Bargaining Outside the Lab –
A Newspaper Experiment of a Three-Person Ultimatum Game*

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Abstract

In November 2001, 5,558 readers of the German weekly *Die Zeit* participated in a three-person ultimatum experiment involving a proposer X, a responder Y, and a dummy Z (Güth and van Damme, 1998). A proposal is a vector (x, y, z) with $x + y + z =$ DM 1,200, and $x \in \{0, 200, 400, 600, 800, 1000\}$, and $y, z \in \{100, 200, 300, 400, 500, 600\}$. Newspaper readers could participate via Internet, mail, or fax and had to decide in the role of X on the proposal and to indicate acceptance or rejection of any of the 18 different proposals in the role of Y. Response behavior is not always monotonic in the responder's share, suggesting that a substantial share of participants is intrinsically interested in a fair allocation. Participants using the Internet are more opportunistic than those using mail or fax, whereas older participants and women care more about fairness. Students behave similar to nonstudents of the same age group suggesting at least age group-specific external validity of experimental results relying on student participants.

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I. Introduction

A newspaper experiment on a three-person ultimatum game (Güth and van Damme, 1998) is presented, which attracted 5,558 readers of the German weekly *Die Zeit* in November 2001. In this experiment, X proposes how to distribute a pie of DM 1,200 (about € 600) among him- or herself, a responder (Y), and a dummy player (Z). If the responder accepts this proposal, then all three players receive their corresponding share, otherwise, in case of rejection, all receive zero.

In recent years, newspaper experiments have become more popular because they offer the chance to address a large audience from the general public, thereby avoiding the selection bias of typical student experiments.[i] Hence newspaper experiments provide an opportunity to explore external validity, i.e., to test 'parallelism' between the lab and the field. So far, this methodological concern has been one of the main motivations for newspaper experiments, in particular in a series of newspaper experiments on the guessing game, where Bosch-Domenech et al. (2000) have found very similar patterns when comparing lab and newspaper data.

However, besides parallelism between the lab and the field, two important opportunities of newspaper experiments have been missed so far. First, by attracting a much broader and more heterogeneous audience than is possible in the lab, newspaper experiments allow to study the influence of a subject's age on decision making. Typically, participants in lab experiments are students aged 20 to 25, whereas participants in newspaper experiments include almost always the full age range from teenagers to retirees. Hence experimental results based on student populations might fail to reflect the behavior of older generations, such as their concern for fairness. Some papers have addressed the question whether children make different decisions than adults. Murnighan and Saxon (1998) report ultimatum bargaining of 3rd graders and 6th graders in kindergarten, finding that 3rd graders offer less (33%) than 6th graders (48%) in the role of proposer and that 6th graders offer about the same as adults. Harbaugh and Krause (2000) find children's altruism in public good or dictator experiments to resemble the altruism of adults. In a subsequent paper, Harbaugh et al. (2001) find only small differences in rational choice behavior between children and adults. However, the benchmark 'adults' are typically students in their early 20ies, implying that they are representative of all adults. Yet we are not aware of studies in experimental economics addressing the question whether students differ in their behavior from older (and nonstudent) adults.[ii] This is somehow surprising given the fact

that the older generations dispose of the vast majority of assets in society.[iii] Since the results of relatively simple bargaining experiments with student participants started a lively debate and inspired various ideas how to explain human behavior observed in these experiments[iv], it seems appropriate to extend the experimental studies on student bargaining behavior to a much larger audience where we can control for possible age effects.

Second, newspaper experiments (like ours) are typically run by allowing submissions via regular mail, fax, or Internet and can thus illuminate the effects of different media on economic decision making. The rapidly increasing share of electronic business transactions (see Lucking-Reiley and Spulber, 2001; Lucking-Reiley, 2000; Roth and Ockenfels, 2001) makes it in our view important to consider the possible effects of different transaction media on economic decisions and bargaining. Shavit et al. (2001) have examined whether students evaluate lotteries differently when making their decisions with paper and pen in the classroom or computerize them via the Internet. Their results indicate that subjects' risk aversion might be lower in the Internet. Our newspaper experiment offers an opportunity to examine how bargaining behavior is affected by the medium.

In our earlier newspaper experiment of a two-person ultimatum game (Güth et al., 2002) with 1,035 readers of a daily newspaper, the *Berliner Zeitung*, we found that the medium by which participants submit their decisions is an important signal: Internet users appear more greedy and opportunistic than participants relying on letter or fax. We had, however, no data on age or education level of our participants. Therefore, the effects of different media might simply reflect an average age or education discrepancy. Our new experiment is designed to disentangle such confounding effects.

One of the most surprising results of Güth et al. (2002) is that acceptance of *all* possible offers (in nine discrete steps from DM 100 to DM 900) is the modal response behavior, and that 34.9% of participants are willing to accept the lowest possible offer of DM 100 which amounts to 10% of the disposable pie of DM 1,000. Acceptance rates of the smallest possible offer are typically smaller by far in lab experiments (see Slonim and Roth, 1998). Interestingly, about 10% of participants rely on non-monotonic response strategies meaning they accept all offers above a certain minimum, larger than the smallest possible offer, and *reject* all offers above a certain maximum, at or below the largest possible offer. Non-monotonic strategies can be detected when the strategy (vector) method is used, and they seem to play more than a marginal role in bargaining.

Besides reexamining the frequency of non-monotonic strategies in ultimatum bargaining, the three-person ultimatum game (Güth and van Damme, 1998) allows to address how strategic power, equity concerns, and altruism interact in shaping reward allocation. It combines the characteristics of two-person ultimatum games and two-person dictator games.[v]. According to standard economic reasoning, if all players are opportunistic, in the sense of maximizing their own monetary payoff, the solution for X is to offer the lowest, positive amount to Y and Z, and for Y to accept all (positive) offers. Hence both, responder Y and dummy player Z, should end up with the smallest possible amount. More specifically, three-person ultimatum experiments may help to answer the following questions: a) Do the powerful players (X and Y) form a coalition which exploits the dummy (Z)? b) Do proposers (X) fear that responders (Y) care for the dummy (Z) and, if so, how do they anticipate such concerns? c) Are responders (partly) motivated by altruism, such that they are more likely to accept a given offer *y* when the dummy (Z) receives more?

The first laboratory experiment (Güth and van Damme, 1998) employed undergraduate students from the University of Tilburg who could share 120 points (about $6.80 at that time). Under the full information treatment[vi], responders care very little for the dummy and base their decision on whether to accept or reject a proposal mainly on their own share *y*. Anticipating this, proposers offer on average slightly more than one third of the pie to the responder and keep most of the rest for themselves. The overall conclusion is that proposers do not have a strong intrinsic motivation for fairness. Since proposers take into account response behavior, they abstain from proposing the game theoretic solution and instead offer the responder what *seems* to be a fair share, namely, about one third of the pie.

In order to be manageable as a newspaper experiment, our design of the three-person ultimatum game differs in two important aspects from the one of Güth and van Damme (1998):

1. Rather than having the game played sequentially, the strategy vector method (every participant has to decide both in the role of X and Y) is employed, and expectations about the modal strategy vector are elicited.

2. A coarser grid and further restrictions for the possible proposals (*x,y,z*) limit the number of choices required by the strategy vector method.

Compared to our former newspaper experiment on two-person ultimatum bargaining (Güth et al., 2002), the main differences are the more complex game structure due to the

additional player (Z), a control group of student subjects, and data on gender as well as (voluntarily) on age and profession.

In the following section 2 the experimental design is described in more detail and general media data on readers of *Die Zeit* is presented. Section 3 reports data on participation, and section 4 presents the main results. In section 5 we discuss the issue of parallelism between student and nonstudent participants. Section 6 concludes.

II. Experimental design

Die Zeit is probably Germany's most prestigious weekly magazine. According to the independent media analyst *Arbeitsgemeinschaft Media-Analyse* (see www.zeit.de), there are about 1.02 million readers per issue (with about 440,000 copies sold), of which 59% are male. 37% of *Die Zeit* readers are below the age of 40 and 64% of readers are graduates of a secondary school or have a university degree.

The instructions for the experiment were proposed by the authors, and the responsible journalist, Christoph Drösser, did the final editing (see App. A for a translated version of the instructions published in *Die Zeit* on November 1, 2001). The instructions introduce (i) the pie of DM 1,200, (ii) the three players X, Y, and Z (framed as brothers),[vii] and (iii) the rules, namely, that X proposes a vector (x, y, z) with $x + y + z = 1{,}200$, and $x \in \{0,200,400,600,800, 1000\}$ and $y, z \in \{100,200,300,400,500,600\}$.

According to these requirements there are 18 possible proposals (x, y, z) of which a subject in the role of X has to select one (see App. B for the decision form). In the role of Y, a subject has to determine for all 18 possible proposals (x, y, z) whether to accept or reject any of them (strategy method for Y). Acceptance means that a subject in the role of X earns the amount x, and Y and Z the amounts y and z, respectively. In case of a rejection all three parties earn nothing.

The instructions inform participants that 18 of them will be randomly selected for actual payments according to the rules by partitioning them into 6 teams of three players each and by randomly assigning the roles X, Y, and Z in each team.[viii] In addition, participants had to fill out the prediction form (see App. B) asking them about their expectations regarding the most frequently selected proposal and the most frequent behavior (accept or reject) for all 18

proposals. Of those who successfully predicted the most frequent strategy vector seven randomly selected participants[ix] could win a prediction prize of DM 400.

The obvious advantage of the strategy method[x] is to deliver more complete decision data, while the disadvantage is that the timing of decisions is not reflected. This may have some important psychological effects which we would like to address briefly. When having to react to all possible contingencies in a game instead of reacting only to prior moves, a subject may be induced to think more carefully, e.g. by considering also the concerns of other players. For instance, when deciding which proposal to choose in the role of X, a subject might consider how player Y will feel and react when facing a meager offer *y* or an ill-treatment of Z. Emotion theory (Frijda, 1986, Loewenstein, 2000, Bosman and van Winden, 2002) refers to a 'cold' state of decision making when emotions have to be anticipated and thus play only a minor role. In a 'hot' state, i.e., when a player in the role of Y knows which proposal has actually been selected by X, emotions are actually experienced and should therefore play a more important role, e.g. by overriding opportunistic (payoff-maximizing) deliberations. Irrespective of these pros and cons the strategy method is, in all important respects, the only straightforward way to run a newspaper experiment.

III. General data on participation

Participation was possible either by cutting out the form from the newspaper, filling it out, and mailing or faxing it, or by using a computerized fill-out form that was available on the Internet site of *Die Zeit*[xi]. Table 1 reports the frequency of participation by media type and subjects pool. In total, 5,558 subjects participated in our experiment of which 1,681 (30.2%) used mail and 490 (8.8%) fax, whereas 2,961 (53.3%) participated via the Internet. The remaining 426 (7.7%) submissions were filled out in classroom situations either in high schools or at a university. The classroom experiments were done on the initiative of the respective instructors without former contacts to the authors, and the data of all participants were submitted collectively by the instructors.[xii] One classroom session was performed with business students during a microeconomics lecture at the University of Frankfurt/Main with altogether 255 participants[xiii], the other classroom data were obtained from 10 school classes from various parts of Germany.

Table 1 about here

We were aware that filling out a paper and pen form can lead to incomplete answers in spite of all our hints that we require completely filled-out decision and prediction forms. A submission was classified as valid when subjects had given their full address and indicated the chosen proposal (as well as the most frequently expected proposal) in the role of X, whether they accepted or rejected any of the 18 different proposals in the role of Y and the corresponding expectations. On a voluntary basis, participants were asked to state their age and their profession.

Compared to Güth et al. (2002), who report a share of 21.8% incomplete mail submissions, our relatively low share (3.4%) of invalid mail submissions might be attributed to the improved instructions for the newspaper form. The many invalid faxes (40.8%) were due to the partly colored decision form.[xiv] Some participants in the classroom experiments did not give their name and address and were therefore disregarded. On the Internet incomplete submissions could be avoided by not allowing confirmation (and transmission of the data) until all necessary fields had been filled out. The seven (0.2%) invalid submissions were due to nonsensical addresses.

In addition to the huge number of submissions, we received about 100 comments, some of them five pages long, from participants debating our design and its advantages and disadvantages, conjecturing about , or simply asking for, our research interests and intentions. Some participants contacted us offering help for continuing our research, e.g. for cross-country comparisons. The frequency and diligence of the comments shows that many participants actually invested quite some time thinking about the experiment.

Table 2 provides some information about the characteristics of our participants, namely, their age distribution and gender, and how this interacts with the medium by which they participated. In total, 4,066 participants with valid submissions (79%) indicated their age. The youngest participant was 8 years old, and the oldest 96. The overall average age was 39.5 years, with 56% of participants being younger than the overall average.[xv] Internet participants of an average age of 36.6 years were significantly younger than participants using either mail or fax, averaging 46.6 and 48.2 years, respectively ($p < 0.001$, t-test). Not surprisingly,

participants in the classroom experiments (students and pupils) were on average the youngest participants.

Table 2 about here

The gender of the participants was identified by the first name in 4,982 cases, altogether 95.6% of the valid submissions. Overall, slightly more than two thirds of participants were male. This is about 8% above the share of male *Die Zeit* readers. With regards to the media, relatively more male participants used the Internet than mail and fax combined ($\chi^2 = 25.5$; $p < 0.001$). Only in the pupil category females were more frequent than males, yet for this group participation was not based on self-selection but on an initiative of the respective instructor.

With respect to profession, 3,364 of the personal submissions revealed their profession and/or their education. Therefore, we divided the active working population into Academics (jobs that regularly require academic education, 1,548 submissions) and Nonacademics (735).[xvi] In addition, 626 submissions were from students, 195 from pupils, and 258 from retirees.

IV. Results

Our large data set is, first, analyzed on the aggregate level, including all 5,211 valid submissions where we distinguish between proposals and response behavior. Second, we examine the determinants of behavior by controlling for participants' characteristics with respect to chosen medium, age, and gender. Third, we address the issue of parallelism by comparing student behavior with that of nonstudent participants.

IV.A. Aggregate data analysis

IV.A.1. Proposer behavior

Table 3 summarizes the actual and expected decisions in the role of proposer and responder, respectively. In the role of the proposer, 2,857 out of 5,211 participants (54.9%)

choose the *equal split* (400,400,400). The second most frequent proposal made by 16.8% of participants is (600,500,100). We refer to this proposal as the *power coalition* since the players with strategic power (X and Y) share (more or less equally) the pie by exploiting the dummy. The *game theoretic benchmark* (1000,100,100) is the third most frequent choice made by 9.1% of participants. In total, the three most frequent proposals account for 80.8% of all proposals.

Table 3 about here

With regards to expectations, 61.3% of the participants expect their own proposal to be the most frequent one. The majority of participants expect the equal split (62.5%) to be most frequent, whereas the power coalition is expected as the most frequent by 14% of the participants. Only 5.7% expect the game theoretic benchmark as the most frequent choice, which is less than two thirds of its *actual* proportion. In fact, about one third of the subjects proposing the game theoretic benchmark expect that most participants will choose the equal split.

Averaging over all decisions for the role of X, Table 4 reports the average shares allocated to X, Y, and Z, both for actual decisions as well as for those expected to be most frequent. The average proposer keeps 43% of the pie (DM 516) for him- or herself, allocates almost exactly one third to the responder and only about 24% to the dummy. The expected allocation is closer to the equal split, with the dummy basically gaining what the proposer loses.

Table 4 about here

IV.A.2. Responder behavior

As responders 96.7% of the subjects are willing to accept the equal split. All other proposals are accepted less often. The second most frequent proposal, the power coalition (600,500,100), is accepted by about two thirds of all participants only. The three offers assigning to Y only DM 100, including the game theoretic benchmark, have the lowest

acceptance rates of 23%. Checking for consistency of a given subject in the roles of X and Y, we find that 97.6% of subjects accept as Y their own proposal.

A general pattern of behavior in the role of Y is that all proposals with $y \geq 400$ are at least accepted by a simple majority of subjects, whereas proposals with $y < 400$ are rejected in the majority of cases. This indicates that acceptance rates are mainly related to the share y allocated to the responder. For a given share y, acceptance rates are in most cases also higher with a higher share z for the dummy. Figure 1 visualizes the relation between acceptance rates and the share y and z. In section 4.2 more detailed econometric evidence of how acceptance rates depend on the proposed shares x, y, and z will be provided.

Figure 1 about here

In view of the actual response behavior, the proposal maximizing expected payoff (of X) is the power coalition (600,500,100), yielding an expected payoff of DM 389.40. The equal split yields only marginally less (DM 386.80), but involves a considerably lower risk due to 97% of subjects accepting it. The game theoretic benchmark (1000,100,100) yields an expected payoff of only DM 224.91 for the proposer. Thus, it seems justified to conclude that even somebody who is not intrinsically concerned about the well-being of others is well advised to question the game theoretic recommendation based on commonly known opportunism.

Maximizing payoffs requires the acceptance of all proposals, which is done by 1,122 participants (21.5%). 447 of them choose the game theoretic benchmark[xvii] in the role of X, whereas 402 participants choose the equal split, and 126 the power coalition. The second most frequent pattern of responder behavior, with a total of 734 participants (14.1%), is to accept half of the proposals. 601 of these participants accept all proposals with $y \geq 400$. Only three choose the game theoretic benchmark in the role of X, whereas 348 choose the equal split, and 238 the power coalition. The third most frequent pattern is accepting only a single proposal. Of 531 participants (10.2%) accepting only a single proposal, 484 accept only the equal split. In the role of X, 483 participants propose the equal split, only 13 choose the power coalition, and two the game theoretic benchmark.

These figures reveal a strong dependency between a participant's decision in the role of X and his or her decisions in the role of Y. Generally, those who are more 'rational' in the sense of proposing the game theoretic benchmark in the role of X are also more 'rational' in the role of Y by accepting almost always all 18 proposals. Those caring for a fair distribution by proposing the equal split in the role of X are typically also more selective when deciding which proposals to accept. Of 2,857 participants proposing the equal split, 17% accept only a single proposal, and 70% accept nine or fewer proposals.

Responder behavior can also be examined for its monotonicity with respect to payoffs. In a simple two-person ultimatum game, monotonicity of responder behavior simply means accepting all offers at or above a certain minimum acceptance level *min* [xviii] In the three-person ultimatum game, there are various ways to define responder monotonicity, for instance by requiring that Y accepts, first, only offers with $y \geq min$, or, second, only those offers with $y + z \geq min$. The latter describes a person who cares primarily for the share of Y and Z together and is less concerned how this sum is shared by the responder and the dummy. The third possibility of accepting only those offers with $x + y \geq min$ is also monotonic. Here the crucial concern of Y is to limit charity, i.e., what goes to the dummy.

Table 5 about here

Table 5 reports the frequency of monotonic strategies, as defined in any of the three ways introduced above. The 1,122 subjects (21.5% of participants) who accept all possible offers can be subsumed under any of the three definitions of monotonicity. In the left part of Table 5 we report monotonicity with respect to the responder only. Except for those accepting all offers, there are 977 subjects (18.7%) who condition their decision as Y solely on the share y. The second and third definitions of monotonicity (in the middle and right part of Table 5) are much less supported: 104 subjects (2.0%) condition on the sum $y+z$ and none on the sum $x+y$. Altogether we can classify a total of 2,203 subjects as monotonic in response strategies according to one of the three definitions. The other 3,008 participants (57.7%) behave non-monotonically in the role of Y.

So far, we have defined monotonicity in terms of payoffs or sums of payoffs. One might define monotonicity also by maximally acceptable payoff differences. In this respect

responder behavior is defined as monotonic if Y accepts either all offers or only those offers with $max\{|x - y|, |y - z|\} \leq c$ where $c \in \{0, 900\}$. Again, all 1,122 subjects who accept all proposals satisfy this definition of monotonicity with $c = 900$. According to Table 6, 484 participants accept the equal split only so that $c = 0$. Between both extremes ($0 < c < 900$), there are only 33 subjects who make their decision as responders strictly contingent on the maximum difference between any two shares *x, y,* or *z*.

Table 6 about here

IV.B. Determinants of behavior

In the following, the determinants of behavior are explored in more detail by studying how behavior depends on age and gender of a participant as well as the medium chosen for submission. We distinguish between Internet submissions and submissions by mail or fax.[xix] Of our four age categories the first consists of all participants under 26, therefore including pupils and most students (who participated on their own initiative). The second age group (26 to 45 years) captures the first half of professional life, and the third (46 to 65 years) its second half. The fourth age group (over 65 years) essentially represents retirement.

First of all, a general aspect of proposer behavior is explored. In view of the obvious power hierarchy – in the sense that X is stronger than Y, and Y is stronger than Z – one might expect proposals which satisfy $x > y > z$. Table 7 presents the frequency of obeying the power hierarchy for certain subclasses as well as for the whole data. Overall, 26.3% of all proposals obey the strict power hierarchy. It turns out that the frequency of participants expecting the most frequent proposal to obey the power hierarchy is significantly smaller (with 22.7% of participants). A comparison of actual and expected proposals supports the evidence from Table 3 that, on average, participants expect most others to be slightly more equity oriented in the role of X than they are themselves.

Table 7 about here

The separate data for media, classroom, gender, and age groups in Table 7 basically confirm for each subgroup that the frequency of actual proposals obeying the power hierarchy is larger than the frequency of expected proposals with $x > y > z$. Note that the frequency of actual proposals with $x > y > z$ is significantly larger in the Internet than in mail/fax ($p < 0.01$, χ^2-test), larger in the student classroom group than with high school pupils ($p < 0.1$), larger in the male than in the female population ($p < 0.01$), and larger the younger the subject pool ($p < 0.01$, ANOVA). Such results are based on a rather coarse classification of data which does not yet account for the interaction of medium, age, or gender.

Table 8 reports average data for decisions in the role of X and Y, respectively, for a given age group separated by medium and gender.[xx] For the sake of clarity, only the three most frequent proposals are examined: the equal split (400,400,400), the power coalition (600,500,100), and the game theoretic benchmark (1000,100,100). In the left part of the Table the frequency of choosing any of the three proposals is presented. Frequencies need not add up to 100% since 15 other proposals are not considered. Still, the three selected proposals cover at least 74% of choices in each subgroup. The right part of the Table reports the acceptance rates for the three proposals. The bottom row in each of the sections a. to d. in Table 8 states the number of observations in a subgroup. For instance, the age group (26 – 45) has 873 male participants using the Internet, and 354 male participants using mail/fax.

Table 8 about here

The frequency of proposing the equal split increases usually with age for any subgroup[xxi], whereas the frequency of choosing the power coalition or the game theoretic benchmark on average declines with age, even though the relationship is less regular than for the equal split. For a given medium female participants always choose the equal split more often than male participants. A star (*) indicates that the distribution of X-proposals is significantly different between both sexes, given a certain medium and age group. Altogether women care more for equity than men. Male participants, on the contrary, are more likely to propose the power coalition or the game theoretic benchmark.

Regarding media of submission, the equal split is almost always more likely in mail/fax than in Internet submissions[xxii], whereas the reverse holds for the game theoretic benchmark.

Although the distribution of proposals for a given age group and gender does not significantly differ between Internet and mail/fax (except for men aged 26 to 45), the results confirm the conclusion of 'fairness in the mail and opportunism in the Internet' (Güth et al., 2002), which can be further refined to 'fairness in the mail submissions of older females and opportunism in the Internet submissions of younger males'.

Opportunism in the Internet can also be detected in the acceptance rates of responders. Irrespective of gender, acceptance rates for the power coalition and theoretic benchmark are always higher in the Internet than in mail/fax, with many of the differences being significant (indicated by $^{\#}$). Acceptance rates of the equal split are always highest and show only few significant differences between media and sexes. When comparing acceptance rates between sexes for a given age group and medium, a slightly more complicated picture emerges: in the age groups 26 to 45 and 46 to 65, respectively, men as a rule (and in most cases significantly, see $^{+}$) more often accept the power coalition and the theoretic benchmark. In the age groups under 26 and over 65, this is mostly reversed, but with only one of the gender effects being significant.

To further explore the determinants of accepting or rejecting a given proposal we run a probit regression, including demographic data on age (in years), gender (1 for male) and medium (1 for Internet) and four additional structural variables measuring deviations from the equal split (see Table 9). By distinguishing deviations from the equal split in the direction of a lower share *and* in the direction of a higher share for a given player, we can account for the possibility of non-monotonic strategies (see the discussion of Tables 5 and 6 above). Significantly negative signs of all four structural variables can reveal whether acceptance rates are non-monotonic in y and z, with a peak at the equal split. However, if acceptance rates depended monotonically on the responder's share y, then the sign of $max\{0, 400 - y\}$ should be negative and that of $max\{0, y - 400\}$ positive.

Table 9 about here

The dependent variable takes on the value 1 when a proposal is accepted and zero if it is not. Since individual acceptance decisions for all 18 proposals are likely to be correlated, an error components econometric model with the individual as the random component is used.[xxiii] Table 9 reports the results for personal submissions. Confirming our discussion of Table 8, we

find that the probability to accept a given proposal declines with age, and is lower for women than for men and for submissions via mail/fax than for those via the Internet.

Furthermore, acceptance rates are monotonic in the share y, as indicated by the negative coefficient for $max\{0, 400 - y\}$ and the positive one for $max\{0, y - 400\}$. Yet the smaller absolute size of the positive coefficient compared to that of the negative one reveals a kink at the equal split. The probability to accept is non-monotonic for the dummy's share z, as can be judged from the negative signs of both, $max\{0, 400 - z\}$ and $max\{0, z - 400\}$. Hence for a given y, the probability to accept a given proposal is higher the closer z is to the equal split.[xxiv]

Summarizing we can say that – controlling for other variables - the chosen medium has a significant impact on behavior. Internet users appear more opportunistic in the sense of being guided more by their own earnings than participants using mail/fax. Furthermore, older participants and women care more about fairness in their proposals and are also more likely to reject an unfair offer.

V. Parallelism

Parallelism, or the external validity of decisions made by students, can be investigated, first, by comparing the submissions from classroom experiments with personal submissions. Second, we may distinguish professional groups, e.g. by comparing 'students' with other professions.[xxv]

Of course, we did not control under which conditions the experiments were run in the classroom. Partly, we contacted the lecturers in order to obtain more information. The experiment with the student group in Frankfurt, for instance, was run at the end of a lecture on game theory and was used to illustrate game theory.[xxvi] The other 10 classroom experiments were run in rather small classes with 10 to 25 pupils. In about half of the cases, teachers used the experiment as a warm-up for discussing problems of social life like fairness in bargaining or income distribution.

Table 10 reports the main data on decision making for both types of classroom situations (students at the University of Frankfurt/Main and pupils) and for personal submissions, respectively. Regarding the latter, we report both the overall data and the data of personal

submissions by participants under 26 who are closest in age to classroom participants (see Table 2 for the average age of students and pupils).

Table 10 about here

The students of the University of Frankfurt/Main reveal a strikingly different behavior from that diagnosed so far, which in our view reflects the conditions under which the experiment was run. Only 10.4% propose the equal split, less than one fifth of the frequency in personal submissions (56.8%); a further 35.2% of students propose the game theoretic benchmark, about four times the fraction in personal submissions (8.3%). Even when comparing the distribution of student proposals with those by personal submissions "under 26", Frankfurt students are much more opportunistic: on average, they allocate DM 714 (59.5% of the pie) to themselves in the role of X and only DM 153 (12.8%) to the dummy player Z. In the role of the responder Y Frankfurt students show significantly higher acceptance rates for the game theoretic benchmark and the power coalition than personal submissions (χ^2-test, $df = 1$; $p < 0.01$ for any comparison). For the Frankfurt students the power coalition would have been the payoff maximizing proposal yielding an expected profit of DM 553.

The behavior of pupils is more similar to that of personal submissions. The frequency of proposing the equal split lies between the frequency in the subgroup of personal submissions "under 26" and the one for all personal submissions. There is, however, a marked difference with respect to the frequency of proposing the power coalition, which is chosen more often than in personal submissions, or the game theoretic benchmark, which is very rare (1.3%) for pupils.[xxvii] On average, pupils as X-players demand DM 473 (39.4%), which is only 8.8% more than what they grant to the Y-player. Thus, pupils do not seem to care (more) for the dummy (than personal submissions). Acceptance rates of pupils in the role of Y are similar to those in personal submissions, with the exception of the very low acceptance rate for the game theoretic benchmark (7.3%). To summarize, pupils' behavior seems close to that of personal submissions, the only exception being the strong rejection of the game theoretic benchmark.

Since we doubt that the behavior of the Frankfurt students is representative of students in general and since we asked participants on a voluntary basis to state their profession, let us

compare personal submissions from those who claim to be students with those stating another profession.[xxviii] In Table 11, aggregate data for students[xxix] and nonstudents is reported, also for nonstudents aged 19 to 30. The latter subset matches rather closely the age structure of the student submissions (see section c. of Table 11). In total, we have 632 student submissions. The distribution for the three prominent proposals in the role of X shows no significant difference between students and nonstudents aged 19 to 30 ($\chi^2 = 1.58$; $df = 2$; $p > 0.2$); moreover, average amounts allocated to X, Y, and Z are almost identical for both groups. Neither do the frequencies of accepting the three proposals differ significantly according to a χ^2-test. Altogether behavior shows the same patterns and regularities for both subject pools.[xxx]

Table 11 about here

Comparing student submissions with all personal submissions (including those aged 19 to 30) reveals a significantly different distribution for the three prominent proposals ($\chi^2 = 23.3$; $df = 2$; $p < 0.01$) and significantly higher acceptance rates of students for the power coalition and the game theoretic benchmark proposal (χ^2-test with $df = 1$ in for any pairwise comparison) which, in the light of our analysis in section 4.2, can be attributed to the large differences in the average age for student and nonstudent submissions (24.9 vs. 43.8 years). According to the results in Tables 5 and 6, about 52% of all 5,211 participants respond monotonically with respect to either payoffs, the sum of payoffs, or payoff differences. Table 12 showsthat, in sum, 316 of 632 students (50%) use such a monotonic response strategy.[xxxi] Hence there does not seem to be an essential discrepancy in the frequency of monotonic strategies either between students and other participants.

Table 12 about here

VI. Conclusion

Our newspaper experiment has provided strong evidence for parallelism of usual experimental evidence since the behavior in personal student submissions is very similar to the behavior in nonstudent submissions given the same age structure. Of course, we do not claim that the behavior of students is representative of a much broader public with a more

differentiated demographic structure. In particular, the age of the decision maker has a strong influence on behavior. Older participants care more for equity when proposing or rejecting unequal distributions. One reason for this strong age effect could be that age stands for wealth. Since older participants are on average richer than younger ones (and in particular richer than students), it is relatively cheaper for them to offer more to others and to reject proposals which they regard as unfair. Another explanation could be the different experiences of older generations (during the postwar period) which might have induced stronger moral obligations, e.g. to share equally.

Like age, gender also plays an important role. There is a large body of related experimental studies on gender differences in the laboratory. Eckel and Grossman (1998) find that women are significantly less selfish than men in dictator experiments, with women offering about twice as much as men. In a subsequent study (Eckel and Grossman, 2001) on gender effects in an ultimatum experiment, they show that women are, on average, more cooperative than men. Andreoni and Vesterlund (2001) have investigated the fair sex also by means of a dictator game but with varying incomes and costs of generosity. According to their findings it is not gender itself that determines fairness but how gender interacts with the costs of altruism, i.e., what it costs to give away money. When altruism is expensive, women are kinder, but when it is cheap, men are more altruistic.

Our results show that women are more generous in their offers and less likely to accept unfair offers. If participants in our experiment perceived the pie at stake as a considerable reward in spite of the low probability of being selected for payment, it would be rather expensive to be altruistic, and our results would be similar to those of Andreoni and Vesterlund (2001). Of course, our participants cover a much broader spectrum of the general population than their typical student subject pool.

Finally, the medium for submitting one's decision seems to matter. Given the growing share of e-commerce, it could be interesting to investigate the driving forces of the differences between Internet and mail submissions. In our experiment, Internet submissions reveal more opportunism in both roles (X and Y), which might be caused by self-selection of participants or by the use of the media. In our view this should however be studied in the light of appropriate data. We therefore leave it to future research to explain the effects of the media. For the time being, we would like to repeat the main finding of our experiment: Bargaining behavior is much fairer when the submission is from an older female using mail/fax than when it is submitted via the Internet by a young male.

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[i] Other differences between laboratory and newspaper experiments concern the duration of an experiment and monetary rewards. Lab experiments seldom last longer than one or two hours. Participants in a newspaper experiment often have one or two weeks to send in their decisions, which gives them more time to reason. Average rewards for student participants are typically close to the hourly wage for students, whereas rewards for newspaper experiments can be much higher in absolute terms, but lower in expected rewards due to their much larger number of (expected) participants. For a discussion of methodological differences between laboratory and newspaper experiments, see Bosch-Domènech et al. (2000).

[ii] In a recent paper Hannan et al. (2002) test for differences in a gift exchange game between undergraduates and (older) MBA students who have several years of work experience. The results show MBAs to reach substantially higher effort levels than undergraduates. The authors conjecture that this difference may result from the MBAs prior work experience in white-collar jobs where gift exchange plays an important role.

[iii] In the context of intergenerational transfers and savings it has been estimated that in the U.S. about 80% of total assets are transferred from parents to adult children, with about 50% inter vivos (see, e.g., Kotlikoff, 1988; Gale and Scholz, 1994).

[iv] See Bolton (1991), Rabin (1993), Fehr and Schmidt (1999), Bolton and Ockenfels (2000), Charness and Rabin (2002), or Roth (1995) for a survey. All models incorporating fairness, other-regarding behavior, or social preferences require common knowledge of other subjects' preferences. The assumption of common knowledge of other subjects' preferences is hard to defend in a newspaper experiment where the number and characteristics of participants are neither predictable nor under complete control.

[v] Introducing a third person, as in Güth and van Damme (1998), makes it easier to disentangle the strategic implications of the ultimatum game and the dictator game, respectively. There are other types of three-person ultimatum games as well (see Knez and Camerer, 1995, Güth et al., 1996, Kagel and Wolfe, 2001, Riedl and Výrašteková, 2002) which differ from the one by Güth and van Damme (1998) in that they have two (competing) responders instead of one responder and one dummy player.

[vi] Güth and van Damme vary the information conditions such that the responder gets to know (i) the proposed shares for all persons, (ii) only the share for him- or herself, or (iii) only the share for the dummy. Under the information condition (iii), the modal proposal allocates (almost) all of the pie to X. In both other cases, the responder receives slightly more than one third.

[vii] The authors suggested a neutral frame. The journalist preferred a frame used in a previous newspaper experiment (Güth et al., 2002).

[viii] Actually, in each of the 6 teams the randomly drawn X proposed the equal split of 400-400-400, and Y accepted this offer.

[ix] 453 submissions correctly predicted the modal strategy vector, namely, the (400,400,400) proposal and acceptance of (x, y, z) only if $y \geq 400$.

[x] See Roth (1995, p. 322f.) for a discussion of the advantages and disadvantages of the strategy method.

[xi] See http://www.zeit.de/specials/wirtschaftsspiel/wirtschaftsspiel.html (access: February 25, 2002).

[xii] In the following, we will refer to submissions by fax, mail, or Internet as 'personal submissions' and to data from classroom experiments as 'collective submissions'.

[xiii] We thank Georg Hirte for conducting the experiment.

[xiv] The idea of the layout staff of *Die Zeit* was that this would help in filling out the form. We did not anticipate that the colored rows, when being faxed, would turn out to be illegible in so many cases.

[xv] The experiment attracted relatively young readers of *Die Zeit.* Excluding students and pupils (which were induced by their instructors to participate in the experiment), the share of participants below age 40 was slightly below 54%, which was still considerably larger than the share of general *Die Zeit* readers in the same age group (37%).

[xvi] Unemployment was only mentioned in two cases.

[xvii] Note that in total there are 474 participants who choose the game theoretic benchmark in the role of X. It seems noteworthy (though not very surprising) that 447 of them (94%) accept *all* proposals.

[xviii] Güth et al. (2002) have found an unusually high share of 10% of responders with non-monotonic strategies in their two-person ultimatum experiment. Typically, these responders were willing to accept intermediate amounts around the equal split, but neither greedy nor too generous offers.

[xix] The age of participants using mail and fax, respectively, is not significantly different. The gender composition differs marginally at the 10% level (χ^2-test). Güth et al. (2002) also pooled mail and fax submissions since they could not find any significant differences in decisions between both types of submissions. As their main finding, they diagnosed 'fairness in the mail and opportunism in the Internet'.

[xx] In this table, we restrict ourselves to the data from personal submissions, i.e. we exclude data from classroom experiments. Section 5 deals with differences of collective submissions and personal submissions.

[xxi] There is a single exception. The relative frequency of the equal split is higher for females using the Internet in the age group 26 to 45 than for those aged 46 to 65.

[xxii] The single exception is the group of male participants aged under 26.
[xxiii] Failing to account for these correlations would underestimate standard errors of the coefficients.
[xxiv] We also estimated alternative specifications of the probit model. Considering either the demographic variables only or the structural variables only leads to the same signs of coefficients and similar significance levels as reported in Table 9. We also performed the probit analysis for classroom data separately for students and pupils. The estimations of the structural variables indicate that acceptance rates are monotonic with y (with a kink at the equal split for pupils) and non-monotonic in z. Gender effects are not significant in both cases.
[xxv] Since most experiments rely on student participants, this seems to be the most important distinction in experimental research.
[xxvi] One may therefore suspect that students regarded the experiment rather as a practical exercise of game theory than a real bargaining experiment.
[xxvii] The distribution of proposals differs significantly (χ^2-test, $df = 2$; $p < 0.01$) both between pupils and personal submissions and between pupils and personal submissions under 26. Significance is mainly due to differences for the power coalition and the game theoretic benchmark.
[xxviii] Basically, both types of participants face the same conditions since they submitted their decisions personally (after having read *Die Zeit* or visited the Internet address www.zeit.de). For comparing students with non-students, we restrict ourselves to submissions filling out a profession.
[xxix] Note that in Tables 11 and 12, the term 'student' refers to personal submissions stating student as profession. Students from the classroom experiment at the University of Frankfurt are excluded.
[xxx] We do not know the percentage of non-students of age 19 to 30 being former students, and, hence, drawn from the same population as students are. But if a considerable part of non-students of age 19 to 30 were, in fact, former students, then our results would indicate that former students behave more or less in the same way as actual students.
[xxxi] None of the student subjects (like in the overall population) has a strictly monotonic strategy with respect to the sum of x and y (disregarding those students who accept all proposals).

Table 1: Participation by media type and subject pool

Subject pool	Media type	Label	Submissions	Valid	Frequency of valid cases
Newspaper	Computerized	Internet	2,961	2,954	0.998
Newspaper	Pen and paper	Mail	1,681	1,625	0.967
Newspaper	Pen and paper	Fax	490	290	0.592
Classroom	Pen and paper	Students (one class)	255	191	0.749
Classroom	Pen and paper	Pupils (10 groups)	171	151	0.883
All			5,558	5,211	0.938

Table 2. Age, profession, gender, and medium

	Personal submissions[a]			Collective submissions[a]		
	Internet (n=2954)	Mail (n=1625)	Fax (n=290)	Students (n=191)	Pupils (n=151)	All (n=5211)
Age						
under 26	0.217	0.110	0.063	0.845	0.992	0.213
26 to 45	0.525	0.376	0.422	0.155	0.008	0.447
46 to 65	0.237	0.368	0.395	0.000	0.000	0.274
over 65	0.021	0.146	0.121	0.000	0.000	0.065
average age (Std. Dev.)	36.6 (13.2) (n=2329)	46.6 (16.6) (n=1292)	48.2 (14.6) (n=223)	23.8 (2.2) (n=102)	18.4 (2.2) (n=120)	39.5 (15.5) (n=4066)
Gender						
Share of male participants	0.711 (n=2912)	0.632 (n=1519)	0.688 (n=263)	0.644 (n=149)	0.460 (n=139)	0.677 (n=4982)
Profession[b]						
Academic	0.460	0.456	0.500	0.000	0.000	0.420
Nonacademic	0.208	0.228	0.280	0.000	0.000	0.199
Retired	0.032	0.148	0.140	0.000	0.000	0.070
Students	0.238	0.112	0.054	1.000	0.000	0.221
Pupils	0.062	0.056	0.027	0.000	1.000	0.090
	(n=2064)	(n=1114)	(n=186)	(n=190)	(n=137)	(n=3691)

a. Only valid submissions are included.

b. With regards to profession, subjects provided (on a voluntary basis) their profession and/or their education. Therefore, we divided the active working population into Academics (jobs that regularly require academic education) and Nonacademics. Unemployment was only mentioned in two cases.

Table 3: Decisions - Overall

	Actual decisions (N=5211)		Expected decisions (N=5211)	
Proposal	Proposal chosen by X (in %)	Acceptance of Y (relative frequency in %)	Expected most frequent proposal by X (in %)	Expected frequency of acceptance of Y (in %)
0-600-600	0.0	83.2	0.0	83.7
200-400-600	0.1	64.3	0.0	64.2
200-500-500	0.2	84.8	0.0	85.5
200-600-400	0.2	83.1	0.1	85.5
400-200-600	0.1	28.7	0.0	20.6
400-300-500	0.1	41.4	0.1	35.9
400-400-400	54.9	96.7	62.5	96.5
400-500-300	3.9	82.6	2.9	86.1
400-600-200	3.6	79.6	3.3	84.6
600-100-500	0.1	23.0	0.1	13.7
600-200-400	0.1	26.8	0.1	18.8
600-300-300	1.2	42.1	2.0	39.3
600-400-200	6.2	58.7	6.4	62.1
600-500-100	16.8	64.9	14.0	70.2
800-100-300	0.0	22.5	0.0	13.1
800-200-200	0.3	26.7	0.5	19.1
800-300-100	3.3	33.4	2.3	30.5
1000-100-100	9.1	22.5	5.7	13.1

Table 4: Average shares for X, Y, and Z (according to proposals by X)

Average amount for	Actual	expected
X	516.50	490.01
Y	395.68	401.02
Z	287.82	308.98

Table 5: Monotonic strategies with respect to payoffs

Number of subjects who accept all (and no other) proposals with[a]					
	subjects		Subjects		subjects
y ≥ 100	1122	y + z ≥ 200	1122	x + y ≥ 600	1122
y ≥ 200	110	y + z ≥ 400	12	x + y ≥ 700	0
y ≥ 300	209	y + z ≥ 600	10	x + y ≥ 800	0
y ≥ 400	601	y + z ≥ 800	23	x + y ≥ 900	0
y ≥ 500	37	y + z ≥ 1000	58	x + y ≥ 1000	0
y = 600	20	y + z = 1200	1	x + y = 1100	0

a. N=5211

Table 6: Frequency of monotonic strategies with respect to payoff differences

Number of subjects accepting all proposals with	Subjects (N=5211)
$max\{\|x-y\|, \|y-z\|\} \leq 900$	1122
$max\{\|x-y\|, \|y-z\|\} \leq 700$	12
$max\{\|x-y\|, \|y-z\|\} \leq 600$	0
$max\{\|x-y\|, \|y-z\|\} \leq 500$	1
$max\{\|x-y\|, \|y-z\|\} \leq 400$	3
$max\{\|x-y\|, \|y-z\|\} \leq 300$	0
$max\{\|x-y\|, \|y-z\|\} \leq 200$	17
$max\{\|x-y\|, \|y-z\|\} = 0$	484

Table 7: Frequency of obeying the power hierarchy in actual and expected proposals

			Relative frequency of proposals with $x > y > z$		χ^2-test (actual vs. expected)
		N	*actual*	*expected*	
Media (excl. classroom)	Internet	2954	0.288	0.247	$p < 0.01$
	Mail and Fax	1914	0.217	0.186	$p < 0.05$
Classroom	Students	193	0.394	0.352	n.s.
	Pupils	151	0.305	0.205	$p < 0.05$
Gender (excl. classroom)	Female	1483	0.209	0.220	n.s.
	Male	3211	0.282	0.226	$p < 0.01$
Age (excl. classroom)	under 26	661	0.351	0.295	$p < 0.05$
	26 to 45	1802	0.263	0.233	$p < 0.05$
	46 to 65	1115	0.226	0.200	n.s.
	over 65	266	0.173	0.124	n.s.
All		5211	0.263	0.227	$p < 0.01$

Table 8: Actual decisions– Interaction of age, medium, and gender for selected proposals

a. Age under 26	X-proposal (frequency in %)				Y-acceptance rate (frequency in %)			
	Internet		Mail/Fax*		Internet		Mail/Fax	
proposal	female	male	female	Male	female	male	female	male
ES: 400-400-400	50.6	40.9	56.6	35.2	98.8	97.4[#]	96.1[+]	86.4
PC: 600-500-100	16.0	24.0	15.8	33.0	78.4	76.0	71.1[+]	65.9
TB: 1000-100-100	12.3	10.6	5.3	5.7	28.4	28.4	17.1	12.5
	N=162	N=342	N=76	N=88	N=162	N=342	N=76	N=88

b. Age 26 - 45	X-proposal (frequency in %)				Y-acceptance rate (frequency in %)			
	Internet*		Mail/Fax*		Internet		Mail/Fax	
proposal	female	male[§]	female	Male	female	male	female	male
ES: 400-400-400	65.9	49.5	70.4	57.3	98.5	98.4	99.0	98.3
PC: 600-500-100	10.6	18.3	10.7	19.2	65.0[+,#]	74.1[#]	49.0[+]	65.0
TB: 1000-100-100	6.2	13.9	2.6	8.2	19.7[+]	34.9[#]	14.3	20.6
	N=340	N=873	N=196	N=354	N=340	N=873	N=196	N=354

c. Age 46 - 65	X-proposal (frequency in %)				Y-acceptance rate (frequency in %)			
	Internet*		Mail/Fax*		Internet		Mail/Fax	
proposal	female	male	female	Male	female	male	female	male
ES: 400-400-400	62.4	56.0	73.9	60.0	96.0	94.8	97.3	95.4
PC: 600-500-100	13.6	16.1	8.2	14.6	54.4[#]	63.1	40.2[+]	57.1
TB: 1000-100-100	0.0	6.1	1.1	4.3	9.6[+]	19.1[#]	8.7	12.9
	N=125	N=423	N=184	N=350	N=125	N=423	N=184	N=350

d. Age over 65	X-proposal (frequency in %)				Y-acceptance rate (frequency in %)			
	Internet		Mail/Fax*		Internet		Mail/Fax	
proposal	female	male	female	Male	female	male	female	male
ES: 400-400-400	85.7	62.8	81.3	63.2	85.7	95.3	93.8	90.8
PC: 600-500-100	14.3	18.6	2.1	11.0	42.9	44.2	35.4	39.9
TB: 1000-100-100	0.0	7.0	0.0	4.3	28.6	14.0	10.4	8.0
	N=7	N=43	N=48	N=163	N=7	N=43	N=48	N=163

ES ... equal split; PC ... power coalition; TB … theoretic benchmark

***** … distribution of X-proposals (frequency of ES, PC, TS) differs significantly between male and female for *given medium*.

[§] … distribution of X-proposals (frequency of ES, PC, TS) differs significantly between Internet and mail/fax for *given sex.*

[+] … distribution of Y-acceptance rate for given proposal differs significantly between male and female for *given medium.*

[#] … distribution of Y-acceptance rate for given proposal differs significantly between Internet and mail/fax for *given sex.*

Notes:

For all tests, we use a χ^2-test and take $p < 0.05$ as critical level for significance. Tests on X-proposals have $df = 2$; tests on Y's acceptance rate for a given proposal have $df = 1$.

Classroom submissions are excluded. Of the personal submissions, we include only those with known age and gender (N=3774).

Table 9: Determinants of acceptance rate of 18 different proposals (probit regression)

Dependent variable: Acceptance rate of 18 different proposals	Personal submissions[+] coefficient	standard error
Constant	3.05**	0.075
max {0, 400-*y*}	– 0.0132**	0.0001
max {0, 400-*z*}	– 0.0081**	0.0002
max {0, *y*-400}	0.0039**	0.0001
max {0, *z*-400}	– 0.0036**	0.0001
age (in years)	– 0.0335**	0.0015
gender (1=male)	0.4430**	0.0490
Medium (1=Internet; 0=mail or fax)	0.4100**	0.0440
Log likelihood	– 20,621	
Pseudo R^2	0.435	

** significant at the 1%-level.

[+] 4867 subjects (excluding classroom), 87606 observations.

Table 10: Classroom versus personal submissions

a. X-proposals (frequency in %)				
	Classroom submissions		Personal submissions	
	students	Pupils	all	aged under 26
proposal	(N=193)	(N=151)	(N=4867)	(N=661)
ES: 400-400-400	10.4	51.7	56.8	44.9
PC: 600-500-100	30.6	26.5	15.9	21.2
TB: 1000-100-100	35.2	1.3	8.3	10.7
Average amount allocated to				
X	713.99	472.85	510.02	546.75
Y	332.64	434.44	396.98	394.40
Z	153.37	292.72	293.00	258.85
b. Y-acceptance rate (frequency in %)				
Proposal				
ES: 400-400-400	93.3	92.1	97.0	97.3
PC: 600-500-100	92.2	68.9	63.7	75.6
TB: 1000-100-100	47.7	7.3	22.0	25.4

Table 11: Personal submissions of students and nonstudents

Proposal	Personal submissions with student given as profession (N=632)	Personal submissions at age 19 – 30 and profession other than student (N=363)	All personal submissions with profession other than student (and age stated) (N=2673)
a. X-proposals (frequency in %)			
ES: 400-400-400	47.0	50.4	58.4
PC: 600-500-100	18.2	16.5	15.6
TB: 1000-100-100	11.2	13.8	7.3
Average amount allocated to			
X	550.63	548.21	502.21
Y	384.97	380.44	400.00
Z	264.40	271.35	297.79
b. Y-acceptance rate (frequency in %)			
proposal			
ES: 400-400-400	96.4	98.3	96.6
PC: 600-500-100	73.9	70.5	61.0
TB: 1000-100-100	28.0	31.7	20.1
c. Data on age			
Average age	24.88	26.65	43.83
standard deviation	4.16	3.60	14.89
5^{th} percentile	20.00	19.00	19.00
95^{th} percentile	31.00	30.00	68.00

Table 12: Monotonic strategies of students (personal submissions)

Number of subjects who accept all (and no other) proposals with

	subjects		subjects		subjects
$y \geq 100$	168	$y + z \geq 200$	168	$max\{\|x-y\|, \|y-z\|\} \leq 900$	168
$y \geq 200$	17	$y + z \geq 400$	1	$max\{\|x-y\|, \|y-z\|\} \leq 700$	1
$y \geq 300$	25	$y + z \geq 600$	2	$max\{\|x-y\|, \|y-z\|\} \leq 600$	0
$y \geq 400$	75	$y + z \geq 800$	2	$max\{\|x-y\|, \|y-z\|\} \leq 500$	0
$y \geq 500$	5	$Y + z \geq 1000$	0	$max\{\|x-y\|, \|y-z\|\} \leq 400$	0
$y = 600$	2	$Y + z = 1200$	0	$max\{\|x-y\|, \|y-z\|\} \leq 300$	0
				$max\{\|x-y\|, \|y-z\|\} \leq 200$	3
				$max\{\|x-y\|, \|y-z\|\} = 0$	15

Note: N=632

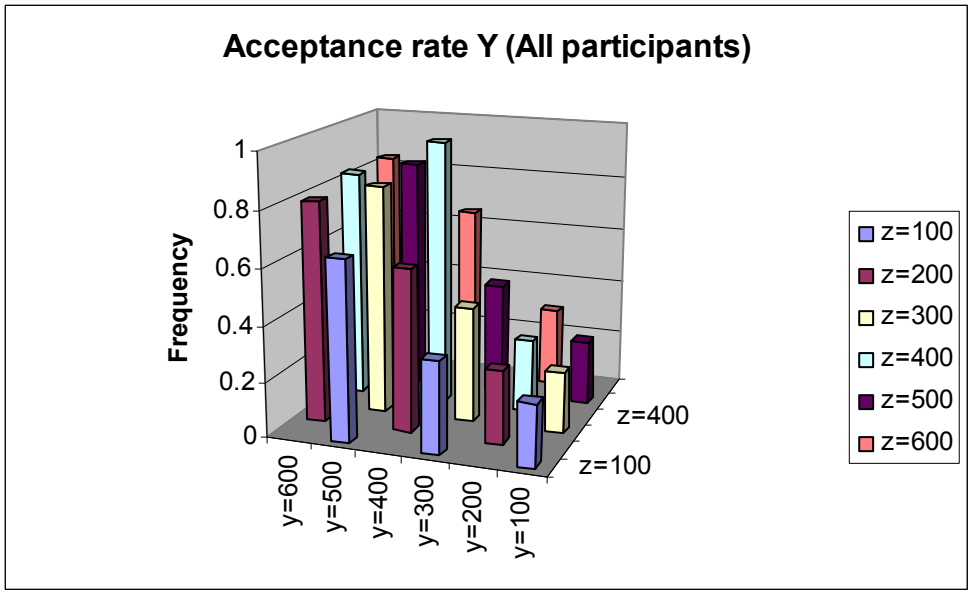

Figure 1: Frequency of responder acceptance for given proposal (*x*, *y*, *z*)

Appendix A. Translated Instructions (originally in German)

The 1200 DM Prize Game for "Die ZEIT" - Readers
By Christoph Drösser
Does the economy rely on rational principles or do the emotions of market players have a major influence on it? The classical game theory was mainly concerned with examinations on how to find the most sensible decision possible in a tricky situation.
In recent years, scientists have increasingly contemplated the extent to which people's decisions actually agree with those that would appear most sensible in a given economic situation.
This game is not just an ordinary prize competition, but rather also a scientific experiment. It is jointly staged by "Die ZEIT" and the Max-Planck-Institute for Research into Economic Systems. Accordingly, our readers do not only have a chance of winning a prize, but will simultaneously help us obtain scientific findings.

The rules of the game
Three brothers (designated X, Y, and Z hereafter) have received 1200 DM from their aunt in America. This sum is to be distributed among them. The following rules have been established by their aunt: X proposes how to distribute the total amount. Y must decide whether (or not) he accepts this proposal. If he agrees, each of the three brothers receives his share as proposed by X. If Y rejects the proposal, their aunt will retain her money. The third brother Z has no say in the distribution of the money at all.
In a first step, it is your task to imagine yourself in the situation of brother X. On our response sheet, you will find eighteen prepared distribution options. Choose one of these!
In the next step, you should slip into the role of brother Y. You are required to state – for each of all eighteen distribution options – if you would accept or reject it.
In other words: you are required to make one cross-mark in column X and eighteen cross-marks in column Y of the fill-out form 1.
The winners are established as follows in this game: From all fill-out forms sent in, six groups of three participants each – one in the role of X, one in that of Y, and one in that of Z – will be chosen in a random procedure. The form sheets of X and Y are then compared with each other. When Y has accepted the distribution proposed by X, the three participants will receive the 1200 DM as suggested by X. All other participants will not be paid.

Additional award for the best forecast
On form sheet 1 you have cross-marked your personal decision. In addition, on form sheet 2 you are requested to predict how the majority of participants will decide. This means: cross-mark the X column for that distribution which you believe has been selected in most cases, then cross-mark all those proposal lines in column Y which you believe have been accepted by the majority of participants. From all responses who predicted the most frequent mode of behavior, we will draw seven winners of the prediction prize of 400 DM each.

Appendix B. Newspaper decision form (translated)

Decision from (form 1)						**Prediction form (form 2)**					
Proposal in the role of X Please cross-mark only one proposal	Distribution of the DM 1200 pie to X, Y, and Z			**Response in the role of Y** Please cross-mark for **every** proposal 'yes' or 'no'! In those columns exactly 18 crosses!		**Modal proposal in the role of X** Please cross-mark only one proposal	Distribution of the DM 1200 pie to X, Y, and Z			**Modal response in the role of Y** Please cross-mark for **every** proposal 'yes' or 'no'! In those columns exactly 18 crosses!	
	X	Y	Z	Yes (accept)	No (reject)		X	Y	Z	Yes (accept)	No (reject)
	0	600	600				0	600	600		
	200	400	600				200	400	600		
	200	500	500				200	500	500		
	200	600	400				200	600	400		
	400	200	600				400	200	600		
	400	300	500				400	300	500		
	400	400	400				400	400	400		
	400	500	300				400	500	300		
	400	600	200				400	600	200		
	600	100	500				600	100	500		
	600	200	400				600	200	400		
	600	300	300				600	300	300		
	600	400	200				600	400	200		
	600	500	100				600	500	100		
	800	100	300				800	100	300		
	800	200	200				800	200	200		
	800	300	100				800	300	100		
	1000	100	100				1000	100	100		
Name: Age (optional):			Address: Profession (optional):			Name: Age (optional):			Address: Profession (optional):		