Will You Accept Without Knowing What? The Yes-No Game in the Newspaper and in the Lab

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Abstract

In this paper we compare behaviour in a newspaper experiment with behaviour in the laboratory. Our workhorse is the Yes-No game. Unlike in ultimatum games responders of the Yes-No games do not know the proposal when deciding whether to accept or not. We use two different amounts that can be shared (100€ and 1000€). Unlike in other experiments with the ultimatum game we find a (small) effect of the size of the stakes. In line with findings for the ultimatum game, we find more generosity among women, older participants, and participants who submit their decision via postal mail than via Internet. By comparing our results with other studies (using executives or students), we demonstrate, at least for this type of game, the external validity of lab research.

Keywords: newspaper experiment; external validity; Yes-No game
JEL-Code: C91, C93

1 Introduction

One aim of this study is to learn more about external validity of laboratory experiments with student participants. Since students are similar in age and education such laboratory experiments leave open the question how far results from the lab can be generalised.

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To increase the variance of socio-demographic characteristics in the subject pool Roth *et al.* (1991) study the ultimatum game with students from different nationalities and find clear differences in behaviour between these groups. Murnighan & Saxon (1998) look at the behaviour of children and observe that generosity in the ultimatum game decreases with age. In a similar study with children Harbaugh *et al.* (2003) find that, once one controls for size, generosity increases with age. In a newspaper experiment with the ultimatum game (Güth *et al.*, 2003) the medium of participation, Internet or postal mail, has an effect on generosity. Güth *et al.* (2007) look at a three-person ultimatum game and show that fairness and rejection rates increase with age. Köhler *et al.* (2007) play an ultimatum game with a heterogeneous sample of German adults illustrating that generosity increases with age and income. Integrating their experiment into an existing survey, the Dutch CentER panel, Bellemare *et al.* (2008) let their participants play either the ultimatum or the dictator game and confirm that generosity increases with age.

Using the trust game, Fehr & List (2004) compare the behaviour of students with that of CEOs who turn out to be more trusting, more trustworthy, and who punish less. Fehr *et al.* (2003) report data from a trust game with a randomly selected sample of German households. Bellemare & Kröger (2007) compare behaviour in the trust game played by students and households of the CentER panel to find a hump-shaped relation between age and trust, and a U-shaped relation between age and trustworthiness. Bornhorst *et al.* (2010) play a trust game with Ph.D. students of different nationalities and find significant differences in trust and trustworthiness between different regions of origin. Sutter & Kocher (2007) study a trust game with participants from different age groups and observe a hump-shaped relation between age and trust and increasing trustworthiness with age.[1]

To explain why non-students outside the lab and students within the lab behave differently, Pull (1999) and Selten (2000) argue that student participants in a lab environment react more clearly to subtle strategic details than

[1]Other games that have been studied with heterogeneous groups of participants include the beauty-contest game of Bosch-Domenech *et al.* (2002) or the prisoners' dilemma in the TV show "Friend or Foe" studied by List (2006).

non-students outside the lab. It is, hence, essential to compare behaviour of student participants with a more heterogeneous population in other games, especially those related to the previously explored ones by differing only in subtle details. This is what we want to do in this paper.[2] We will use a very simple and abstract game and concentrate on analysing the effect of stakes and the effects of the subject pool on the offers and on the willingness to accept.

Our workhorse is the Yes-No game which is a game where proposers suggest how to share a given positive monetary amount and responders decide without knowing the proposal. From ultimatum games (see Camerer, 2003, for a survey of ultimatum experiments), Yes-No games differ since responders in ultimatum games know what they accept or reject.[3] Unlike to dictator experiments (e.g. Forsythe *et al.*, 1994), the responder in Yes-No games still has full veto power in the sense that without his consent the pie of 100€ or 1000€ is lost.

We find the Yes-No game an interesting game for several reasons:

- Many offers or opportunities in real life contain a certain as well as an uncertain component. E.g. a work contract might specify an explicit salary but might be silent about working hours, pensions, obligations of the worker and much more. Other examples include so-called experience goods whose quality is not known to customers or partnership proposals without knowing how reliable the partner(s) will be, as e.g. in joint ventures or spouse relationships.

  The ultimatum game studies as one extreme the (artificial) situation of an offer with no uncertainty at all. Everything that can be said about the offer is known to the responder. The Yes-No game looks at the other extreme: A situation where the offer is entirely unknown to the responder.

- The Yes-No game also sheds new light on motives of behaviour in situ-

[2]Other limitations of laboratory experiments are due to the controlled or artificial situation in the lab (see Levitt & List, 2007). We concede that these limitations exist, however, we do not deal with these limitations here.

[3]The extensive form of the Yes-No game is one with imperfect but complete information whereas for the ultimatum game the extensive form has perfect and complete information. Incomplete information has been explored experimentally, for instance, by Mitzkewitz & Nagel (1993).

ations like the ultimatum game. Do proposers make generous offers in the ultimatum game because they fear rejection of a lower offer? Since the offer is unknown to the responder low offers are not more likely to be rejected than high offers. Proposers who make high offers must have other reasons.

Even more interestingly, responders who reject unfair offers in the ultimatum game should when they expect to receive unfair offers in the Yes-No game reject these offers, too.

We already know from ultimatum games with private information (Güth *et al.*, 1996), where only the proposer knows whether the pie is large or small, that most proposers who could divide the large pie offered only a fair share of the small pie which was never rejected by the responder.

Such response behaviour can be explained either by "in dubio pro reo" (the pie could be small) or by "in dubio pro meo" (better little then nothing). In the Yes-No game accepting an unknown offer can be similarly justified (Gehrig *et al.*, 2007). But since in the Yes-No game the proposer can be more exploitative by offering only the smallest positive amount the responder may expect less what could weaken the "in dubio pro meo" argument. Will we therefore observe more rejections (No) by responders who expect a low offer? Will these rejections be more frequent if the pie is small (100€) and punishment is cheap?

- Another reason for using the Yes-No game is, of course, that it only differs from the ultimatum game by one subtle detail, namely that one does not know the proposal when exercising one's veto power. Is this a detail overlooked more frequently by non-students than by student participants? Finally, is it possible that not only students but also executives are paying more attention to subtleties like these. Do we have reasons to single out important and economically relevant subgroups of non-students?

In this paper we want to describe properties of a heterogeneous population playing the Yes-No game. Will participants with a socio-demographic background different from students as responders also rely to the same degree on "in dubio pro reo" or "in dubio pro meo"? And will they as proposers yield to the exploitation incentive or will they feel more committed to fairness

concerns, at least when the pie is small (and exploitation less profitable)?

In section 2, we introduce the design of the experiment and discuss some hypotheses which, in section 3, are tested with the help of the rather large data set (involving altogether 1175 participants). Section 4 concludes.

2 Experiment

In this paper we will compare five different media to participate in the experiment:

- 112 participants of a traditional lab experiment run by Gehrig *et al.* (2007) with low stakes[4],
- 64 participants of a lab experiment with high stakes where only some participants are paid,
- 303 participants of a newspaper experiment with high stakes where only some participants are paid and who chose to respond by postal mail,
- 568 participants of the same newspaper experiment with high stakes who chose to make their decision via the Internet,
- 128 business executives who play essentially the same situation with high stakes and who respond with pencil and paper[5].

Table 1 shows characteristics of participants for the different media of participation.[6] Figure 1 shows boxplots of the distribution of age for the media of participation where we know the age.

For the media of participation with high stakes we used the strategy vector method, i.e. all participants submitted strategies and expectations for a pie of 100€ and for a pie of 1000 € and for both positions in the game (X and

[4]Here we refer only to what Gehrig *et al.* (2007) call their "first experiment series". The games in their "second experiment series" were embedded in a bidding mechanism rendering the data less comparable to ours.

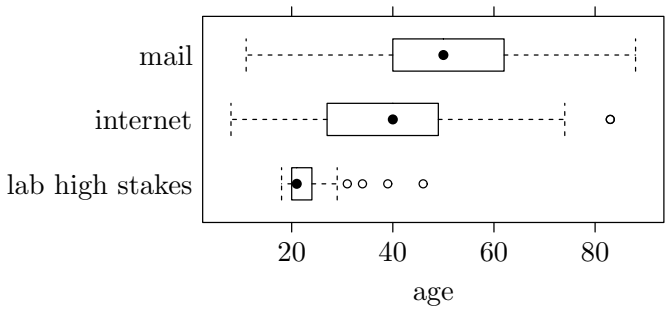
[5]As usual the specifics of the company will not be revealed by us.

[6]To keep the experiment simple we elicited only these characteristics together with the strategies and expectations for the game. Details of the implementation are shown in the online-appendix B.

Table 1 Characteristics of participants

experiment	num. of participants	known sex [%]	females [%]	known age [%]	mean age [years]	median age [years]	known profession [%]	blue collar [%]
internet	568	91.0	48.9	82.2	39.0	40.0	61.4	13.5
mail	303	99.3	57.5	96.0	49.8	50.0	65.0	27.4
lab high stakes	64	100.0	56.2	100.0	23.0	21.0	100.0	0.0
executives	128	0.0		0.0			100.0	0.0
lab small stakes	112	0.0		0.0			0.0	
all	1175	75.1	52.4	70.0	41.6	42.0	62.8	13.7

Figure 1 Boxplot of age for different media of participation with high stakes



Y).[7] After all participants had submitted their decisions a small number of participants were selected to be rewarded by actually playing the game. First, these participants were randomly grouped into pairs of two players. One of these two players was the proposer in the Yes-No game (X-player), the other the responder (Y-player). Another random draw decided which pairs had to divide 100€ and which had to divide 1000€. For each pair the X-player chose a division. To simplify the use of the strategy vector method as well as the evaluation of the questionnaires we only allowed 10 possible divisions

[7]One might suspect that eliciting two offers, one for 100€ and another for 1000€, implies a demand effect. We fully agree that the differences in behaviour between the two amounts could perhaps be smaller had we used the game method. However, using the strategy vector method greatly simplifies the implementation of the newspaper experiment. Furthermore, here we are not interested in the absolute size of the effect but rather how this effect depends on other variables.

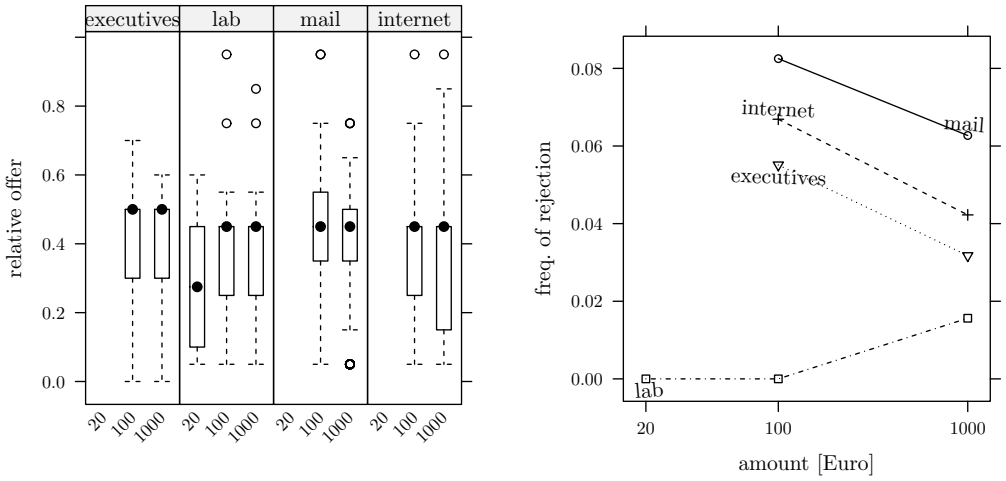
between 5€ and 95€ when 100€ could be divided. Similarly, 10 divisions between 50€ and 950€ were allowed when 1000€ could be divided. When the Y-player chose "yes" the amount was divided according to the proposal of the X-player. In case of "no" both players received zero. Details of the implementation are explained in the online-appendix B.

A materially opportunistic responder should accept the unknown but necessarily positive offer. Anticipating such opportunism, an equally opportunistic proposer should offer the lowest possible amount. We, however, do expect only few participants to behave in line with such common opportunism.

Whether "stakes" matter is often explored by using the same stakes in rich and poor countries, i.e., stake variation relies on large discrepancies of living conditions (see, e.g. Cameron, 1999). We avoid confounding "stake" and culture in our within-subjects design: the same participants decide for a small (100€) and a much larger (1000€) pie. In view of the stake independence observed for offers in the closely related ultimatum game (Hoffman *et al.*, 1996) we expect the relative shares, offered by proposers for both pie sizes, to be similar. Hoffman *et al.* (1996) also observe that rejection rates in ultimatum games are lower when stakes are higher. A reason might be that "teaching fairness to proposers" might be too expensive when stakes are high. We hence expect lower rejection rates for high stakes.

We also suspect that student participants in the laboratory might be more clearly aware of the crucial aspect of the Yes-No game and that their behaviour is closer to the equilibrium solution of the game. As in Eckel & Grossman (1998) and Eckel & Grossman (2001) we expect women to be more generous than men. In line with Harbaugh *et al.* (2003), Güth *et al.* (2007), Köhler *et al.* (2007), Bellemare *et al.* (2008) we expect that older participants offer more as proposers and reject less as responders. In line with Güth *et al.* (2003) we expect "more fairness in the mail than in the Internet".

Figure 2 Boxplot of relative offers and frequencies of rejections



The diagram on the left shows boxplots of relative offers for the different media of participation and the different amounts that are to be divided. The diagram on the right shows relative frequencies of rejections.

3 Results

Stakes: The left part of Figure 2 shows boxplots for offers for the different stakes and the different media of participation.[8] For a given medium of participation the median relative offer is always the same for 100€ and for 1000€. With small stakes of 20€ small relative offers are more frequent. That, however, might be due to several parameters that were different in the 20€ small stakes experiment by Gehrig *et al.* (2007) from the participants of experiments with large stakes. For an amount of 100€ the average offered share is 0.376 of the entire amount, for an amount of 1000€ the average offered share is with 0.364 slightly smaller. This difference is small, but significant[9].

The right part of Figure 2 shows frequencies of rejections. For three out of four media of participation (postal mail, Internet, executives) rejection rates are lower for stakes of 1000€. In the lab situation we have exactly

[8]The data in this paper was analysed with R version 2.14.1 (2011-12-22) (R Development Core Team, 2011).

[9]An exact paired Wilcoxon test based on the Shift Algorithm by Streitberg & Röhmel (1986) yields a p-value of 0.00004, a paired t-test yields a p-value of 0.00008.

one rejection and this for 1000€. Taken together, for 100€ 6.6% of all participants reject, whereas for 1000€ only 4.5% of all participants reject. The difference is significant.[10]

Lab versus field: While there is a small effect of stakes on rejection rates Figure 2 reveals a large effect of the subject pool. Students in laboratory experiments are much closer to the game theoretic solution and reject rarely, regardless whether stakes are 20€, 100€, or 1000€. Rejection rates outside the lab are significantly higher than inside the lab.[11] There is no significant difference between rejection rates for high stakes and the experiment with small stakes done by Gehrig *et al.* (2007).[12]

Age and gender: The left graph in Figure 3 shows how offers and expected offers depend on age and the gender of the decision makers. Offers clearly increase with age. Furthermore, females are more generous. This is in line with Eckel & Grossman (1998) and Eckel & Grossman (2001).[13] Expected offers do not seem to depend on gender.

The right graph in Figure 3 shows how rejection rates depend on age and gender. Also rejection rates increase with age. There does not seem to be a systematic difference between males and females in rejection rates. Expected offers are lower than actual offers and expected rejection rates are higher than actual rates. In particular female expectations of rejection rates are too pessimistic.

Age and medium of participation: The left part of Figure 4 shows how average offers depend on the age group and on the medium of participation.

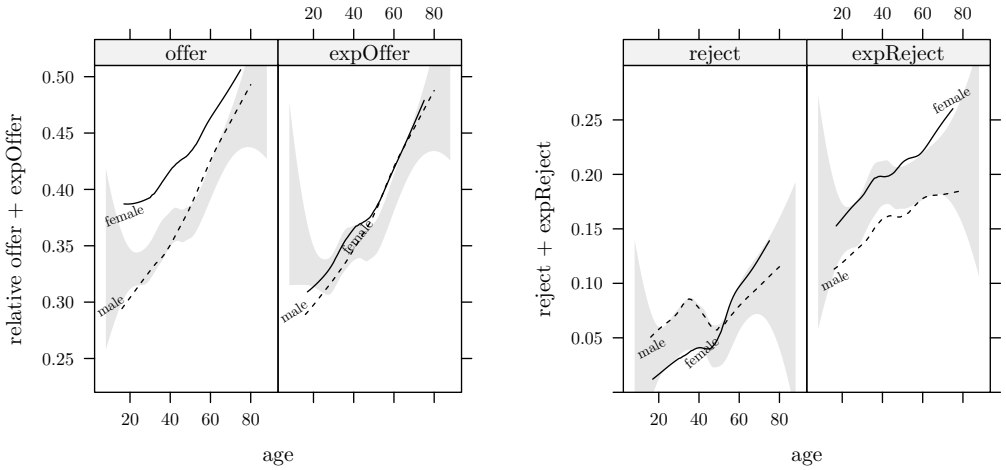
[10] A one-sided Fisher's exact test for independence of the amount yields a p-value of 0.0234.

[11] For high stakes we find rejection rates in the lab 0.8% and rejection rates elsewhere 5.9%. A Fisher's exact test for independence yields a p-value of 0.0086.

[12] For high stakes we find a rejection rate of 0.8% while Gehrig *et al.* (2007) find for small stakes 0%. A Fisher's exact test for independence of lab and field yields a p-value of 1.

[13] A mixed effects regression where we control for stakes, age, the medium of participation, gender, and the subject pool finds age and gender to be significant (see specification 2 in Table 2 in the appendix).

Figure 3 Average relative offers and rejection rates for males and females



Graphs show own choices (relative offer and reject) and expected choices (expOffer and expReject) of the other player. The lines are lowess-splines (Cleveland, 1981) based on the defaults of R's `plsmo` function (see R Development Core Team, 2011. `plsmo` is a function that plots smoothed estimates based on a lowess smoother). The gray area is a 95%-confidence band for the average behaviour of males and females for all media of participation where we know the age.

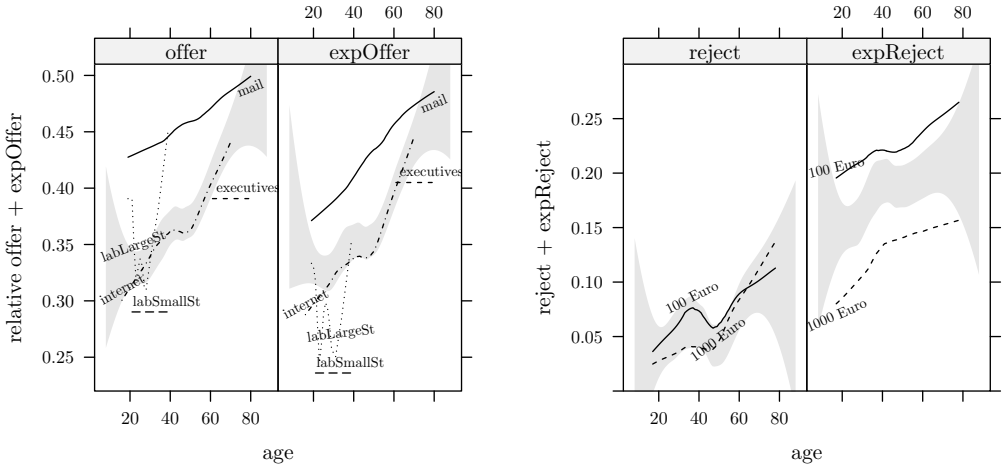
For media of participation where we have a large number of young and old participants (postal mail, Internet) offers clearly increase with age. For the remaining media of participation (lab small stakes, lab large stakes, executives) the offers are approximately consistent with the age group. This holds for actual offers as well as for expected offers and is in line with what Harbaugh *et al.* (2003), Güth *et al.* (2007), Köhler *et al.* (2007), Bellemare *et al.* (2008) find for ultimatum games.

The right part of Figure 4 shows the relation between rejection rates and age. Although actual rejection rates hardly depend on the stakes, expected rejection rates do so very much.[14]

Correlation between own choice and expectations: Do participants who make generous offers expect similar offers? And are participants who expect frequent rejections more likely to reject themselves? The answer to

[14] A mixed effects regression where we explain expected rejection rates as a function of stakes, age, the medium of participation, gender, and the subject pool finds stakes to be highly significant (see Table 5 in the appendix).

Figure 4 Average relative offers and rejection rates for medium of participation and stakes



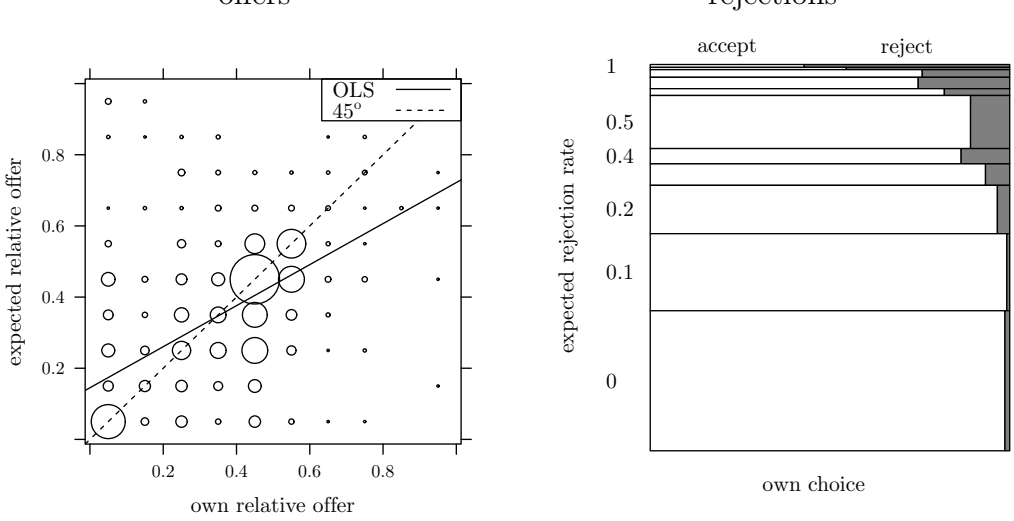
Graphs show own choices (relative offer and reject) and expected choices (expOffer and expReject) of the other player. The lines are lowess-splines based on the defaults of R's `plsmo` function. Data for business executives and for the lab experiment with small stakes are shown as horizontal lines since we have no information on the exact age for these groups. The gray area is a 95%-confidence band for the average behaviour of males and females for all media of participation where we know the age.

both questions is "yes". The left graph in Figure 5 shows a bubble-plot of expectations over offers. We see that on the individual level own relative offers and expected offers are clearly correlated. Participants who make small offers expect small offers from others. Participants who are generous expect generous offers from other participants. The right graph in Figure 5 shows a mosaicplot of actual and expected rejections. Again, we find that expectations are in line with choices. Participants who expect low rejection rates seldom reject. There are not many participants who expect a high rejection rate but those who do will reject rather frequently.

4 Conclusion

Lab research is often questioned by arguing that the stakes are minor, student participants are not representative, and experimental games are far too abstract. Here we concentrate on the first two issues, i.e. whether the

Figure 5 Own choices and expectations in the newspaper experiment



The area of the circles (in the left diagram) and the area of the rectangles (in the right diagram) are proportional to the number of observations. The solid line in the left diagram shows an OLS regression of expectations on offers.

size of the pie matters and whether student participants are representative. The Yes-No-game is simple enough to be understood by reasonably educated newspaper readers and executives. It also captures some important aspect of life, namely the need to accept or reject some deal whose profitability has already been determined or manipulated but is not known to the responder.

With respect to the first issue, size of stakes, we have explored stake dependence by quite high pie sizes of 100€ and 1000€. Of course, the random selection of only 40 participants questions the stake size. Still, there is little evidence for random payment effects (see, for instance Cubitt *et al.*, 1998). While Hoffman *et al.* (1996) reports no significant effect of the stake size for the ultimatum game we find for the Yes-No game a significant effect of stakes on the aggregate level. Of course, the effect is small and is only significant due to the large number of 1175 participants. Still, it is possible that also for other games the impact of stakes could be small, but different from zero. With a limited number of participants in the lab small effects might be harder to detect than with a large number of newspaper readers.

With respect to the second point, representativeness of the student pop-

ulation, we agree that students belong to a rather narrow age bracket. We have found three important socio-demographic variables: age, gender, and the medium of participation (postal mail vs. Internet). Here our observations confirm most of our expectations. In line with Eckel & Grossman (1998, 2001) women are more generous. Similar to (Güth *et al.*, 2003) there is more "fairness in the mail and more material opportunism in the internet". Consistent with Harbaugh *et al.* (2003), Güth *et al.* (2007), Köhler *et al.* (2007), Bellemare *et al.* (2008) we find older people to be more generous.

In particular—once we control for age—results from the field are surprisingly consistent with behaviour in the lab. Newspaper readers with the age of laboratory participants behave very similar to laboratory participants. Older participants are more generous and reject more frequently. The newspaper study can, thus, be seen as a natural extension of the laboratory. It allows us to easily access a more heterogeneous subject pool.

There are many games which so far have only been researched in the lab. We have seen in this paper that one has to be careful when extrapolating from these laboratory results to the field. We have also seen that newspaper experiments can help us to learn more about external validity since the group of participants is more heterogeneous than those in the laboratory. Newspaper experiments also include typically many more participants. This allows us to detect small, but perhaps interesting, effects.

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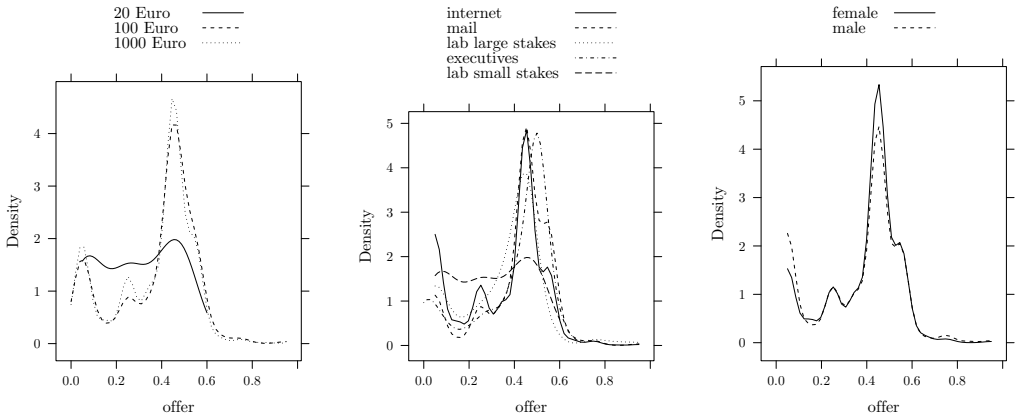
Appendix - online material

Figure 6 Densities for relative offers



The left graph compares estimated densities of offers for different amounts to be distributed. The graph in the middle shows estimated densities of offers for different scenarios. The graph on the right compares densities of offers for female and for male participants.

A Estimation results

Offers: To extend the analysis of section 3 we estimate the following random effects model[15]:

$$\frac{\text{offer}}{\text{amount}} = \beta_1 \cdot d_1 + \beta_{1000€} \cdot d_{1000€} + \beta_{\text{age}} \cdot \text{age} + \beta_{\text{Internet}} \cdot d_{\text{Internet}} + \\ + \beta_{\text{lab}} \cdot d_{\text{lab}} + \beta_{\text{male}} \cdot d_{\text{male}} + \nu_i + \epsilon_{ik} \quad (1)$$

where the dummy $d_{1000€}$ is one if the amount is 1000€ and zero otherwise, the dummy d_{Internet} is one for participants who submitted their strategy through the Internet and zero otherwise, the dummy d_{lab} is one for participants in the lab, and the dummy d_{male} is one for male participants and zero otherwise. ν_i is a random effect for each participant and ϵ_{ik} is a random effect for the individual offer. Estimation results for this and some related specifications

[15] All estimations of random effects models are based on `lme4-0.999375-42`.

are shown in Table 2.[16] Alternative models where age enters as a polynomial of second or higher degree do not lead to a significant change in the estimation results. Also, when we add a dummy for white collar workers to equation (1) or to the following equations (2) and (4) we do not find a significant effect nor a substantial change in the estimated coefficients.

Estimation results in Table 2 confirm what we see in Figures 3 and 4: offers increase significantly with age and male participants offer significantly less than female participants (in line with Eckel & Grossman, 1998, 2001, who rely on dictator experiments and ultimatum games).[17]

The effect of the medium of participation, Internet or postal mail (see also Figures 2 and 4), is highly significant. Even when we control for age, offers on the Internet are significantly smaller and closer to the game theoretic solution behavior based on material opportunism (in line with Güth *et al.*, 2003).

Increasing the pie size by a factor of ten decreases the relative offer by 1.6%. This is only a small amount and only weakly significant in some specifications.

Running the experiment in the lab decreases the relative amount by a small and for all specifications insignificant amount. This is in line with Figure 4.

Rejections: We estimate the rejection probability as a function of age and other explanatory variables. Since we see in the left part of Figure 4 older people having more pessimistic expectations than young ones we include expectations as an explanatory variable in the following random effects model:

$$P(\text{reject}) = \mathcal{L}\Big(\beta_1 \cdot d_1 + \beta_{1000€} \cdot d_{1000€} + \beta_{\text{lab}} \cdot d_{\text{lab}} + \beta_{o^E} \cdot o^E + \beta_{\text{age}} \cdot \text{age} + \\ + \beta_{1000€\times\text{lab}} d_{1000€} d_{\text{lab}} + \beta_{\text{Internet}} \cdot d_{\text{Internet}} + \beta_{\text{male}} \cdot d_{\text{male}} + \nu_i\Big) \quad (2)$$

[16] All the estimations shown in Tables 2–5 include only data from the newspaper experiment and the lab experiment with high stakes since we know age and gender neither for the business executives nor for the lab data of Gehrig *et al.* (2007).

[17] More basically, one can control for the idiosyncratic testosterone level of male participants (see Burnham, 2007).

	1	2	3	4	5
(Intercept)	0.324^{***}	0.326^{***}	0.374^{***}	0.413^{***}	0.390^{***}
	$[0.295; 0.353]$	$[0.292; 0.360]$	$[0.312; 0.436]$	$[0.319; 0.507]$	$[0.332; 0.447]$
1000€	-0.016^{*}	-0.016^{*}	-0.016^{*}	-0.017	-0.017
	$[-0.030; -0.001]$	$[-0.030; -0.001]$	$[-0.030; -0.001]$	$[-0.034; 0.001]$	$[-0.034; 0.001]$
age	0.002^{***}	0.002^{***}	-0.000	-0.001	0.001
	$[0.002; 0.003]$	$[0.001; 0.003]$	$[-0.003; 0.002]$	$[-0.006; 0.003]$	$[-0.001; 0.002]$
internet	-0.046^{***}	-0.047^{***}	-0.046^{***}	-0.047^{***}	-0.049^{***}
	$[-0.064; -0.028]$	$[-0.067; -0.028]$	$[-0.065; -0.027]$	$[-0.071; -0.023]$	$[-0.073; -0.026]$
male	-0.020^{*}	-0.020^{*}	-0.021^{*}	-0.014	-0.076^{*}
	$[-0.037; -0.002]$	$[-0.036; -0.003]$	$[-0.038; -0.004]$	$[-0.034; 0.007]$	$[-0.136; -0.015]$
lab		-0.006	-0.012	-0.020	-0.017
		$[-0.043; 0.031]$	$[-0.050; 0.026]$	$[-0.060; 0.021]$	$[-0.059; 0.025]$
age^2			0.000	0.000	
			$[-0.000; 0.000]$	$[-0.000; 0.000]$	
whiteCollar				-0.013	-0.010
				$[-0.043; 0.017]$	$[-0.039; 0.019]$
age × male					0.002^{*}
					$[0.000; 0.003]$
indep.obs.	817	817	817	603	603
N	1634	1634	1634	1206	1206

TABLE 2: Random effects estimation of equation 1

Confidence intervals and p-values are based on a parametric bootstrap with 1000 replications. The estimations in Tables 2–5 do not include data on business executives, since there we neither know age nor gender.

Table 3 Random effects estimation of equation 2

	β	σ	z	p value	95% conf	interval
(Intercept)	-8.94	4.17	-2.15	0.0319	-17.1	-0.772
lab	-14.1	250	-0.0567	0.9548	-503	475
1000€	-1.34	0.388	-3.46	0.0005	-2.1	-0.584
expOffer	-1.57	2.1	-0.751	0.4527	-5.68	2.53
age	0.0182	0.0677	0.27	0.7875	-0.114	0.151
Internet	-0.102	2.35	-0.0433	0.9655	-4.72	4.51
male	0.444	2.2	0.202	0.8400	-3.87	4.76
1000€ × lab	14.3	249	0.0574	0.9542	-474	503

$\mathcal{L}$ is the standard logistic function and o^E is the expected relative offer. Estimation results are shown in Table 3. The only significant factor is the size of the pie: participants are less likely to reject a share of a large (1000€) pie than a share of a small (100€) pie.

Eckel & Grossman (2001) find more rejections by males in ultimatum games. In our study we find with 0.444 a positive, but insignificant male effect. The effect of lab is with -14.1 negative but not significant.

Expected offers: Similar to equation (1) we explain expected relative offers o^E:

$$o^E = \beta_1 \cdot d_1 + \beta_{1000€} \cdot d_{1000€} + \beta_{\text{age}} \cdot \text{age} + \beta_{\text{Internet}} \cdot d_{\text{Internet}} + \\ + \beta_{\text{lab}} \cdot d_{\text{lab}} + \beta_{\text{male}} \cdot d_{\text{male}} + \nu_i + \epsilon_{ik} \quad (3)$$

Table 4 shows estimation results for equation (3) in column 1 as well as estimation results for an augmented version where we also include own offers. Both specifications find male participants to be more optimistic—significantly so once we control for offers. Also both specifications find participants in the lab to be significantly more pessimistic.

Expected rejection rates: As in equation (2) we explain expected rejection rates (elicited as "expected average frequencies" in the experiment) with a logistic regression with random effects. Since the rejection by another

Table 4 Random effects estimation of equation 3 for expected offers

	1	2
(Intercept)	0.331^{***}	0.181^{***}
	$[0.296; 0.366]$	$[0.148; 0.215]$
1000€	-0.015^{*}	-0.008
	$[-0.031; -0.000]$	$[-0.021; 0.004]$
age	0.002^{***}	0.001
	$[0.001; 0.002]$	$[0.000; 0.001]$
internet	-0.047^{***}	-0.025^{*}
	$[-0.067; -0.027]$	$[-0.042; -0.008]$
lab	-0.056^{**}	-0.053^{**}
	$[-0.093; -0.019]$	$[-0.086; -0.021]$
male	0.005	0.014^{*}
	$[-0.012; 0.023]$	$[-0.001; 0.030]$
offer		0.458^{***}
		$[0.414; 0.502]$
indep.obs.	817	817
N	1634	1634

Confidence intervals and p-values are based on a parametric bootstrap with 1000 replications.

person can not depend on the own expectation equation 4 does not contain the expected offer o^E.

$$P(\text{reject}) = \mathcal{L}\Big(\beta_1 \cdot d_1 + \beta_{1000€} \cdot d_{1000€} + \beta_{\text{lab}} \cdot d_{\text{lab}} + \beta_{1000€\times\text{lab}} d_{1000€} d_{\text{lab}} + \beta_{\text{age}} \cdot \text{age} + \beta_{\text{Internet}} \cdot d_{\text{Internet}} + \beta_{\text{male}} \cdot d_{\text{male}} + \nu_i\Big) \quad (4)$$

We show results in Table 5. As in the comparison of actual with expected offers in equation (1) and (3), also estimation results for actual and expected rejection rates in equations (2) and (4) yield similar results. Correctly, participants expect smaller rejection rates when stakes are higher. Expected rejection rates are smaller in the lab, but not significantly so.

Table 5 Random effects estimation of equation 2 for expected rejection rates

	β	σ	z	p value	95% conf	interval
(Intercept)	-1.34	0.247	-5.44	0.0000	-1.83	-0.859
age	0.00584	0.00433	1.35	0.1782	-0.00266	0.0143
Internet	0.0386	0.139	0.278	0.7811	-0.234	0.311
lab	-0.443	0.386	-1.15	0.2513	-1.2	0.314
1000€	-0.369	0.127	-2.89	0.0038	-0.618	-0.119
male	-0.167	0.125	-1.33	0.1828	-0.413	0.0788
1000€ × lab	-0.142	0.563	-0.252	0.8009	-1.24	0.961

B Implementation of the experiment:

- The lab experiment with small stakes is described in Gehrig *et al.* (2007).

- The instructions to the newspaper experiment were published on Saturday, 6 September 2008, and on Saturday, 13 September by the Ostthüringer Zeitung (Gera, Germany) as part of their weekend supplement. You find a translation of these instructions below in section B.1.

  In the newspaper article readers would find a link to a web-page. This page repeated the instructions and (on the same page) contained a form which would allow readers to enter their decisions and which was very similar to the decision form in the newspaper.

  The 40 participants who were selected randomly for payment all received a letter at the end of October 2008. They were asked for their bank and their account number. Then their earnings from the experiment were transferred to their bank account. In one case where this was not possible the participant was paid by cheque.

- The lab experiment with high stakes was run in the laboratory of the MPI in Jena on 30. May 2011 and on 1. June 2011. Participants from the subject pool of the MPI and the University were invited via ORSEE (Greiner, 2004) and could register for the experiment over the Internet. All participants who arrived in time for the experiment would get a show-up fee of 2.50€ before the experiment started. Then they would

read the instructions (see section B.1). Thereafter they would enter their decisions on the computer. The 8 participants who were selected randomly for payment were informed on 2 June 2011 via email and received a letter from the MPI until mid June. As in the newspaper experiment their earnings from the experiment were transferred to their bank account.

- The experiment with business executives was done in a pencil and paper format. A translation of the instructions is shown in section B.2.

B.1 Translation of the instructions for the newspaper and lab experiment

[[newspaper:]] As a reader of the Ostthüringer Zeitung you can participate in this experiment which is jointly organised by the Max-Planck-Institut for Economics and the Friedrich-Schiller-University Jena as a contribution to "Jena. Stadt der Wissenschaft 2008".
How can you participate? One possibility is to complete the entire decision form below and send it by mail to the publisher of the Ostthüringer Zeitung. You can also visit our Internet page http://www.kirchkamp.de/ja-nein/ and complete the decision form there.

[[lab:]] This experiment is jointly organised by the Max-Planck-Institut for Economics and the Friedrich-Schiller-University Jena.

What is going on in this experiment? Two participants can divide either 100€ or 1000€. One of them, let us call him X, can can propose how to divide the available amount. The other, we will call him Y, can agree, i.e. say "yes", or disagree, i.e. say "no", not knowing which division has been proposed by X. "Yes" means that the amount is divided as proposed by X, "no" means that both participants get nothing. When X decides on how to divide the amount he does not know whether Y says "yes" or "no". When Y decides on whether to say "yes" or "no", he does not know how the amount is divided by X.

Let us look at an example: We can divide the amount of 1000€. The X-participant demands 450€ for himself and offers 550 € to the Y-participant. If Y has said "yes", then Y receives exactly 550€ and X receives the demanded 450 €. If Y has said "no", then the X- and Y-participant receive both zero €.

As we do not know yet, whether you, if you participate in the experiment, belong to the

[[newspaper:]] 40 | *[[lab:]]* four

randomly selected participants which are paid according to their decisions and the rules that we described above, you have to make decision both the position of the X and the position of the Y. Hence, for the position of the X you have to choose a division of the 100€ and the 1000€. For the position of the Y you have to choose "yes" or "no" for each of the two amounts.

Among all decisions

[[newspaper:]] 40 | *[[lab:]]* four

will be selected randomly.

[[newspaper:]] Twenty | *[[lab:]]* Two

of these will be used for the position of the X and Y, respectively. Hence, we form

[[newspaper:]] 20 | *[[lab:]]* two

pairs of one X and one Y each. Also the position of X and Y is chosen randomly for each participant.

[[newspaper:]] Ten | *[[lab:]]* One

of these pairs will divide 100€,

[[newspaper:]] the remaining 10 pairs | *[[lab:]]* the other pair

will divide 1000 €.

[[newspaper:]] Hence, we will pay at most 11 000€.

Regardless whether you participate by postal mail or by Internet, it is important that you complete the entire decision form. The 40 participants that are selected will be selected only from the submissions where the entire decision form has been completed.

Please make now your decision for both positions that you can have in the experiment:

[[lab:]] Hence, we will pay for the four selected participants at most 1 100€.

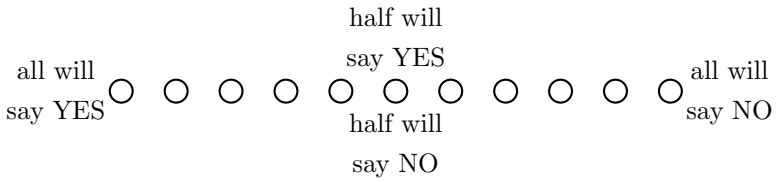
At the end of the experiment you will be informed via email whether you belong to the four selected participants. The divided amount will be, according to your decision, transferred to your account.

In a few minutes you can make your decisions on the computer screen for both roles that you can have in the experiment:

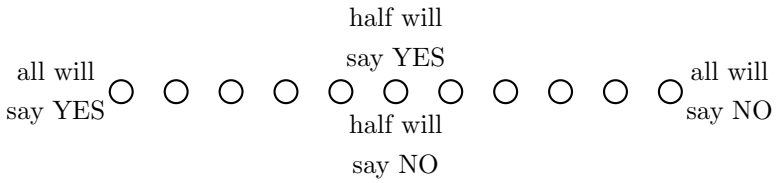
In the newspaper and in the lab the following two sections "You are an X participant" and "You are a Y participant" were presented (horizontally) side by side, X on the left, Y on the right. Participants who completed the form on the Internet would find both sections on one page, just below the instructions, first X and then Y.

You are an X participant

- How, do you think, will the other Y participants decide when the amount is 100 €? Please tick *one* of the following circles.



- How, do you think, will the other Y participants decide when the amount is 1000 €? Please tick *one* of the following circles.



- When 100€ are divided (Please tick *one* of the following circles)...

You demand	5	15	25	35	45	55	65	75	85	95	€
	○	○	○	○	○	○	○	○	○	○	
You offer to Y	95	85	75	65	55	45	35	25	15	5	€

- When 1000€ are divided (Please tick *one* of the following circles)...

You demand	50	150	250	350	450	550	650	750	850	950	€
	○	○	○	○	○	○	○	○	○	○	
You offer to Y	950	850	750	650	550	450	350	250	150	50	€

You are a Y participant How, do you think, will the other X participants behave?

- When 100€ are divided (Please tick *one* of the following divisions)...

they demand	5	15	25	35	45	55	65	75	85	95	€
	○	○	○	○	○	○	○	○	○	○	
they offer to Y	95	85	75	65	55	45	35	25	15	5	€

- When 1000€ are divided (Please tick *one* of the following divisions)...

they demand	50	150	250	350	450	550	650	750	850	950	€
	○	○	○	○	○	○	○	○	○	○	
they offer to Y	950	850	750	650	550	450	350	250	150	50	€

- Your 1st decision: When 100€ are divided (Please tick *one* of the following possibilities)

  ○ I accept the decision of X.

◯ I refuse the decision of X.

- Your 2nd decision: When 1000€ are divided (Please tick *one* of the following possibilities)

  ◯ I accept the decision of X.

  ◯ I refuse the decision of X.

[[For the lab experiment the following section was presented on a separate screen. In the newspaper and also on the web form this section was on the same page as the previous sections.]]

If you are among the 40 selected participants, we also need your name and your address

- Name: .....
- Address: .....

  .....

  .....

  The following fields are optional:

- Age: .....
- Profession: .....
- Sex: male ◯ / ◯ female

B.2 Translation of the instructions for the experiment with business executives

You are an X participant

Question: How probable (in %) is in your opinion a "yes" of the Y-participant if the amount is 100€ and 1000€.

Your answer: If the amount is 100€ I expect a "yes" with a probability of... %. I expect a "no" with a remaining probability of... %.
If the amount is 1000€ I expect a "yes" with a probability of... %. I expect a "no" with a remaining probability of... %.

Your first decision: When 100€ are divided,

- I demand... € for me and
- I offer Y exactly... €

(please enter only integer €-amounts between 5 and 95. The sum of both amounts must be 100€.)

Your second decision: When 1000€ are divided,

- I demand...€ for me and
- I offer Y exactly...€

(please enter only integer €-amounts between 5 and 995. The sum of both amounts must be 1000€.)

You are a Y participant

Question: How much, do you think, will the other X participant offer you when 100€ or 1000€ can be divided?

Your answer: I expect to be offered...€ when 100€ are divided (please enter only integer €-amounts between 5 and 95.)
I expect to be offered...€ when 1000€ are divided (please enter only integer €-amounts between 5 and 995.)

Your first decision: When 100€ are divided, I accept ☐ or I refuse ☐. (Please tick only one box, and only the one you prefer!)

Your second decision: When 1000€ are divided, I accept ☐ or I refuse ☐. (Please tick only one box, and only the one you prefer!)