Journal of Behavioral and Experimental Economics 56 (2015) 55–61

Contents lists available at ScienceDirect

Journal of Behavioral and Experimental Economics

journal homepage: www.elsevier.com/locate/socec

The willingness to pay for partial vs. universal equality Insights from three-person envy games

Agnes Bäker[a], Werner Güth[b], Kerstin Pull[a,*], Manfred Stadler[c]

[a] Faculty of Economics and Social Sciences, University of Tübingen, Nauklerstr. 47, Tübingen D-72074, Germany
[b] Max Planck Institute of Economics, Strategic Interaction Group, Kahlaische Str. 10, Jena D-07745, Germany
[c] Faculty of Economics and Social Sciences, University of Tübingen, Mohlstr. 36, Tübingen D-72074, Germany

ARTICLE INFO

Article history:
Received 2 October 2014
Revised 20 March 2015
Accepted 20 March 2015
Available online 27 March 2015

JEL Classfication:
C72
C91
D63

Keywords:
Equality concerns
Willingness to pay
Envy games
Behavioral economics

ABSTRACT

In three-person envy games, an allocator, a responder, and a dummy player interact. Since agreement payoffs of responder and dummy are exogenously given, there is no tradeoff between allocator payoff and the payoffs of responder and dummy. Rather, the allocator chooses the size of the pie and thus—being the residual claimant—defines his own payoff. While in the dictator variant of the envy game, responder and dummy can only refuse their own shares, in the ultimatum variant, the responder can accept or reject the allocator's choice with rejection leading to zero payoffs for all three players. Comparing symmetric and asymmetric agreement payoffs for responder and dummy shows that equality concerns are significantly context-dependent: allocators are willing to leave more money on the table when universal equality can be achieved than when only partial equality is at stake. Similarly, equality seeking of responders is most prominent when universal equality is possible.

1. Introduction

Equality concerns are usually studied in situations where one person can sacrifice own payoff and at the same time increase the payoff of others – thus reducing inequality between players (see, e.g., Fehr and Schmidt, 1999 or Bolton and Ockenfels, 2000). In our paper, we analyze equality concerns in an envy game (see Casal et al., 2012) where there is no trade-off between own and others' payoff. Studying this game thus enables us to analyze a person's willingness to pay for equality without that money being transferred to the other party—disentangling a person's willingness to pay for equality from the person's willingness to increase the payoff of others (on the relevance of the "price of giving" see, e.g., Jakiela, 2013).

In envy games, allocators do not distribute a given pie as in standard ultimatum or dictator games but rather choose the pie size from some generic interval.[1] Since the other players' agreement payoffs are exogenously given and since the allocator acts as the residual claimant, the choice of the pie size only determines the allocator's agreement payoff and does not affect the agreement payoffs of the others. Hence, there is no trade-off between allocator's and others' payoff. Choosing a pie size below the maximal size is equivalent to leaving money "on the table". Choosing the maximal pie size may indicate that the allocator is efficiency seeking, but it is at the same time also self-serving—potentially provoking feelings of envy[2] on the part of the responder and the dummy player.

Choosing the pie size rather than directly what one, as a proposer participant, demands for oneself possibly makes a difference (see, e.g., List, 2007). But this applies to all experiments where the proposer decides on the size of the pie (e.g., also to generosity experiments, see below). A real life application of the envy game might be a situation where one member of a joint venture has the opportunity to receive a larger reward than the others (e.g., because of an exclusive access to a subsidy program) and where (s)he might not want to take the money in order not to provoke feelings of envy by the other members of the joint venture (especially when envy might result in a break-up of the team).

In the literature, the two-person envy game has been introduced by Casal et al. (2012). Other than Casal et al. (2012), we study the

* Corresponding author. Tel.: +49 7071 2978186.
E-mail addresses: agnes.baeker@uni-tuebingen.de (A. Bäker), gueth@coll.mpg.de (W. Güth), kerstin.pull@uni-tuebingen.de (K. Pull), manfred.stadler@uni-tuebingen.de (M. Stadler).

[1] On the role of equality vs. efficiency concerns in other distribution experiments see, e.g., Engelmann and Strobel (2004), Loewenstein et al. (1989) or Charness and Rabin (2002).

[2] On the role of envy in ultimatum games see, e.g., Kirchsteiger (1994) and on the relation between envy and egalitarian preferences see Kemp and Bolle (2013).

http://dx.doi.org/10.1016/j.socec.2015.03.004

envy game in a three-player context with a proposer, a responder and a dummy player. We do so because we want to study the effect of symmetric vs. asymmetric agreement payoffs for responder and dummy on the proposer's willingness to pay for (universal or only partial) equality. Similarly, Güth et al. (2010) have studied the effect of symmetric vs. asymmetric agreement payoffs in the so-called generosity game where the responder or the dummy player act as residual claimant. In the generosity game, by choosing the maximal pie size, the allocator is not self-serving, but displays *generosity* toward the responder or dummy and thus increases the probability of acceptance. The generosity game was introduced by Güth (2010) and experimentally analyzed in a two-player context by Güth, Levati and Ploner (2012) and by Bäker et al. (2014) where the latter focus on the role of "entitlement".[3]

To disentangle intrinsic equality seeking and a corresponding intrinsic willingness to pay for equality from a willingness to pay that is motivated by fear of rejection, we compare a dictator (DEG) and an ultimatum variant (UEG) of the envy game. In DEG, only intrinsic equality concerns suggest to leave money on the table and forego own payoff for the sake of equality. In UEG, fear of rejection by potentially "envious" responders might add to intrinsic equality concerns and thus increase the willingness to pay for equality. The introduction of a third (dummy) player in both variants (DEG and UEG) allows to compare games with exogenous symmetric and asymmetric agreement payoffs and explore if the allocator's willingness to pay for equality is affected by whether universal or only partial equality is possible.

We find that an allocator's willingness to pay for equality is larger in the ultimatum than in the dictator variant of the game, and that it is—and this is our new finding—context-dependent in the sense that it is larger when universal and not only partial equality can be achieved. That is, allocators in DEG and UEG are more willing to leave money on the table when this results in all players receiving the same payoff (universal equality) as compared to the situation where only partial equality is possible. With respect to the above described application of a joint venture this means that in a situation where the other team members' rewards from the joint venture are unequal from the outset, the readiness to leave money on the table will be reduced.

The remainder of the paper is organized as follows. In Section 2, we introduce the games formally and describe the experimental protocol. In Section 3, we analyze the experimental data and state our results. Section 4 concludes.

2. Experimental design

2.1. The class of games

Let X denote the allocator, Y the responder, and Z the dummy player in the three-person envy game. Further, let p be the pie size, i.e., the monetary amount which the three players can share. The decision process in the UEG is as follows:

- First X chooses $p \in [\underline{p}, \overline{p}]$ where $0 < \underline{p} < \overline{p}$ (for further restrictions on $\underline{p}$ and $\overline{p}$ see below).
- After learning the choice of p, responder Y can either accept ($\delta(p) = 1$) or reject ($\delta(p) = 0$) the choice.
- Only in case of $\delta(p) = 1$, dummy player Z can accept ($\rho(p) = 1$) or reject ($\rho(p) = 0$) his share which ends the game.[4]

Let y and z denote the exogenously given positive agreement payoffs for Y and Z, respectively, satisfying $\min\{y, z\} > \underline{p} - y - z \geq 0$ so that $p = \underline{p}$ would give less to X than to Y or Z but still cause no loss for X. Furthermore, $\bar{p} - y - z > \max\{y, z\}$ allows allocator X to earn more than the others. The payoffs depend on the choices and the exogenous payoff parameters as follows:

- X earns $\delta(p)(p - y - z)$,
- Y earns $\delta(p)y$, and
- Z earns $\rho(p)\delta(p)z$.

We played five treatments: three UEGs and two DEGs. The three UEGs differ in the relation between the exogenous agreement payoffs. We analyze three cases: $y > z$, $y = z$, and $y < z$. The parameter restrictions guarantee that X can claim less, the same (at least partially), or more than what the others get in case of $\delta(p) = 1$ and $\rho(p) = 1$.

The two DEGs with payoff $p - y - z$ for X, irrespective of $\delta(p)$ and $\rho(p)$ allow the two dummy players Y and Z to individually refuse their own share. Their earnings are $\delta(p)y$ and $\rho(p)z$, respectively. We analyze one case where $y = z$ and one where $y < z$.

If all three players are only concerned about their own payoff, the solution for all games requires $\delta*(p) = 1$, $\rho*(p) = 1$ for all p and $p^* = \bar{p}$ implying the payoff vector $(\overline{p} - y - z, y, z)$ if Y's behavior is anticipated by X in UEG. In DEG, the latter assumption is not needed.

2.2. Experimental protocol

To elicit the "natural" attitudes of participants who confront a three-person envy game for the first time, we implemented a one-shot game as a pen-and-paper classroom experiment, conducted at the University of Tübingen with participants of an Intermediate Microeconomics course who were not yet familiar with game theory.[5]

After reading the instructions carefully and privately answering questions (see the English translation of material in the Appendix), participants filled out the control questionnaires and the decision forms. Only the decisions of students who correctly answered the control questions entered the empirical analysis. Rather than playing the game sequentially, we implemented it as a normal-form game by employing the strategy method for players Y and Z.[6] We set $\underline{p}$ =12 and $\overline{p} = 22$ and allowed only for integer pie choices $p \in [\underline{p}, \overline{p}]$. Thus, X had 11 possible pie choices p, and Y could chose $\delta(p) \in \{0, 1\}$ for each of these possible values of p. Z could only decide on whether, in case of $\delta(p) = 1$, to accept z or not by choosing $\rho(p) \in \{0, 1\}$. Payments were received after the next lecture of the course. The experiment was programmed in z-tree (see Fischbacher, 2007).

3. Results

3.1. Structure of the data

Of the students participating in the experiment, 266 answered all control questions correctly, were included in the data set and matched with one participant of each of the other roles. Table 1 displays the number of participants with correct answers to all control questions, separately for each role (X, Y, Z) and all game variants.[7]

3.2. Allocator behavior

Figure 1a combines all UEG pie choices over all three UEG treatments, and Figure 1b combines all DEG pie choices over the two DEG

[3] For a recent survey on ultimatum bargaining experiments including envy and generosity games, see Güth and Kocher (2014).

[4] Forcing the dummy player to accept whatever is given to him would render him not only powerless but also voiceless (see, e.g., Forsythe et al., 1994).

[5] Different colors were used for the instructions of the five different treatments. After blocks of X-, Y-, and Z-participants were formed in the large lecture room, neighboring participants in the same block and the same role type (X, Y, or Z) received the instructions, control questionnaires, and decision forms of different treatments to discourage any attempts to learn from others.

[6] The obvious advantage of more interactive data gained by the strategy method is sometimes questioned by its "coldness". But the evidence so far is mixed and "hot" vs. "cold" seems less crucial for the tension between efficiency and equality seeking.

[7] We assigned less participants to the role of Z and matched these participants repeatedly where, of course, Z-players were only paid according to one match.