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DOI: https://doi.org/10.1007/s11238-013-9364-5

Theory & Decision manuscript No.
(will be inserted by the editor)

Entitlement and the efficiency-equality trade-off: an experimental study

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Received: date / Accepted: date

Abstract When randomly assigning participants to experimental roles and the according payment prospects, participants seem to receive "manna from heaven". In our view, this seriously questions the validity of laboratory findings. We depart from this by auctioning off player roles via the incentive compatible random price mechanism thus avoiding the selection effect of competitive second price auctions. Our experiment employs the generosity game where the proposer chooses the size of the pie, facing an exogenously given own agreement payoff, and the responder is the residual claimant. We find that entitlement crowds out equality seeking and strengthens efficiency seeking. More generally, we find that inducing entitlement for the roles in which participants find themselves makes a difference. Interpreting participants' willingness to pay for their role as their aspiration level further allows to test satisficing and

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explore 'mutual satisficing'. We find that responder participants apparently do not anticipate proposer generosity in aspiration formation.

Keywords entitlement · equality · efficiency · satisficing

1 Introduction

So far experimental economics suffers from the "manna from heaven" tradition questioning its internal and external validity. The few exceptions include (i) experiments in which player roles are auctioned off (Güth and Schwarze, 1983; Güth and Tietz, 1986), (ii) advanced production experiments letting participants first produce what they later distribute (e.g. Mikula, 1973; Hackett, 1993; Königstein, 2000; Gantner *et al.*, 2001; Cappelen *et al.*, 2007), (iii) real effort experiments (e.g. Bosman and van Winden, 2002; Rutström and Williams, 2000), and (iv) experiments assigning roles according to unrelated quiz scores (e.g. Hoffman and Spitzer, 1985).

Here we follow the first way of inducing entitlement but employ the incentive compatible random price mechanism (Becker *et al.*, 1964) in order to avoid the selection effect of competitive second price auctions. Participants first bid for buying the role in the game and then play the game only if they have bought their respective role.

The specific game whose roles may be bought is the generosity game (Güth *et al.*, 2012) offering two player roles: proposer and responder. The proposer chooses the size of the pie which the responder and residual claimant can accept or reject. In case of acceptance the payoff of the proposer is exogenously given whereas the responder collects what is left from the pie after paying the proposer.Unlike in the ultimatum or dictator game, there is thus no trade-off between proposer and responder payoff in the generosity game: giving more to the responder is no sacrifice for the proposer.

The generosity game has been used to study the trade-off between equity (e.g. Homans, 1961) and efficiency seeking: Will proposers seek equality by selecting a pie size twice as large as their own agreement payoff or will they choose the largest possible pie size to maximize the sum of payoffs? Güth *et al.* (2012) have shown for the two-person generosity game with random role assignment that pie choices are either efficiency or, less frequently, equality seeking.[1]

Will inducing entitlement via auctioning off roles with the help of the random price mechanism for each individual participant change the observed equality-efficiency focus? What we observe is that even when the right to play the generosity game has to be bought, participants care more for efficiency than for equality, but that inducing entitlement further strengthens efficiency seeking.

[1] For a theoretical and experimental study of three-person generosity games in which either the responder or a third "dummy" player is the residual claimant, see Güth *et al.* (2010).

Interpreting, similar to Güth and Schwarze (1983), participants' willingness to pay for their role as their aspiration level for what they want to earn in the generosity game, we also test satisficing (Simon, 1955). Due to asking participants for hypothetical bids for the other role, we further explore mutual satisficing (see Friedlander and Pickle, 1968) in the sense that (i) proposers choose pie sizes larger or equal to the sum of own actual and hypothetical bid, and (ii) responders accept pie choices larger or equal to the sum of their own actual and hypothetical bid. Measuring a priori-aspirations via bids for playing the game suggests quite modest aspirations.

Our study propagates a convincing method to explore behavior based on entitlement and questions far reaching conclusions from experiments in the "manna from heaven" tradition.[2]

The remainder of the paper is organized as follows. In section 2, we describe our design and experimental procedures. In section 3, we derive our behavioral predictions. In section 4, we present and analyze the data. Section 5 concludes.

2 Experimental design

In the two-person generosity game experiment, participants are either in role X, the proposer, or in role Y, the responder. Proposer X first chooses the pie size $p \in \left[\underline{p}, \overline{p}\right]$ with $\underline{p} = 7$ and $\overline{p} = 17$ which then responder Y, being informed about p, either accepts, $\delta(p) = 1$, or rejects, $\delta(p) = 0$. In case of rejection both earn 0 whereas, in case of acceptance, proposer X gets an exogenously given payoff x and responder Y collects the residual $p - x$. We imposed $0 < x = 6 < \underline{p} = 7 < 2x = 12 < \overline{p} = 17$. The payoffs for all possible decisions $(p, \delta(p))$ are $\delta(p)\, x$ for X and $\delta(p)\,(p - x)$ for Y. Due to $x = 6 < 7 = \underline{p}$, the residual $p - x$ is positive for all $p \in \left[\underline{p}, \overline{p}\right]$. Thus, $\delta(p) \equiv 1$, i.e. universal acceptance by Y and any $p\ in\ \left[\underline{p}, \overline{p}\right]$ define an equilibrium when both players are known to be opportunistic.

Participants are randomly assigned to possibly buy role $i = X$ or role $i = Y$, i.e. an individual participant is either a potential X- or a potential Y-participant. To possibly play the game as player $i = X, Y$, each participant i submits a bid $b_i \in [0, B = 13]$ with $B = 13 < \overline{p} = 17$ facing a random price mechanism: a random variable $r_i \in [1, B - 1 = 12]$ is drawn according to the uniform density function on this interval: A participant with bid b_i acquires the right to play in the role of player $i = X, Y$ if $r_i \leq b_i$. In this case, the i-participant gets what he earns in the role of player i minus the accepted random price r_i. If, however, $r_i > b_i$, i.e. the random price r_i is rejected, then the i-participant does not acquire the right to play and neither earns from acting in the role of player i nor has to pay anything.

Clearly, this incentive compatible mechanism should induce an i-participant to bid his certainty equivalent. for the prospect of playing the generosity game in the role of player $i = X, Y$. For X the only uncertainty is whether the choice

[2] See for opposite results Cherry *et al.* (2005) who find no entitlement effect in public good experiments and Ruffle (1998) whose experimental workhorse is the ultimatum game.

of p will be accepted;[3] for Y the certainty equivalent is $(p-x)$ for a given p if Y is only interested in own payoff.

We implemented the generosity game in its normal form to obtain more informative strategy data for Y-players. After randomly assigning the roles $i = X$ and $i = Y$ for which a participant could bid (half of the participants for the X-role and half for the Y-role), i-participants were asked for their bids b_i. X-participants choose the pie size $p \in \left[\underline{p}, \overline{p}\right]$, knowing their own bid but not the realization of r_i (i.e. $X-$participants did neither know whether their bid had been successful ($r_i \leq b_i$) or not ($r_i > b_i$) nor the price to be paid for their role). Y-participants, also not knowing whether their bid had been successful and, if so, the price of their role, decide for all possible pie choices p whether to accept ($\delta(p) = 1$) or not ($\delta(p) = 0$). To render the strategy method applicable for responder Y, only integer pie choices $p \in \left[\underline{p},\ overline{p}\right]$ are allowed.

The role of fairness in the experimental game with induced entitlement is not at all obvious. To see this, assume that the choice and acceptance of $p = 2x = 12$ (equal payoffs) would be commonly judged as fair so that $b_x = x = b_y$ would be the optimal bids. In the same way one can argue for other commonly expected and accepted pie choices p like, for example, $p = \overline{p} = 17$, suggesting the bids $b_x = x$ and $b_y = \overline{p} - x$. Thus, gains would result only from random prices smaller than bids. While the positive difference between bid and random price may vary for the two roles, participants have no way to "share" their potential, but unknown gains from lower random prices.

Participants played the generosity game with its preceding bidding phase for altogether 12 rounds, of which two were randomly chosen for payment. There was no feedback in between. Thus, how a participant behaves is role-specific, but otherwise totally idiosyncratic. The reason for repeating the bidding and playing-game is that participants may only learn to anticipate how bidding against a random price and possibly playing the game affect their earnings. Thus possible dynamics in the sense of changing behavior across rounds reflect only more familiarity with a complex decision environment in later rounds.

For each round, we determined for all i-participants whether they bought their role i or not. Participants acquiring their role $i = X, Y$ were randomly matched with a j-participant ($i, j = X, Y, j \neq i$) having acquired the other role.[4] The payoffs in the game implied by the strategies of the respective i- and j-participant, minus their individual costs for buying their role, determined participants' payoffs for the two chosen rounds.[5] Individual bids b_i remained

[3] According to the findings by Güth *et al.* (2012) from their "manna from heaven" experiment, this risk is negligible for pie sizes $p \geq 2x$.

[4] As there might not have been an equal number of X- and Y-participants acquiring the X- and the Y-role in each session, we used the decision of some participants repeatedly but, of course, paid them only once, according to a randomly selected partner. Since there is no feedback information the fact that one participant affects the payoffs of several others (without knowing this) is unproblematic.

[5] The costs r_i for acquiring role $i = X, Y$, may exceed what was subsequently earned in the generosity game, e.g. due to $\delta(p) = 0$. Possible losses were subtracted from the show-up fee or could be paid out of pocket when exceeding the show-up fee. Otherwise, participants

private information to provide a best-case scenario for equal payoffs (proposal and acceptance of $p = 2x$). We graphically illustrate the experimental process by the timeline diagrams (Figure A1 and Figure A2 in Appendix A).

The instructions (Appendix C) first explain the random price mechanism eliciting the willingness to pay and then introduce the rules of the generosity game. Subsequently, some control questions are asked to check whether the rules of the generosity game and those for buying the player roles - including the optimality (weak dominance) of truthful bidding - are understood. The latter has been checked by a pre-phase with experimentally induced values to see whether participants actually accept truthful bidding as optimal. The share of participants not deviating by more than one experimental currency unit (ECU) from the induced value is 62%, i.e. the majority of participants opted for truth-telling.[6]

The experiment was programmed in z-tree (Fischbacher, 2007). We ran four sessions with 32 participants in three sessions and 31 participants in one session. Participants were students of the University of Jena (Germany). Average age was 24.6 years and 57 percent of participants were female. In each session, participants played 12 rounds. Participants were told that they would be matched randomly. The 12 rounds lasted on average 25 minutes. Earnings, including a show-up fee of 2.50 euros and earnings from the experimental pre-phase, ranged from 0.50 to 46.10 euros. On average, participants received 17.09 euros.

3 Behavioral predictions

3.1 *Pie choices and acceptance*

How could entitlement affect the outcome of the generosity game? Having to *pay* for playing the game, proposers may want to make sure that their offer is accepted and that they do not incur a loss. Further, being aware that Y-participants also paid dearly for playing the game, suggests an additional reason for proposer generosity:

Prediction 1 (Entitlement effects): Compared to the generosity game experiment with randomly assigned roles with double-peaked pie choices ($p = 2x$ and $p = \overline{p}$), pie choices by X-players in the generosity game with entitlement will be single-peaked at $p = \overline{p}$.

had to fulfill an additional task at the end of the experiment to cover their losses. This occurred only twice, and as we had participants register for a long enough time interval to cover potential losses, none of the participants left the experiment with negative earnings. The instructions clearly stated that payoffs amount to the earnings from the generosity game minus the role price. One of the provided examples in the instructions (see Appendix C, example 2) showed that negative payoffs were possible.

[6] Exogenously induced true values avoid the problem that the true value may depend on the random price (see Horowitz, 2006).

Concerning Y-players, the picture is less clear: On the one hand, responders might reject p-choices below $2x$ *less* often than observed in a situation without entitlement to avoid or reduce losses due to paying for their role. On the other hand, Y-players might also perceive pie choices $p < 2x$ as unacceptable.

In our view, not informing participants whether or not having bought their role and also not of the role price is a worst case scenario for observing treatment differences between with and without entitlement, i.e. entitlement effects. Of course, when providing this information, the random price might matter too. For example, entitlement might increase with the random price one has to pay.

3.2 *Bids*

We interpret participants' bids as a priori-aspirations[7] for what one expects or wants to earn in the role for which one is bidding (see Güth and Schwarze, 1983). Bids should comply with $b_x \leq x$ for X-players and with $b_y \leq (\widehat{p}_y - x)$ for Y-players where $\widehat{p}_y$ represents the pie choice that the responder expects, e.g. $\widehat{p}_y = 2x$. If Prediction 1 is confirmed, and if responders have rational expectations this would imply $\widehat{p}_y = \overline{p}$ and $b_y = \overline{p} - x$.[8]

Prediction 2 (Satisficing): Participants in the role of player $i = X, Y$ earn in at least b_i from playing the generosity game.

"Mutual satisficing" in bidding is understood as $b_x + b_y \leq p$. Since participants did not know their counterparts' bids, we elicited hypothetical bids concerning the other role by asking: "Which $\widehat{b}_y \left(\widehat{b}_x\right)$ would you bid if you were a $Y(X)$-participant?" If motivated by mutual satisficing and expecting others to decide as oneself,[9] proposers X should bid according to $b_x + \widehat{b}_y \leq p$ with $\widehat{b}_y$ as their hypothetical bid for role Y and p as their actual choice. Similarly, responders Y should comply with $(\widehat{b}_x + b_y) \leq \widehat{p}_y$ with $\widehat{b}_x$ as their hypothetical bid for role X and $\widehat{p}_y$ as their expected X-choice.[10]

[7] We cannot use the a posteriori-aspirations because they might be biased when the actual price is much lower than the bid.

[8] To explore whether or not participants have rational expectations concerning the behavior of the other player in the subsequent generosity game, we asked participants what they expect their counterparts to choose. Specifically, we asked proposers X which responder choice $\widehat{\delta}(p)$ for their chosen p-value they expect. Responders Y were asked: "Which p-choice by X do you expect $(\widehat{p}_y)$?" Of course, also the bids b_i are informing about such expectations.

[9] Such reasoning may, of course, be a false consensus when behavior is heterogeneous.

[10] These questions (including the ones on proposer and responder expectations, see footnote 9) were asked in each round. Although one might be concerned that participants would not answer them carefully and although hedging confounds have been shown not to be a major problem (see Blanco *et al.*, 2009), we refrained from incentivizing these questions to not cognitively overburden participants. Answering the questions regarding hypothetical behavior and expected behavior of one's counterpart might be considered as a "mental preparation" for own decisions.

Both, X- and Y-participants might bid less than their expected payoff due to stochastic and strategic uncertainty aversion. Stochastic uncertainty results from the random price since the actual price r_i is unknown when playing the generosity game.

Prediction 3 (mutual satisficing): The sum of the actual bid b_x, resp. b_y, and the hypothetical bid $\widehat{b}_y$, resp. $\widehat{b}_x$, for the other role will be substantially lower than $\overline{p}$ and possibly even lower than $2x$.

4 Experimental results

As in former experimental studies of the generosity game (Güth *et al.*, 2012 for the two-person game and Güth *et al.*, 2010 for the three-person game), we want to study the inclinations of inexperienced participants and not the learning or evolutionary dynamics based on feedback information about previous plays. Due to the more complex experimental protocol letting participants play just once, seemed, however, inadequate. Participants may change their mind and behavior after becoming more familiar with the experimental procedure. In Figure B1 and B2 (see Appendix B), we graphically illustrate that there are no striking familiarity effects when classifying bids by being smaller than, equal to or larger than 6 what would be implied by proposing and accepting $p = 12$. This is done repeatedly for X- and Y-participants. In our subsequent data analysis we thus can rely on first or last round as well as on average choices of individual participants.

4.1 *Pie choices and acceptance*

According to Prediction 1, the choice of the equality mode $p = 2x$ by player X should be negligible compared to the case of no entitlement. In fact, we find evidence for an entitlement effect:

Result 1.1: In case of entitlement, $p = 2x$ is chosen significantly less often than in the experiment without entitlement: with entitlement, only 16% (13%) of proposers choose $p = 2x = 12$ in the first (last) round (see Figure 1 for the results of the first round) compared to 40% in the generosity game experiment without entitlement (see Güth *et al.* 2012). Applying a binomial test for Prob$\{p = 2x\}$, crowding out of equality seeking by entitlement is highly significant.

Further, we also find an entitlement effect on the part of responders: Y-participants reject p-choices below $2x$ more often than in the experiment without entitlement.

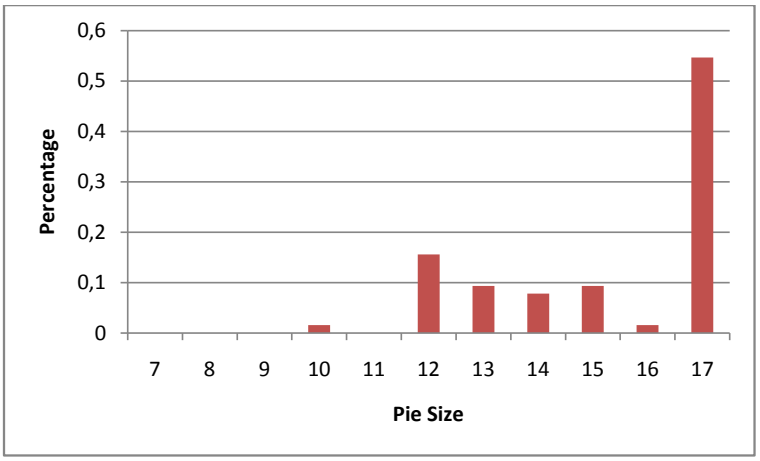

Fig. 1 *Percentages of Chosen Pie Sizes (First Round),* $x = 6$

Result 1.2: Compared to the generosity experiment without entitlement with rejection rates varying between 47% ($p = 7$) and 12% ($p = 11$) for pie sizes $p < 2x = 12$ (see Güth *et al.* 2012), responders in the generosity game with entitlement show substantially higher rejection rates for all pie sizes $p < 2x = 12$. More specifically, the rejection rate for $p = 7$ in the first (last) round is 70% (56%), i.e. 44 (35) of 63 participants rejected $p = 7$, and even for $p = 11$ it is 22% (27%), i.e. 14 (17) of 63 participants rejected $p = 11$ (see Figure 2 for the results of the first round).

4.2 *Bids*

Concerning bids, on average more than 67% of X-participants bid less than x, 26% bid exactly x, and 7% bid more than x, thereby risking a loss when r_i is between x and their bid. Overbidding x, i.e. $b_x > x$, is rare compared to $b_x \leq x$. The average (median) bid by X-participants amounts to $b_x = 5.21$ ($b_x = 5.5$).[11] The corresponding data for Y-participants are: 59% bid less than x, 18% bid exactly x (expecting equality seeking proposers choosing $p = 2x$), and 23% bid more than x (hoping for efficiency minded proposers). The average (median) bid by Y-participants is $b_y = 5.22$ ($b_y = 5$). On average, Y-participants do not increase their bids in later rounds (see Figure B2 in Appendix B). There are very few bids $b_y\,(t)$ exceeding 6 even in later rounds, i.e. responders Y do not anticipate proposer generosity.

[11] For X-participants there are no monotonic aggregate dynamics (see Figure B1 in Appendix B). The distribution of bids $b_x\,(t)$ does not differ significantly across rounds $t = 1, ...12$ according to a Mann-Whitney U test comparing pairs of rounds (significance levels > 0.1 for all $t = 1, ..., 12$).

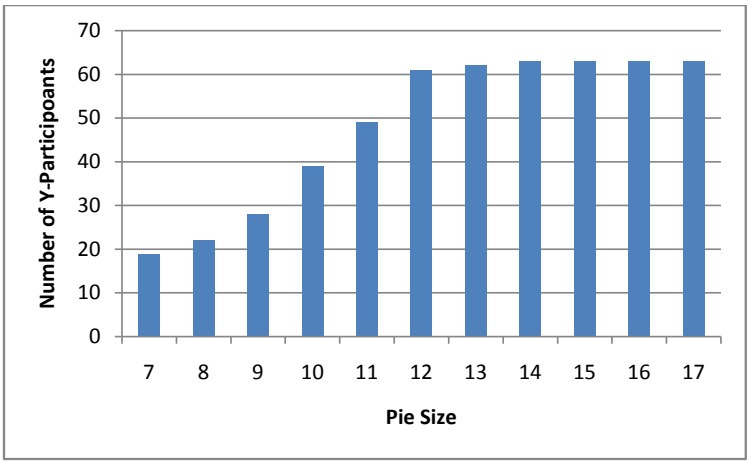

Fig. 2 *Responders' Acceptance Rates (First Round)*

Table 1 *Classification of Bids according to Expected Counterpart Strategy*

	Relation	Frequency
X-Participant	$b_x \geq \widehat{\delta}\,(p)\,x$	251
(for chosen p)	$b_x < \widehat{\delta}\,(p)\,x$	516
Y-Participant	$b_y \geq \widehat{p}_y - x \geq 6$	98
	$b_y \geq \widehat{p}_y - x < 6$	65
	$b_y < \widehat{p}_y - x \geq 6$	568
	$b_y < \widehat{p}_y - x < 6$	25

For X-participants, ambitious bids $b_x \geq \widehat{\delta}(p)x$ are observed in less than one third of all cases (251 out of 767), i.e. most X-participants include a risk premium in view of their own hypothetical responder choice (see Table 1). Similarly, Y-participants overwhelmingly also include a risk premium by bidding less than their expected payoff ($\widehat{p}_y - x$): 593 (=568+25) out of 753 bids by Y-participants were below the expected payoff.

Result 2: In most cases we observe satisficing behavior in the sense that participants in the role of player $i = X, Y$ bid less than what they expect to earn.

In view of "mutual satisficing" ($b_i + \widehat{b}_j \leq \overline{p};\ i, j = X, Y; i \neq j$), the average actual bid b_x, resp. b_y, and the average hypothetical bid $\widehat{b}_y$, resp. $\widehat{b}_x$, add up to 10.43. Hence, the sum of bids is much smaller than $\overline{p} = 17$ and also significantly smaller than $2x = 12$ (significance level < 0.01). For Y-participants there

seems to be a familiarity effect, i.e. bid sums decrease across rounds (see Figure B3 in Appendix B). Comparing the evidence displayed in Figure B2 and Figure B3, this familiarity effect seems to be driven by Y-Participants adapting their hypothetical bids $\widehat{b}_x$ and not their own bids b_y.

Result 3.1: The average sum of own actual and hypothetical bids is smaller than $2x = 12$ confirming Prediction 3. Furthermore, the sum of the two bids by Y-participants is significantly lower than the sum of the two bids by X-participants (significance level < 0.06). Y-participants apparently do not fully anticipate the strong efficiency seeking by X-participants, illustrated in Figure 1.

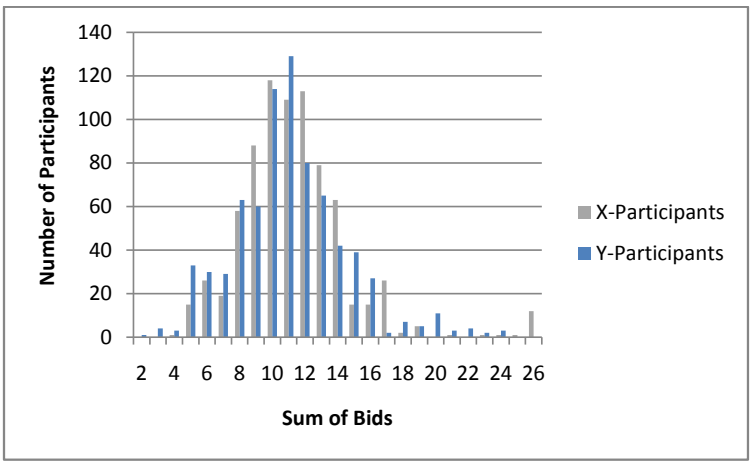

Fig. 3 *Distribution of Sums of Own Actual Bid and Hypothetical Bid*

Figure 3 visualizes the distribution of bid sums, separately for X- and Y-participants: low sums are more often observed for Y- than for X-participants. Apparently, Y-participants fear spiteful X-participants. Efficiency (sum of bids equal to 17) is rarely observed for X-participants and not at all for Y-participants. The massive concentration of the sum of bids for both types of participants is close to $2x = 12$. Assuming that bids represent the payoff aspirations of participants and that hypothetical bids represent the expected payoff aspirations of the other participants, the fact that the sum of own actual and other hypothetical bid is about twice as large as the own bid, suggests that mutually satisficing participants assign their respective counterparts about the same payoff aspirations as themselves.

Result 3.2: When bidding for their own and hypothetically for the other role, both X- and Y-participants are mainly focusing on equality, with Y-participants, however, being less confident.[12]

5 Conclusion

In experiments of the two-person generosity game without entitlement, proposer participants either display generosity by choosing the maximal pie size or are equality seeking by proposing equal agreement payoffs for both players. Inducing entitlement via the incentive compatible random price mechanism crowds out equality and strengthens efficiency seeking. Similarly, responders paying for their role more often reject unfair pie choices $p < 2x$. Using the bid data from the random price mechanism to test satisficing, we find average payoff aspirations to be rather modest and below average, actual and expected, earnings.

The "manna from heaven" tradition of experimental economics is obviously problematic and biasing game playing behavior. Compared to earlier studies inducing entitlement, we avoid the selection bias of strategic auctions which let only the most ambitious participants play the game what often implies losses of such participants.

Providing entitlement in laboratory studies induces participants to exploit the advantages of their position what should improve the internal and external validity of experimental findings (Güth and Kliemt, forthcoming). We observe clear entitlement effects. In our view, similar to "equality seeking", also other experimental findings may be questioned when properly inducing entitlement.

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[12] Note that responders did not learn to anticipate the strong efficiency concerns of proposers due to not receiving feedback information.

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Appendix A: Timeline of the Experimental Procedure

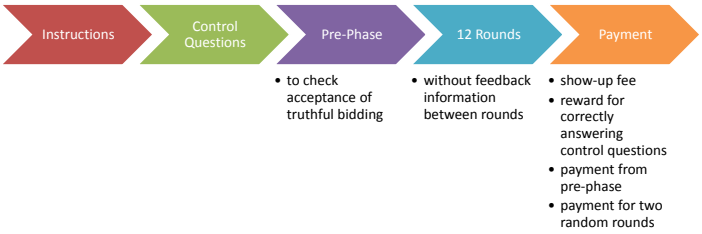

Figure A1: Overview of the Experimental Procedure

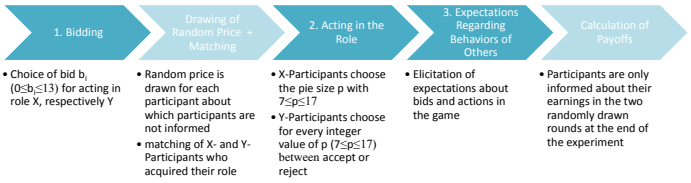

Figure A2: Steps of a Round

Appendix B: Familiarity Dynamics of Bids

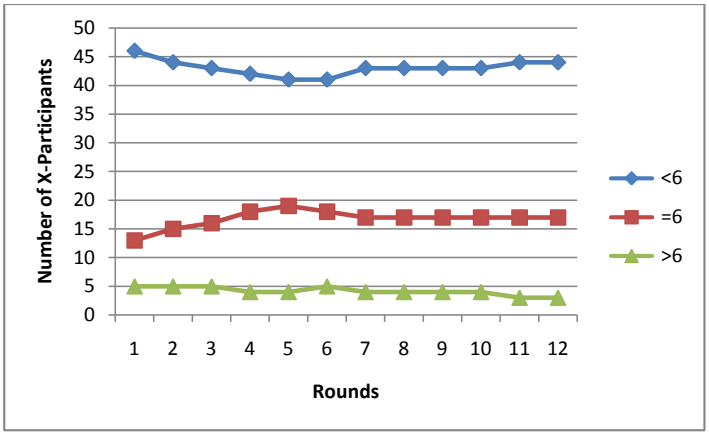

Figure B1: Frequency of Bids by X-Participants over 12 Rounds

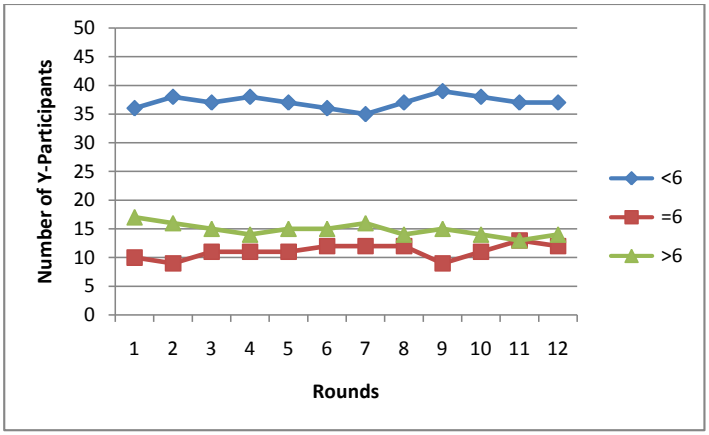

Figure B2: Frequency of Bids by Y-Participants over 12 Rounds

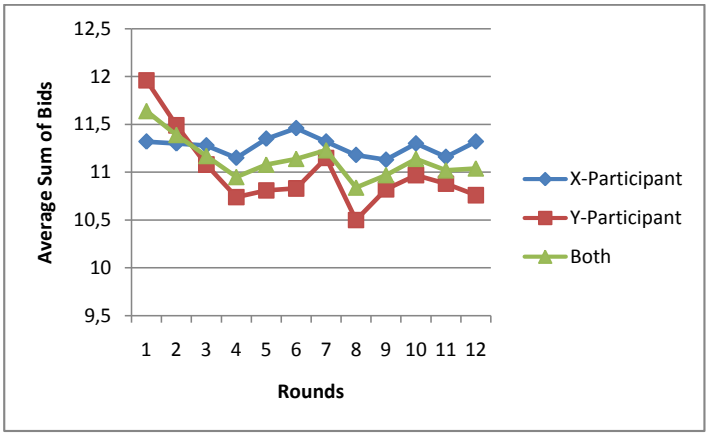

Figure B3: Average Sum of Own Actual Bid and Hypothetical Bid over 12 Rounds

Appendix C: Instructions

Welcome and thanks for participating in this experiment. You will receive 2.50 euros for having shown up on time. Please remain quiet and switch off your mobile phone. Please read the instructions — which are the same for everyone — carefully. You are not allowed to talk to other participants during the experiment. If you do not follow these rules, we will have to exclude you from the experiment and therefore from any payment. To make sure you have understood the instructions, you have to answer several control questions before you can begin with the experiment. You will receive 3 euros for correctly answering the control questions. If you answer a control question three times incorrectly, you will be excluded from the experiment. If you have a question, please raise your hand. An experimenter will then come to you and answer your question in private. The show-up fee of 2.50 euros, the 3 euros for answering the control questions, as well as any additional amount of money that you may earn during the experiment, will be paid out to you in cash at the end of the experiment. The payments are made in private so that no other participant will know the amount of your payment. In the experiment, all amounts are denoted in ECU (experimental currency units). At the end of the experiment, the ECU earned will be converted into euros according to the following exchange rate:

$$1 \text{ ECU} = 2 \text{ euros}$$

Please note that it is also possible to incur losses in this experiment. In this case, you can choose whether you pay for the incurred losses out of your own pocket or compensate for them by fulfilling an additional task at the end of the experiment. In this task, you will be asked to search for certain letters in a text and to count them. By doing so, you can compensate a 1 euro loss

per extra task. Please note that these additional tasks can only be used to counterbalance possible losses but not to increase your earnings.

Proceedings of the Experiment

The experiment consists of a pre-phase, followed by twelve rounds with the identical course of action in every round. You will be paid for the pre-phase and two of the following twelve rounds. One of these two payoff relevant rounds is randomly drawn from the first six rounds, and the other from the second six rounds. In every round, two participants will interact with each other just once; afterwards, new pairs will be formed. Hence, it is very unlikely that you will encounter the same participant twice in the course of the experiment. Your identity will not be revealed to any other participant.

At the outset of the experiment, you will be assigned one of two possible roles: X or Y. You will be informed of your role following the pre-phase, i.e., at the beginning of the first round. You will keep your role through all twelve rounds of the experiment. However, whether you will be able to act in your role depends on luck as well as on how much you are willing to pay for the opportunity to act in your role.

1. Part: Instructions for acquiring the role

Following the pre-phase, i.e., at the beginning of the first round, half of the participants are randomly selected as candidates for role X and the other half as candidates for role Y. Thus, an X-candidate cannot acquire the role of Y, and vice versa.

At the outset of the first round, you will be told whether you are an X- or an Y-participant, and thus, which role you can acquire. You are then asked to name the maximal price b you are willing to pay to act in your designated role in this round. As your willingness to pay b, you can choose a number between 0 and 13 ECU (at most two decimal places): $0 \leq b \leq 13$.

Subsequently, we randomly draw the actual price r that you would have to pay to acquire the right to act in your designated role in the given round. The actual price r is a number between 1 and 12 ECU (at most two decimal places): $1 \leq r \leq 12$. If the actual price r is higher than your maximal willingness to pay $b (r > b)$, you do not acquire the right to act in your role. Consequently, your payoff for this round is zero. If the actual price r does not exceed the price you named, $b, (r \leq b)$, then you acquire the right to act in your role in that round and pay the amount r for it.

If you acquire the right to act in your designated role in a given round, you can earn a payoff (see part 2). The price r, which you paid for the acquirement of your role, will be subtracted from this payoff. However, if you do not acquire your role, you will receive no payoff and do not have to pay for acting in your role.

We recommend[13] that you choose b so that you are indifferent between "paying b and acting in the role with the prospect of receiving a payoff"and "not paying b (if the randomly drawn actual price r equals your bid b) and receiving a zero payoff". If you choose a price b that lies below your true maximal willingness to pay, you may not acquire the right to act in your designated role even though you would have been willing to pay for it. If you choose a price b that lies above your true maximal willingness to pay, you might be required to pay more for acting in your role than you are willing to pay.

Irrespective of whether or not you acquired your role in a given round of the experiment, you will be asked in each round to make the decisions in your role according to the following instructions:

2. Part: Instructions for acting in the role

In each round, each pair of X- and Y-participants can share a certain amount of ECU. In the following, we will abbreviate this amount of money by p.

- If you are the X-participant in your pair, it is your task to propose the amount of money p to be shared. More specifically, you can propose the amounts p, i.e., 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or 17 ECU. Independently of the amount of money p you propose, you will always receive 6 ECU for yourself, and the remaining $(p-6)$ ECU of the amount will be offered to Y. For example, if you propose $p = 7$, you may claim 6 ECU for yourself, and 1 ECU will be offered to Y; if you propose $p = 8$, you may claim 6 ECU for yourself, and 2 ECU will be offered to Y, and so on.
- If you are the Y-participant in your pair, it is your task to decide for each possible amount of money p that X may propose, if you "accept" or "reject" it. You will face the following table on your computer screen:

	Amount of money p										
	7	8	9	10	11	12	13	14	15	16	17
Accept	o	o	o	o	o	o	o	o	o	o	o
Reject	o	o	o	o	o	o	o	o	o	o	o

For every amount of money p, you have to specify in advance whether you accept or reject it by clicking the corresponding button (i.e., you are required to take 11 decisions per round).

After all participants have made their choices, your earnings and the earnings of the other participant in your pair will be determined as follows: for the amount of money p actually proposed by the X-participant, the computer will

[13] We have decided for such a "recommendation" rather than proving why this is the only dominant strategy and then testing the acceptance of this proof by a pretest (see Güth and Tietz 1986).

check whether the respective Y-participant in the pair accepted this amount. If so, X will earn 6 ECU and Y will earn (p – 6) ECU. If Y rejected the amount of money chosen by X, then both X and Y will earn nothing.

The possible earnings that the two participants in the pair will receive are summarized in the table below:

		X earns in euro	Y earns in euro
X chooses $p = 7$	Y accepts	6	1
	Y rejects	0	0
X chooses $p = 8$	Y accepts	6	2
	Y rejects	0	0
X chooses $p = 9$	Y accepts	6	3
	Y rejects	0	0
X chooses $p = 10$	Y accepts	6	4
	Y rejects	0	0
X chooses $p = 11$	Y accepts	6	5
	Y rejects	0	0
X chooses $p = 12$	Y accepts	6	6
	Y rejects	0	0
X chooses $p = 13$	Y accepts	6	7
	Y rejects	0	0
X chooses $p = 14$	Y accepts	6	8
	Y rejects	0	0
X chooses $p = 15$	Y accepts	6	9
	Y rejects	0	0
X chooses $p = 16$	Y accepts	6	10
	Y rejects	0	0
X chooses $p = 17$	Y accepts	6	11
	Y rejects	0	0

Two examples for the course of a round

Example 1: As a willingness to pay b, the X-participant in a pair names the amount of 4.91 ECU. The willingness to pay b of the Y-participant is 7.62 ECU. The randomly generated actual price r is 3.20 ECU for X and 4.33 ECU for Y. Since both participants offered more than the actual price, they acquire the right to act in their respective roles. In his role, X chooses the amount of money p = 15 ECU. Y accepts this amount. Accordingly, both participants receive a payoff from this interaction.

- X receives 6 ECU, from which the price $r = 3.20$ ECU for the acquirement of his role is subtracted. Thus, X's payoff in this round amounts to 2.80 ECU.

- Y receives 15 – 6 = 9 ECU, from which the price r = 4.33 ECU for the acquirement of the role is subtracted. Accordingly, Y's payoff amounts to 4.67 ECU.

Example 2: As a willingness to pay b, the X-participant in a pair names the amount of 7.80 ECU. The Y-participant's willingness to pay b is 5.01 ECU. The randomly generated actual price r is 6.20 ECU for X and 8.03 ECU for Y. In this case, X acquires the right to act in his role, but Y does not. For the following decisions, X is therefore matched with another Y-participant, who acquired his role at a price of 6 ECU. In his role, X chooses an amount of p = 13 ECU. Y refuses this amount. Accordingly, both participants do not receive a payoff but need to pay the price for the acquirement of their role.

- X receives 0 – 6.20 = - 6.20 ECU
- Y receives 0 – 6 = - 6 ECU

Your payoff

Your final payoff consists of:
An amount of money for showing-up on time (2.50 EUR)
+ an amount of money for answering the control questions correctly (3 EUR)
+ earnings from the pre-phase
+ earnings from a round randomly drawn from rounds 1-6
+ earnings from a round randomly drawn round from rounds 7-12

Please remain quiet. If you have any questions, please raise your hand.