the game. Our findings imply that the qualitative results of Nelson (2002) or Falk et al. (2003) apply for a wider age range than just for the limited pool of students.[11] Hence, models of economic behavior which include both intentions and outcomes can reasonably be expected to be a good predictor of economic bargaining behavior, both for younger subjects as well as adults.

More specifically, we have found for any of our three age groups (children, teens and students) that rejection rates of a given offer depend systematically on the available alternative offers and, hence, the perceived intentions of the proposer. Besides intentions, outcomes play a role as well. Rejections of unequal offers – even if the proposer had no other alternative – show that there is a considerable fraction of subjects with pure inequality aversion. This fraction of subjects is significantly larger in the pool of our young subjects (children and teens) than in the pool of students. Children and teens reject unequal offers much more often than students, revealing that for younger subjects equal distributions, i.e. fair outcomes, are relatively more important than the perception of fair intentions. Hence, we may conclude that the nature of fair behavior becomes more sophisticated with older age, such that

[11] Burnham et al. (2002) have also shown that intentions play a role in extensive form trust games. Rather than manipulating the available alternatives – as we did – they manipulated the framing of the trust game by denoting the counterpart either "partner" or "opponent". Indeed, the "partner"-treatment elicits much more trust and reciprocity, probably because intentions of "partners" are perceived to be more friendly than those of "opponents". Similar to our approach, McCabe et al. (2003) have manipulated the outside options of the first mover in a trust game, showing that trust and trustworthiness are higher when the first mover has positive opportunity costs of being cooperative (in which case a cooperative move signals good intentions) than when opportunity costs are zero (implying that the second mover cannot infer the "quality" of the first mover's intentions).

intentions become relatively more prominent – compared to actual outcomes – in shaping our economic decisions.

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