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## Abstract

We introduce the give-or-destroy game that allows us to fully elicit an individual's social preference schedule. We find that about one third of the population exhibits both pro-social and anti-social preferences that are independent of payoff comparisons with those who are affected. We call this type of preference a *desire to influence others*. The other two thirds of the population consist to almost equal parts of payoff maximizers and pro-socials. Furthermore, we find that full information and experimenter demand may increase the extent of pro-social preferences, but neither treatment affects the extent of anti-social preferences or the distribution of social types in the population.

**JEL:**

A13, C90, D31, D63, D64

**Keywords:**

altruism, joy of destruction, other-regarding behavior, giving and destruction, fairness, spite

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The desire to influence others is a recurring theme in mythology, literature, and psychology.[1] Both in The Lord of the Rings and in Wagner's Nibelungen Ring wars are fought and friends betrayed in the pursuit of the ultimate influence on others. The interesting aspect of the desire to influence others is that it combines seemingly contradicting preferences for acts of kindness and acts of maliciousness. The contradiction is easily resolved by noting that an individual with a desire to influence others does not seek utility from the distributional consequences of the own actions, in the way an altruist, an equity-seeker, or a competitive envy type would. Instead, the desire to influence relates to gaining utility from the process of altering the fortune of others, no matter in which direction. So far, the behavioral relevance of the desire to influence others has been widely ignored in the economic literature. Previous studies have either focused exclusively on pro-social behavior, or exclusively on anti-social behavior, but have rarely attempted to uncover the relationship between preferences for the two antipodes in a single game.[2]

In this paper, we introduce a simple experimental design that allows us to elicit the preferences for pro-social and anti-social behavior within subjects. In doing so, we provide clean experimental evidence for the coexistence and correlation of the two competing preference types. We find that a surprisingly large fraction of the population (about 30 percent) entertains both types of preferences with a significant and strong positive correlation between the strength of the pro-social and the anti-social preferences. We call this type of

[1] Some authors use the terms such as "need for domination" or "desire for being the master of others' fate" for the phenomenon that we refer to as a "desire to influence others." Murray (1928), for example, defines the "need for dominance" as a need "[t]o influence or control others. To persuade, prohibit, dictate. To lead and direct. To restrain. To organize the behaviour of a group." (Murray 1938, p. 82). Weber (1968 p. 941) calls the need to influence others "domination" and finds that "[d]omination in the most general sense is one of the most important elements of social action. Of course, not every form of social action reveals a structure of dominancy. But in most of the varieties of social action domination plays a considerable role, even where it is not obvious at first sight."

[2] There are a few other studies in which pro-social and anti-social preferences are elicited within subjects. Offerman, Sonnemans, and Schram (1996) have a focus on correlating player types to voluntary contributions in a public goods game, but do not attempt to correlate pro-social and anti-social behavior. Herrmann and Orzen (2008) use different games to identify pro-social and anti-social types. The authors find that a number of the subjects are hard to classify in either pure type. Savikhin and Sheremeta (2012) study the effect of subjects' simultaneous participation in multiple games on competitive and cooperative behavior.

preference schedule the "desire to influence others" and coin the term "influencer" for the individuals exhibiting such preferences.[3]

In our first experiment, we introduce the *give-or-destroy game*, an experimental setup akin to the dictator game that allows us to simultaneously assess each individual's pro-social and anti-social preferences. Dictators in the *give-or-destroy game* can either increase the receivers' payoffs, can destroy a part of that payoff, or can choose to do both. We find that a substantial number (more than one third) of the dictators actually choose to do both. For the dictators who give and destroy, we typically observe that giving and destruction behavior are positively correlated. Those who choose high levels of giving also choose high levels of destruction. Hence, it seems that a substantial fraction of subjects are neither purely pro-social, nor purely anti-social types, but combine both preference schedules in their desire to influence others.

In a second experiment, we test whether influencing behavior (i.e. choosing both to give and to destroy) is affected by the amount of information the receivers have on the dictators' choices. While we observe slightly more giving in the full information treatment than in the partial information treatment, neither the level of destruction nor the prevalence of influencers in the experimental population is affected by the information structure.

In a third experiment with an extended version of the give-or-destroy game we elicit dictators' beliefs on the preference schedules expected by the experimenter. This modification allows us to infer the prevalence and direction of experimenter demand effects in the give-or-destroy game. Our findings suggest that experimenter demand may bias behavior in the pro-social dimension, but has no effect on anti-social behavior.

[3] In a related study Fehr, Herz and Wilkening (2010) find that individuals have a preference for authority in the sense of the entitlement to take decisions for a group. While their study focuses on the question whether individuals are willing to incur a cost to have the right to decide, we study whether individuals who have the right to decide are willing to incur a cost to change the payoff of others.

The most striking contribution of our study is the robust finding that about one third of the population exhibits both pro-social and anti-social preferences. The other two thirds consist of payoff maximizers and pro-socials to equal parts. While full information and experimenter demand seem to increase the extent of pro-social behavior slightly, we neither observe a significant difference in the extent of anti-social behavior nor a substantial change in the distribution of the three types.

Our study is closely related to numerous other studies in which subjects can affect other's payoffs. In one strand of the literature, the studies on the classical dictator game (Forthythe, Horowitz, Savin, and Sefton 1994), subjects' choices are restricted to the pro-social domain. The main finding in this literature is that a substantial fraction of the dictators voluntarily provide payoffs for the receivers. This is true even if the anonymity of the dictator – towards the receiver and the experimenter – is guaranteed (Hoffmann, McCabe, and Smith 1996). Note, however, that giving in the context of the classical dictator game is not only in line with purely pro-social preferences, but also in line with the desire to influence others, because observed choices are only in the pro-social domain. In a different strand of the literature, the money burning games (Abbink and Sadrieh 2009, Abbink and Herrmann 2011), dictators' choices are restricted to the anti-social domain. The destruction choices observed in these games are obviously both in line with purely anti-social preferences and with the desire to influence others.

A few papers have studied dictator games in which the dictator can give to or take from the receiver (List 2007 and Bardsley 2008). Generally, a substantial number of both give and take choices are observed in these experiments. It is important to note that take choices in these studies do not necessarily imply anti-social preferences, but may also be due to subjects' payoff maximization. Hence, the choices observed in these experiments cannot be used to identify or falsify the desire to influence others.

In games with a more complex interaction, a richer set of motives (including reciprocity and inequity aversion) determines the outcomes. Nevertheless, we cannot rule out that the pro-social and the anti-social behavior observed in these games are at least partially motivated by a desire to influence others. In public goods games with punishment opportunities, for example, punishment choices may be driven by pro-social motives (Fehr and Gächter 2002) or by anti-social motives (Herrmann, Thöni, and Gächter 2008). Similarly, behavior in tournaments has been found to have both pro-social and anti-social aspects (Harbring and Irlenbusch 2005, 2011).

The rest of the paper is organized in the following way. We first describe the game and derive predictions based on models of other-regarding preferences. In section II, we describe our first experiment (baseline) and analyze the data. The full information and the belief elicitation experiments follow in sections III and IV, before we conclude with a discussion of the results.

## I. The game

The simple give-or-destroy game that we use to identify pro-social and anti-social preferences is a modified dictator game (Forsythe, Horowitz, Savin, and Sefton 1994). The dictator in our game can either choose to increase or to decrease the expected payoff of the receiver. Just as in the original dictator game, our dictator receives an endowment $\mu_D$ that he can partially give up in order to increase the expected payoff of the receiver. Additionally, the dictator in our game also has the option to give up some of his endowment in order to decrease the expected value of the receiver's payoff. Both giving and destruction occur at a 1:1 rate. For any giving or destruction choice $x$ the dictator spends the amount $|x|$ resulting in the following profit function for the dictator: $\pi_D = \mu_D - |x|$. The receiver's expected payoff $\hat{\pi}_R$ is either increased by $x$, if $x > 0$, or decreased by $x$, if $x < 0$. The amount spent by the dictator is limited by some maximum $\bar{x}$, i.e. $\bar{x} \geq x \geq -\bar{x}$. In contrast to the original dictator game, the receiver's payoff in our game is a random variable $\Pi_R$ that is uniformly distributed in an $\varepsilon$-

interval around the endowment $\mu_R$ and is shifted by the dictator's choice, i.e. $\Pi_R \in [\mu_R + x - \varepsilon,\ \mu_R + x + \varepsilon]$ with $\mathrm{E}[\varepsilon] = 0$.

A purely money maximizing dictator will obviously not spend any part of his endowment to modify the distribution of the receiver's payoff, i.e. $(x = 0)$. Hence, the (expected) payoffs in equilibrium are $\pi_D = \mu_D$ and $\hat{\pi}_R = \mathrm{E}[\Pi_R] = \mu_R$. However, if the dictator has pro-social or anti-social preferences, he may choose $x > 0$ or $x < 0$, correspondingly, which leaves him with $\mu_D - |x|$ in either case.

To be able to elicit all the different types of preference schedules, it is necessary to observe the individual's preferences in the entire decision space. We implement this by eliciting the subjects' preferences for all possible values of $x$ using ten binary selection possibilities. In each of the ten cases, one option is not to modify the receiver's expected payoff, while the alternative is to increase (in five cases) or to decrease (in five cases) the receiver's expected payoff. The five giving and the five destruction cases are spread evenly over the range of possible choices.

To test for the effect of relative standing on the giving and the destruction preferences, we vary the receiver's endowment $\mu_R$ in three treatments. In the *poor receivers* treatment $(\mu_D > \mu_R)$, the receiver always has a lower expected payoff than the dictator. Even if the dictator decides to transfer the highest possible amount (five tokens), the receiver still expects a lower payoff than the dictator. In the *equality* treatment $(\mu_D = \mu_R)$, the receiver's expected payoff is equal to the dictator's payoff as long as the dictator does not choose to give. In the *rich receivers* treatment $(\mu_D < \mu_R)$, the receiver always has a higher payoff than the dictator.

In the following subsections, we describe the preference patterns that are predicted by models of other-regarding preferences. We generally assume that all utilities $\mathrm{u}_i$ increase in payoffs $\pi_i$ and that the marginal utility of money is decreasing everywhere, i.e.

$\partial \mathrm{u}_i(\pi_i)/\delta\pi_i > 0$ and $\partial^2 \mathrm{u}_i(\pi_i)/\partial^2\pi_i < 0$ for $i = D, R$ (dictators, receivers). Note that all examined models predict monotonous preference schedules in the positive and the negative domains. Except for the desire to influence, all other models also predict monotonic preferences across domains.

### *A. Own payoff maximization*

The dictator always maximizes his own monetary payoff by choosing not to modify the receiver's expected payoff. Assuming that the dictator's utility only depends on his own payoff from the game, the simple model is

(1) $$\mathrm{u}_D^{own} = \mathrm{u}_D(\pi_D)$$

As this utility function is independent of the receiver's payoff, the receiver's endowment has no effect on the payoff maximizing dictator's utility. Hence, the model does not predict any treatment differences.

### *B. Altruism*

An altruistic dictator maximizes the sum of the own and the receiver's utilities.[4] The simplest form of an altruistic utility function is:

(2) $$\mathrm{u}_D^{altru} = \mathrm{u}_D(\pi_D) + \alpha\,\mathrm{u}_R(\hat{\pi}_R), \text{ where } 0 < \alpha \leq 1$$

We assume that the utility of the receiver enters the altruistic dictator's utility function with a coefficient $\alpha$ that is positive and smaller than or equal to one. This implies that the altruistic dictator always cares about his own utility at least as much as about the receiver's utility.

The altruist never chooses destruction. Since we assume decreasing marginal utilities of payoff (i.e. money is a normal good), the extent of transfers (the number of dictators choosing

[4] Obviously we could model the more extreme case of altruistic dictators who only maximize the utility of the receiver, instead of maximizing joint total utility. However, since the extensive experimental literature on social preferences (Fehr and Schmidt 2006) provides no evidence whatsoever for such extreme preferences, we follow the standard approach, in which the altruist maximizes both the own utility and the utility of the other (e.g. Andreoni and Miller 2002).

to give and the average level of giving) decreases in the receiver's expected payoff. Hence, the model predicts treatment differences. We should observe that transfer payments decrease with receiver's expected payoff, thus, the richer the receivers, the lower the transfer payments by altruistic dictators.

### *C. Inequity aversion*

An inequity averse dictator does not only care about his own payoff, but also about equity. In addition to the positive utility of the own payoff, models of inequity aversion characterize the disutility of the absolute (e.g. Fehr and Schmidt 1999) or the relative payoff differences to others (e.g. Bolton and Ockenfels 2000). There are different degrees to which dictators may be concerned about fairness. We introduce the simplified approach below as a generic representation of inequity aversion models, where $\alpha$ is a positive factor denoting the degree of concern for fairness and $\Delta$ denotes the payoff comparison function.

$$\mathrm{u}_D^{ineq} = \mathrm{u}_D(\pi_D) - \alpha\Delta \tag{3}$$

The function $\Delta$ may differ substantially, depending on the type of payoff comparison that is considered. It may, for example, represent the absolute or the relative difference between payoffs. While in elaborate games these models can sometimes lead to intriguingly different predictions, in our simple setting, all inequity aversion models predict that dictators will never choose destruction. The simple reason is that destruction reduces the dictator's and the receiver's payoff by the same amount, thus sustaining the absolute difference and even increasing the relative difference.

In contrast to destruction choices, giving choices may effectively reduce payoff differences, as long as the dictator's payoff is strictly greater than the receiver's expected payoff. When this condition holds true, the dictator can transfer payoff to the receiver at a 1:1 ratio, thus, reducing the payoff difference. Hence, with inequality aversion we should observe $x > 0$ only when the dictator's endowment is greater than the receiver's endowment $(\mu_D > \mu_R)$.

*D. Warm glow*

In addition to the utility of the own payoff, dictators with warm glow preferences are characterized by a utility of giving that is associated with the amount given (e.g. Andreoni 1989 and Andreoni 1990). The decisive element of warm glow is that the dictator's utility gain from giving only depends on the amount given, but not on the utility enhancement for the receiver. The simplest way to model warm glow is

$$u_D^{wg} = u_D(\pi_D) + \begin{cases} w_D(x) & for\ x > 0 \\ 0 & for\ x \leq 0 \end{cases} \tag{4}$$

where $w_D(x)$ denotes an increasing function of $x$. Since the utility gain of the dictator is independent of the receiver's utility gain, the decision of the dictator will also be independent of the receiver's payoff level, i.e. warm glow does not predict any differences in the distribution of giving across treatments. Furthermore, a dictator with warm glow preferences will never choose to destroy the receiver's expected payoff, because destruction leads to a decrease of own payoff without any utility gain from destruction.

*E. Joy of destruction*

Individuals with joy of destruction preferences have a utility gain from destroying the payoff of others. Abbink and Sadrieh (2009) find that the joy of destruction does not depend on the payoff distribution. We model the joy of destruction as

$$u_D^{jod} = u_D(\pi_D) + \begin{cases} 0 & for\ x \geq 0 \\ v_D(x) & for\ x < 0 \end{cases} \tag{5}$$

where $v_D(x)$ denotes a decreasing function of $x$, i.e. the greater $|x|$, the greater the utility of the act of destruction. Decision makers motivated by the joy of destruction incentives may choose to destroy part of the receiver's payoffs, but will never choose to give. Hence, we should observe no giving, but may observe destruction choices that are distributed identically across receivers' payoff levels (i.e. across treatments).

Other preference schedules that may induce anti-social behavior (e.g. spite or envy) do not result in destruction choices in our give-or-destroy game as long as the dictator is not better off than the receiver. This is due to the fact that destruction in our game is at a one-to-one rate and, thus, cannot be used to improve the dictator's relative standing, when the dictators' payoffs are lower or equal to the receivers' payoffs.[5] Hence, if destruction is driven by spite, we should only observe it in the case where dictators are better off than receivers.[6]

### *F. The desire to influence others*

Individuals with a desire to influence others have both a utility of giving and of destroying the payoff of others. This utility is independent of the direction in which others' payoff is altered. A strong desire to influence others leads to both high giving and high destruction choices. Correspondingly, a weak desire to influence others predicts small giving and small destruction choices. Hence, giving and destruction are positively correlated in our model. For simplicity we will assume that preferences in the giving and the destruction domain are perfectly correlated, i.e. they can be modeled using a single function defined on the absolute payoff effect for the other player:

$$\mathrm{u}_D^{dom} = \mathrm{u}_D(\pi_D) + z_D(|x|) \tag{6}$$

where $z_D(|x|)$ denotes the utility of influencing others. Utility is strictly increasing in the absolute value of $|x|$ with a decreasing marginal utility, i.e. $\delta z_D(|x|)/\delta|x| > 0$ and $\delta^2 z_D(|x|)/\delta^2|x| \leq 0$. Since the dictators' decisions are independent of receivers' payoff levels, the desire to influence others does not predict differences in the distribution of giving and destruction choices across treatments.

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[5] Individuals with spiteful preferences tend to reduce other players' payoffs to enhance their own relative standing (Fröhlich et al. 1984, Huck and Müller 2000, Brandts, Saijo and Schram 2004).

[6] Envy cannot explain destruction choices in our experiment. Envious individuals choose destruction only if the cost of destruction is lower than the effect (Kirchsteiger 1994) or if they are relatively worse off than the other and the destruction choice reduces inequity (Mui 1995).

## II. Baseline experiment

### *A. Parameters and procedure*

We conducted the give-or-destroy game experiment in the entrance hall of the cafeteria of the university. Overall 170 students leaving the cafeteria participated. We took precautions to ensure that nobody participated twice. Subjects' interaction was anonymous. We provided five desks at distant corners of the hallway to disable communication. Participants were assigned a desk, where they read the instructions immediately after recruitment. We recruited participants over a long period of time (four hours) and informed them that the person they interact with either had already left the building or was not yet in the hallway. No dictator-receiver pair was present in the hallway at the same time.

Half of the participants were assigned the role of a dictator and half were assigned the role of a receiver. Every participant first received written instructions and was asked to read these carefully and quietly.[7] Procedural questions were answered privately, but in a standardized manner.

Dictators received a preference elicitation sheet on which they marked their preferences for each of the ten cases that constituted their full preference schedule for all values of $x$ that were possible.[8] All dictators had an initial endowment of 20 tokens. Table 1 displays the ten preference elicitation questions that the dictators faced in each of the three treatments.

In the *poor receivers* treatment, the receivers always have a lower expected payoff than the dictators. Even if the dictator decides to transfer the highest possible amount (five tokens), the receiver still expects a lower payoff than the dictator. In the *equality* treatment, the receiver's expected payoff is equal to the dictator's payoff, as long as the dictator does not choose to

[7] The instructions are contained in the appendix.

[8] The preference elicitation sheets are contained in the appendix.

give. In the *rich receivers* treatment, the receivers always have a higher payoff than the dictators.

We designed our experiment in a way to ensure that preferences varying with receivers' payoffs or with absolute or relative inequity are revealed in a comparison across treatments. A treatment comparison also allows us to uncover preferences that are insensitive to receivers' payoff variations. Additionally, by covering all possible values of $x$, our elicitation method reveals the dictators' full preference schedule in giving and in destruction.

**Table 1. Treatments and parameters**

| case | *poor receivers* | | | | *equality* | | | | *rich receivers* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | do not modify | | modify | | do not modify | | modify | | do not modify | | modify | |
| | $\pi_D$ | $E[\pi_R]$ | $\pi_D$ | $E[\pi_R]$ | $\pi_D$ | $E[\pi_R]$ | $\pi_D$ | $E[\pi_R]$ | $\pi_D$ | $E[\pi_R]$ | $\pi_D$ | $E[\pi_R]$ |
| 1 | 20 | 8 | 15 | 3 | 20 | 20 | 15 | 15 | 20 | 32 | 15 | 27 |
| 2 | 20 | 8 | 16 | 4 | 20 | 20 | 16 | 16 | 20 | 32 | 16 | 28 |
| 3 | 20 | 8 | 17 | 5 | 20 | 20 | 17 | 17 | 20 | 32 | 17 | 29 |
| 4 | 20 | 8 | 18 | 6 | 20 | 20 | 18 | 18 | 20 | 32 | 18 | 30 |
| 5 | 20 | 8 | 19 | 7 | 20 | 20 | 19 | 19 | 20 | 32 | 19 | 31 |
| 6 | 20 | 8 | 19 | 9 | 20 | 20 | 19 | 21 | 20 | 32 | 19 | 33 |
| 7 | 20 | 8 | 18 | 10 | 20 | 20 | 18 | 22 | 20 | 32 | 18 | 34 |
| 8 | 20 | 8 | 17 | 11 | 20 | 20 | 17 | 23 | 20 | 32 | 17 | 35 |
| 9 | 20 | 8 | 16 | 12 | 20 | 20 | 16 | 24 | 20 | 32 | 16 | 36 |
| 10 | 20 | 8 | 15 | 13 | 20 | 20 | 15 | 25 | 20 | 32 | 15 | 37 |

Receivers in our experiment – just as in any dictator game – had no choices to make. Unlike classical dictator experiments, however, our receivers' payoff was uncertain. Receivers drew their payment from an opaque bag containing 5 balls, each marked with an integer in the range $[\mu_R + x - \varepsilon,\ \mu_R + x + \varepsilon]$, where $\varepsilon = 2$. Receivers knew that a dictator may have altered the contents of the bag they drew from. Receivers, however, could not tell whether a dictator had modified their expected payoff. We varied receivers' initial endowment (i.e. the treatment parameter $\mu_R$) between 8, 20, and 32 for the treatments poor receivers, equality, and rich receivers, correspondingly.

Note that the instructions informed all participants that dictators were endowed with 20 tokens. The instructions also informed on the exchange rate of 1 euro per 5 tokens.[9] Subjects were paid individually. Before being paid, immediately after handing in their preference elicitation sheet, each dictator drew one of ten balls from an opaque bag, where each ball was marked with the number of a different case. The drawn case determined the dictator's payoff and the receiver's payoff range.

### *B. Results*

Figure 1 shows the distribution of modification choices in the giving and the destruction domain. For both domains, we observe that the percentage of dictators choosing modification increases as the level of modification $|x|$ decreases. It seems that giving and destruction are both normal goods, each with a decreasing marginal utility. We find this feature of the aggregate demand also on the individual level for a substantial number of subjects.

While lower amounts of giving and destruction are generally preferred to higher amounts, only 50 of the 85 dictators (about 60 percent) reveal preference schedules that are monotonous in both domains separately. This distribution is stable across treatments. We observe no significant difference in the distribution of monotonous and non-monotonous dictators across treatments (Fisher Exact Test, $p>0.20$, two-tailed). [10]

[9] At the time of the experiment the exchange rate of the euro to the US Dollar was approximately 1.38.

[10] We have included a Table displaying the number of monotonous and non-monotonous dictators in each of the treatments in the Appendix.

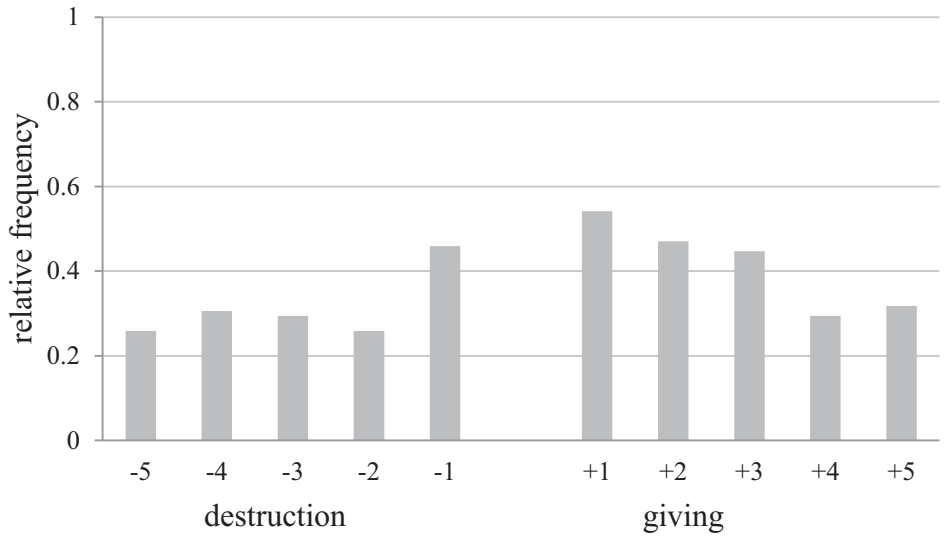


**Figure 1. Distribution of modification preferences of all dictators (baseline)**

Table 2 displays the number of dictators with monotonous preference schedules who give or destroy at least one unit, taking all treatments together and for each of the three treatments separately.[11] Overall, we observe that a majority of dictators (29 out of 50) give at least one unit. Forty percent (20) destroy at least one unit. Comparing giving to destruction, we find that significantly more dictators (29 to 20) give than destroy (Fisher Exact Test, p=0.055, two-tailed).

**Table 2. Frequency and average level of giving and destruction (baseline)**

| | overall | | *poor receivers* | | *equality* | | *rich receivers* | |
|---|---|---|---|---|---|---|---|---|
| | # | avg. | # | avg. | # | avg. | # | avg. |
| giving | 29 (0.58) | 0.90 | 8 (0.53) | 0.97 | 10 (0.53) | 0.60 | 11 (0.69) | 1.18 |
| destruction | 20 (0.40) | 0.48 | 6 (0.40) | 0.73 | 6 (0.32) | 0.40 | 8 (0.50) | 0.35 |

# : number (percentage) of subjects choosing to give or destroy at least one unit
avg. : average level of giving or destruction over all subjects

The table additionally shows the average level of giving and destruction in each treatment. Overall, we observe that dictators prefer higher giving than destruction levels (on average over all treatments 0.90 vs. 0.48). This difference is highly significant (Wilcoxon-Signed-Ranks-Test, z=2.798, p = 0.005, two-tailed).

[11] In the following we restrict our analysis to the dictators with monotonous preference schedules in order to give the theoretical predictions the best shot.

Comparing treatments, we observe slightly higher giving levels in the rich receivers treatment compared to the equality treatment. This difference, however, is at most marginally significant (U-test, z=1.328, p=0.184, two-tailed). Apart from this marginal effect, we detect no significant differences in pairwise treatment comparison of giving and destruction (U-test, p>0.20, two-tailed).

Table 3 summarizes the distribution of different dictator types. We categorize dictators as one of four types, i.e. influencers, pro-socials, anti-socials and payoff maximizers. *Influencers* choose both to give and to destroy. These dictators seem to have a utility of influencing others' payoffs and, hence, exhibit both pro-social and anti-social preferences. Dictators categorized as *pro-socials* show purely pro-social preferences by only giving, but not destroying. We classify dictators who only destroy, but do not give, as *anti-socials*. Finally, we refer to those dictators who never give up their own payoff to modify the receiver's payoff as *payoff maximizers*.

The majority of dictators (36 percent) are payoff maximizers. An only slightly smaller fraction of dictators are influencers (34 percent). About 24 percent of the dictators show purely pro-social preferences and only 3 dictators (6 percent) are categorized as anti-socials. We do not detect significant differences in the distribution of dictator types across treatments (pairwise 2x2 Fisher Test, at p>0.20, two-tailed). All in all, the results are homogeneous across treatments even though the variation of the payoff asymmetry is substantial.

**Table 3. Classification of dictators according to their preference schedules (baseline)**

| | influencers | pro-socials | anti-socials | payoff maximizers |
|---|---|---|---|---|
| poor receivers | 5 (0.33) | 3 (0.20) | 1 (0.07) | 6 (0.40) |
| equality | 5 (0.26) | 5 (0.26) | 1 (0.05) | 8 (0.42) |
| rich receivers | 7 (0.44) | 4 (0.25) | 1 (0.06) | 4 (0.25) |
| overall | 17 (0.34) | 12 (0.24) | 3 (0.06) | 18 (0.36) |

number (percentage) of subjects

Table 4 displays the average levels of giving and destruction for each of the four types of dictators. While the influencers modify the payoff of the receivers in both domains they do so

to a lesser extent than the pro-socials in giving and the anti-socials in destruction.[12] Comparing their choices in the two domains, we find a strong and significant correlation between giving and destruction by the influencers (Spearman rank correlation on giving and destruction levels, r = 0.941, p = 0.000, two-tailed).

**Table 4. Average level of giving and destruction by type (baseline)**

| | giving | destruction |
|---|---|---|
| influencers | 1.15 (1.11) | 1.06 (1.14) |
| pro-socials | 2.12 (1.13) | 0.00 (0.00) |
| anti-socials | 0.00 (0.00) | 2.07 (1.62) |
| payoff maximizers | 0.00 (0.00) | 0.00 (0.00) |

average level of giving or destruction over all subjects (standard deviation in parenthesis)

### *C. Discussion*

The results of the first experiment are surprising in two ways. On the one hand, we find no differences in the dictators' preferences no matter whether the receivers are poorer, equally well off, or richer than the dictators. Since neither giving nor destruction are affected by the wealth level of the receivers, it seems that distributional concerns, especially inequity aversion and classical altruism, play no role in this setting. On the other hand, it is striking that those dictators who are not pure payoff maximizers can be categorized in two distinct types. The pro-socials exhibit other-regarding preferences that are best in line with a model of warm glow giving. The more surprising finding is that more than one third of the subjects can be categorized as influencers who seem to enjoy both giving and destruction. It is interesting that influencing preferences are strongly correlated across the giving and destruction domains, i.e. those who give a lot, destroy a lot, and those who give little, destroy little. We find this to be clear evidence for the prevalence of the desire to influence others in a substantial part of the population. This is an observation that has not been reported in any economic experiment so far.

[12] The difference between influencers and pro-socials is significant (U-test, z=2.19, p=0.028, two-tailed). The difference between influencers and anti-socials cannot be tested due to the small number of anti-socials.

## III. Full information experiment

In the baseline experiment, receivers' payoffs are stochastic. Hence, the receivers cannot infer the dictators' choices from the realized payoffs. The fact that the dictators' preferences cannot be observed by the receivers may have affected the dictators' choices in the baseline experiment. Dana, Weber, and Kuang (2007), for example, report that decreasing the information that others have on dictators' decisions can lead to a decrease in pro-social behavior. In destruction games, decreasing the information that others have on the subjects' decisions can lead to an increase in anti-social behavior (e.g. Abbink and Sadrieh 2009). To control for the information effect in our give-or-destroy game, we ran a second experiment in which the receiver's payoff was not stochastic and in which we informed the receiver of the entire preference schedule of the dictator.

### *A. Parameters and Procedure*

A receiver's payoff in the setup of this experiment is equal to $8+x$, where the endowment is $8$ (i.e. the expected endowment in the poor receivers treatment of the baseline experiment) and $x>0$ denotes giving, $x<0$ denotes destruction, and $x=0$ denotes no modification. Except for the informational setting, the game setup and parameters are analogous to the poor receivers treatment, as described in the previous section.[13]

Overall 60 subjects took part in our full information experiment. We made sure that no subject had participated in the baseline experiment.

### *B. Results*

Table 5 displays the number of dictators with monotonous preference schedules who give or destroy at least one unit in the two separate experiments. As in the baseline experiment, we

[13] We only ran the poor receivers version of the game in this experiment, because we had no reason to believe that varying the receivers' endowments would lead to any differences in preferences, since we had not found any significant treatment effects in the baseline experiment.

observe that the majority of dictators (82 percent) in the full information experiment choose to give at least one unit. But, compared to the baseline treatment the fraction of dictators who give is significantly larger (Fisher Exact Test, p=0.086, two-tailed). We observe that the fraction of dictators choosing to destroy at least one unit is slightly, but insignificantly, lower in the full information experiment compared to the baseline experiment (Fisher Exact Test, p>0.20, two-tailed).

**Table 5. Frequency and average level of giving and destruction (full information)**

| | *baseline* | | *full information* | |
|---|---|---|---|---|
| | # | avg. | # | avg. |
| giving | 29 (0.58) | 0.90 | 14 (0.82) | 1.85 |
| destruction | 20 (0.40) | 0.48 | 7(0.41) | 0.46 |

# : number (percentage) of subjects choosing to give or to destroy at least one unit
avg. : average level of giving or destruction over all subjects

Additionally, table 5 summarizes the average level of giving and destruction in the two experiments. As in the baseline experiment, we observe significantly higher giving levels than destruction levels (Wilcoxon z=3.109, p=0.002, two-tailed). Compared to the baseline experiment, we find that the level of giving is significantly greater under full information (U-Test, z=-2.490, p=0.013, two-tailed), but the level of destruction is not significantly different (U-Test z=0.008, p=0.994, two-tailed).

Table 6 illustrates the categorization of dictators according to their preference schedules. We observe a similar distribution of types (i.e. influencers, pro-socials, anti-socials, and payoff maximizers) as in the baseline experiment. It seems that under full information the fraction of pro-socials is slightly higher, while the fraction of payoff maximizers is slightly lower than in the baseline experiment. However, pairwise comparisons do not reveal any significant differences in the distribution of player types (Fisher Exact Test, p > 0.20, two-tailed).

**Table 6. Classification of dictators according to their preference schedules (full information)**

| | influencers | pro-socials | anti-socials | payoff maximizers |
|---|---|---|---|---|
| baseline | 17 (0.34) | 12 (0.24) | 3 (0.06) | 18 (0.36) |
| full information | 7 (0.41) | 7 (0.41) | 0 (0.00) | 3 (0.18) |
| overall | 24 (0.36) | 19 (0.28) | 3 (0.04) | 21 (0.31) |

number (percentage) of subjects

### *C. Discussion*

Comparing the results of our full information experiment to those of the baseline experiment, we find significantly more giving, but no differences in the extent of destruction and in the distribution of dictator types. More giving with more information is in line with the results of earlier studies that examined classical dictator games (Dana, Weber, and Kuang. 2007). Interestingly, however, we do not observe the opposite effect: destruction levels are not lower when revealed destruction preferences are observable by receivers. This effect has been reported in studies in which the dictators' choices were only in the destruction domain (Abbink and Sadrieh 2009). While we find a few differences between our full and our partial information settings, the most important message we take out of the second experiment is that the distribution of types is not affected by the informational setting. Hence, we conclude that no matter which informational setting we are in, the population of dictators is basically composed of payoff maximizers, pro-socials, and influencers in almost equal shares, with a very small fraction of anti-socials (i.e. 32, 29, 36, and 5 percent, correspondingly, as shown in table 6).

## IV. Belief elicitation experiment

An alternative explanation for observing influencer preferences is that they are (at least partially) caused by experimenter demand (Bardsley 2008, Zizzo and Fleming 2011, Karakostas and Zizzo 2012). In his recent work, Zizzo (2010) differentiates between two types of experimenter demand, cognitive and social experimenter demand. Cognitive

experimenter demand originates in the subjects' beliefs that the experimenter is better informed about the game than they are. Thus, subjects try to guess the experimenter's prediction and try to choose accordingly in order to maximize their expected payoffs. Social experimenter demand is induced by social pressure, i.e. subjects may try to reciprocate for being allowed to participate in the experiment by behaving the way they believe the experimenter wants them to behave. In either case, the demand effects can only be verified if the subjects' beliefs on the experimenters' expectations are elicited and compared to observed behavior. To this end, we introduce the *belief elicitation* experiment in which we study the direction and the extent of the demand effect in our give-or-destroy game.

### *A. Parameters and procedure*

The belief elicitation experiment consists of two treatments, a *simple belief elicitation* treatment and an *incentivized belief elicitation* treatment. Both treatments are identical to the poor receivers treatment of the baseline experiment with the only exception that subjects are additionally asked to report their beliefs concerning the experimenters' expectations before they submit their preference schedules. Subjects' beliefs are elicited using a belief elicitation form that is very similar to the preference elicitation form. On the belief elicitation form, subjects are asked to report the preference schedule that they believe the experimenter expects to observe. To avoid ad hoc guessing by subjects who do not believe that the experimenter has a strong prior to see a specific outcome, we have added a "neither-nor" option to each of the 10 cases, allowing the prediction on the demanded preference schedule to be partially incomplete. The additional instructions for the belief elicitation are printed on the top of the belief elicitation form. This allows us to keep the instruction sheet and the preference elicitation form identical to those used in the baseline experiment. All instructions and forms are contained in the appendix.

The difference between the two treatments of the belief elicitation experiment is that we give no monetary incentives for providing truthful reports in the simple belief elicitation treatment, but do so in the incentivized belief elicitation treatment. We ran both treatments, because a recent study by Gächter and Renner (2010) shows that there may be differences in elicited beliefs that depend on the type of incentives given to the subjects. The problem of incentivizing beliefs in our setting is that there is no credible way of verifying the experimenters' true expectations. Hence, we use a proxy for the experimenters' true expectations. Before the experiment, we elicited 10 experts' opinions on the results that they believe an experimenter running our experimental protocol may expect to obtain. The experts were interviewed during a conference on experimental and behavioral economics. They received a full set of instructions before making their judgments. Our proxy for the experimenters' true expectation is the preference schedule that the majority of the experts believe is desired by the experimenters. Majority rule is easy to implement here, because the preference schedule is constructed from 10 binary comparisons that allow a simple case by case evaluation of the experts' opinions. For each of the 10 cases, for which the subject's response on the expectation elicitation form matches the majority opinion of the experts, we pay the subject 0.10 euro.

### *B. Results*

A total of 100 subjects participated in our belief elicitation experiment, 40 in the simple belief elicitation treatment and 60 in the incentivized belief elicitation treatment. As before, we only include the dictators with monotonous preference schedules in our analyses.

Table 7 summarizes the number of dictators giving and destroying at least one unit and the average level of giving and destruction. Comparing the two belief elicitation treatments to the baseline experiment, we find no significant differences, neither in the frequency nor in the

extent of giving and destruction. We conclude that our belief elicitation protocols do not bias the dictators' preferences.

**Table 7. Frequency and average level of giving and destruction (belief elicitation)**

| | *Baseline* | | *simple belief elicitation* | | *incentivized belief elicitation* | |
|---|---|---|---|---|---|---|
| | # | avg. | # | avg. | # | avg. |
| giving | 29 (0.58) | 0.90 | 6 (0.55) | 1.04 | 12 (0.67) | 1.57 |
| destruction | 20 (0.40) | 0.48 | 4 (0.36) | 0.55 | 4 (0.22) | 0.28 |

# : number (percentage) of subjects choosing to give or to destroy at least one unit
avg. : average level of giving or destruction over all subjects

Comparing the distribution of dictator types (summarized in table 8) across treatments, we find no substantial differences, even though we observe more pro-social dictators in the incentivized belief elicitation treatment than in the other cases.[14]

**Table 8. Classification of dictators according to their preference schedules (belief elicitation)**

| | influencers | pro-socials | anti-socials | payoff maximizers |
|---|---|---|---|---|
| baseline | 17 (0.34) | 12 (0.24) | 3 (0.06) | 18 (0.36) |
| simple belief elicitation | 4 (0.36) | 2 (0.18) | 0 (0.00) | 5 (0.45) |
| incentivized belief elicitation | 4 (0.22) | 8 (0.44) | 0 (0.00) | 6 (0.33) |

number (percentage) of subjects

Tables 9 and 10 tabulate the frequencies of giving and destruction by the responses to the belief elicitation. Since we observe no significant differences across treatments, we have pooled the data from both treatments for this analysis. Ignoring the 10-20 percent of cases in which the subjects indicate that neither of the alternatives is expected by the experimenter, we find that giving preferences are correlated to the belief that giving is expected by the experimenter (pairwise binomial tests for each case except the maximum level of giving, $p<0.10$, two-tailed; in the maximum giving case, $p=0.11$, two-tailed), but destruction preferences are not correlated to the corresponding beliefs (pairwise binomial tests for each case, $p>0.20$, two-tailed).

[14] Using pairwise Fisher's Exact Test we only find a marginally significant difference in the fraction of pro-socials between the baseline experiment and the incentivized belief elicitation treatment ($p=0.134$, two-tailed). Note however, that the number of observations in the two belief elicitation treatments is relatively small, making it less likely to observe significant differences across treatments.

**Table 9. Beliefs and preferences for giving**

| preferences | beliefs on the experimenters' expectations | | | |
|---|---|---|---|---|
| | do not give | neither-nor | give | total |
| do not give | 48 | 13 | 11 | 72 |
| give | 12 | 13 | 48 | 73 |
| total | 60 | 26 | 59 | 145 |

**Table 10. Beliefs and preferences for destruction**

| preferences | beliefs on the experimenters' expectations | | | |
|---|---|---|---|---|
| | do not destroy | neither-nor | destroy | total |
| do not destroy | 97 | 9 | 15 | 121 |
| destroy | 11 | 5 | 8 | 24 |
| total | 108 | 14 | 23 | 145 |

### *C. Discussion*

Our belief elicitation experiment neither reveals any substantial differences in comparison to the baseline experiment nor any strong evidence for an experimenter demand effect in the destruction domain. In the giving domain, however, we find evidence for a correlation between giving and the belief that the experimenter expects to observe giving. Additionally, in the incentivized belief elicitation treatment, we find a slightly higher frequency and level of giving than in the baseline experiment. All in all, our conclusion is that experimenter demand in this setting may bias behavior in the pro-social dimension, but has little effect on anti-social behavior. Similarly, eliciting beliefs may slightly enhance giving, but does not affect destruction behavior.

## IV. Concluding discussion

We introduce the give-or-destroy game, in which dictators can choose to modify receivers' payoffs at a cost. Receivers in the baseline experiment are not informed about dictators' choices. We elicit dictators' preference schedules for all feasible levels of giving and destruction. This allows us to identify the relationship between pro-social and anti-social

preferences on an individual level. We find strong evidence that for a substantial fraction of dictators (about 30 percent) pro-social and anti-social preferences are combined in the desire to influence others.

To test whether dictators' preferences are different when receivers are informed about their pro-social and anti-social preferences, we introduce a modified version of the give-or-destroy game. In this modified version, receivers are fully informed about dictators' choices. We find that this change leads to an increase in giving, but does not affect destruction.

In a third experiment, we elicit dictators' beliefs concerning the experimenters' expectations and test whether the preferences for pro-social and anti-social behavior are affected by their beliefs on the experimenter demand. Our findings suggest that the influence of experimenter demand on dictators' preferences is rather small in our setting. We detect a positive correlation between giving and the belief that the experimenters expect to observe giving, but find no such correlation for destruction.

Table 11 summarizes our data analysis in two simple regression models that support our findings. The first regression shows that the extent of giving is unaffected by most of the exogenous parameters except for a positive effect of full information and a negative effect of studying economics or business administration. Both of these effects have been previously reported in the literature (Dana, Weber, and Kuang 2007, Marwell and Ames 1981). Furthermore, the regression shows no evidence that pro-social preferences are induced by the subjects' beliefs on the experimenters' expectations, even though we find a positive correlation between pro-social preferences and these beliefs. Finally, the regression underlines the rather surprising result that models of pure altruism and inequity aversion are not supported by our data, because pro-social preferences in our setting seem independent from the receivers' financial situation.

The second regression shows that the treatments have almost no effect on the destruction preferences. However, in contrast to giving that was not affected by the dictator's gender and age, we find that the level of destruction is higher amongst female dictators and increases with the dictator's age. It is also worthwhile noting that students of economics or business administration spend less than others both on giving and destruction.

**Table 11. Regression analysis (96 observations)**

| | giving | destruction |
|---|---|---|
| male | -0.43 (0.28) | -0.40 (0.20)** |
| age | 0.03 (0.06) | 0.13 (0.04)*** |
| economist | -0.57 (0.31)* | -0.73 (0.21)*** |
| equality | -0.32 (0.44) | -0.20 (0.30) |
| rich receivers | 0.07 (0.46) | -0.53 (0.32)* |
| full information | 0.87 (0.47)* | -0.24 (0.33) |
| belief elicitation | 0.03 (0.51) | -0.05 (0.35) |
| incentivized belief elicitation | 0.55 (0.54) | -0.44 (0.37) |
| Constant | 0.77 (1.46) | -1.80 (1.01)* |
| $R^2$ | 0.16 | 0.22 |

coefficient (standard error in parenthesis)
*significant at p<0.10; **significant at p<0.05; ***significant at p<0.01

All in all, our study reveals that a substantial fraction of individuals enjoys both to give and to destroy, where the extent of giving is generally slightly higher than the extent of destruction. We call this type of preference schedule a "desire to influence others." We note that the reason why the desire to influence others has not been identified in the literature so far, is probably due to the fact that most of the previous experiments have elicited preferences only in the positive or in the negative domain, but have seldom combined both domains in a within subject elicitation design. About one third of our subjects exhibit preferences that are in line with a desire to influence others. The other two-thirds are almost equally divided between money maximizers and warm-glow altruists, who enjoy to give, no matter whether they face affluent, equally well-off, or poor receivers.

The economic implications of our findings are obviously broad. The existence of a substantial fraction of individuals with a desire to influence others will require some recalibration of the

models, but may result in novel insights and enhance the empirical validity of predictions. In the field the existence of influencers may lead to a reevaluation of numerous private and public policies including contracting, surveillance, civic order, recruitment, and human resource development policies.

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# Appendix A: Monotonous and non-monotonous dictators by treatment

**Table A1. Monotonous and non-monotonous dictators by treatment**

| | monotonous | non-monotonous |
|---|---|---|
| poor receivers | 15 (0.54) | 13 (0.46) |
| equality | 19 (0.68) | 9 (0.32) |
| rich receivers | 16 (0.55) | 13 (0.45) |
| full information | 17 (0.57) | 13 (0.43) |
| simple belief elicitation | 11 (0.55) | 9 (0.45) |
| incentivized belief elicitation | 18 (0.60) | 12 (0.40) |
| overall | 96 (0.58) | 69 (0.42) |

number (percentage) of subjects

## Appendix B: Instructions and decision forms baseline experiment

You participate in an economic experiment, in which you can earn money that is paid to you in cash. Your payoff depends on your choices, the choices of another participant, and/or a random draw. All payoffs in this experiment are provided in tokens, where 5 tokens = 1 euro. An exchange table is below.

**The experiment:**

You are matched to another participant, whose identity is never revealed to you. One of you is player Blue and one is player Yellow.

- Yellow's payoff depends on Blues' choices.
  - At the end of the experiment Yellow draws a ball from a bag containing five balls with different values. The value on the ball determines Yellow's payoff.
  - Which 5 balls are in the bag depends on Blue's choices.
  - **Yellow does not know which choices Blue has taken and which balls are in the bag he is drawing from.**

- **Blue receives an endowment of 20 tokens** and faces 10 choice cases.
  - In each case, Blue decides:
    - Either to keep the 20 tokens and not to modify Yellow's payoff
    - or to give up X tokens and to modify Yellow's payoff.
  - After all choices are made, Blue draws one of 10 balls that determines which case is realized.
  - **Only one case is realized.**

You are informed whether you are Blue or Yellow by the experimenter. All participants are recruited at the same place, but with a time lag. Thus, it is certain that nobody near you is matched to you in the game.

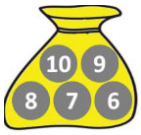
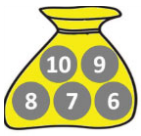
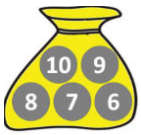
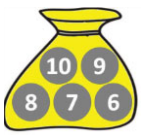
**Exchange table**

| **Value in tokens** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Value in euro** | 0.20 | 0.40 | 0.60 | 0.80 | 1.00 | 1.20 | 1.40 | 1.60 | 1.80 | 2.00 |
| **Value in tokens** | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| **Value in euro** | 2.20 | 2.40 | 2.60 | 2.80 | 3.00 | 3.20 | 3.40 | 3.60 | 3.80 | 4.00 |
| **Value in tokens** | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **Value in euro** | 4.20 | 4.40 | 4.60 | 4.80 | 5.00 | 5.20 | 5.40 | 5.60 | 5.80 | 6.00 |
| **Value in tokens** | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| **Value in euro** | 6.20 | 6.40 | 6.60 | 6.80 | 7.00 | 7.20 | 7.40 | 7.60 | 7.80 | 8.00 |

## Decision form (poor receivers)

You are player **Blue.**

Please mark **exactly one choice in each row**.

| | **do not modify** | | | | **modify** | |
|---|---|---|---|---|---|---|
| | Yellow draws from this bag | | | | | Yellow draws from this bag |
| 1. |  | You receive **20** tokens | ◯ | or ◯ | You receive **15** tokens |  |
| 2. |  | You receive **20** tokens | ◯ | or ◯ | You receive **16** tokens |  |
| 3. |  | You receive **20** tokens | ◯ | or ◯ | You receive **17** tokens |  |
| 4. |  | You receive **20** tokens | ◯ | or ◯ | You receive **18** tokens |  |
| 5. |  | You receive **20** tokens | ◯ | or ◯ | You receive **19** tokens |  |
| 6. |  | You receive **20** tokens | ◯ | or ◯ | You receive **19** tokens |  |
| 7. |  | You receive **20** tokens | ◯ | or ◯ | You receive **18** tokens |  |
| 8. |  | You receive **20** tokens | ◯ | or ◯ | You receive **17** tokens |  |
| 9. |  | You receive **20** tokens | ◯ | or ◯ | You receive **16** tokens |  |
| 10. |  | You receive **20** tokens | ◯ | or ◯ | You receive **15** tokens |  |

**Some questions about you:**

female ◯ male ◯

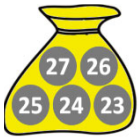
age: ___

field of study: _____

## Decision form (equality)

You are player **Blue.**

Please mark **exactly one choice in each row**.

| | | **do not modify** | | | **modify** | |
|---|---|---|---|---|---|---|
| | Yellow draws from this bag | | | | | Yellow draws from this bag |
| 1. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **15** tokens  |
| 2. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **16** tokens  |
| 3. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **17** tokens  |
| 4. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **18** tokens  |
| 5. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **19** tokens  |
| 6. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **19** tokens  |
| 7. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **18** tokens  |
| 8. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **17** tokens  |
| 9. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **16** tokens  |
| 10. |  | You receive **20** tokens | ◯ | or | ◯ | You receive **15** tokens  |

**Some questions about you:**

female ◯ male ◯

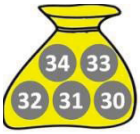
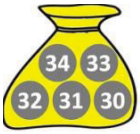
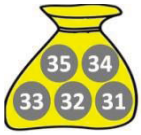
age: ___

field of study: _____

## Decision form (rich receivers)

You are player **Blue.**

Please mark **exactly one choice in each row**.

| | **do not modify** | | | | **modify** | |
|---|---|---|---|---|---|---|
| | Yellow draws from this bag | | | | | Yellow draws from this bag |
| 1. |  | You receive **20** tokens | ◯ | or ◯ | You receive **15** tokens |  |
| 2. |  | You receive **20** tokens | ◯ | or ◯ | You receive **16** tokens |  |
| 3. |  | You receive **20** tokens | ◯ | or ◯ | You receive **17** tokens |  |
| 4. |  | You receive **20** tokens | ◯ | or ◯ | You receive **18** tokens |  |
| 5. |  | You receive **20** tokens | ◯ | or ◯ | You receive **19** tokens |  |
| 6. |  | You receive **20** tokens | ◯ | or ◯ | You receive **19** tokens |  |
| 7. |  | You receive **20** tokens | ◯ | or ◯ | You receive **18** tokens |  |
| 8. |  | You receive **20** tokens | ◯ | or ◯ | You receive **17** tokens |  |
| 9. |  | You receive **20** tokens | ◯ | or ◯ | You receive **16** tokens |  |
| 10. |  | You receive **20** tokens | ◯ | or ◯ | You receive **15** tokens |  |

**Some questions about you:**

female ◯ male ◯

age: ___

field of study: _____

## Appendix C: Instructions and decision forms full information experiment

You participate in an economic experiment, in which you can earn money that is paid to you in cash. Your payoff depends on your choices, the choices of another participant, and/or a random draw. All payoffs in this experiment are provided in tokens, where 5 tokens = 1 euro. An exchange table is below.

**The experiment:**

You are matched to another participant, whose identity is never revealed to you. One of you is player Blue and one is player Yellow.

- Yellow's payoff depends on Blues' choices.

- **Blue receives an endowment of 20 tokens** and faces 10 choice cases.
  - In each case, Blue decides:
    - Either to keep the 20 tokens and not to modify Yellow's payoff
    - or to give up X tokens and to modify Yellow's payoff.
  - After all choices are made, Blue draws one of 10 balls that determines which case is realized.
  - **Only one case is realized.**

- For each of the 10 cases, Yellow is informed whether Blue has chosen to modify Yellow's payoff or not. Apart from this information, Yellow does not receive any further information on Blue.

You are informed whether you are Blue or Yellow by the experimenter. All participants are recruited at the same place, but with a time lag. Thus, it is certain that nobody near you is matched to you in the game.

**Exchange table**

| **Value in tokens** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Value in euro** | 0.20 | 0.40 | 0.60 | 0.80 | 1.00 | 1.20 | 1.40 | 1.60 | 1.80 | 2.00 |
| **Value in tokens** | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| **Value in euro** | 2.20 | 2.40 | 2.60 | 2.80 | 3.00 | 3.20 | 3.40 | 3.60 | 3.80 | 4.00 |
| **Value in tokens** | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **Value in euro** | 4.20 | 4.40 | 4.60 | 4.80 | 5.00 | 5.20 | 5.40 | 5.60 | 5.80 | 6.00 |
| **Value in tokens** | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| **Value in euro** | 6.20 | 6.40 | 6.60 | 6.80 | 7.00 | 7.20 | 7.40 | 7.60 | 7.80 | 8.00 |

## Decision form (rich receivers)

You are player **Blue.**

Please mark **exactly one** choice **in each row**.

| | **do not modify** | | | **modify** |
|---|---|---|---|---|
| 1. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **15** tokens<br>Yellow receives **3** tokens |
| 2. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **16** tokens<br>Yellow receives **4** tokens |
| 3. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **17** tokens<br>Yellow receives **5** tokens |
| 4. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **18** tokens<br>Yellow receives **6** tokens |
| 5. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **19** tokens<br>Yellow receives **7** tokens |
| 6. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **19** tokens<br>Yellow receives **9** tokens |
| 7. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **18** tokens<br>Yellow receives **10** tokens |
| 8. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **17** tokens<br>Yellow receives **11** tokens |
| 9. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **16** tokens<br>Yellow receives **12** tokens |
| 10. | You receive **20** tokens<br>Yellow receives **8** tokens | ◯ | or ◯ | You receive **15** tokens<br>Yellow receives **13** tokens |

Some questions about you:
female ◯ male ◯

age: ___

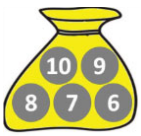
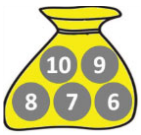
field of study: _____

**Appendix D: Decision form simple belief elicitation**

**First, please consider which choices are desired by the experimenter.**

## Which choices does the experimenter desire?

Please indicate for each of the 10 choice cases, whether you believe that one of the choices is desired by the experimenter and if yes, which.

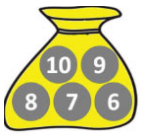
| | | **do not modify** | | **modify** | |
|---|---|---|---|---|---|
| | Yellow draws from this bag | | | | Yellow draws from this bag |
| 1. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **15** tokens ◯ |  |
| 2. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **16** tokens ◯ |  |
| 3. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **17** tokens ◯ |  |
| 4. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **18** tokens ◯ |  |
| 5. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **19** tokens ◯ |  |
| 6. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **19** tokens ◯ |  |
| 7. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **18** tokens ◯ |  |
| 8. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **17** tokens ◯ |  |
| 9. |  | You receive **20** tokens ◯ | neither-nor ◯ | You receive **16** tokens ◯ |  |
| 10. |  | You receive **20** tokens ◯ | neiter-nor ◯ | You receive **15** tokens ◯ |  |

**Now, please indicate which choices you take in the described experiment.**

## Decision form

You are player **Blue.**

Please mark **exactly one choice in each row**.

| | Yellow draws from this bag | **do not modify** | | | **modify** | Yellow draws from this bag |
|---|---|---|---|---|---|---|
| 1. |  | You receive **20** tokens | ◯ | or ◯ | You receive **15** tokens |  |
| 2. |  | You receive **20** tokens | ◯ | or ◯ | You receive **16** tokens |  |
| 3. |  | You receive **20** tokens | ◯ | or ◯ | You receive **17** tokens |  |
| 4. |  | You receive **20** tokens | ◯ | or ◯ | You receive **18** tokens |  |
| 5. |  | You receive **20** tokens | ◯ | or ◯ | You receive **19** tokens |  |
| 6. |  | You receive **20** tokens | ◯ | or ◯ | You receive **19** tokens |  |
| 7. |  | You receive **20** tokens | ◯ | or ◯ | You receive **18** tokens |  |
| 8. |  | You receive **20** tokens | ◯ | or ◯ | You receive **17** tokens |  |
| 9. |  | You receive **20** tokens | ◯ | or ◯ | You receive **16** tokens |  |
| 10. |  | You receive **20** tokens | ◯ | or ◯ | You receive **15** tokens |  |

**Some questions about you:**

female ◯ male ◯

age: ___

field of study: _____

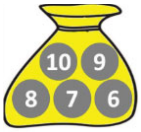
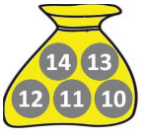
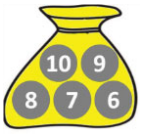
## Appendix E: Decision form incentivized belief elicitation

**First, please consider which choices are desired by the experimenter.**

## Which choices does experimenter desire?

We presented the instructions and the decision form to 10 experts and asked them, for each of the 10 choice cases, whether they believe that one of the choices is desired by the experimenter and if yes, which.

Please indicate in each row which answer you believe that the majority of the 10 experts marked as the choice desired by the experimenter. For each correct answer you receive 10 cent. For wrong answers you receive 0 cent.

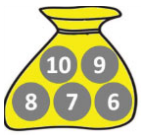
| | **do not modify** | | | **modify** | |
|---|---|---|---|---|---|
| | Yellow draws from this bag | | | | Yellow draws from this bag |
| 1. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **15** tokens ○ |  |
| 2. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **16** tokens ○ |  |
| 3. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **17** tokens ○ |  |
| 4. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **18** tokens ○ |  |
| 5. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **19** tokens ○ |  |
| 6. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **19** tokens ○ |  |
| 7. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **18** tokens ○ |  |
| 8. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **17** tokens ○ |  |
| 9. |  | You receive **20** tokens ○ | neither-nor ○ | You receive **16** tokens ○ |  |
| 10. |  | You receive **20** tokens ○ | neiter-nor ○ | You receive **15** tokens ○ |  |

**Now, please indicate which choices you take in the described experiment.**

## Decision form

You are player **Blue.**

Please mark **exactly one choice in each row**.

| | **do not modify** | | | | **modify** | |
|---|---|---|---|---|---|---|
| | Yellow draws from this bag | | | | | Yellow draws from this bag |
| 1. |  | You receive **20** tokens | ◯ | or | ◯ You receive **15** tokens |  |
| 2. |  | You receive **20** tokens | ◯ | or | ◯ You receive **16** tokens |  |
| 3. |  | You receive **20** tokens | ◯ | or | ◯ You receive **17** tokens |  |
| 4. |  | You receive **20** tokens | ◯ | or | ◯ You receive **18** tokens |  |
| 5. |  | You receive **20** tokens | ◯ | or | ◯ You receive **19** tokens |  |
| 6. |  | You receive **20** tokens | ◯ | or | ◯ You receive **19** tokens |  |
| 7. |  | You receive **20** tokens | ◯ | or | ◯ You receive **18** tokens |  |
| 8. |  | You receive **20** tokens | ◯ | or | ◯ You receive **17** tokens |  |
| 9. |  | You receive **20** tokens | ◯ | or | ◯ You receive **16** tokens |  |
| 10. |  | You receive **20** tokens | ◯ | or | ◯ You receive **15** tokens |  |

**Some questions about you:**

female ◯ male ◯

age: ___

field of study: _____

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