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THAT'S JUST – NOT FAIR: GENDER DIFFERENCES IN NOTIONS OF JUSTICE

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ABSTRACT

In Becker et al. (2013a,b), we proposed a theory to explain giving behaviour in dictator experiments by a combination of selfishness and a notion of justice. The theory was tested using dictator, social planner, and veil of ignorance experiments. Here we analyse gender differences in preferences for giving and notions of justice in experiments using the same data. Similar to Andreoni and Vesterlund (2001), we find some differences in giving behaviour. We find even stronger differences in the notion of justice between men and women; women tend to be far more egalitarian. Using our preference decomposition approach from Becker et al. (2013a) and parametric estimates, we show that differences in the giving behaviour between men and women in dictator experiments are explained by differences in their notion of justice and not by different levels of selfishness. We employ both parametric and non-parametric techniques, and both methods confirm the result.

1 INTRODUCTION

In the 2012 US presidential elections, 55% of female voters voted for the Democratic candidate Barack Obama while only 45% of male voters did so.[1] This pattern – more women than men favouring the Democratic candidate or party – has been a consistent phenomenom in US elections for decades (Lott and Kenny 1999 or Kaufmann and Petrocik 1999). Female policy makers also tend to vote more liberal than men (Welch 1985). This gender voting gap is not restricted to the United States but has been observed in other countries as well (Studlar et al. 1998, Inglehart and Norris 2000). There are many potential reasons for this gap. An obvious candidate is that women tend to be more in favour of redistribution than men (Edlund and Pande 2002, Chaney et al. 1998), a phenomenon that has been observed for many countries (Alesina and Giuliano 2009). It should therefore be no surprise that a candidate or party that is considered to be more left-wing

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[1] Source: The Roper Center for Public Opinion Research.

and more in favour of redistribution should generally be more popular with female than male voters.

This seemingly stronger preference for redistribution among females seems to be already present at a young age. Fehr et al. (2013) conducted a simplified dictator experiment called “sharing game”.When grouping children into different types according to their choices, girls where significantly more often classified as “egalitarian types” than boys. In a three-person ultimatum bargaining game conducted as a newspapers experiment by Güth et al. (2007) women split up the pie equally between all three group members significantly more often than men. This was valid for all age groups of the adult participants. Thus, a preference for equal outcomes seems to be prevalent in females of different age groups.

There are at least three possible reasons for why people demand at least some redistribution of wealth or income: i) immediate self-interest, that is, people favour redistribution because they stand to benefit from it (e.g., Edlund and Pande 2002); ii) concerns for distributional justice, that is, a general preference for a more equal distribution of income and wealth (e.g., Fong 2001); and iii) insurance, that is, prefering to be safeguarded against possibly falling on hard times at some point in the future (e.g., Rehm 2005). Let us focus on the first two reasons.[2] As far as self-interest is concerned, a voter with a high income should oppose more redistribution from high to low income individuals, while a voter with low income should support it. Pure concern for distributional justice however does not depend on self-interest. While many voters probably favour a more equal distribution of wealth per se, some might worry that high taxes lead to considerable deadweight loss, reducing the overall wealth. These voters might prefer a higher overall level of wealth even if it comes at the cost of some inequality. In our terminology, such a preference for efficiency over equality is a possible *notion of justice*.[3]

A common approach to measure self-interest is to conduct a dictator experiment, the first of which was conducted by Forsythe et al. (1994). In such an experiment, a subject is asked to distribute a certain amount of money between himself and some other, usually anonymous, subject. A more elaborate design with varying transfer rates was introduced by Andreoni and Vesterlund (2001) and Andreoni and Miller (2002), where for some choice situations the recipient receives more or less than one unit of money for every unit of money given up by the decision maker. To some extent, this setup already allows to examine how subjects trade off efficiency and equality.

In this paper, we analyse the results of an experiment conducted to examine the notion of justice of subjects in more detail and to test if giving in dictator experiments can be explained by a combination of self-interest and preferences over just distributions (the notion of justice). We use a dictator experiment with varying transfer rates as in Andreoni and Vesterlund (2001) and Andreoni and Miller (2002) to measure self-interest, and a social planner experiment (cf. Dickinson and Tiefenthaler 2002) and a dictator experiment behind a veil of ignorance (Rawls 1971, Schildberg-Hörisch 2010) to learn about individual notions of justice.

Evidence on gender differences in dictator experiments is mixed. While Eckel and Grossman (1998, 2008) find that there are gender differences in giving behaviour, Bolton and Katok (1995)

[2]While the third reason is also about self-interest, it can be argued that it is actually more closely related to the second reason based on Rawls’s (1971) “veil of ignorance”. To compare the general “justness” of two distributions of wealth, we can conduct a thought experiment in which we imagine that we are born into a society with one of the two wealth distributions. We are then randomly assigned to one of the possible wealth levels.

[3]Another reason why some people might oppose redistribution is that they feel that the recipients do not deserve money that they have not earned themselves. However, this motivation is not the focus of our paper.

find no such differences.[4] Andreoni and Vesterlund (2001) find that the giving behaviour of men and women strongly depends on the transfer rates.

In our dictator experiment, we replicate the result of Andreoni and Vesterlund (2001); in particular, we find that men react more strongly to changes in the transfer rates. However, while Andreoni and Vesterlund (2001) find that men are somewhat more selfish as they give less on average, we find that men give more on average, although the difference is insignificant. Andreoni and Vesterlund's (2001) finding that women give more is likely an experimental artefact: Whether men or women give more on average strongly depends on the transfer rate.

One novel finding in our paper is that gender differences in the social planner and veil of ignorance experiments are even stronger than in the dictator experiment; in particular, women are far more concerned with equality than men. While this result may not be surprising per se, the combination of the two experiments allows us to test if differences in giving behaviour in the dictator experiment are due to differences in self-interest between men and women. We find strong evidence that this is not the case: Differences in the dictator experiment can be explained by differences in the notion of justice. Thus, in situations where women give more money than men, this is not because men are more selfish, but because men feel that the situation does not warrant passing a great amount because it would be inefficient to do so. In situations where men give more money than women, this is not because women are more selfish, but because women feel that passing a great amount would not be just as they prefer more equal outcomes.

The rest of the paper is organised as follows: In Section 2 we briefly summarise the theoretical framework and the central idea of the preference decomposition. In Section 2.1 preferences, notions of justice, and two central axioms are defined. Section 2.2 describes the data collection and gives a brief review on revealed preference. Section 2.3 describes the CES function and its relation with the two axioms and the CES function.

Section 3 gives an overview of the experimental design and our hypotheses. Section 3.1 describes the experimental tasks, Section 3.2 provides the experimental protocol. In Section 3.3 we formulate our hypotheses.

Section 4 presents our results. In Section 4.1 we screen our data for treatment and ordering effects. In Section 4.2 we present both non-parametric and parametric estimation results of the dictator experiment and give an outlook on giving behaviour based on our prediction. Section 4.3 provides descriptive results on the social planner and veil of ignorance experiments, estimates of individual's justice functions, and a prediction. In Section 4.4 we combine the data of the dictator and the social planner or veil of ignorance experiments and provide estimation results. In Section 4.5 we present the result of a non-parametric comparison between male and female subjects.

Section 5 concludes.

2 PRELIMINARIES

In this section, we briefly review some of the theory introduced by Becker et al. (2013a). This is necessary to understand the basic distinction between *preferences* and *notions of justice*. We then describe the two axioms introduced by Becker et al. (2013a).

We also briefly introduce revealed preference terms. This is necessary because we screen our data for violations of utility maximisation and our new axioms based on non-parametric revealed preference tests. The methods are also relevant for our non-parametric comparison of the strength of the sense of justice.

[4]Note that Bolton and Katok (1995) used a very specific experimental design where participants are not allowed to transfer more than 50% of the pie. Therefore this design is not directly comparable to ours.

The new axioms are then used to interpret the parameters of the CES function in terms of preferences and notions of justice.

We will only consider the two-dimensional case here (i.e., allocations of money between two individuals) because that is all we need for our experimental data.

2.1 *Preferences and notions of justice*

We want to analyse the preference and notion of distributive justice which together determine the decision making of an individual — the *decision maker* (DM) — who is asked to allocate money between two individuals, one of whom may be the DM. We call an element $a \in \mathbb{R}^2_+$ an *allocation*. Whenever the DM who is asked to choose an allocation is one of these individuals, his payoff is given by a_1, and a_2 is the payoff of the other individual.

A hypothesis experimentally tested in Becker et al. (2013b) is that the DM can be represented by transitive, complete, continuous, and monotonic[5] binary relations on $\mathbb{R}^2_+$. The first relation, $\succsim$, is called the DM's *preference*. This preference determines the DM's choice when he is one of the recipients of the money. The second relation, $\succsim_{\mathrm{J}}$, is called the DM's *notion of justice*. This notion of justice determines the DM's choice when he is not one of the recipients. We also need a third relation, $\succ_{\mathrm{S}}$, which is simply defined as $a \succ_{\mathrm{S}} a'$ if $a_1 > a'_1$. This relation compares the payoff for the DM whenever he has an own stake.

The main idea is that DMs care about two things: (i) their own payoff, and (ii) how just an allocation is. A DM may make choices which violate his own justice ideal (i.e., his notion of justice), but only if he benefits from it in terms of his own payoff. Thus, if $a \succ_{\mathrm{S}} a'$ and $a \succsim_{\mathrm{J}} a'$, we must have $a \succsim a'$ because a gives the DM a higher payoff *and* is more just. On the other hand, if $a \succ_{\mathrm{S}} a'$ and $a' \succsim_{\mathrm{J}} a$, the DM may or may not prefer a over a'. This idea is formalised in the following axiom, called *Agreement*:

$$a \succsim_{\mathrm{J}} a' \text{ and } a \succ_{\mathrm{S}} a' \text{ implies } a \succsim a'. \tag{1}$$

In our experiment, a DM has no information about the other recipients of the money he allocates, so there should be no reason to treat two anonymous recipients differently. Therefore, we impose an impartiality condition on the notion of justice $\succsim_{\mathrm{J}}$. We call this condition *Symmetry* because it implies iso-curves which are symmetric with respect to the 45° line:

$$(a_1, a_2) \sim_{\mathrm{J}} (a_2, a_1), \tag{2}$$

where $\sim_{\mathrm{J}}$ is the symmetric part of $\succsim_{\mathrm{J}}$.

2.2 *Data collection and revealed preference*

We observe choices on budgets with different prices. Budgets are of the form $B(p^i) = \{x \in \mathbb{R}^2_+ : p^i x \leq 1\}$, where prices $p^i \in \mathbb{R}^2_{++}$ are normalised such that income is 1. We observe N choices x^i, $i = 1, \dots, N$, so a set of observations can be denoted $\{(x^i, p^i)\}_{i=1}^N$. We then use revealed preference techniques to test the data for consistency with several assumptions. We say the allocation x^i is *directly revealed preferred* to an allocation y, written $x^i \,\mathrm{R}^0\, y$, if $p^i x^i \geq p^i y$. Let R be the transitive closure of R^0.

A set of observations satisfies the *Generalised Axiom of Revealed Preference* (GARP) if $p^j x^j \leq p^j x^i$ whenever $x^i \,\mathrm{R}\, x^j$. Varian (1982) showed that GARP is equivalent to the existence

[5]Note that monotonicity excludes strong forms of inequality aversion (i.e., violations of stochastic dominance). However, as we only collect choices on common competitive budgets, we cannot distinguish between violations of non-satiation and monotonicity. See Becker et al. (2013a) for more information and arguments.

of a continuous, monotonic, and concave utility function u that rationalises the data, that is, $u(x^i) \geq u(y)$ whenever $x^i \,\mathrm{R}\, y$.

As minor errors in decision making can already lead to a violation of GARP, we employ a standard measure of efficiency, the *Afriat Efficiency Index* (AEI). For $e \in [0,1]$, we write $x^i \,\mathrm{R}^0(e)\, y$ if $e\, p^i x^i \geq y$ and let $\mathrm{R}(e)$ be the transitive closure of $\mathrm{R}^0(e)$. Then the AEI is the greatest e such that $e\, p^j x^j \leq p^j x^i$ whenever $x^i \,\mathrm{R}(e)\, x^j$.

Note that the revealed preference approach is used to construct both the *revealed preference* and the *revealed notion of justice*. In Becker et al. (2013a), we also derive the revealed preference implications of the Agreement and Symmetry axioms. This allows us to test data non-parametrically for consistency with utility maximisation and the two new axioms and to compute efficiency indices.

2.3 *The CES function*

In Section 4 we will estimate parameters of CES functions. We assume that the preference $\succsim$ can be represented by the CES utility function

$$u(a) = (\alpha a_1^\rho + [1-\alpha] a_2^\rho)^{1/\rho} \tag{3}$$

and the notion of justice $\succsim_{\mathrm{J}}$ can be represented by the CES justice function

$$v(a) = (\beta a_1^\varsigma + [1-\beta] a_2^\varsigma)^{1/\varsigma}\,, \tag{4}$$

with $\alpha, \beta \in [0,1]$ and $\rho, \varsigma \leq 1$. As Becker et al. (2013b) have already found that most subjects have very high efficiency indices not only for utility maximisation but also for consistency with Agreement and Symmetry, we can work under the assumption that these two axioms are satisfied. Becker et al. (2013a) show that Symmetry implies $\beta = 1/2$, and Agreement implies that $\rho = \varsigma$.

The parameter α in the utility function can obviously be interpreted as a measure for selfishness, as it is the weight the DM puts on his own payoff. With $\beta = 1/2$, the maximisation of the justice function $v(a)$ is equivalent to maximising $\tilde{v}(a) = (a_1^\varsigma + a_2^\varsigma)^{1/\varsigma}$. Then ς is the only parameter in the justice function and can therefore be thought of as representing the notion of justice. This also demonstrates the effect of the notion of justice on the preference: It is the curvature of the indifference curve. Note that $\eta_\rho = 1/(\rho-1)$ and $\eta_\varsigma = 1/(\varsigma-1)$ are the elasticities of substitution of the utility and justice function, respectively.

The interpretation of α is standard and has appeared in the literature before (e.g., Andreoni and Miller 2002). The interesting new result here is that our axioms provide a good interpretation of the second parameter ρ: As Agreement implies $\rho = \varsigma$, this parameter represents the notion of justice. Our framework therefore allows us to take a closer look at the two different motivations DMs are assumed to have. In particular, we will be able to find out if differences between men and women in the dictator game are due to differences in selfishness (differences in α) or notion of justice (differences in ρ) or a combination of both.

Note that maximising the utility function yields the demand function

$$a_i(p_i, p_j) = \frac{A}{A + (p_j/p_i)^r} \frac{1}{p_i} \tag{5}$$

for $i, j = 1, 2$, $i \neq j$, where $A = [\alpha/(1-\alpha)]^{[1/(1-\rho)]}$ and $r = \rho/(\rho-1)$.

Another advantage of the CES form is that it captures four prototypical utility representations: With $\alpha = 1$ we have the same preference as $\tilde{u}(a) = a_1$ (selfish preferences). As $\rho \to 1$, the elasticity of substitution approaches infinity, and with $\alpha = 1/2$ we obtain perfect substitute (PS) preferences represented by $\tilde{u}(a) = a_1 + a_2$. As $\rho \to -\infty$, η_ρ approaches zero and the utility function takes the max-min or Rawlsian form $u(a) = \min\{a_1, a_2\}$ (Rawls 1971). As $\rho \to 0$, η_ρ approaches -1 and the utility function takes the Cobb-Douglas form $u(a) = a_1^\alpha a_2^{1-\alpha}$. We say that individuals with $\alpha = 1/2$ and $\rho = 0$ have Nash preferences because the Nash bargaining solution (Nash 1950) maximises this function.

3 EXPERIMENT AND HYPOTHESES

In this section we first describe the idea of our experiment and how it relates to the theoretical framework in Section 2. We then provide the experimental protocol (see also Becker et al. 2013b). Finally, we formulate our hypotheses about differences between male and female subjects.

3.1 *Experimental tasks*

In our analysis, we use the data collected by Becker et al. (2013b). We have two different experimental tasks to elicit the two relations—preference and notion of justice—described in Section 2. The first one collects the data to elicit the revealed preference R, and the second one collects the data to elicit the revealed notion of justice $\mathrm{R_J}$. Choice i in the first task is denoted by $x^i = (x_1^i, x_2^i)$, while prices are denotes as $p^i = (p_1^i, p_2^i)$. In the second task choices are denoted by $y^i = (y_1^i, y_2^i)$, while prices are denotes as $q^i = (q_1^i, q_2^i)$.

A *dictator experiment* is an experiment in which the first element of each bundle, x_1, is the payoff to the participant, while the second element x_2 is the payoff to the other individual. A *social planner experiment* is an experiment in which the participant has no personal monetary stake, that is, an experiment in which the participant allocates the payoff of two other individuals. A *veil of ignorance experiment* is an experiment in which the participant has a personal monetary stake but does not know whether y_1 or y_2 is his own payoff. More precisely, the participant allocates payoff to "persons" labelled j = A,B, and every individual $i = 1, 2$, including the participant, is labelled person j with the same probability. We will call these experiments D-experiments, P-experiments, and V-experiments, respectively.

We conducted four treatments which consisted of the D-experiment and either the P- or V-experiment. To account for possible ordering effects, we first played the dictator experiment and then the other experiment in Treatments 1 and 2 and vice versa in Treatments 3 and 4. See Table 1 for an overview of the treatments.

TREATMENT	GAME 1	GAME 2
1	dictator experiment D	social planner experiment P
2	dictator experiment D	veil of ignorance experiment V
3	social planner experiment P	dictator experiment D
4	veil of ignorance experiment V	dictator experiment D

Table 1: Treatments.

The D-experiment is used to elicit R, and the P- and V-experiment is used to elicit $\mathrm{R_J}$. The combined data from the D- and either the P- or V-experiment can be used to test Agreement. We discuss the three types of experiments in more detail in Becker et al. (2013a,b). We are agnostic as to whether the P- or the V-experiment is better suited to elicit $\mathrm{R_J}$. However, Becker et al. (2013b) report that there are only minor differences in the choices and recovered notions of justice.

We also analyse ordering and treatment effects in Section 4.1 and conclude that we can pool the data from the two types of experiments.

For the estimation of the CES parameters, we use the data from the D-experiment to estimate α and ρ of the utility function in Eq. (3), and the data from the P- and V-experiment to estimate β and ς of the justice function in Eq. (4).

3.2 *Experimental protocol*

We ran our experiment at the laboratory of the department of business administration and economics of the University of Jena, Germany in 2012. The majority of participants were students from the University of Jena, some were students from the University of Applied Sciences in Jena. Recruitment was done via ORSEE (Greiner 2004). The participants were aged 18–32; the average age was 22.7. Slightly more than half of our participants (53.2%) were female. The experiment consists of four treatments and we conducted three sessions per treatment, totalling 188 participants.[6] The experiment was programmed and conducted with z-tree (Fischbacher 2007). Sessions lasted on average 104 minutes and the average payment was 16.50 Euros.

The experimental sessions were conducted in the following way: Participants came to the lab and were randomly seated. We ensured that all participants mastered the German language well enough to understand the instructions. Then all participants read the instructions for the first part individually (see Appendix C) and filled out a comprehension test for this part. It was announced in the instructions that a second part would follow. If participants had questions, they were answered by the experimenter in private. Once the experimenter had controlled the comprehension test, she explained to the respective participants again in private the issues they did not understand while taking care that clarifications were provided each time in the same way. After the first part of the experiment had been completed participants received the instructions and comprehension test for the second part knowing that this would be the last part. Other procedures were the same as in the first part. After both experimental parts had been completed participants filled out a questionnaire on socio-demographic issues and their strategies for their decisions.

In the D-experiment each participant was asked to split up induced budgets with varying price vectors between himself and a randomly matched participant. Giving something to the matched participant meant forgoing own payoff. The amount one had to forego in order to give something to the matched participant, however, varied from budget to budget and therefore also from round to round. Since all other participants had to do the same task, each participant also received an amount that a randomly matched participant (not the one that he was matched to for his allocation) allocated to him.

In the P-experiment each participant was asked to allocate given budgets with varying price vectors to two other participants. This means that his choice did not affect his own payoff. However, since all participants had the same task, each participant also received two allocations from two randomly matched participants (not the ones he allocated money to).

In the V-experiment each participant divided budgets with varying price vectors between himself and another participant, called person A and person B. He allocated the money to person A and person B and it was later randomly determined which person he would be and therefore

[6]There were 16 participants in eleven of the twelve sessions. In one of the sessions we only had 12 participants because some of the people who registered did not show up. Before our actual sessions started we ran two pilot sessions to test the software, the instructions, and the payoff calibration. The data of the pilot sessions will not be included in the data analysis. Neither will we include the data of a session which was disrupted by a software crash after the first part which made it impossible to gather data for the second part of the treatment.

which of the payoffs he allocated to person A and person B he would receive knowing that he would receive either of the two roles with equal probability. With this mechanism of randomly determining a role each person also received an amount of money that another participant allocated to the other role.

In each of the three tasks participants received 15 budgets with different price relations for the payoffs of the two matched participants, that is, certain allocations were more efficient than other allocations. All of the participants in a given task received the same 15 budgets, but the order of the budgets was randomized to account for ordering effects. The 15 budgets were always the same 15 budgets within a task, but differed between the D-experiment and the P- and V-experiment.

At the beginning of each of the two parts of the experiment participants had two trial rounds to become familiar with the software which were not payoff relevant before the 15 payoff relevant rounds started.

The budgets are given in Table 2. Income is normalised to 1, so that each budget is defined by the equation $p_1x_1 + p_2x_2 = 1$ for the D-experiment and similarly for the P- and V-experiment. Here, p_1 is the price for one Euro for the decision making participant (x_1), while p_2 is the price for giving one Euro to the receiving other participant (x_2). The table also shows the price ratio and maximal possible values of x_1 and x_2. Figure 1 represents the budgets graphically.

BUDGETS										
	DICTATOR					SOCIAL PLANNER AND VEIL OF IGNORANCE				
BUDGET	$\frac{p_2}{p_1}$	p_1	p_2	$x_{1\,\max}$	$x_{2\,\max}$	$\frac{q_2}{q_1}$	q_1	q_2	$y_{1\,\max}$	$y_{2\,\max}$
1	0.222	0.272	0.061	3.67	16.50	0.290	0.290	0.084	3.450	11.910
2	0.333	0.200	0.067	5.00	15.00	0.400	0.260	0.104	3.850	9.620
3	0.500	0.222	0.111	4.50	9.00	0.500	0.222	0.111	4.500	9.000
4	0.500	0.190	0.095	5.25	10.50	0.500	0.190	0.095	5.250	10.500
5	0.500	0.167	0.083	6.00	12.00	0.573	0.220	0.126	4.550	7.940
6	0.833	0.182	0.152	5.50	6.60	0.833	0.182	0.152	5.500	6.600
7	1.000	0.143	0.143	7.00	7.00	1.000	0.143	0.143	7.000	7.000
8	1.000	0.125	0.125	8.00	8.00	1.000	0.125	0.125	8.000	8.000
9	1.200	0.152	0.182	6.60	5.50	1.200	0.152	0.182	6.600	5.500
10	2.000	0.111	0.222	9.00	4.50	2.000	0.111	0.222	9.000	4.500
11	2.000	0.100	0.200	10.00	5.00	2.000	0.095	0.190	10.500	5.250
12	2.000	0.095	0.190	10.50	5.25	2.000	0.083	0.167	12.000	6.000
13	2.000	0.083	0.167	12.00	6.00	2.382	0.084	0.200	11.910	5.000
14	3.106	0.090	0.279	11.12	3.58	3.528	0.068	0.240	14.710	4.170
15	4.496	0.061	0.272	16.50	3.67	4.496	0.061	0.272	16.500	3.670

Table 2: The budgets used in the experiment.

The layout of the screens and the procedure was the following (see Figure 15 in Appendix C.3): On the right hand side of the screen, participants could see in words the maximum amount they could give to themselves or the other player in the D-experiment, P-experiment, or V-experiment, respectively. On the left hand side of the screen a figure showed the same information: The horizontal axis showed payoffs for oneself or “person A”, the vertical axis showed payoffs for the other person or “person B”, respectively. A blue line showed all possible allocations of the budget. To make a decision, participants could enter on the right hand side of the screen how much they wished to allocate to themselves (person A), respectively. When they pressed the “Show”-button, it was shown on the right hand side of the screen how much they (person A) and the other person

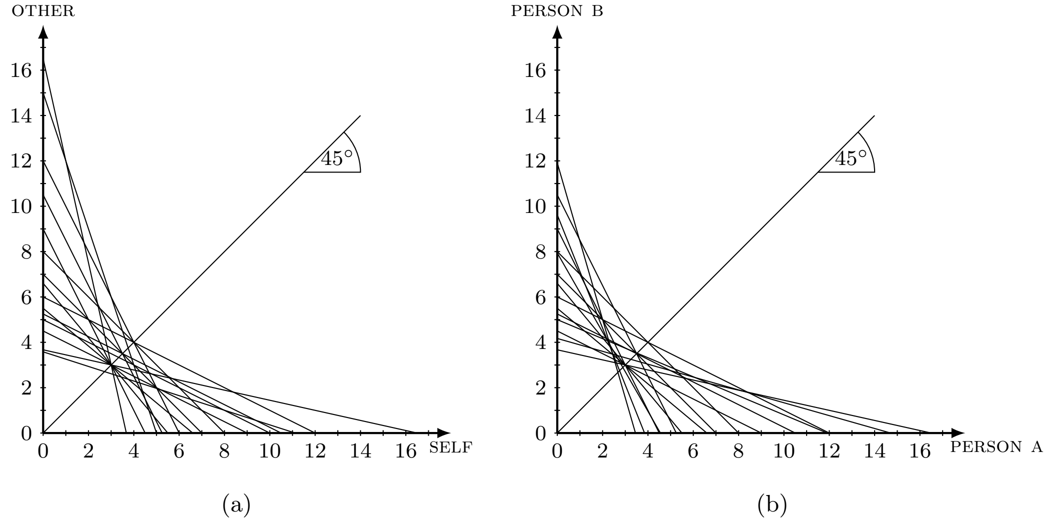


Figure 1: The budgets used in the D-experiment (a) and the P- and V-experiment (b).

(person B) would get if this choice was confirmed. On the left hand side of the screen, red lines in the graph indicated the currently chosen allocation of the budget. Participants could try out as many different allocations as they wished until they confirmed their choice. Once everyone completed a round, the next round followed.

For the payment one round of the first task and one round of the second task were randomly chosen. Only these two rounds were paid out for each of the participants, so that each participant received payoff for the D-experiment and either for the P-experiment (treatments 1 and 3) or the V-experiment (treatments 2 and 4). Thus, the payment consisted of four parts: For the D-experiment each participant received the amount he allocated to himself and the amount one of the other participants allocated to him (i.e. to his matched counterpart); for the P-experiment each participant received the amount that one matched participant distributed to player A and the amount that a second matched participant distributed to player B; for the V-experiment each participant received the amount he distributed to the person whose role was randomly determined for him and the amount another participant distributed to the other role, respectively. Since no feedback was given between rounds, participants were only informed about their earnings at the very end of the experiment. The amount earned in the experiment was paid out in Euros privately directly after the experiment had been completed.

3.3 *Hypotheses*

The analysis of the D-experiment is most closely related to Andreoni and Vesterlund (2001). However, we include more budgets with more extreme price levels. Including more budgets enables us to observe more choices per individual and including more extreme price levels enables us to extract more detailed information about the preferences and notions of justice. If men and women react differently to changes in the price ratios we can expect stronger gender differences in the amounts given with more extreme price ratios.

Our first hypothesis states:

Hypothesis 1a *There are no differences in the observed giving behaviour of men and women in the D-experiment.*

In accordance with the results of Andreoni and Vesterlund (2001) we expect to reject this hypothesis and to find significant differences in the amounts passed for men and women. Men are expected to give more money to the recipient when it is cheap (efficient) to do so, while women are expected to give more money to the recipient when it is expensive (or inefficient) to do so.

One would expect that differences (if they exist) are reflected in the preferences recovered from the choices. We therefore also expect that the differences in the giving behavior can be rationalised with different preferences for giving. For example, Andreoni and Vesterlund (2001) found that most women have Rawlsian preferences while most men have PS preferences.

Our next hypothesis therefore states:

Hypothesis 1b *There are no gender differences in the preferences for giving in the* D*-experiment.*

Our way to test this hypothesis is to use estimated parameter values of CES functions.

In accordance with the literature we expect to reject this hypothesis. We expect that men and women have different utility representations. However, we have no reason to believe that either gender is more selfish than the other, as there are contrary results in the literature (e.g., Bolton and Katok 1995 and Eckel and Grossman 1998). Andreoni and Vesterlund (2001) find that males are more selfish than females, which may be an experimental artifact due to their particular choice of budgets. Furthermore, given their result that men are more likely to have PS preferences while women are more likely to have Rawlsian preferences, we expect to find differences in the notion of justice but not in the extent of selfishness. We therefore expect to find gender differences in the parameter ρ but not α.

The analysis of our P-experiment is related to Dickinson and Tiefenthaler (2002) and Hong et al. (2015) and the analysis of our V-experiment to Schildberg-Hörisch (2010). Besides Hong et al. (2015), these studies only use on observation per individual. Hong et al. (2015) argue that their finding that women are more egalitarian in P-experiments accords with Andreoni and Vesterlund's (2001) finding in D-experiments. However, with our study we can combine data from the two types of experiments. This actually allows us to test on the subject level whether women behave differently in D-experiments because they are more egalitarian and if there are differences in the levels of selfishness.

Our hypothesis states:

Hypothesis 2a *There are no gender differences in the observed allocation behaviour in the* P*- and* V*-experiment.*

In accordance with the results of Dickinson and Tiefenthaler (2002) and Schildberg-Hörisch (2010) and Hong et al. (2015), we expect to reject this hypothesis. We expect that men allocate more money to the individual with the lower price, while women are expected to allocate money more equally in all cases.

Again, one would expect that differences (if they exist) are reflected in the notion of justice recovered from the choices. We therefore also expect that the differences in the allocation behaviour can be rationalised with different preferences for giving. In particular we expect that women are most interested in equal allocations which imply Rawlsian notions of justice, while men are expected to be more interested in maximising the total sum of payoffs which implies PS notions of justice.

Our next hypothesis therefore states:

Hypothesis 2b *There are no gender differences in impartial notions of distributive justice in the* P*- and* V*-experiment.*

To our knowledge there is no literature on individual notions of justice or justice functions and gender differences in P- or V-experiments other than the three papers mentioned above. In analogy to these studies we expect to reject this hypothesis. As Becker et al. (2013b) found strong evidence for consistency with Symmetry, the parameter β is expected to be close to 1/2 for most subjects. We therefore expect no differences between men and women in β. However, we do expect differences in the parameter ς.

Next we turn to a within-subject analysis. Becker et al. (2013b) found that their axioms are mostly satisfied. We therefore combine the choices of the P- and V-experiments with that of the D-experiment. Our next hypothesis states:

Hypothesis 3 *The notion of justice is not sufficient to explain gender differences in the* D-*experiment.*

Given the evidence for consistency with Agreement, we expect that the parameter ς of the justice function, estimated with data from the P- or V-experiment, is equal to the parameter ρ of the utility function, estimated with data from the D-experiment. We expect that differences in these parameters (i.e., differences in the notion of justice) are sufficient to explain gender differences, and that men and women have the same α. Therefore we expect to reject Hypothesis 3. If we reject this hypothesis we find strong evidence that gender differences in the D-experiment are not due to different degrees of selfishness but due to differences in their ideas about what makes an allocation just.

4 RESULTS

We first test the data for possible treatment or ordering effects. We then use the data from the D-experiment to test Hypotheses 1a and 1b and the data from the P- and V-experiment to test Hypothesis 2a and 2b. Afterwards we use the combined data to test Hypothesis 3. Finally, we conduct a non-parametric comparison of the individual strength of the sense of justice between men and women as suggested in Becker et al. (2013a,b).

We applied our revealed preferences tests and efficiency indices to screen the data for severe violations of GARP, Agreement, and Symmetry. Details about this analysis can be found in Becker et al. (2013b). Out of 188 subjects, 164 (87.23%) meet our efficiency criteria – 77 males (46.95%) and 87 females (53.05%). We restrict the analysis in the main part of the paper to these 164 subjects and call this set of participants the "restriced set". However, for completeness we provide the results for the entire data set of all 188 participants in Appendix B.1.

In Section 4.1 we compare up to four treatments and therefore apply the Kruskal-Wallis test (KW, test statistic H, Kruskal and Wallis 1952) and the multiple comparison test (MC, Siegel and Castellan 1988).[7] In all remaining Sections we compare the choices between two groups and apply the Anderson-Darling test (AD, test statistic A^2, Anderson and Darling 1952) for a comparison of the distributions and the Mann-Whitney test (MW, test statistic z, Mann and Whitney 1947) for comparison of the medians. Note that the k-sample KW test is essentially a generalisation of the two-sample MW test.

When testing the distributions for differences for each of the 15 budgets, there may be significant differences in some budgets merely by chance. To make sure that this is not the case we also present the results of a custom randomisation test (a random permutation test; see for example Westfall and Young 1993, Good 2005): For example, say that there are n_1 participants

[7]For the KW test we report the χ^2 value, because H is approximately χ^2; for the MCT, we report the rank mean difference.

in Treatments 1 and 2 (T1,2) and n_2 participants in Treatments 3 and 4 (T3,4). When we test for differences between T1,2 and T3,4, we randomly sample without replacement n_1 of the participants and assign them to a group G_1, and assign the remaining n_2 participants to a group G_2. We then compare the choices made by participants in G_1 with those in G_2 for each of the budgets and compute the p-values for the KW, the AD, or the MW test. We repeat this 10,000 times. We then compute the percentage of random permutations for which the number of budgets with significant differences between G_1 and G_2 is greater than or equal to the number of budgets with significant differences between T1,2 and T3,4. This is an estimate of the probability with which we can expect to observe the differences between the choices of the treatments if there actually are no differences. Suppose there are two budgets for which choices are significantly different between T1,2 and T3,4 on the five percent level, and one more with significant differences only on the ten percent level. Suppose that in 1,200 out of 10,000 cases there are at least two budgets with significant differences between G_1 and G_2 on at least the five percent level, and a total of three budgets with significant differences on at least the ten percent level. In that case we would conclude that the differences between T1,2 and T3,4 are likely to occur by chance even if there are no differences. Therefore, the differences between T1,2 and T3,4 are insignificant.

4.1 *Ordering or treatment effects and pooling*

When testing for ordering or treatment effects we have to consider all four treatments. We use the Kruskal-Wallis test (KW, Kruskal and Wallis 1952) as the appropriate non-parametric test for overall differences. When appropriate, we further use the multiple comparison test (MCT, Siegel and Castellan 1988) to identify differences between individual treatments. Note that for completeness we present the results for all treatment comparisons even though differences between T1 and T4, or between T2 and T3, are hardly interpretable.

In the D-experiment, we compare the amounts allocated to the recipient. In the P- and V-experiment, we compare the amounts allocated to the second individual and person B, respectively. We do this for each budget and gender separately. Tables 12 for the D-experiment and 13 for the P-V-experiment in Appendix A.1 show the results.[8]

The last line of Tables 12 and 13 present the results of the custom permutation test. No value is given when there were no significant differences in the original data.

4.1.1 D-*experiment*

We first test for overall effects in the D-experiment, that is we test whether individuals behaved differently in all four treatments. Differences between individual treatments are tested with the MC test when overall effects are found. Table 12 shows no significant differences between the choices in all four treatments for our male participants. Considering our female participants we find one minor effect which is not significant on the adjusted significance level.[9] We therefore conclude that there are no overall effects for males and females.

To test for ordering effects we pool the D-data of Treatments 1 and 2 (T1,2) on the one hand and Treatments 3 and 4 (T3,4) on the other hand and test for differences between these two groups. We thereby test whether individuals behave differently when the dictator task is performed first (T1,2) as opposed to those treatments where it is performed after the P- or V-experiment (T3,4).

[8] Table 17 and Tables 18 and 19 in Appendix B.1 show the results for all 188 males and females, for the D-, P- and V-experiment respectively.

[9] When making multiple comparisons, the chance to find significant differences rises simply due to the increased amount of comparisons. The MC test accounts for this, inter alia, by adjusting the significance level accordingly. For more details see Siegel and Castellan (1988, p. 213).

Table 12 shows that there are no ordering effects for females and only minor effects for males which are not significant according to the random permutation test. We conclude that there are no ordering effects between T1,2 and T2,3 for males and females, respectively.

To test for treatment effects we pool the data of T1 and T3 (T1,3) on the one hand and T2 and T4 (T2,4) on the other hand. We thereby test if individuals behave differently in the P-experiment (T1,3) as opposed to those in the V-experiment (T2,4). We find no significant effects for either males or females. We therefore pool the data of the D-experiment for each gender separately.

4.1.2 P- *and* V-*experiment*

We are interested in pooling the data of the P- and the V-experiment. As the aim of this paper is to draw general conclusions on gender differences in notions of justice, and as we are agnostic as to which experiment is better suited to elicit an individual's notion of justice, we would pool the data of the P- and V-experiment if our participants behave similarly in these tasks. We therefore compare the choices between all four treatments first. In case there are significant differences, the MC test is used to identify differences between individual treatments. Table 13 shows that there are no overall effects for males and only minor effects for women in budgets 7 and 8. However, the MC test reveals that these differences are not significant on the adjusted significance levels. We therefore conclude that there are no overall effects for either males or females.

For ordering effects we compare the pooled data of T1,2 versus T3,4 and for treatment effects we compare the choices made in the P-experiment (T1,3) with those made in the V-experiment (T2,4). We find no ordering or treatment effects for males and only minor treatment effects for females. The random permutation test finds that these differences are not significant. We therefore conclude that there are no ordering or treatment effects for males and females, respectively.

We therefore pool the data of all four treatments for each gender separately.[10]

4.2 *Dictator experiment*

We first provide some descriptive results on the giving behaviour of men and women. We then turn to an economic interpretation of these results in terms of demand, elasticities, and utility functions. Finally, we estimate individual demands and compare our predicted results to those of other studies.

4.2.1 *Giving behaviour*

Comparing the total amounts passed over all budgets we find that on average men pass 1.614 Euro (s.d. 1.651) to their recipient while women pass 1.487 Euro (s.d. 1.384). However, this difference in the behaviour of males and females is not significant ($A^2 = 1.301$, $p = 0.231$; $z = -0.076$, $p = 0.9394$).

Taking a closer look at the giving behaviour for each budget separately, we find significant differences between males and females.

Table 3 summarises the amounts given to the recipient for each gender and budget separately. We report the relative price of giving p_2/p_1, where p_2 is the price for giving to the recipient and p_1 is the price for the DM's payoff. We also report the mean amounts given (standard deviation in parentheses) and the median amount given. Furthermore, we report the resulting test-statistics of the MW-test in order to compare the medians, and of the 2-sample AD test when comparing the

[10]We also provide the results of the P-and V-experiment separately in Appendix B.2. Note that all results hold for the P- and V-experiment separately.

Amounts given in the d-experiment							
		Males		Females			
Budget	$\frac{p_2}{p_1}$	mean(sd)	median	mean(sd)	median	z	A^2
1	0.22	5.893 (6.139)	3.012	4.449 (4.897)	3.012	0.796	2.010*
2	0.33	3.734 (4.738)	0.990	3.050 (3.825)	1.500	0.290	0.692
3	0.50	1.977 (2.417)	1.000	1.639 (2.095)	1.000	0.417	0.445
4	0.50	2.258 (2.757)	0.500	1.941 (2.424)	0.500	-0.402	2.119*
5	0.50	2.755 (3.353)	1.100	2.054 (2.592)	1.000	0.847	1.130
6	0.83	1.077 (1.310)	0.060	1.188 (1.394)	0.600	-1.042	1.573
7	1.00	1.103 (1.456)	0.000	1.312 (1.311)	1.000	-1.582	3.786**
8	1.00	1.189 (1.710)	0.000	1.431 (1.539)	1.000	-1.496	3.125**
9	1.20	0.973 (1.195)	0.250	1.048 (1.055)	0.500	-1.203	3.072**
10	2.00	0.591 (0.942)	0.000	0.770 (0.853)	0.500	-2.247**	5.623***
11	2.00	0.632 (1.008)	0.000	0.688 (0.874)	0.250	-1.182	1.837
12	2.00	0.633 (1.069)	0.000	0.795 (0.971)	0.250	-2.480**	5.953***
13	2.00	0.778 (1.286)	0.000	0.980 (1.124)	0.750	-2.285**	6.237***
14	3.11	0.334 (0.617)	0.039	0.493 (0.652)	0.200	-2.574**	5.088***
15	4.50	0.284 (0.622)	0.000	0.469 (0.659)	0.111	-3.192***	8.672***
Total		1.614 (1.651)	1.100	1.487 (1.384)	1.067	-0.076	1.301
Prob.						0.040	0.018

Table 3: Average amounts given to the recipient for each gender and budget in the d-experiment, for the restricted set of participants. Total reports the statistics assuming one mean observation over all budgets per individual. The test statistic of the MW test is z, and the test statistic of the AD test is A^2. It reports the result of comparing the distributions of the choices between males and females for each budget separately. The last line gives the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%.

distribution of the amounts given by men and women for each budget separately. We also report the result of the random permutation test.[11]

The data shows that men give more money to their recipient than women when giving is relatively cheap, that is, when $p_2/p_1 < 1$. Women on the other hand give more money than men when giving is relatively expensive, that is, when $p_2/p_1 > 1$. Testing for differences in the giving behaviour we find that those differences are significant for prices greater than or equal to one.

We have to be careful in our interpretation of this result because it is likely that out of 15 budgets there will be some with significant differences merely by chance. We therefore use the custom randomisation test and find that it is unlikely that the observed differences are due to chance (see Table 3). We therefore conclude:

Result 1a *There are gender differences in the giving behaviour, in particular when giving is relatively expensive.*

Our findings are in line with the results of Andreoni and Vesterlund (2001) who also found significant differences in the giving behaviour of males and females when giving is expensive and weakly significant when giving is cheap.

Result 1a states that there are systematic differences in the behaviour of men and women in the d-experiment. Women consistently give more money to the recipient than men when giving is

[11]We are interested in gender differences in the giving behaviour. Therefore we focus on comparing the distributions of the amounts given between men and women. Note that the AD test has high test power for dictator games with a small sample size (Forsythe et al. 1994, p. 354) and that it is a very general non-parametric test which can be used to test for dissimilarities in location, shape, and scale, while the MW-test is only useful to detect differences in location.

expensive or "inefficient". It is inefficient in the sense that money given to the recipient when the relative price of giving exceeds one reduces the total amount paid out to both individuals. Men, hoewever, give more when it is cheap or "efficient" to do so.

Table 3 shows that men pass a wider range of monetary values. The ratio between the mean amount given and the maximum amount that can be passed to the other participant for men is between 8% for budget 15 and 36% for budget 1. For women, this ratio lies only between 13% and 26%, which indicates that men react more strongly to changes in the relative price.

To visualise these gender differences, we define a (relative) price and a demand for giving as in Andreoni and Vesterlund (2001). The price of giving is defined as the price p_2/p_1 as before. The demand for giving is defined as the amount given to others as a fraction of the amount kept to oneself. Formally,

$$d_g = \frac{x_2}{x_1}; \tag{6}$$

note that the demand can be greater than one when $x_1 < x_2$.

Men and women react differently to changes in the price of giving, so the demand for giving should be more elastic for males than for females and the corresponding demand curve for giving should be steeper for men than for women. Figure 2 shows that this is indeed the case.[12] Note that the demand curve of women crosses the male demand curve from below at a price ratio of 0.833.

4.2.2 *Preferences for giving*

We expect to find that the differences in behaviour between men and women will also be reflected by preferences used to rationalise the choices. For a first rough classification, we group our data using four prototypical utility representations: Selfish, Rawlsian, perfect substitutes, and Nash (see Section 2.3).

In order to classify our subjects according to these preference types we use the same approach as Andreoni and Miller (2002) and Becker et al. (2013b): For each budget we determine the choices for each of the four prototypical utility representations. We then calculate the Euclidean distance to each of these prototypical choices. The minimum deviation to one of the four prototypical utility representations then gives us the preference classification for our subjects. We further classify our subjects into a strong and a weak type: Individuals whose maximum deviation to each of the 15 choices of one prototypical utility function is not greater than 0.1 are classified as having a strong preference type.

Table 4 shows the distribution of the utility classification of our 164 participants. It includes the classification results without Nash as well to make it easier to compare to the results reported by Andreoni and Vesterlund (2001) who did not use Nash as a category. Note that some of our budgets did not make it as easy to choose on the 45° line as those used by Andreoni and Vesterlund (2001), which might explain why we have no strong Rawlsian types.

The same percentage of males and females are selfish (both 69%) and the order of the appearances of the remaining preference types are similar for both men and women: 21% (18%) of all women (men) have Nash preferences, 7% (10%) can be represented by preferences of the PS type, and 3% (3%) have Rawlsian preferences. This differs from the classification results of

[12] We pool the data for equal price ratios and calculate one mean observation for one price ratio for each participant. As already noted by Andreoni and Vesterlund (2001), this is not actually a demand curve in the classical sense.

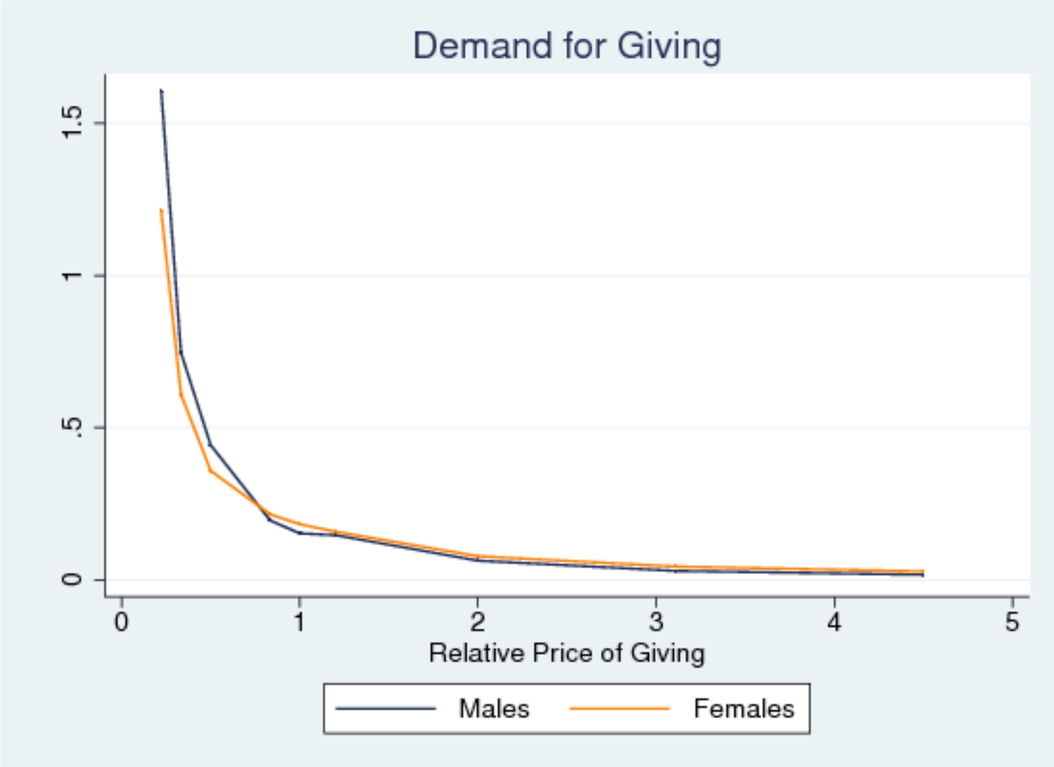


Figure 2: Demand for giving in the D- experiment for the restricted set of participants.

Distribution of utility functions in the d-experiment						
	Males			Females		
Utility Function	strong	weak	total	strong	weak	total
	Classification with Nash					
Selfish	16 (20.78%)	37 (48.05%)	53 (68.83%)	12 (13.79%)	48 (55.17%)	60 (68.97%)
Rawlsian	0 (0.00%)	2 (2.60%)	2 (2.60%)	0 (0.00%)	3 (3.45%)	3 (3.45%)
Perfect Substitutes	0 (0.00%)	8 (10.39%)	8 (10.39%)	0 (0.00%)	6 (6.90%)	6 (6.90%)
Nash	0 (0.00%)	14 (18.18%)	14 (18.18%)	0 (0.00%)	18 (20.69%)	18 (20.69%)
	Classification without Nash					
Selfish	16 (20.78%)	38 (49.35%)	54 (70.13%)	12 (13.79%)	51 (58.62%)	63 (72.41%)
Rawlsian	0 (0.00%)	13 (16.88%)	13 (16.88%)	0 (0.00%)	15 (17.24%)	15 (17.24%)
Perfect Substitutes	0 (0.00%)	10 (12.99%)	10 (12.99%)	0 (0.00%)	9 (10.34%)	9 (10.34%)

Table 4: Classification result of utility functions in the D-experiment for the restricted set of participants.

Andreoni and Vesterlund (2001) who did not use Nash: In their sample the majority of men were selfish, while the majority of women were classified as having Rawlsian preferences. Excluding Nash preferences, we find that 71% (69%) of our females (males) are categorised as selfish, 20% (18%) exhibit Rawlsian preferences, and 9% (13%) have PS preferences.

A χ^2-test reveals that gender has no influence on the distribution of the preference types ($\chi^2_{[3]} = 0.8126, p = 0.846$). This result is surprising as we found significant differences in the giving behaviour of men and women – see Result 1a. It is possible that this rough classification is inadequate to compare the two groups.

Therefore, to get more information about the underlying preferences and notions of justice, we use a parametric approach and estimate the CES demand function introduced in Section 2.3. Following Andreoni and Miller (2002) and Fisman et al. (2007) we estimate the budget share

$$x_1 p_1 = \frac{A}{A + (p_2/p_1)^r} + \varepsilon^{\mathrm{D}}, \tag{7}$$

with $A = [\alpha/(1-\alpha)]^{[1/(1-\rho)]}$ and $r = \rho/(\rho - 1)$, and with an i.i.d. error term ε^{D}.[13] The budget share is between 0 and 1. In order to account for the lower and for the upper bound we use a two-limit Tobit maximum likelihood model; this was also used by Andreoni and Miller (2002) and Fisman et al. (2007).

Note that the CES function is homothetic, which is why we want to make sure that the data does not violate homotheticity too much. We apply the Homothetic Efficiency Index (Hei) introduced by Heufer (2013) and generalised by Heufer and Hjertstrand (2014). As in Becker et al. (2013b), we base the index on the "best 14 out of 15" choices, that is, our result uses the subset of 14 choices with the highest Hei. We find that 155 (95.12%) of our 164 participants exceed an Hei of 0.9 (97.40% for males and 93.10% for females). These results are similar to those from two other dictator experiments (Andreoni and Miller 2002 and Fisman et al. 2007); see Heufer (2013) for details. We conclude that estimating a homothetic function is justified.

For the estimation we use the restricted set of 164 participants and exclude all 28 participants which were classified as having strong selfish preferences (see Table 4). This is because for these subjects, we must have $\alpha = 1$, which means that ρ cannot be estimated. This leaves us with a total of 136 individuals for our estimation.

We estimate the demand share for each individual separately. The results can be found in Table 14 in Appendix A.2. The parameters are highly significant. The average values for each of the estimated parameters A, r, and σ can be found in Table 5. The values for α, ρ, and η_ρ are derived from the respective averages.[14] The parameter σ is the estimated standard error for the residual of the demand share and is needed for the prediction.

We compare the distributions between the individual parameters. As we are interested in the differences between all 164 individuals we include those classified as having a strong notion of justice and set the parameters accordingly.[15]

Consider the CES utility function in Eq. (3). For the strong selfish types we set $\alpha = 1$. Note that for the strong selfish types we can draw no conclusions about the respective ρ parameter. However, if we accept the Agreement axiom (based on the tests in Becker et al. 2013b), we can use ς estimated from the p- or v-experiment.

[13] Note that directly estimating the CES demand function as in Eq. (5) results in heteroscedastic error terms. This has no implications for the estimated parameters but for the variances, which results in biased variances and inaccurate test results. Heteroscedasticity is avoided by estimating the budget share as given by Eq. (7).

[14] The mean value for ρ is derived from the mean value for r (i.e. $\bar{\rho} = \bar{r}/\bar{r} - 1$), whereas the median ρ results from the median value for r (i.e. $\tilde{\rho} = \tilde{r}/\tilde{r} - 1$).

[15] Note that we assume that there is no error in the choices of the strong types.

AVERAGES OF THE ESTIMATED COEFFICIENTS IN THE D-EXPERIMENT						
	Males			Females		
	mean	sd	median	mean	sd	median
A	5.2253×10^9	4.0775×10^{10}	12.8391	1.0455×10^{11}	9.0540×10^{11}	6.7227
r	-2.7491	4.5792	-0.9485	-1.0472	3.0454	-0.1542
σ	5.0327	21.7758	0.1019	0.1077	0.0733	0.0930
α	0.9974	-	0.7875	1.0000	-	0.8390
ρ	0.7333	-	0.4868	0.5115	-	0.1336
η_ρ	-3.7491	-	-1.9485	-2.0472	-	-1.1542

Table 5: Average values resulting from the estimation of the weak preference types.

As $\rho \to -\infty$, the utility function becomes $u(x_1, x_2) = \min\{x_1, x_2\}$, that is, the Rawlsian case (see also Section 2.3). However, this implies demand on the 45° line. Someone with a Rawlsian notion of justice should therefore, according to the CES utility function, only demand egalitarian allocations, even if he is relatively selfish. This is unrealistic and will distort the estimates – the CES utility function does not allow to adequately capture the preferences of such an individual. We therefore propose a more general alternative for participants whose choices imply a very low ρ. Let $\tilde{u}(x_1, x_2) = \min\{x_1/\alpha, x_2/(1-\alpha)\}$. We can then easily estimate α. Note that maximising $\tilde{u}$ implies that $(x_2/x_1) = (1-\alpha)/\alpha$, so when $p_1 = p_2$ demand is the same as for a Cobb-Douglas utility function ($\rho = 0$) with parameter α. Instead of implying a choice on the 45° line, $\tilde{u}$ implies choices on a line with $\arctan([1-\alpha]/\alpha)$ degrees, which only equals 45° for $\alpha = 1/2$.

Given the budget constraint, we obtain the demand $x_1^*(p_1, p_2) = \alpha/(\alpha p_1 + [1-\alpha]p_2)$. The remaining question is what values of ρ should be considered "very low". Graphical inspection of the estimation results of the CES utility function suggests that estimating the general Rawlsian function is already applicable when ρ is around -1. We therefore use $\rho = -1$ as a threshold.

We now turn to the individual results. We are able to compare the distributions of the ρ and α parameters between males and females. Comparing the weights α and $1-\alpha$, we find no significant difference when testing the distribution of the 77 males versus the 87 females ($A^2 = 1.104, p = 0.2926$; $z = -0.449$, $p = 0.6531$). As expected, when comparing the α values of the 136 weak types only, we also do not find significant differences ($A^2 = 1.700, p = 0.1379$; $z = -1.610, p = 0.1073$).

In order to compare the distributions of the ρ parameter, a transformation of ρ is necessary as $\rho \in (-\infty, 1]$ with $\rho = -\infty$ for the strong Rawlsian types. We apply the inverse logit transformation $f(\rho) = e^\rho/(1+e^\rho)$ such that $f(\rho) \in [0, 0.7311]$. When comparing all 164 transformed ρ-parameters we find highly significant differences ($A^2 = 5.657, p = 0.0015$; $z = 3.207, p = 0.0013$). When comparing the distributions of the weak types only, we also find highly significant differences ($A^2 = 4.669, p = 0.0041$; $z = 2.857, p = 0.0043$).[16]

We therefore conclude that there are significant differences in the notions of justice derived from the choices in the D-experiment, while there are none in the selfishness of men and women.

Result 1b *There are gender differences in the preferences for giving in the* D*-experiment.*

[16]This result is also confirmed when testing the distributions of the ρ parameters of the 136 weak types: ($A^2 = 4.607, p = 0.0044$; $z = 2.947, p = 0.0032$).

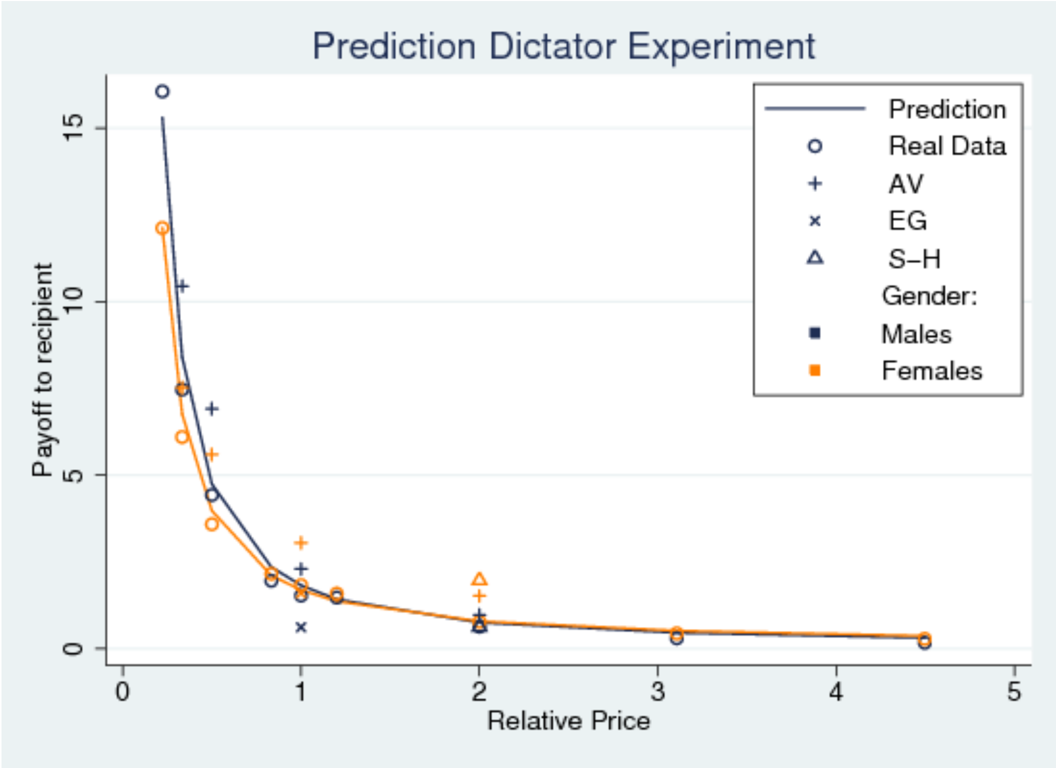


Figure 3: Predicted amount given to the recipient, when dictator is endowed with ten Euros.

4.2.3 *Prediction*

After estimating the demand share we predict the amount given to the recipient when the dictator is asked to allocate ten Euros. We predict the demand shares for the 136 individuals who are not classified as strongly selfish. The demand shares for the remaining 28 individuals are set according to their parameters, where we assume that we observed the strong types without any error. We then determine the mean amount given to the recipient for each relative price.

The connected line in Figure 3 shows the predicted amount allocated to the recipient when endowed with ten Euros. Each circle corresponds to the mean share allocated by our participants multiplied by ten at each relative price. For comparison we also include the results of Andreoni and Vesterlund (2001, AV), Eckel and Grossman (1998, EG), and the results of the dictator treatment of Schildberg-Hörisch (2010, S-H). We do not include the results of Bolton and Katok (1995) because their experimental setup is not directly comparable to ours.

Note that both our data and the data of the other studies fit quite well.

4.3 *Planner and veil of ignorance experiment*

We first provide some descriptive results on the allocation behaviour of men and women. We then turn to an economic interpretation of these results in terms of demand, elasticities, and justice functions. Finally, we estimate individual demands and compare our predicted results to those of other studies.

4.3.1 *Allocation behaviour*

When we compare the total amounts passed over all budgets we find that on average men allocated 3.64 Euros (s.d. 0.39) to B while women allocated 3.48 Euros (s.d. 0.34) to B. However, as men and women react differently to different price ratios, we need to investigate the choices for each budget, where the equity-efficiency trade-off can be seen in more detail.

P- AND V-EXPERIMENT							
		Males		Females			
BUDGET	$\frac{q_2}{q_1}$	MEAN (SD)	median	MEAN (SD)	median	z	A^2
1	0.290	8.045 (3.406)	8.458	6.678 (3.171)	6.732	2.354^{**}	4.166^{***}
2	0.400	5.876 (2.632)	5.372	5.009 (2.221)	4.623	2.128^{**}	3.321^{**}
3	0.500	5.541 (2.348)	5.000	4.549 (1.911)	4.000	2.681^{***}	5.151^{***}
4	0.500	6.560 (2.699)	5.600	5.380 (2.122)	5.300	2.652^{***}	5.842^{***}
5	0.573	4.778 (1.898)	4.450	3.746 (1.180)	3.228	3.544^{***}	8.573^{***}
6	0.833	3.610 (1.295)	3.000	3.320 (0.815)	3.000	1.168	1.591
7	1.000	3.412 (1.172)	3.500	3.445 (0.606)	3.500	0.901	1.144
8	1.000	3.956 (1.143)	4.000	4.037 (0.388)	4.000	-1.283	1.799
9	1.200	2.501 (1.127)	3.000	2.837 (0.465)	3.000	-2.381^{**}	4.796^{***}
10	2.000	1.772 (1.168)	2.000	2.230 (0.903)	2.500	-2.534^{**}	4.643^{***}
11	2.000	1.959 (1.334)	2.250	2.562 (1.035)	2.750	-2.736^{***}	5.349^{***}
12	2.000	2.152 (1.556)	2.500	2.743 (1.211)	3.000	-2.222^{**}	4.281^{***}
13	2.382	1.865 (1.417)	2.061	2.349 (1.159)	2.523	-2.048^{**}	3.765^{**}
14	3.528	1.362 (1.206)	1.335	1.792 (1.136)	1.902	-2.158^{**}	3.501^{**}
15	4.496	1.179 (1.145)	1.001	1.537 (1.089)	1.446	-2.170^{**}	3.570^{**}
Total		3.638 (0.391)	3.571	3.481 (0.337)	3.402	2.356^{**}	3.540^{**}
Prob.						0.001	0.001

Table 6: Average amounts allocated to B for each gender and budget in the P- and V-experiment for the restricted set of participants. Total reports the statistics assuming one mean observation over all budgets per individual. The test statistic of the MW test is z, and the test statistic of the AD test is A^2. It reports the result of comparing the distributions of the choices between males and females for each budget separately. The last line gives the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%.

Table 6 shows the results. We report the relative price of allocating to B (q_2/q_1), the mean amount allocated to B (standard deviation in parentheses), and the median amount allocated to B. Furthermore, we report the resulting test-statistics of the MW-test in order to compare the medians, and of the AD test when comparing the distribution of the amounts allocated to B by men and women for each budget separately. We also report the result of the random permutation test.

We find very strong evidence for systematic differences in the amounts allocated to B for all budgets except for those with a relative price close to one. The differences are all highly significant at the 1% or 5% level. As in the D-experiment, men allocate more money to B than women when giving to B is cheap. Contrary, when it is expensive to allocate money to B women allocate more money to B than men. This result is confirmed by the random permutation test.

We therefore conclude:

Result 2a *There are gender differences in the observed allocation behaviour in the* P- *and* V-*experiment for all relative prices except those which are one or close to one.*

Table 6 shows that men allocate a wider range of monetary values than women: The ratio between the mean amount allocated to B and the maximum amount that can be allocated to B for men is between 21% for budget 15 and 68% for budget 1. For women, this ratio lies only between 42% and 56%, which indicates that men react more strongly to the varying relative prices.

In order to visualise these gender differences in terms of equality-efficiency trade-offs, we define a price and a demand for equality. We invoke the Symmetry axiom which implies that no participant is biased towards either A or B. This allows us to generally define the price of equality in terms of the trade-off between efficiency and equality: The price of equality is defined as the amount one has to forego by choosing an amount that equalises payoffs instead of choosing the amount that is most efficient, normalised by the amount that equalises payoffs. Formally:

$$q_{\mathrm{eq}} = (\max\{y_{1\,\max}, y_{2\,\max}\} - y_R)/y_R, \tag{8}$$

where y_R is the demand for both y_1 and y_2 of a DM with Rawlsian preferences who equalises payoff.

Note that the price of equality is restricted to values greater than or equal to one as $\max\{y_{1\,\max}, y_{2\,\max}\} \geq y_R$. Also note that the price of equality is equal to one if and only if the relative price is equal to one.

The corresponding demand for equality is then given by the chosen amount for the more expensive good, divided by the amount resulting from equalising payoffs. That is, the demand for equality is a measure between zero and one with the demand being equal to one when an individual chooses the allocation that equalises payoffs and zero when the efficient allocation is chosen:

$$d_{\mathrm{eq}} = y_{\mathrm{ex}}/y_R, \tag{9}$$

where y_{ex} is the chosen amount of the expensive good, that is $y_{\mathrm{ex}} = y_1$ if $q_1 > q_2$, $y_{\mathrm{ex}} = y_2$ if $q_2 > q_1$ and $y_{\mathrm{ex}} = \max\{y_1, y_2\}$ if $q_1 = q_2$. Note that the demand for equality could also exceed one when Symmetry is violated.

Figure 4 shows the corresponding demand curves for the restricted set of 164 participants using the mean demand for equality. It can be seen that for all price levels women have a greater demand for equality than men. Furthermore, males react more strongly to the varying prices of equality than females: At very high prices the mean demand for equality is around 0.4 for males while it is consistently greater than 0.5 for women. When the price of equality decreases the demand for equality rises for both males and females. When the price of equality is one, males have a demand for equality of around 0.89. The demand of 0.89 means that some of our male participants (17.53%, to be specific) have chosen allocations that deviate from the one that equalises payoff. Note that an individual who only cares about efficiency and therefore maximises the total sum of payoffs may choose any allocation on a budget with a relative price of one.

4.3.2 *Notions of justice*

The analysis of Becker et al. (2013b) shows that most subjects in the the P- and V-experiment either satisfy GARP or come close to it in terms of efficiency, and that they can therefore be rationalised by justice functions in analogy to utility functions. In analogy to Section 4.2.2, we group our data for a first rough classification using the three prototypical utility representations Rawlsian, perfect substitutes, and Nash (see Section 2.3). In order to classify our participants according to these justice types we use the Euclidean distance approach explained in Section 4.2.2. Table 7 shows the distribution of the utility classification of our 164 participants. It includes the

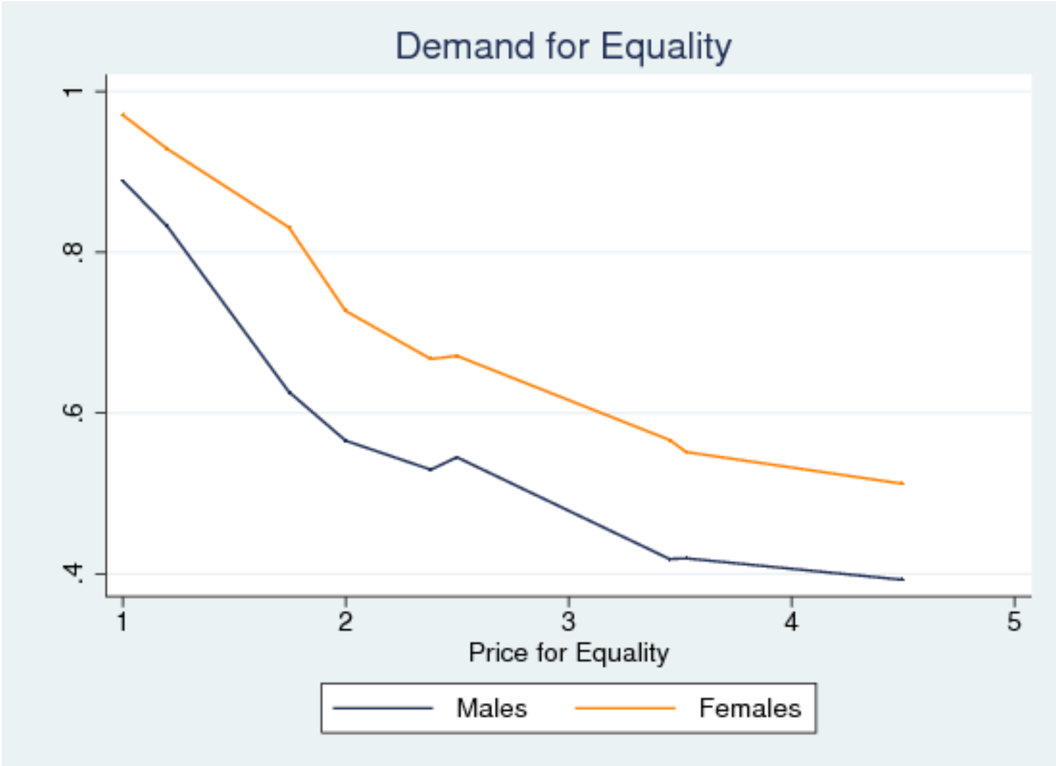


Figure 4: Demand of equality in the P- and V- experiment for the restricted set, pooled over each price ratio, respectively, and for males and females separately.

classification results without Nash as well to make it easier to compare to the results reported by Andreoni and Vesterlund (2001) who did not use Nash as a category.

P- AND V-EXPERIMENT						
	Males			Females		
JUSTICE FUNCTION	strong	weak	total	strong	weak	total
Rawlsian	3 (3.90%)	15 (19.48%)	18 (23.38%)	4 (4.60%)	26 (29.89%)	30 (34.49%)
Perfect Substitute	9 (11.69%)	14 (18.18%)	23 (29.87%)	0 (0.00%)	9 (10.34%)	9 (10.34%)
Nash	1 (1.30%)	35 (45.45%)	36 (46.75%)	1 (1.15%)	47 (54.02%)	48 (55.17%)
	CLASSIFICATION WITHOUT NASH					
Rawlsian	3 (3.90%)	39 (50.65%)	42 (54.55%)	4 (4.60%)	61 (70.11%)	65 (74.71%)
Perfect Substitute	9 (11.69%)	26 (33.76%)	35 (45.45%)	0 (0.00%)	22 (25.29%)	22 (25.29%)

Table 7: Classification results of justice function in the P- and V-experiment for the restricted set of participants.

The majority of males and females exhibit a notion of justice which is closest to Nash preferences (47% of all males and 55% of all women). The second most prevalent notion of justice for males is that of perfect substitutes (30%), while 23% of all males can best be represented by a Rawlsian notion of justice. In contrast only 10% of all women show behaviour that is in accordance with maximising total payoffs while 34% can be classified by a Rawlsian notion of justice. Note that 12% of all males can be classified as having strong PS preferences, while none of the females fall into this category.

A χ^2-test reveals that gender has an influence on the distribution of the notions of justice ($\chi^2_{[2]} = 10.267, p < 0.01$). We therefore conclude that men and women have different notions of justice.

We now turn to the parametric estimation of the justice function. As before, we estimate parameters of the CES function introduced in Section 2.3. Note that $\beta \in [0,1]$ represents the weights put on A's and B's payoff and ς measures the curvature of the justice function. The estimated value for β can also be used for a parametric test of Symmetry – it should be close to 1/2.

The demand is estimated as a budget share

$$y_1 q_1 = \frac{B}{B + (q_2/q_1)^s} + \varepsilon^{\text{PV}} \tag{10}$$

with $B = [\beta/(1-\beta)]^{[1/(1-\varsigma)]}$ and $s = \varsigma/(\varsigma - 1)$, and with an i.i.d. error term ε^{PV}. As before, the budget share is between 0 and 1, and we use a two-limit Tobit maximum likelihood model for the estimation.

As before in Section 4.2.2, we apply the test for homotheticity. We find that 162 (98.78%) of our 164 participants meet our threshold (100% for males and 97.7% for females).

For the estimation we use the restricted set of 164 participants and exclude 18 participants who fall into one of the strong categories (see Table 4). This leaves us with a total of 146 individuals for our estimation.

We estimated the demand share for each individual separately. The results can be found in Table 15 in Appendix A.2. The parameters are highly significant. The average values for each of the estimated parameters B, s, and σ can be found in Table 8. The values for β, ς, and η_ς are derived from the respective averages.[17] The parameter σ is the estimated standard error for the residual of Equation (10) and is needed for the prediction.

Planner and VoI-experiment						
	Males			Females		
	mean	sd	median	mean	sd	median
B	1.2901	2.0690	1.0181	1.0477	0.2243	1.0077
s	-1.8575	8.3195	-0.5635	-0.5666	2.2422	-0.1313
σ	0.1333	0.0950	0.1247	0.1122	0.0672	0.0962
β	0.5223	-	0.5029	0.5074	-	0.5017
ς	0.6500	-	0.3604	0.3617	-	0.1160
η_ς	-2.8575	-	-1.5635	-1.5666	-	-1.1313

Table 8: Average values resulting from the estimation of the weak preference types.

On average the weights β in Table 8 indicate that males (0.52) and females (0.51) treat A and B very similarly and that β comes close to 1/2. The parameter ς which describes the curvature of the notion of justice is greater for men (0.65) than for women (0.36). As expected, the resulting elasticity of substitution is greater in absolute terms for males (-2.86) than for females (-1.57).

To go into more detail, we compare the distributions between the individual parameters. As we are interested in the differences between all 164 individuals we include those falling into a

[17]The mean value for ς is derived from the mean value for s (i.e. $\bar{\varsigma} = \bar{s}/\bar{s} - 1$), whereas the median ς results from the median value for s (i.e. $\tilde{\varsigma} = \tilde{s}/\tilde{s} - 1$).

strong category and set the parameters accordingly.[18] For $\varsigma < -1$ we estimate β according to $y_a^*(q_1, q_2) = \beta/(\beta q_1 + [1-\beta]q_2)$; see Section 4.2.2 for more details.

Comparing the distributions of the 77 male vs. the 87 female β coefficients we find no differences ($A^2 = 0.607$, $p = 0.4815$; $z = -0.119$, $p = 0.9055$). Comparing the distributions of the β coefficients of the weak types only, we find no differences as well ($A^2 = 0.317$, $p =, 0.5984$; $z = -0.087$, $p = 0.9309$). In order to compare the distributions of the ς-parameters we apply the inverse logit transformation as explained in Section 4.2.2. We find highly significant gender differences ($A^2 = 5.349$, $p = 0.0020$; $z = 2.868$, $p = 0.0041$) in the (transformed) notions of justice. Comparing the transformed ς-parameters of the weak types only, we find weakly significant differences as well ($A^2 = 1.981$, $p = 0.0951$; $z = 1.848$, $p = 0.0646$).

Combining both results we conclude that men and women apply equal weights in the P- and V-experiment and that gender differences in their allocation behaviour are the result of different notions of justice.

Result 2b *There are gender differences in the notions of justice in the* P- *and* V-*experiment.*

4.3.3 *Prediction*

After estimating the demand share we predict the amount given to B when the impartial decision maker is asked to allocate ten Euros. We predict the demand shares for each of the 146 individuals who are not classified by strong preferences. The demand shares for the remaining 18 individuals are set according to their respective preference type.[19] We then determine the mean amount allocated to A and B for each relative price.

The connected line in Figure 5 shows the predicted amounts allocated to B when given ten Euros. Each circle corresponds to the mean share allocated by our participants multiplied by ten at each relative price. For comparison we also include the results of the veil of ignorance treatment of Schildberg-Hörisch (2010, S-H). We do not include the results of Dickinson and Tiefenthaler (2002) because of their non-linear transfer function which is not directly comparable to our setup.

As expected the demand curves of males and females cross at a price equal to one. Note also that the predicted demand and the real data show a very good fit.

4.4 *Combining results*

In the previous sections we have shown that there are gender differences in the notions of justice. Result 1b states that there are gender differences in the preferences for giving. After estimating the utility functions we further found that the gender differences are not due to different levels of selfishness (neither gender is more selfish than the other) but due to differences in the notions of justice. This was confirmed by Result 2b where we found no gender differences in the weights but highly significant differences in the notions of justice.

If the Agreement axiom holds, we can combine and/or directly compare the data of the D-experiment with the data of the P- and V-experiment. Combining the data provides certain advantages: First, we can compare the notions of justice between the treatments. Agreement implies that the estimate for the ρ and ς parameters should be equal for each participant. This would be one possible parametric test of the Agreement axiom that would complement the non-parametric test conducted in Becker et al. (2013b). Second, if we invoke Agreement, we can estimate the demand function with the combined data to get thirty data points and get estimates

[18] Note that we assume that there is no error in the choices of the strong types.

[19] We assume that we observed the strong types without any error.

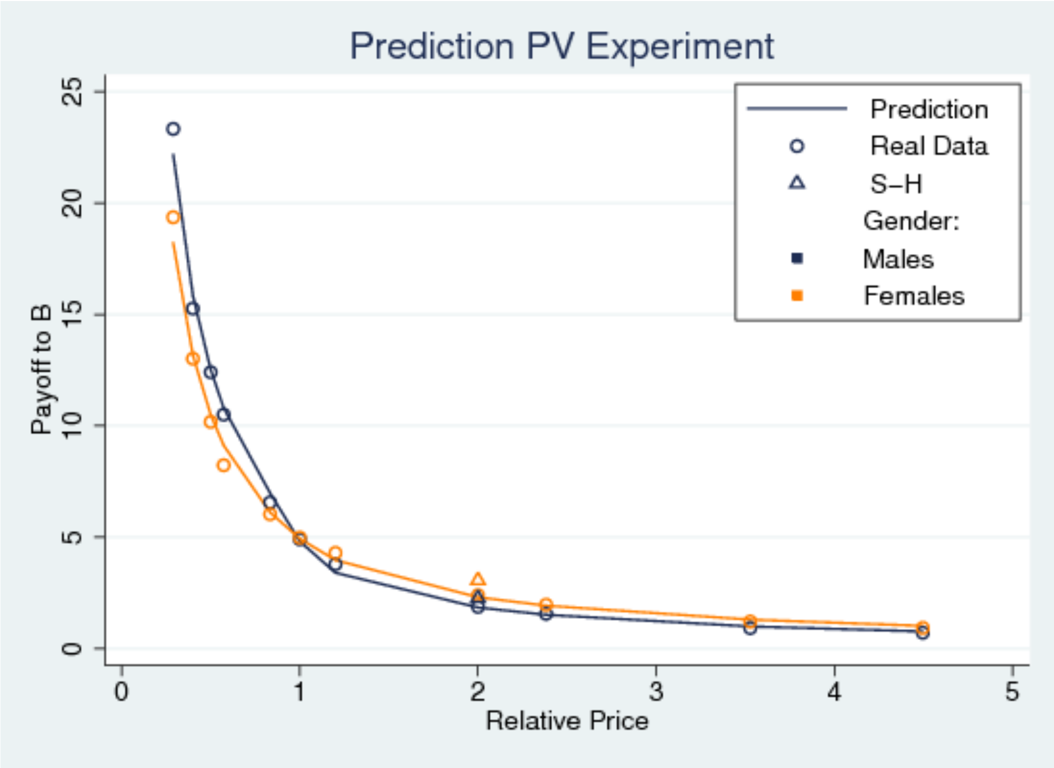
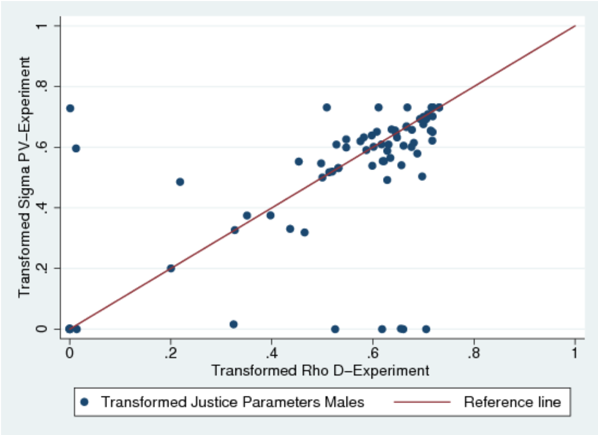


Figure 5: Predicted allocation to B with an endowment of ten Euros.

for those with strict selfish preferences in the D-experiment even though participants never gave away any money.

The Symmetrie axiom states that in a P- or V-experiment, both receiving individuals shall be treated equally. In case of the CES justice function (10) SY therefore translates into $\beta = 0.5$. This condition can be tested for each participant with a weak classification separately, resulting in 146 test results. The estimated parameters B and r from Table 15 are used to derive the weight β and the hypothesis of equality is tested using the non-linear Wald test. We report the results for all common significance levels: At a significance level of 10% we cannot reject the hypothesis of equality for 84.38% of our male and for 80.49% of our female participants. At a significance level of 5% we cannot reject the hypothesis of equality for 90.63% of our male and for 86.59% of our female participants. At a significance level of 1% we cannot reject the hypothesis of equality for 92.19% of our male and for 93.90% of our female participants.

The Agreement axiom implies that the estimation results of ρ and ς should be equal for each participant separately. Using the estimation results r and s we can derive the respective parameters ρ and ς to test the equality of these parameters between the treatments. However in case r and s are equal to one, it is impossible to compare the resulting justice parameters since $\rho = r/(r-1)$ which is indetermined for $r = 1$ (and equally for ς and s). In this case we interpret ρ (ς) as approaching $-\infty$. However, in order to take all results into consideration, we apply the inverse logit transformation $f(\rho) = e^{\rho}/(1 + e^{\rho})$ to both, r and s.



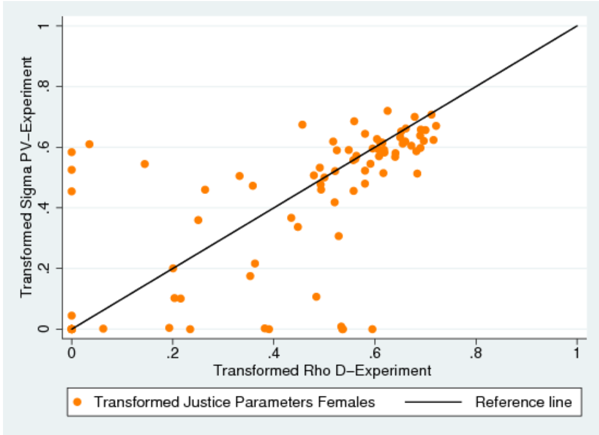


Figure 6: Transformed ρ and ς parameters of males.

Figure 7: Transformed ρ and ς parameters of females.

In order to test for equality of the justice parameters we use the non-linear Wald test.[20] This results in 136 comparisons, with 61 males and 75 females. We did not test for equality of the transformed ρ- and ς parameters for our 28 strong selfish types (see Section 4.2.2 for more details). We report the results for all common significance levels: At a significance level of 10% we cannot reject the hypothesis of equality for 49.18% of all men and 50.67% of all women. At significance level of 5% we cannot reject the hypothesis of equality for 52.46% of all male and 52.00% of all female comparisons. At a significance level of 1% we cannot reject the hypothesis of equality for 55.74% of all men and 62.67% of all women.

The individual relationship between the transformed ρ- and ς-parameters (Spearman's rho $= 0.6514$, $p < 0.000$ for males, Spearman's rho $= 0.7343$, $p < 0.000$ for females) can be seen in Figures 6 and 7.

Our conclusions are based on the 5% significance level: We find strong evidence that our estimation results are in line with Symmetrie. We further find strong evidence for equality of the justice paramaters between the experimental tasks for the majority of our participants. In Sections 4.2.2 and 4.3.2 we showed that differences in the choices of our participants are not due to gender differences in the weights α and β, but to differences in the justice paramters.

We therefore conclude:

Result 3 *The notion of justice is sufficient to explain gender differences in the* D*-experiment for the majority of our participants.*

The results from the parametric analysis confirm the conclusions about consistency with Symmetry and Agreement based on the non-parametric analysis in Becker et al. (2013b) to a large extend. We can therefore also combine the data of the D- with those of the P- or V-experiment and estimate a joint demand, as the shape parameters are the same. To do so, we keep the notion of justice (now denoted as θ and derived from the joint parameter t) equal between those experiments. We estimate

$$z = \delta\left(\frac{A}{A + (p_2/p_1)^t}\right) + (1-\delta)\left(\frac{B}{B + (q_2/q_1)^t}\right) + \varepsilon^{\text{DPV}} \tag{11}$$

[20] In three cases (ID's 4, 38 and 63) the iteration procedure of the non-linear Wald test fails to converge. In these cases we test $r = s$ directly. Note that because the Wald test produces different results depending on the formulation of the hypothesis, testing $r = s$ may yield different results than testing $\rho = \varsigma$. However when comparing the transformed values we feel that this produces rather conservative results and that we can use these results instead.

with $\delta = 1$ for observations from the D-experiment and $\delta = 0$ in the P- or V-experiment. The left hand side of Eq. (11), z, is $x_1 p_1$ for the D-experiment, and $y_1 q_1$ for the P- or V-experiment, that is, the budget share.

The average results can be found in Table 9 and the values for α β, θ, and η_θ are derived from the estimated parameters respectively.[21] More details as well as all individual estimation results can be found in Appendix A.2.1.

Estimated coefficients in the combined D-P-V-experiment						
	Males			Females		
	mean	sd	median	mean	sd	median
A	4.8119×10^{36}	4.1958×10^{37}	18.7041	4.3353×10^{11}	4.0212×10^{12}	9.3367
B	25.9959	156.2378	1.0268	1.0343	0.2431	0.9982
t	-9.6458	37.7175	-0.7804	-0.5454	1.9388	-0.1069
σ	25.1936	196.3494	0.1501	0.1205	0.0704	0.1071
α	0.9996	-	0.8382	1.0000	-	0.8827
β	0.5759	-	0.5037	0.5055	-	0.4996
θ	0.9061	-	0.4383	0.3529	-	0.0965
η_θ	-10.6458	-	-1.7804	-1.5454	-	-1.1069

Table 9: Average values resulting from the estimation of the combined data set.

4.5 *Non-parametric comparison*

We now compare the strength of the sense of justice of the participants using the non-parametric approach developed in Becker et al. (2013a), which was inspired by the analysis of Karni and Safra (2002a,b). This allows for a comparison between male and female subjects without relying on parametric estimates which require a particular functional form of utility.

Let $\trianglerighteq$ be the *stronger sense of justice than* relation. For two preference-notion of justice pairs $(\succsim^1, \succsim^1_{\mathrm{J}})$ and $(\succsim^2, \succsim^2_{\mathrm{J}})$ which satisfy Agreement, we define

$$(\succsim^1, \succsim^1_{\mathrm{J}}) \trianglerighteq (\succsim^2, \succsim^2_{\mathrm{J}}) \quad \text{if} \quad (\succsim^1 \cap \precsim^1_{\mathrm{J}}) \subseteq (\succsim^2 \cap \precsim^2_{\mathrm{J}}).$$

That is, a subject with the preference-justice pair $(\succsim^1, \succsim^1_{\mathrm{J}})$ has a stronger sense of justice than a subject with the preference-justice pair $(\succsim^2, \succsim^2_{\mathrm{J}})$ if, for every allocation $a \in \mathbb{R}^2_+$, the set of allocations which the first subject prefers over a even though he feels that they are less just than a is a subset of the same construction for the other subject. In other words, the set of allocations for which the first subject violates his own notion of justice by preferring them is a subset of the set of allocations for which the second subject violates his own notion of justice. Even more succinctly, the "selfish set" of the first is a subset of the "selfish set" of the second. See Becker et al. (2013a) for more details, in particular about the operational aspect when dealing with experimental data.

In Becker et al. (2013b) we apply this method for the first time to the same data set as the one considered here. In particular, we compare each subject with all of the other subjects. We use the simplified version of the non-parametric comparison described in Becker et al. (2013a). We use choices adjusted by the subjects' efficiency level, with the plain revealed preference relation and the symmetry-extended revealed justice relation.

[21] The mean value for θ is derived from the mean value for t (i.e. $\bar{\theta} = \bar{t}/\bar{t} - 1$), whereas the median θ results from the median value for t (i.e. $\tilde{\theta} = \tilde{t}/\tilde{t} - 1$).

As described in Becker et al. (2013a), we need a *partially revealed stronger sense of justice* to compare the data. A partially stronger sense means there is at least one incidence where two subjects agree on which of two allocations is more just, but the first one prefers the more just allocation, while the second one prefers the less just allocation. Then the result of a comparison between any two subjects falls into one of four categories. *Stronger* (*weaker*) means that the first subject has a partially stronger sense of justice than the second subject (that the second subject has a partially weaker sense of justice than the first subject) but not vice versa. *Neither* means that neither the first subject has a partially stronger sense of justice than the second subject nor vice versa. *Both* means that the first subject has a partially stronger sense of justice than the second subject and vice versa.

We first compare male and female participants within each of the four treatments. That provides more data on potential differences between male and female participants without ever comparing two participants of two different treatments with each other. We then pool the data before the comparison, and then compare all males of all treatments combined with all females of all treatments combined. We only report the results for the restricted set of participants.

We consider two approaches: First, to control for potential treatment effects, we only compare male and female participants within each of the four treatments. We then also pool the results of two or all of the treatments together. That provides more data on potential differences between male and female participants without ever comparing two participants of two different treatments with each other. Second, we pool the data before the comparison, and then compare all males of all treatments combined with all females of all treatments combined. We only report the results for the restricted set of participants, that is, those participants who satisfy the efficiency threshold.

Table 10 reports the results. For each of the four treatments, it shows the percentage of comparisons between a male and a female participant which fall into one of the categories. For example, in the upper left hand side, the table shows that in Treatment 1, a male participant has a stronger sense of justice than a female participant in 24.07% of all cases. The fifth row shows the results for the pooled data on within treatment comparisons over all four treatments. The last row shows the results for comparisons between all participants across treatments.

COMPARISON OF THE SENSE OF JUSTICE: MALES VS FEMALES

TREATMENT	STRONGER	WEAKER	BOTH	NEITHER
1	24.07%	44.44%	28.24%	3.24%
2	30.62%	27.51%	40.91%	0.96%
3	28.35%	29.65%	37.66%	4.33%
4	23.82%	36.84%	37.12%	2.22%
All	26.80%	34.36%	36.13%	2.72%
Combined	25.30%	35.78%	35.63%	3.28%

Table 10: Percentage of comparisons between a male and a female participant which fall into one of the categories. "Stronger" means that a male subject has a stronger sense of justice than a female subject. The first four rows in each section are comparisons within one of the four treatments. The fifth row shows the results for the pooled data on within treatment comparisons over all four treatments. The last row shows the results for comparisons between all participants across treatments.

We are particularly interested in the question of whether men and women differ in the strength of their sense of justice. Because we are not comparing all participants with each other, we face the problem that any two distributions we wish to compare can heavily depend on each other:

If a male participant has a stronger sense of justice than a female participant, then this female participant can no longer have a stronger sense of justice than the male participant.

We therefore use a custom randomisation test (a random permutation test as described in the beginning of Section 4). For example, we first wish to compare the difference in the mean percentage for the stronger category between the n_m male and n_f female participants in Treatment 1. The difference in the mean (here: -20.37) is our test statistic. We randomly assign n_m of all participants of Treatment 1 to a pseudo-male group, and the remainder to a pseudo-female group (resampling without replacement). We then compute the mean percentage of comparisons between the two groups that fall into the stronger category, and record the difference. We repeat this resampling 50,000 times. This results in a good approximation of the distribution of the chosen test statistic.

Because we have no reason to assume that either gender is more just, we focus on one-sided tests. Thus, if less than 5% of the random permutations result in an absolute difference in means that exceeds the difference of the experimental data, we reject the hypothesis that male and female participants have the same mean at the 5% significance level. We also compute the Mann-Whitney and Anderson-Darling test statistic (z and A^2, respectively) of the distributions for both the experimental data and for 50,000 random permutations. We do this for all four treatments separately; for the pooled data of Treatments 1 and 2, 3 and 4, 1 and 3, and 2 and 4; for all four treatments together, and for the combined data (comparison across treatments).

Table 11 reports the derived p-values. We find that there are no significant differences in the mean or the MW test statistic. The AD test statistic only shows a weakly significant difference in the distributions for the pooled data from Treatment 1 and 2, and for the combined data.

RANDOMISATION TESTS: DIFFERENCES BETWEEN MALES AND FEMALES			
TREATMENT	DIFFERENCE IN MEAN	MW (z)	AD (A^2)
1	0.1845	0.3023	0.1410
2	0.8226	0.8088	0.3460
3	0.9251	0.9052	0.9179
4	0.3879	0.4290	0.3305
1&2	0.3999	0.3035	0.0994*
3&4	0.5241	0.6319	0.4899
1&3	0.3064	0.3052	0.2998
2&4	0.6564	0.5251	0.6204
All	0.2892	0.2361	0.2339
Combined	0.1609	0.1186	0.0815*

Table 11: Randomisation test results. The table shows the p-values for the one-sided tests given the CDF of the distribution of the test statistic approximated with 50,000 random permutations. Significance: ***1%, **5%, *10%.

We can conclude that based on our interpersonal comparison of participants, we find that there are no significant differences in the strength of the sense of justice between men and women. We find some weakly significant differences in the distribution of the sense of justice within men and women, respectively. Section B.3 in the appendix provides additional information on the distribution of the "stronger" categorie and an analysis using the money-metric function.

Women vote differently than men. Men tend to vote more conservatively than women. What is the reason for this gender gap in voting?

One of the possible reasons are gender differences in the demand for redistribution. Men tend to oppose it while women tend to be in favour of it. There are mainly two reasons for the demand of redistribution: Some may expect to benefit from redistribution now or in the future and support it for selfish reasons. Others may demand redistribution because they are concerned about the well being of others; in other words, they may also have a general demand for equality.

The aim of this paper is to analyse gender differences in altruism which we referred to as a preference for giving. We argue that whenever individuals have to distribute income between themselves and another unknown recipient—as in a dictator experiment—their choices are determined by both their notion of distributive justice and their own self-interest. Differences between individuals are due to differences in the weight they put on these two motivations and/or differences in the notion of distributive justice. Making use of the theoretical approach developed in Becker et al. (2013a) we are able to disentangle the effects of self-interest and notions of distributive justice in the preference for giving. We show that men and women are equally selfish but have very distinct notions of distributive justice, that is, they have very different ideas about what makes a distribution just.

We use the data collected by Becker et al. (2013b): A dictator experiment with varying transfer rates to infer an individual's preference for giving and an experiment with an impartial decision maker—a social planner (P) or someone behind a veil of ignorance (V)—to infer an individual's notion of justice.

In the dictator experiment we replicate the results of Andreoni and Vesterlund (2001) and find that women distribute more income to the recipient when giving is expensive while men pass (insignificantly) more when giving is cheap. This behaviour is even more pronounced in the P- and V-experiments: Under most circumstances, women choose significantly more equal allocations.

To explain this behaviour we estimate a CES utility function in the dictator experiment and a CES justice function in the P- and V-experiment. We find that differences in the observed behaviour are not the result of different degrees of selfishness. In fact, we find that our male and female participants are equally selfish. Instead, we find that the differences in the preferences for giving are due to gender differences in the notions of justice. The justice parameters estimated for the dictator experiment are clearly related to the justice parameters estimated for the P- and V-experiment. For the majority of each gender we found no differences in the justice parameters between the experimental tasks.

Therefore, observed differences in the giving behaviour of men and women are mostly not due to different degrees of selfishness but due to different notions of distributive justice. Our results imply that men and women behave differently because they perceive different justice concepts as just. When men choose allocations that yield the highest total income, they do so because to them it is the most just choice. When women choose allocations that yield the same outcome for both individuals, they do so because it reflects their justice concept. Therefore, while men and women have very different perceptions of justice or just allocations, each gender makes their choices in accordance to it. Men and women have different moral ideas, but they do follow them to the same extend.

We therefore propose that gender differences in the demand for redistribution are the result of distinct notions of justice and not primarily due to gender differences in selfishness.

A APPENDIX: TABLES AND ESTIMATION RESULTS

This appendix includes the tables referenced in Section 4 for the restricted set of participants.

A.1 *Pooling*

Tables 12 and 13 show the KW test results and the results of the MCT for the restricted set of male and female participants for the D-experiment and for the PV-experiment, respectively.

A.2 *Estimation results*

Table 14 shows the estimation results for each individual of the D-experiment. Table 15 shows the estimation results for each individual of the P-V-experiment.

A.2.1 *Combined results: Estimation of preferences and notions of justice*

To a large extend, the results from the parametric analysis confirm the conclusions about consistency with Symmetry and Agreement based on the non-parametric analysis in Becker et al. (2013b). We now combine the data of the D- with those of the P- and V-experiment and estimate a joint demand while keeping the notion of justice equal between those experiments. We estimate

$$z = \delta\left(\frac{A}{A + (p_2/p_1)^t}\right) + (1-\delta)\left(\frac{B}{B + (q_2/q_1)^t}\right) + \varepsilon^{\text{DPV}} \tag{12}$$

with $\delta = 1$ for observations from the D-experiment and $\delta = 0$ in the P- or V-experiment. The left hand side of Eq. (12), z, is x_1p_1 for the D-experiment, and y_1q_1 for the P- or V-experiment, that is, the budget share. Note that the shape parameter – previously ρ and ς, now denoted as θ – is assumed to be equal for both experiments by estimating a single parameter t instead of r and s, respectively. This is based on implications of the Agreement axiom for the CES parameters (see Becker et al. 2013a). We estimate Eq. (12) for the whole data set of 164 participants. The average results are presented in Table 9 and the values for α β, θ, and η_θ are derived from the estimated parameters respectively.[22] The individual results can be found in Table 16. Note that the individual parameters are highly significant. In cases where the θ-parameter is below -1 (the Rawlsian case) we estimate the α and β parameters using an alternative as already described in Section 4.2.2.

Table 16 shows the combined estimation results for each individual of the D-P- and D-V-experiment.

[22]The mean value for θ is derived from the mean value for t (i.e. $\bar{\theta} = \bar{t}/\bar{t} - 1$), whereas the median θ results from the median value for t (i.e. $\tilde{\theta} = \tilde{t}/\tilde{t} - 1$).

COMPARISON OF TREATMENTS: DICTATOR EXPERIMENT: RESTRICTED SET OF PARTICIPANTS												
	MALES			FEMALES								
BUDGET	1-2-3-4	1,2-3,4	1,3-2,4	1-2-3-4	multiple comparisons between treatments						1,2-3,4	1,3-2,4
					1-2	1-3	1-4	2-3	2-4	3-4		
1	0.7963	0.6262	0.4103	0.6159	-	-	-	-	-	-	0.5608	0.9623
	(1.021)	(0.237)	(0.678)	(1.796)	-	-	-	-	-	-	(0.338)	(0.002)
2	0.5037	0.2336	0.7794	0.1819	-	-	-	-	-	-	0.8907	0.9399
	(2.346)	(1.419)	(0.078)	(4.866)	-	-	-	-	-	-	(0.019)	(0.006)
3	0.5703	0.7481	0.7160	0.1377	-	-	-	-	-	-	0.2548	0.7488
	(2.010)	(0.103)	(0.132)	(5.515)	-	-	-	-	-	-	(1.297)	(0.103)
4	0.7185	0.5051	0.6825	0.2719	-	-	-	-	-	-	0.3353	0.6440
	(1.345)	(0.444)	(0.167)	(3.905)	-	-	-	-	-	-	(0.928)	(0.214)
5	0.2520	0.0750*	0.4148	0.1901	-	-	-	-	-	-	0.3224	0.2971
	(4.089)	(3.170)	(0.665)	(4.761)	-	-	-	-	-	-	(0.979)	(1.087)
6	0.5874	0.3651	0.8326	0.4407	-	-	-	-	-	-	0.4697	0.3880
	(1.928)	(0.820)	(0.045)	(2.697)	-	-	-	-	-	-	(0.523)	(0.745)
7	0.7668	0.5503	0.5140	0.0905*	0.0282	0.0111	0.0646	0.3557	0.3779	0.2523	0.1403	0.3505
	(1.143)	(0.357)	(0.426)	(6.480)	(14.23)	(17.05)	(11.77)	(2.82)	(2.46)	(5.28)	(2.175)	(0.872)
8	0.1771	0.0374**	0.8918	0.1303	-	-	-	-	-	-	0.2996	0.4773
	(4.928)	(4.333)	(0.019)	(5.644)	-	-	-	-	-	-	(1.076)	(0.505)
9	0.2207	0.0890*	0.8825	0.3708	-	-	-	-	-	-	0.2571	0.7303
	(4.407)	(2.893)	(0.022)	(3.139)	-	-	-	-	-	-	(1.284)	(0.119)
10	0.1785	0.0633*	0.6469	0.8023	-	-	-	-	-	-	0.6293	0.8814
	(4.910)	(3.448)	(0.210)	(0.996)	-	-	-	-	-	-	(0.233)	(0.022)
11	0.6090	0.1955	0.6705	0.9061	-	-	-	-	-	-	0.5025	0.8220
	(1.828)	(1.675)	(0.181)	(0.558)	-	-	-	-	-	-	(0.450)	(0.051)
12	0.7135	0.4208	0.8299	0.5495	-	-	-	-	-	-	0.2193	0.8349
	(1.366)	(0.648)	(0.046)	(2.112)	-	-	-	-	-	-	(1.509)	(0.043)
13	0.2578	0.1306	0.3369	0.6043	-	-	-	-	-	-	0.6009	0.4846
	(4.034)	(2.285)	(0.922)	(1.849)	-	-	-	-	-	-	(0.274)	(0.489)
14	0.5266	0.2426	0.7415	0.9429	-	-	-	-	-	-	0.6805	0.7190
	(2.227)	(1.366)	(0.109)	(0.387)	-	-	-	-	-	-	(0.170)	(0.130)
15	0.7066	0.3887	0.9570	0.7570	-	-	-	-	-	-	0.4107	0.9264
	(1.396)	(0.743)	(0.003)	(1.183)	-	-	-	-	-	-	(0.677)	(0.009)
Prob.	-	0.1406	-	0.1472	-	-	-	-	-	-	-	-

Table 12: Comparison of amount allocated to the recipient in the D-experiment (x_o) between different treatments and per budget for the restricted data set. 1,2-3,4 indicates the column with the results for treatment 1 and 2 (pooled) vs. 3 and 4 (pooled), etc. The Kruskal-Wallis test identifies overall effects between multiple treatments; when appropriate, the multiple comparison test identifies differences between individual treatments. Grey columns are included for completeness only. The table shows the p-values (test statistic in parentheses) for the Kruskal-Wallis test. The last line is the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%; adjusted significance for multiple comparisons: ***0.083%, **0.42%, *0.83%, accordingly.

COMPARISON OF TREATMENTS: SOCIAL PLANNER AND VEIL OF IGNORANCE EXPERIMENT, RESTRICTED SET OF PARTICIPANTS													
	MALES			FEMALES									
BUDGET	1-2-3-4	1,2-3,4	1,3-2,4	1-2-3-4	multiple comparisons between treatments							1,2-3,4	1,3-2,4
					1-2	1-3	1-4	2-3	2-4	3-4			
1	0.5741	0.9955	0.3482	0.3701	-		-	-	-	-		0.5957	0.0943^{*}
	(1.992)	(0.000)	(0.880)	(3.143)	-	-	-	-	-	-		(0.282)	(2.799)
2	0.3461	0.8208	0.1711	0.3882	-		-	-	-	-		0.4269	0.1294
	(3.311)	(0.051)	(1.873)	(3.022)	-	-	-	-	-	-		(0.631)	(2.299)
3	0.5121	0.5101	0.5071	0.9519	-		-	-	-	-		0.6516	0.9715
	(2.302)	(0.434)	(0.440)	(0.342)	-	-	-	-	-	-		(0.204)	(0.001)
4	0.5969	0.6971	0.8886	0.7765	-	-	-	-	-	-		0.4781	0.4360
	(1.884)	(0.152)	(0.020)	(1.102)	-	-	-	-	-	-		(0.503)	(0.607)
5	0.6792	0.6444	0.5904	0.3599	-	-	-	-	-	-		0.1939	0.9487
	(1.513)	(0.213)	(0.290)	(3.213)	-	-	-	-	-	-		(1.688)	(0.004)
6	0.1830	0.5227	0.1747	0.2395	-	-	-	-	-	-		0.7460	0.0457^{**}
	(4.851)	(0.409)	(1.842)	(4.211)	-	-	-	-	-	-		(0.105)	(3.991)
7	0.6341	0.3943	0.3775	0.0799^{*}	0.4147	0.3962	0.1281	0.3197	0.1813	0.0867		0.4518	0.0503^{*}
	(1.713)	(0.726)	(0.779)	(6.760)	(1.61)	(1.96)	(8.81)	(3.57)	(7.20)	(10.77)		(0.566)	(3.833)
8	0.1986	0.1048	0.4625	0.0703^{*}	0.5000	0.3978	0.2798	0.3999	0.2836	0.2071		0.5361	0.0781^{*}
	(4.658)	(2.631)	(0.540)	(7.052)	(0.00)	(1.93)	(4.53)	(1.93)	(4.53)	(6.46)		(0.383)	(3.104)
9	0.9107	1.0000	0.5316	0.8417	-	-	-	-	-	-		0.7624	0.4305
	(0.537)	(0.000)	(0.391)	(0.832)	-	-	-	-	-	-		(0.091)	(0.621)
10	0.2859	0.5254	0.1156	0.4488	-	-	-	-	-	-		0.5190	0.1683
	(3.783)	(0.403)	(2.477)	(2.650)	-	-	-	-	-	-		(0.416)	(1.898)
11	0.4616	0.6834	0.6059	0.6482	-	-	-	-	-	-		0.4810	0.9592
	(2.576)	(0.166)	(0.266)	(1.650)	-	-	-	-	-	-		(0.497)	(0.003)
12	0.5761	0.5553	0.5731	0.3044	-	-	-	-	-	-		0.3635	0.2515
	(1.982)	(0.348)	(0.318)	(3.629)	-	-	-	-	-	-		(0.826)	(1.315)
13	0.1161	0.1731	0.2157	0.6289	-	-	-	-	-	-		0.6790	0.2256
	(5.909)	(1.856)	(1.533)	(1.736)	-	-	-	-	-	-		(0.171)	(1.468)
14	0.6327	0.4591	0.3966	0.5215	-	-	-	-	-	-		0.3378	0.2572
	(1.719)	(0.548)	(0.719)	(2.254)	-	-	-	-	-	-		(0.919)	(1.284)
15	0.5478	0.6219	0.3068	0.2551	-	-	-	-	-	-		0.2130	0.1193
	(2.120)	(0.243)	(1.044)	(4.060)	-	-	-	-	-	-		(1.551)	(2.427)
Prob.	-	-	-	0.3304	-	-	-	-	-	-		-	0.1089

Table 13: Comparison of amount allocated to B in the P- and V-experiment (y_2) between different treatments and per budget for the restricted data set. 1,2-3,4 indicates the column with the results for treatment 1 and 2 (pooled) vs. 3 and 4 (pooled), etc. The Kruskal-Wallis test identifies overall effects between multiple treatments; when appropriate, the multiple comparison test identifies differences between individual treatments. Grey columns are included for completeness only. The table shows the p-values (test statistic in parentheses) for the Kruskal-Wallis test. The last line is the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%; adjusted significance for multiple comparisons: ***0.083%, **0.42%, *0.83% accordingly.

Estimated coefficients for each participant of the d-experiment

ID	A	(sd_A)	r	(sd_r)	σ	(sd_σ)	ρ	α	η_ρ	LogL	Wald-χ^2
1	1.186***	(0.148)	-1.556***	(0.210)	0.097***	(0.017)	0.61	0.52	-2.56	9.73	218.15***
2	5.049***	(1.350)	-1.107***	(0.253)	0.121***	(0.023)	0.53	0.68	-2.11	2.39	27.46***
3†	n.d.						-	1.00	-	-	-
4	19.668***	(5.432)	1.000	(0.000)	0.077***	(0.014)	-1.50×10^{7}	0.95◇	0.00	8.91	33.35***
5	1.200***	(0.193)	-0.113	(0.281)	0.150***	(0.030)	0.10	0.54	-1.11	7.16	40.61***
7†	n.d.						-	1.00	-	-	-
8†	n.d.						-	1.00	-	-	-
9	1.609***	(0.103)	0.325***	(0.099)	0.058***	(0.010)	-0.48	0.67	-0.68	21.35	273.81***
10	6.224***	(1.830)	-0.906***	(0.267)	0.093***	(0.017)	0.48	0.72	-1.91	10.16	30.46***
11	7.800×10^{12}	(0.000)	-18.755***	(0.000)	0.242***	(0.092)	0.95	0.82	-19.75	-6.93	2.70×10^{9}***
12	1.833***	(0.158)	-0.110	(0.092)	0.074***	(0.008)	0.10	0.63	-1.11	17.84	162.97***
13†	n.d.						-	1.00	-	-	-
14	1.076***	(0.068)	-0.542***	(0.076)	0.055***	(0.010)	0.35	0.51	-1.54	22.25	421.70***
15†	n.d.						-	1.00	-	-	-
16	32.134	(58.744)	-1.964**	(0.997)	0.269***	(0.075)	0.66	0.76	-2.96	-6.74	72.38***
17	68.700	(43.641)	1.000***	(0.000)	0.073***	(0.014)	-7.60×10^{4}	0.99◇	0.00	2.33	3.00×10^{9}***
19	8.352**	(3.858)	0.922**	(0.404)	0.110***	(0.023)	-11.86	0.90◇	-0.08	8.15	36.04***
20	1.300×10^{7}	(1.100×10^{7})	-10.937***	(0.581)	0.194**	(0.081)	0.92	0.80	-11.94	-7.68	4.90×10^{5}***
21	1.110×10^{3}***	(217.840)	-0.036	(0.312)	0.020**	(0.008)	0.03	1.00	-1.04	-7.48	100.96***
23†	n.d.						-	1.00	-	-	-
24	0.574***	(0.130)	-2.535***	(0.387)	0.109***	(0.016)	0.72	0.46	-3.54	6.96	124.53***
25	2.355***	(0.460)	-0.928***	(0.231)	0.130***	(0.018)	0.48	0.61	-1.93	6.00	62.87***
26†	n.d.						-	1.00	-	-	-
28	14.229***	(4.032)	0.564**	(0.248)	0.058***	(0.012)	-1.29	0.95◇	-0.44	14.12	34.58***
29	9.149***	(3.435)	-0.624***	(0.240)	0.123**	(0.050)	0.38	0.80	-1.62	7.00	50.58***
30	10.266***	(1.168)	-0.088	(0.116)	0.034***	(0.006)	0.08	0.89	-1.09	29.29	215.52***
31	1.957×10^{3}***	(237.919)	0.810*	(0.457)	0.053	(0.000)	-4.26	1.00◇	-0.19	-7.83	75.94***
32	8.147***	(0.708)	0.506***	(0.152)	0.037***	(0.006)	-1.03	0.92◇	-0.49	28.07	157.22***
33	3.725***	(0.435)	-0.075	(0.119)	0.073***	(0.012)	0.07	0.77	-1.07	17.88	164.41***
34	668.670*	(401.789)	1.000***	(0.010)	0.113***	(0.026)	-2.63×10^{3}	1.00◇	0.00	-4.64	4.06×10^{4}***
35	4.425**	(1.943)	-2.958***	(0.553)	0.179***	(0.046)	0.75	0.59	-3.96	-4.15	30.93***
36	3.044***	(0.682)	-0.583**	(0.178)	0.133***	(0.028)	0.37	0.67	-1.58	7.10	36.68***
37	1.140***	(0.055)	0.010	(0.061)	0.045***	(0.010)	-0.01	0.53	-0.99	25.25	1.11×10^{3}***

Continued on next page

Table 14 – continued from previous page

ID	A	(sd_A)	r	(sd_r)	σ	(sd_σ)	ρ	α	η_ρ	LogL	Wald-χ^2
38	1.084***	(0.039)	0.974***	(0.039)	0.027***	(0.006)	-37.81	$0.52^\diamond$	-0.03	32.87	3.52×10^{3}***
39	3.009***	(0.668)	-0.480	(0.2439)	0.152***	(0.022)	0.32	0.68	-1.48	5.32	63.71***
40	6.499***	(1.296)	-1.153***	(0.269)	0.085***	(0.015)	0.54	0.70	-2.15	9.52	64.24***
41†	n.d.						-	1.00	-	-	-
42	1.510***	(0.196)	0.411**	(0.190)	0.120***	(0.017)	-0.70	0.67	-0.59	10.56	148.27***
43	1.128***	(0.099)	-0.341***	(0.117)	0.080***	(0.011)	0.25	0.52	-1.34	16.64	230.12***
45	3.067***	(0.461)	-0.783***	(0.139)	0.091***	(0.013)	0.44	0.65	-1.78	14.67	144.10***
46	1.715***	(0.176)	-0.655***	(0.159)	0.088***	(0.010)	0.40	0.58	-1.65	15.11	207.50***
47	0.663***	(0.179)	-0.779*	(0.448)	0.238***	(0.052)	0.44	0.44	-1.78	-3.03	62.50***
49	3.400×10^{7}	(2.900×10^{7})	-12.143***	(0.550)	0.224**	(0.063)	0.92	0.79	-13.14	-8.12	1.50×10^{5}***
50	13.026	(8.331)	-1.369***	(0.498)	0.145***	(0.033)	0.58	0.75	-2.37	1.17	33.68***
51†	n.d.						-	1.00	-	-	-
54	3.302***	(0.466)	0.174	(0.132)	0.091***	(0.012)	-0.21	0.81	-0.83	14.59	118.43***
55	20.990	(14.396)	-1.044**	(0.518)	0.065***	(0.015)	0.51	0.82	-2.04	10.55	32.34***
56	809.563***	(224.153)	0.377	(0.530)	0.324**	(0.107)	-0.61	1.00	-0.62	-9.62	93.93***
57	7.354***	(0.946)	-0.302**	(0.130)	0.048***	(0.008)	0.23	0.82	-1.30	24.15	143.37***
58	38.381***	(13.477)	-2.795***	(0.298)	0.053***	(0.012)	0.74	0.72	-3.80	4.33	370.16***
60	1.144***	(0.028)	0.991***	(0.031)	0.018***	(0.003)	-110.67	$0.53^\diamond$	-0.01	38.64	1.87×10^{3}***
61	9.330***	(3.155)	-1.104***	(0.266)	0.092***	(0.021)	0.52	0.74	-2.10	5.11	26.19***
62	14.338***	(3.520)	-0.479**	(0.210)	0.054***	(0.009)	0.32	0.86	-1.48	14.97	40.79***
63	62.507***	(0.000)	0.872***	(0.000)	0.101***	(0.000)	-6.82	$0.98^\diamond$	-0.13	-0.02	1.6×10^{8}***
65	7.236***	(0.989)	0.768***	(0.136)	0.041***	(0.010)	-3.32	$0.90^\diamond$	-0.23	23.38	70.42***
66	3.574***	(0.742)	-0.311	(0.824)	0.194***	(0.058)	0.24	0.73	-1.31	1.92	36.97***
67	1.585***	(0.589)	-1.452***	(0.375)	0.193***	(0.046)	0.59	0.55	-2.45	1.76	26.35***
68	1.549**	(0.818)	-1.834**	(0.778)	0.257***	(0.057)	0.65	0.54	-2.83	-2.97	31.43***
69	2.359***	(0.606)	0.077	(0.233)	0.190***	(0.043)	-0.08	0.72	-0.92	0.60	20.68***
70	0.988***	(0.140)	-2.249***	(0.190)	0.081***	(0.020)	0.69	0.50	-3.25	8.20	224.80***
71	1.091***	(0.070)	0.560***	(0.116)	0.062***	(0.010)	-1.27	$0.53^\diamond$	-0.44	20.50	672.79***
72	1.674***	(0.374)	-0.992***	(0.286)	0.173***	(0.035)	0.50	0.56	-1.99	3.75	92.14***
73	468.378	(585.340)	-4.010***	(0.835)	0.064***	(0.018)	0.80	0.77	-5.01	-2.80	6.05×10^{3}***
74	577.836	(1.581×10^{3})	-3.127	(1.831)	0.078***	(0.018)	0.76	0.82	-4.13	7.51	447.49***
75†	n.d.						-	1.00	-	-	-
76	462.201	(828.531)	1.000	(0.000)	0.0171***	(0.004)	-1.60×10^{5}	$1.00^\diamond$	0.00	9.17	9.80×10^{10}***
77	68.589	(91.297)	1.000	(0.000)	0.158***	(0.052)	-2.50×10^{6}	$0.99^\diamond$	0.00	-1.72	11.59***
78	1.171***	(0.071)	0.361***	(0.068)	0.057***	(0.008)	-0.56	0.56	-0.64	21.74	455.64***

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Table 14 – continued from previous page

ID	A	(sd_A)	r	(sd_r)	σ	(sd_σ)	ρ	α	η_ρ	LogL	Wald-χ^2
79	6.286	(6.465)	-2.012**	(0.914)	0.413***	(0.133)	0.67	0.65	-3.01	-10.32	27.17***
80	46.868	(61.688)	-1.970***	(0.727)	0.183***	(0.045)	0.66	0.79	-2.97	-4.03	25.59***
81	5.230***	(1.053)	-0.166	(0.224)	0.101***	(0.018)	0.14	0.81	-1.17	13.17	165.33***
82†	n.d.						-	1.00	-	-	-
83	19.358***	(4.239)	0.368*	(0.207)	0.036***	(0.007)	-0.58	0.99	-0.63	22.71	34.79***
84	22.113***	(7.944)	1.000	(0.000)	0.096***	(0.018)	-4.00×10^{7}	0.96◇	0.00	1.77	18.05***
86	1.585***	(0.405)	-0.494	(0.374)	0.214***	(0.028)	0.33	0.58	-1.49	1.83	49.56***
87	7.000×10^{6}	(5.900×10^{6})	-9.489***	(0.553)	0.035***	(0.012)	0.91	0.82	-10.49	-5.19	3.24^{3}***
89†	n.d.						-	1.00	-	-	-
90	1.068***	(0.124)	0.204	(0.160)	0.112***	(0.013)	-0.26	0.52	-0.80	11.60	104.59***
91†	n.d.						-	1.00	-	-	-
92	1.356	(0.000)	-0.825***	(0.265)	0.284	(0.286)	0.45	0.54	-1.83	-6.23	281.33***
93	0.848***	(0.082)	-0.809***	(0.144)	0.075***	(0.013)	0.45	0.48	-1.81	17.49	241.25***
94	5.387*	(2.799)	1.000	(0.000)	0.275***	(0.053)	-8.60×10^{6}	0.84◇	0.00	-6.11	18.25***
96	154.160	(268.651)	-0.764	(0.769)	0.054***	(0.012)	0.43	0.95	-1.76	6.72	14.57***
97	776.336***	(181.559)	-0.125	(0.416)	0.037***	(0.012)	0.11	1.00	-1.13	-5.44	4.85
98	413.751	(447.409)	-6.943***	(1.005)	0.121***	(0.028)	0.87	0.68	-7.94	-4.93	154.62***
99	2.689***	(0.643)	-0.240	(0.214)	0.171***	(0.031)	0.19	0.69	-1.24	3.50	45.42***
100	1.394***	(0.132)	0.423***	(0.152)	0.079***	(0.015)	-0.73	0.64	-0.58	16.77	164.83***
101†	n.d.						-	1.00	-	-	-
102	17.512***	(3.657)	0.577***	(0.197)	0.032***	(0.007)	-1.37	0.96◇	-0.42	20.93	45.96***
103	136.138**	(56.934)	0.922***	(0.320)	0.008***	(0.001)	-11.87	0.99◇	-0.08	33.40	23.88***
104	798.028	(690.964)	-3.366***	(0.547)	0.064***	(0.022)	0.77	0.82	-4.37	-2.73	89.73***
105	849.958***	(305.218)	0.814	(0.571)	0.003***	(0.001)	-4.36	1.00◇	-0.19	51.16	25.37***
106†	n.d.						-	1.00	-	-	-
107†	n.d.						-	1.00	-	-	-
108†	n.d.						-	1.00	-	-	-
109	12.061***	(3.702)	-0.730***	(0.259)	0.063***	(0.013)	0.42	0.81	-1.73	13.15	31.24***
110	14.322***	(3.351)	-0.128	(0.419)	0.053***	(0.013)	0.11	0.91	-1.13	17.39	40.49***
113	971.687	(1.035×10^{3})	-4.920***	(0.675)	0.110***	(0.038)	0.83	0.76	-5.92	-7.79	207.77***
114	90.175***	(15.528)	0.640**	(0.312)	0.092	(0.000)	-1.78	1.00	-0.36	1.56	1.84
115	4.655×10^{3}***	(957.586)	-0.154	(1.015)	0.009***	(0.002)	0.13	1.00	-1.15	-2.54	4.52
116	3.300×10^{7}	(2.600×10^{7})	-12.140***	(0.509)	0.114***	(0.026)	0.92	0.79	-13.14	4.02	993.53***
117	0.942***	(0.108)	0.294**	(0.143)	0.105***	(0.014)	-0.42	0.48	-0.71	12.52	115.32***
118	387.225	(685.527)	-2.858**	(1.160)	0.067***	(0.012)	0.74	0.82	-3.86	4.99	64.06***

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Table 14 – continued from previous page

ID	A	(sd_A)	r	(sd_r)	σ	(sd_σ)	ρ	α	η_ρ	LogL	Wald-χ^2
119†	n.d.						-	1.00	-	-	-
120	2.842	(4.412)	-1.784	(2.762)	0.208***	(0.048)	0.64	0.59	-2.78	-0.36	23.81***
121	8.439***	(1.127)	0.381	(0.248)	0.061***	(0.013)	-0.62	0.97	-0.62	20.70	63.60***
123	2.698×10^3	(0.000)	-5.065***	(0.818)	0.402***	(0.040)	0.84	0.79	-6.07	-10.14	207.85***
124	6.670***	(1.394)	0.589***	(0.219)	0.092***	(0.014)	-1.43	0.90$^\diamond$	-0.41	10.45	41.00***
125	2.021***	(0.291)	0.308*	(0.183)	0.120***	(0.017)	-0.45	0.73	-0.69	10.48	79.29***
127	13.433	(11.410)	-1.994***	(0.598)	0.200***	(0.050)	0.67	0.70	-2.99	-4.15	22.18***
128	14.581*	(7.689)	-0.948**	(0.380)	0.111***	(0.027)	0.49	0.80	-1.95	3.67	19.21***
130	3.854***	(1.173)	-0.929***	(0.288)	0.179***	(0.031)	0.48	0.67	-1.93	-0.36	27.58***
131	1.107***	(0.087)	0.730***	(0.203)	0.082***	(0.030)	-2.71	0.53$^\diamond$	-0.27	16.20	175.37***
132	12.839*	(7.562)	-1.797***	(0.459)	0.169***	(0.058)	0.64	0.71	-2.80	-1.27	26.04***
133†	n.d.						-	1.00	-	-	-
134	1.000×10^{8}*	(5.300×10^7)	-14.269***	(0.634)	0.226***	(0.080)	0.94	0.77	-15.27	-9.82	137.38***
135	3.742***	(0.637)	-1.353***	(0.244)	0.096***	(0.013)	0.58	0.64	-2.35	10.08	57.10***
136†	n.d.						-	1.00	-	-	-
137	1.021**	(0.455)	-5.499***	(1.028)	0.213***	(0.051)	0.85	0.50	-6.50	-7.41	17.55***
138	1.397***	(0.197)	0.060	(0.185)	0.124***	(0.017)	-0.06	0.59	-0.94	10.05	87.55***
139	1.005***	(0.027)	0.035	(0.034)	0.026***	(0.008)	-0.04	0.50	-0.97	33.50	1.42×10^{3}***
140†	n.d.						-	1.00	-	-	-
141	4.166***	(0.693)	0.158	(0.185)	0.102***	(0.018)	-0.19	0.85	-0.84	12.97	64.62***
142†	n.d.						-	1.00	-	-	-
143	18.065***	(2.073)	-0.145	(0.097)	0.021***	(0.003)	0.13	0.93	-1.15	36.49	111.25***
144	2.956**	(1.229)	-1.230***	(0.422)	0.183***	(0.047)	0.55	0.62	-2.23	1.43	31.81***
145	566.557	(683.648)	-5.549***	(1.759)	0.162***	(0.042)	0.85	0.73	-6.55	-7.52	73.52***
146	1.480***	(0.205)	-0.939***	(0.194)	0.110***	(0.017)	0.48	0.55	-1.94	11.83	105.81***
147	0.937***	(0.183)	-0.480*	(0.280)	0.181***	(0.025)	0.32	0.49	-1.48	4.38	61.40***
148	628.565	(732.864)	-3.209***	(0.745)	0.055***	(0.013)	0.76	0.82	-4.21	4.31	113.00***
149	2.568***	(0.215)	-0.668***	(0.093)	0.058***	(0.011)	0.40	0.64	-1.67	21.51	191.30***
150	2.336***	(0.375)	0.029	(0.159)	0.125***	(0.014)	-0.03	0.71	-0.97	9.93	72.32***
151	1.767	(2.489)	-3.755	(4.176)	0.284***	(0.097)	0.79	0.53	-4.76	-7.01	12.77***
152†	n.d.						-	1.00	-	-	-
153	1.410***	(0.432)	-4.088***	(0.800)	0.138***	(0.027)	0.80	0.52	-5.09	-1.02	33.54***
154	1.600×10^{6}*	(9.300×10^5)	-6.857***	(0.394)	0.008***	(0.003)	0.87	0.86	-7.86	-2.25	464.81***
155	3.000×10^4	(2.100×10^4)	-14.352***	(0.858)	0.251***	(0.045)	0.94	0.66	-15.35	-6.47	238.06***
156	1.104×10^{3}***	(160.804)	-0.233	(0.373)	0.052***	(0.006)	0.19	1.00	-1.23	-8.26	2.51

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Table 14 – continued from previous page

ID	A	(sd_A)	r	(sd_r)	σ	(sd_σ)	ρ	α	η_ρ	LogL	Wald-χ^2
157	39.989**	(17.377)	-2.328***	(0.307)	0.074***	(0.023)	0.70	0.75	-3.33	0.37	98.86***
158	6.723	(4.320)	-0.173	(0.767)	0.229***	(0.045)	0.15	0.84	-1.17	-4.01	17.37***
159†	n.d.						-	1.00	-	-	-
160	1.946***	(0.250)	0.026	(0.121)	0.106***	(0.021)	-0.03	0.66	-0.97	12.43	97.41***
161	14.102	(8.578)	-1.281***	(0.413)	0.189***	(0.046)	0.56	0.76	-2.28	-3.41	16.14***
163	16.561***	(3.595)	0.149	(0.227)	0.040***	(0.007)	-0.18	0.96	-0.85	21.03	46.41***
164†	n.d.						-	1.00	-	-	-
165	3.200×10^{11}	(0.000)	-15.598	(0.000)	0.001***	(0.000)	0.94	0.83	-16.60	-3.97	1.90
166†	n.d.						-	1.00	-	-	-
167	5.055***	(0.752)	-0.436***	(0.166)	0.076***	(0.009)	0.30	0.76	-1.44	17.33	74.91***
168	4.400×10^{7}	(0.000)	-13.655***	(0.653)	99.991***	(36.787)	0.93	0.77	-14.66	-10.40	0.25
170	111.263***	(35.926)	0.124	(0.224)	0.011***	(0.003)	-0.14	1.00	-0.88	34.35	28.14***
171	4.831***	(0.591)	0.542***	(0.101)	0.062***	(0.011)	-1.18	0.87◇	-0.46	20.44	96.78***
172	1.103×10^{3}	(161.809)	-0.233	(0.373)	0.052***	(0.006)	0.19	1.00	-1.23	-8.26	2.50
173	13.297***	(3.870)	1.000	(0.000)	0.113***	(0.026)	-3.70×10^{8}	0.93◇	0.00	0.12	20.62***
174	12.634**	(4.903)	-1.625***	(0.314)	0.099***	(0.018)	0.62	0.72	-2.63	3.44	34.46***
175†	n.d.						-	1.00	-	-	-
177	4.326***	(0.520)	0.523***	(0.110)	0.058***	(0.010)	-1.10	0.85◇	-0.48	21.53	116.80***
178	1.082***	(0.222)	-0.911***	(0.367)	0.190***	(0.043)	0.48	0.51	-1.91	-0.48	48.05***
179	9.294***	(2.286)	1.000	(0.000)	0.125***	(0.038)	-3.20×10^{7}	0.90◇	0.00	-2.44	19.67***
180	4.400×10^{7}	(0.000)	-13.655***	(0.635)	99.991***	(36.787)	0.93	0.77	-14.66	-10.40	0.25
182†	n.d.						-	1.00	-	-	-
183	41.203	(75.000)	-3.938**	(1.992)	0.124***	(0.020)	0.80	0.68	-4.94	5.66	105.47***
184	4.400×10^{7}	(0.000)	-13.655***	(0.635)	99.991***	(36.786)	0.93	0.77	-14.66	-10.40	0.25
185	1.937***	(0.078)	-0.057	(0.053)	0.034***	(0.004)	0.05	0.65	-1.06	29.42	684.93***
186	1.721***	(0.175)	0.209**	(0.103)	0.085***	(0.019)	-0.26	0.67	-0.79	15.72	139.85***

Table 14: Estimated coefficients per individual of the D-experiment; robust standard errors in parantheses; † parameters were set according to strong preference type; ◇ α values were estimated using the generalized Rawlsian utility function; n.d. stands for not defined; Significance: *** 1%, ** 5%, * 10%.

Estimated coefficients for each participant of the p- and v-experiment

ID	B	(sd_B)	s	(sd_s)	σ	(sd_σ)	ς	β	η_ς	LogL	Wald-χ^2
1	1.060^{***}	(0.111)	-1.177^{***}	(0.191)	0.085^{***}	(0.010)	0.54	0.51	-2.18	15.67	171.00^{***}
2	1.277^{***}	(0.242)	-0.550^{**}	(0.280)	0.165^{***}	(0.043)	0.36	0.54	-1.55	3.93	59.84^{***}
3	1.008^{***}	(0.010)	1.000	(0.000)	0.009^{***}	(0.002)	-2.40×10^{9}	$0.50^{\diamond}$	0.00	49.04	8548.29^{***}
4	0.989^{***}	(0.007)	0.987^{***}	(0.010)	0.005^{***}	(0.000)	-74.90	$0.50^{\diamond}$	-0.01	56.94	$3.40\times10^{4***}$
5	1.005^{***}	(0.005)	1.000^{***}	(0.000)	0.005^{***}	(0.003)	-5.80×10^{5}	$0.50^{\diamond}$	0.00	56.77	$8.50\times10^{7***}$
$7^{\dagger}$	1.000		n.d.		-		1.00	0.50	n.d.	-	-
$8^{\dagger}$	1.000		n.d.		-		1.00	0.50	n.d.	-	-
9	0.972^{***}	(0.047)	0.855^{***}	(0.049)	0.039^{***}	(0.135)	-5.91	$0.49^{\diamond}$	-0.15	27.54	696.57^{***}
10	1.011^{***}	(0.082)	-0.062	(0.104)	0.076^{***}	(0.011)	0.06	0.50	-1.06	17.34	193.94^{***}
11	1.858^{**}	(0.710)	-2.439^{***}	(0.801)	0.226^{***}	(0.052)	0.71	0.55	-3.44	-4.53	24.83^{***}
12	0.982^{***}	(0.089)	-0.569^{***}	(0.137)	0.076^{***}	(0.016)	0.36	0.50	-1.57	17.39	220.66^{***}
13	1.127^{***}	(0.082)	-0.092	(0.095)	0.067^{***}	(0.010)	0.09	0.53	-1.09	19.30	242.57^{***}
14	1.017^{***}	(0.049)	-0.577^{***}	(0.050)	0.041^{***}	(0.020)	0.37	0.50	-1.58	26.49	668.68^{***}
15	0.829^{***}	(0.164)	0.999^{***}	(0.074)	0.132^{***}	(0.069)	-852.85	$0.45^{\diamond}$	0.00	6.71	93.34^{***}
16	1.604^{***}	(0.293)	-0.941^{***}	(0.252)	0.148^{***}	(0.015)	0.49	0.56	-1.94	5.82	63.17^{***}
17	0.978^{***}	(0.020)	0.980^{***}	(0.037)	0.017^{***}	(0.023)	-48.31	$0.49^{\diamond}$	-0.02	40.27	3684.01^{***}
19	1.009^{***}	(0.009)	1.000^{***}	(0.000)	0.007^{***}	(0.002)	-5.00×10^{5}	$0.50^{\diamond}$	0.00	53.22	$4.30\times10^{7***}$
20	1.037^{***}	(0.086)	-1.777^{***}	(0.212)	0.075^{***}	(0.013)	0.64	0.50	-2.78	15.39	196.69^{***}
$21^{\dagger}$	1.000		n.d.		-		1.00	0.50	n.d.	-	-
23	1.955	(1.063)	-2.238^{**}	(1.030)	0.395^{***}	(0.079)	0.69	0.55	-3.24	-9.49	15.81^{***}
24	1.162^{***}	(0.176)	-0.740^{***}	(0.236)	0.147^{***}	(0.028)	0.43	0.52	-1.74	5.64	74.86^{***}
25	0.936^{***}	(0.088)	-0.583^{***}	(0.145)	0.083^{***}	(0.015)	0.37	0.49	-1.58	16.08	192.71^{***}
26	1.002^{***}	(0.006)	0.989^{***}	(0.013)	0.006^{***}	(0.000)	-88.52	$0.50^{\diamond}$	-0.01	56.53	3.20^{4***}
28	1.092^{***}	(0.088)	0.686^{***}	(0.179)	0.081^{***}	(0.017)	-2.19	$0.53^{\diamond}$	-0.31	16.49	177.44^{***}
$29^{\dagger}$	1.000		n.d.		-		$-\infty$	0.50	n.d.	-	-
30	1.675^{***}	(0.262)	0.248	(0.144)	0.146^{***}	(0.031)	-0.33	0.67	-0.75	7.59	66.86^{***}
$31^{\dagger}$	1.000		n.d.		-		$-\infty$	0.50	n.d.	-	-
32	1.232^{***}	(0.210)	0.139	(0.209)	0.154^{***}	(0.030)	-0.16	0.56	-0.86	6.74	67.72^{***}
33	1.177^{***}	(0.094)	-0.937^{***}	(0.089)	0.063^{***}	(0.010)	0.48	0.52	-1.94	20.12	291.68^{***}
34	1.006^{***}	(0.060)	0.754^{***}	(0.108)	0.049^{***}	(0.024)	-3.06	$0.51^{\diamond}$	-0.25	23.82	413.58^{***}
35	0.834^{***}	(0.118)	-5.536^{***}	(1.113)	0.110^{***}	(0.023)	0.85	0.49	-6.54	-1.88	39.42^{***}
36	1.002^{***}	(0.215)	-0.221	(0.366)	0.209^{***}	(0.046)	0.18	0.50	-1.22	0.64	47.53^{***}
37	0.988^{***}	(0.027)	-0.231^{***}	(0.035)	0.026^{***}	(0.003)	0.19	0.50	-1.23	33.21	1455.03^{***}

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Table 15 – continued from previous page

ID	B	(sd_B)	s	(sd_s)	σ	(sd_σ)	ς	β	η_ς	LogL	Wald-χ^2
38	1.042	(0.008)	1.000	(0.000)	0.019***	(0.002)	-1.20×10^{13}	$0.50^\diamond$	0.00	40.87	11.68***
39	0.671***	(0.184)	-1.460***	(0.401)	0.191***	(0.040)	0.59	0.46	-2.46	-1.38	56.82***
40	1.239***	(0.124)	-0.793***	(0.122)	0.086***	(0.011)	0.44	0.53	-1.79	15.50	170.84***
41	0.977**	(0.439)	-5.593***	(1.071)	0.216***	(0.052)	0.85	0.50	-6.59	-7.47	16.89***
42	0.924***	(0.033)	-0.020	(0.041)	0.031***	(0.000)	0.02	0.48	-1.02	30.96	1025.09***
43	1.245***	(0.069)	-0.405***	(0.065)	0.051***	(0.007)	0.29	0.54	-1.41	23.30	407.75***
45	1.030***	(0.058)	-0.393***	(0.087)	0.051***	(0.015)	0.28	0.51	-1.39	23.24	422.51***
46	0.999***	(0.057)	-1.321***	(0.115)	0.047***	(0.011)	0.57	0.50	-2.32	24.45	509.63***
47	0.608**	(0.228)	-1.648***	(0.597)	0.249***	(0.050)	0.62	0.45	-2.65	-4.84	39.70***
49†	1.000		n.d.		-		1.00	0.50	n.d.	-	-
50	1.103***	(0.145)	-0.480***	(0.262)	0.132***	(0.038)	0.32	0.52	-1.48	6.99	85.06***
51	0.998***	(0.008)	0.995***	(0.016)	0.007***	(0.000)	-197.28	$0.50^\diamond$	-0.01	54.17	2.30×10^4***
54	0.997***	(0.052)	0.404***	(0.081)	0.047***	(0.016)	-0.68	0.50	-0.60	24.61	443.74***
55	0.970***	(0.038)	-18.116***	(4.760)	0.041**	(0.000)	0.95	0.50	-19.12	-3.32	79.31***
56	0.819***	(0.154)	0.608***	(0.190)	0.154***	(0.061)	-1.55	$0.44^\diamond$	-0.39	4.67	70.04***
57	1.250***	(0.163)	0.150	(0.251)	0.136***	(0.031)	-0.18	0.57	-0.85	8.69	78.62***
58	1.666***	(0.187)	-0.689***	(0.087)	0.088***	(0.015)	0.41	0.58	-1.69	15.25	137.24***
60	1.032***	(0.030)	0.878***	(0.077)	0.032***	(0.011)	-7.21	$0.51^\diamond$	-0.12	30.35	988.26***
61	1.302***	(0.156)	0.031	(0.183)	0.124***	(0.020)	-0.03	0.57	-0.97	10.01	88.49***
62	1.043***	(0.225)	0.075	(0.317)	0.205***	(0.038)	-0.08	0.51	-0.93	2.46	51.89***
63	9.320	(240.180)	-12.175	(0.000)	0.434***	(0.077)	0.92	0.54	-13.18	-9.85	12.46***
65	1.114***	(0.144)	-0.805***	(0.210)	0.113***	(0.019)	0.45	0.52	-1.81	11.42	109.46***
66	1.850	(1.154)	-3.530**	(1.303)	0.353***	(0.070)	0.78	0.53	-4.53	-8.95	14.33***
67	1.037***	(0.338)	-1.793***	(0.297)	0.175***	(0.035)	0.64	0.50	-2.79	4.87	58.17***
68	1.036***	(0.291)	-0.194	(0.434)	0.264***	(0.051)	0.16	0.51	-1.19	-2.54	39.50***
69	0.892***	(0.202)	-0.029	(0.290)	0.191***	(0.055)	0.03	0.47	-1.03	1.81	53.74***
70	1.124***	(0.222)	-2.361***	(0.364)	0.125***	(0.028)	0.70	0.51	-3.36	2.05	65.45***
71	0.982***	(0.060)	0.054	(0.097)	0.063***	(0.014)	-0.06	0.50	-0.95	20.27	266.29***
72	1.166***	(0.168)	-0.276	(0.177)	0.135***	(0.058)	0.22	0.53	-1.28	6.44	77.50***
73	1.113***	(0.134)	-0.652***	(0.183)	0.117***	(0.018)	0.40	0.52	-1.65	10.86	110.97***
74	1.125***	(0.083)	-0.870***	(0.094)	0.062***	(0.011)	0.47	0.52	-1.87	20.36	307.40***
75	0.552*	(0.282)	-8.018***	(2.390)	0.199**	(0.049)	0.89	0.48	-9.02	-8.03	14.63***
76	1.183***	(0.090)	-0.509***	(0.117)	0.071***	(0.013)	0.34	0.53	-1.51	18.36	231.84***
77	1.132***	(0.074)	-0.113	(0.087)	0.063***	(0.011)	0.10	0.53	-1.11	20.18	270.31***
78	0.937***	(0.060)	0.563***	(0.100)	0.052***	(0.016)	-1.29	$0.49^\diamond$	-0.44	23.07	372.61***

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Table 15 – continued from previous page

ID	B	(sd_B)	s	(sd_s)	σ	(sd_σ)	ς	β	η_ς	LogL	Wald-χ^2
79	1.321**	(0.473)	-2.036***	(0.630)	0.247***	(0.044)	0.67	0.52	-3.04	-3.71	29.83***
80	1.020***	(0.021)	1.000***	(0.000)	0.018***	(0.007)	-4.80^5	$0.50^\diamond$	0.00	38.99	2.40×10^{7}***
81†	1.000		n.d.		-		$-\infty$	0.50	n.d.	-	-
82	0.689**	(0.300)	-1.498**	(0.605)	0.319***	(0.061)	0.60	0.46	-2.50	-7.17	29.40***
83	1.057***	(0.155)	0.098	(0.249)	0.135***	(0.020)	-0.11	0.52	-0.90	8.75	80.49***
84	1.455***	(0.248)	0.155	(0.270)	0.169***	(0.032)	-0.18	0.61	-0.85	5.39	60.01***
86	1.206***	(0.173)	-1.186***	(0.211)	0.112***	(0.018)	0.54	0.52	-2.19	11.57	111.06***
87	0.536	(0.296)	-7.464*	(2.615)	0.258***	(0.057)	0.88	0.48	-8.46	-6.87	17.65***
89†	1.000		n.d.		-		$-\infty$	0.50	n.d.	-	-
90	1.145***	(0.183)	0.413*	(0.322)	0.169***	(0.058)	-0.70	0.56	-0.59	5.36	61.66***
91†	1.000		n.d.		-		0.00	0.50	-1.00	-	-
92†	1.000		n.d.		-		1.00	0.50	n.d.	-	-
93	1.013***	(0.104)	-0.905***	(0.157)	0.087***	(0.012)	0.48	0.50	-1.91	15.27	170.81***
94	1.056***	(0.129)	0.426***	(0.171)	0.110***	(0.016)	-0.74	0.52	-0.57	11.85	104.89***
96	0.843***	(0.132)	-0.605***	(0.216)	0.140***	(0.018)	0.38	0.47	-1.61	8.25	90.96***
97	1.111***	(0.308)	-0.790**	(0.373)	0.239***	(0.050)	0.44	0.52	-1.79	0.21	48.79***
98	1.424***	(0.356)	-4.340***	(0.843)	0.129***	(0.024)	0.81	0.52	-5.34	-3.14	35.09***
99	1.067***	(0.149)	-0.579***	(0.186)	0.122***	(0.018)	0.37	0.51	-1.58	10.22	102.26***
100	0.975***	(0.058)	0.805***	(0.103)	0.050***	(0.015)	-4.12	$0.50^\diamond$	-0.20	23.76	427.08***
101†	1.000		n.d.		-		0.00	0.50	-1.00	-	-
102	1.140***	(0.127)	0.684***	(0.267)	0.122***	(0.048)	-2.17	$0.54^\diamond$	-0.32	10.25	92.53***
103	0.995***	(0.006)	0.986***	(0.013)	0.005***	(0.000)	-68.32	$0.50^\diamond$	-0.01	57.82	3.80^4***
104	0.793***	(0.101)	-0.055	(0.165)	0.110***	(0.016)	0.05	0.45	-1.06	11.77	105.86***
105	0.755***	(0.283)	-0.635	(0.611)	0.260***	(0.071)	0.39	0.46	-1.64	-4.41	38.90***
106	1.027***	(0.024)	0.891***	(0.065)	0.027***	(0.000)	-8.19	$0.51^\diamond$	-0.11	32.81	1351.52***
107	1.036***	(0.290)	-0.695**	(0.358)	0.248***	(0.023)	0.41	0.51	-1.70	-0.39	48.53***
108	1.012***	(0.290)	-0.328	(0.492)	0.256***	(0.060)	0.25	0.50	-1.33	-3.27	38.40***
109	0.973***	(0.218)	-1.077***	(0.302)	0.165***	(0.040)	0.52	0.50	-2.08	4.02	72.71***
110	0.881***	(0.041)	0.449***	(0.049)	0.040***	(0.016)	-0.81	0.44	-0.55	27.06	612.80***
113	0.874***	(0.099)	-0.975***	(0.143)	0.083***	(0.020)	0.49	0.48	-1.98	16.01	209.40***
114	1.093***	(0.105)	-0.217*	(0.141)	0.093***	(0.018)	0.18	0.52	-1.22	14.28	143.12***
115	1.018***	(0.030)	0.826***	(0.063)	0.029***	(0.006)	-4.74	$0.51^\diamond$	-0.17	31.71	1155.63***
116	0.984***	(0.138)	-1.023***	(0.241)	0.125***	(0.018)	0.51	0.50	-2.02	9.87	103.07***
117	1.166***	(0.195)	0.338	(0.269)	0.161***	(0.032)	-0.51	0.56	-0.66	6.07	64.70***
118	0.908***	(0.292)	-1.861***	(0.929)	0.216***	(0.048)	0.65	0.49	-2.86	-1.94	38.35***

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Table 15 – continued from previous page

ID	B	(sd_B)	s	(sd_s)	σ	(sd_σ)	ς	β	η_ς	LogL	Wald-χ^2
119	1.067***	(0.086)	0.580***	(0.105)	0.070***	(0.010)	-1.38	0.53$^\diamond$	-0.42	18.70	220.65***
120	0.941***	(0.089)	-0.833***	(0.155)	0.083***	(0.013)	0.45	0.49	-1.83	16.05	193.44***
121	1.076***	(0.068)	0.339***	(0.081)	0.060***	(0.011)	-0.51	0.53	-0.66	20.96	282.30***
123	0.990***	(0.007)	-0.014*	(0.008)	0.006***	(0.001)	0.01	0.50	-1.01	54.25	2.20×10^4***
124	0.953***	(0.043)	0.845***	(0.063)	0.039***	(0.007)	-5.45	0.49$^\diamond$	-0.16	27.24	650.85***
125	0.933***	(0.037)	0.911***	(0.056)	0.034***	(0.006)	-10.18	0.48$^\diamond$	-0.09	29.30	884.77***
127	1.123***	(0.154)	-0.742***	(0.184)	0.122***	(0.022)	0.43	0.52	-1.74	10.29	103.76***
128	0.966***	(0.156)	-0.277	(0.200)	0.153***	(0.028)	0.22	0.49	-1.28	6.83	73.35***
130	0.996***	(0.004)	0.997***	(0.006)	0.003***	(0.001)	-361.59	0.50$^\diamond$	0.00	64.12	8.80×10^4***
131	0.952***	(0.050)	0.865***	(0.074)	0.046***	(0.008)	-6.38	0.49$^\diamond$	-0.14	24.95	486.04***
132	1.024***	(0.057)	0.866***	(0.075)	0.048***	(0.009)	-6.48	0.51$^\diamond$	-0.13	24.31	452.59***
133	1.027***	(0.108)	-0.085	(0.131)	0.101***	(0.018)	0.08	0.51	-1.09	13.13	124.02***
134	1.302***	(0.216)	-1.623***	(0.288)	0.119***	(0.024)	0.62	0.53	-2.62	7.05	79.46***
135	0.925***	(0.038)	-0.377***	(0.052)	0.039***	(0.007)	0.27	0.49	-1.38	27.53	736.31***
136	0.975***	(0.021)	-0.145***	(0.026)	0.020***	(0.004)	0.13	0.50	-1.15	37.29	2427.80***
137	0.850***	(0.234)	-2.767***	(0.673)	0.155***	(0.037)	0.74	0.49	-3.77	-0.04	42.38***
138	0.869***	(0.100)	0.680***	(0.153)	0.103***	(0.019)	-2.12	0.46$^\diamond$	-0.32	12.76	125.01***
139	1.025***	(0.053)	-0.149**	(0.065)	0.050***	(0.009)	0.13	0.51	-1.15	23.78	425.37***
140	0.753***	(0.153)	0.420	(0.260)	0.185***	(0.036)	-0.72	0.38	-0.58	2.09	53.98***
141	0.903***	(0.132)	-0.268	(0.182)	0.138***	(0.025)	0.21	0.48	-1.27	8.43	83.09***
142	0.754***	(0.112)	-0.879***	(0.199)	0.125***	(0.024)	0.47	0.46	-1.88	7.86	108.27***
143	0.971***	(0.065)	-0.141*	(0.083)	0.064***	(0.012)	0.12	0.49	-1.14	19.92	265.86***
144	1.070***	(0.273)	-0.352	(0.322)	0.239***	(0.049)	0.26	0.51	-1.35	-2.51	40.26***
145	1.036***	(0.197)	-1.833***	(0.310)	0.130***	(0.028)	0.65	0.50	-2.83	4.63	77.09***
146	0.967***	(0.067)	-0.497***	(0.089)	0.064***	(0.012)	0.33	0.49	-1.50	19.85	290.49***
147	1.348***	(0.298)	-0.099	(0.280)	0.208***	(0.038)	0.09	0.57	-1.10	2.28	51.09***
148	1.039***	(0.252)	-0.539*	(0.316)	0.222***	(0.043)	0.35	0.51	-1.54	-0.29	46.65***
149	1.000***	(0.057)	-0.184***	(0.071)	0.054***	(0.010)	0.16	0.50	-1.18	22.38	361.56***
150	0.775***	(0.104)	0.084	(0.162)	0.126***	(0.023)	-0.09	0.43	-0.92	9.77	86.11***
151	1.341***	(0.109)	-0.467***	(0.105)	0.074***	(0.014)	0.32	0.55	-1.47	17.77	203.79***
152	0.823***	(0.131)	0.580***	(0.212)	0.144***	(0.026)	-1.38	0.46$^\diamond$	-0.42	7.80	73.82***
153	0.695***	(0.178)	-1.897***	(0.477)	0.172***	(0.037)	0.66	0.47	-2.90	1.27	53.75***
154†	1.000		n.d.		-		$-\infty$	0.50	n.d.	-	-
155	1.153**	(0.556)	-5.903***	(1.943)	0.203***	(0.068)	0.86	0.51	-6.90	-6.32	18.63***
156	0.913***	(0.169)	-1.058***	(0.288)	0.154***	(0.028)	0.51	0.49	-2.06	6.75	75.79***

Continued on next page

Table 15 – continued from previous page

ID	B	(sd_B)	s	(sd_s)	σ	(sd_σ)	ς	β	η_ς	LogL	Wald-χ^2
157†	1.000		n.d.		-		1.00	0.50	n.d.	-	-
158	0.995***	(0.007)	1.000***	(0.000)	0.006***	(0.001)	-4.80$\times 10^5$	0.50$^\diamond$	0.00	54.82	5.40$\times 10^7$***
159	1.018***	(0.141)	-0.631***	(0.183)	0.125***	(0.023)	0.39	0.50	-1.63	9.88	101.45***
160	1.121***	(0.086)	0.138	(0.095)	0.073***	(0.013)	-0.16	0.53	-0.86	17.88	198.57***
161	1.076***	(0.238)	-1.914***	(0.398)	0.150***	(0.027)	0.66	0.51	-2.91	7.15	75.09***
163	0.782***	(0.240)	-2.669***	(0.899)	0.167***	(0.031)	0.73	0.48	-3.67	5.52	61.99***
164	0.953***	(0.305)	-1.680***	(0.471)	0.222***	(0.054)	0.63	0.50	-2.68	-3.78	35.02***
165†	1.000		n.d.		- .		1.00	0.50	n.d.	-	-
166	1.118***	(0.156)	-0.299*	(0.174)	0.132***	(0.024)	0.23	0.52	-1.30	9.09	86.90***
167	0.507***	(0.143)	-0.950**	(0.382)	0.186***	(0.036)	0.49	0.41	-1.95	2.29	74.04***
168	0.947***	(0.213)	-0.984***	(0.289)	0.186***	(0.041)	0.50	0.49	-1.98	-0.27	52.19***
170	1.138***	(0.085)	0.431***	(0.096)	0.069***	(0.013)	-0.76	0.56	-0.57	18.73	216.46***
171†	1.000		n.d.		-		$-\infty$	0.50	n.d.	-	-
172	0.836***	(0.086)	-0.671***	(0.134)	0.091***	(0.017)	0.40	0.47	-1.67	14.67	175.94***
173	0.970***	(0.054)	0.857***	(0.078)	0.049***	(0.009)	-6.02	0.49$^\diamond$	-0.14	24.04	430.17***
174	1.566***	(0.489)	-1.186***	(0.408)	0.235***	(0.054)	0.54	0.55	-2.19	-3.56	29.86***
175	0.985***	(0.014)	0.968***	(0.020)	0.012***	(0.002)	-30.51	0.50$^\diamond$	-0.03	45.27	7062.77***
177	0.988***	(0.057)	0.366***	(0.074)	0.054***	(0.010)	-0.58	0.50	-0.63	22.43	340.21***
178	0.805***	(0.228)	-0.799**	(0.350)	0.241***	(0.052)	0.44	0.47	-1.80	-3.26	40.92***
179†	1.000		n.d.		-		$-\infty$	0.50	n.d.	-	-
180†	1.000		n.d.		-		1.00	0.50	n.d.	-	-
182	1.086***	(0.375)	-4.394***	(1.137)	0.158***	(0.050)	0.82	0.50	-5.39	-4.25	30.45***
183	0.989***	(0.090)	-1.312***	(0.134)	0.071***	(0.013)	0.57	0.50	-2.31	18.30	261.78***
184†	1.000		n.d.		-		1.00	0.50	n.d.	-	-
185	1.012***	(0.018)	-0.075***	(0.022)	0.017***	(0.003)	0.07	0.50	-1.08	39.80	3315.97***
186	1.068***	(0.112)	0.353***	(0.136)	0.099***	(0.018)	-0.55	0.53	-0.65	13.40	121.88***

Table 15: Estimated coefficients per individual of the P- and V-experiment; robust standard errors in parantheses; † parameters were set according to strong preference type; $^\diamond$ β values were estimated using the generalised Rawlsian utility function; n.d. stands for not defined; significance: ***1%, **5%, *10%.

Estimated coefficients for each participant of the combined d-p- and d-v-experiments

ID	A	(sd_A)	B	(sd_B)	t	(sd_t)	σ	(sd_σ)	θ	α	β	ν^θ	LogL	Wald-χ^2
1	1.177***	(0.142)	1.061***	(0.131)	-1.374***	(0.138)	0.09***	(0.01)	0.58	0.52	0.51	-2.37	24.31	272.76***
2	4.435***	(1.155)	1.279***	(0.233)	-0.780***	(0.197)	0.16***	(0.02)	0.44	0.70	0.54	-1.78	4.63	86.91***
3	3.356	(19.077)	1.888	(0.000)	-0.605	(10.140)	0.67	(5.16)	0.38	0.68	0.60	-1.60	-25.06	22.49***
4	18.704***	(3.485)	0.989***	(0.057)	0.995***	(0.081)	0.05***	(0.01)	-187.28	0.95$^\diamond$	0.50$^\diamond$	-0.01	37.47	470.88***
5	1.238***	(0.206)	0.960***	(0.148)	0.386***	(0.142)	0.15***	(0.02)	-0.63	0.59	0.48	-0.61	14.33	140.65***
7	1.500×10^{26}	(0.000)	1.000***	(0.007)	-35.117***	(1.242)	0.00*	(0.00)	0.97	0.84	0.50	-36.12	-10.80	2.30^{4}***
8	233.638	(2.800×10^{4})	196.895	(0.000)	-254.427***	(61.831)	197.79	(776.31)	1.00	0.51	0.51	-255.43	-20.83	17.01***
9	1.694***	(0.138)	0.956***	(0.070)	0.588***	(0.071)	0.07***	(0.01)	-1.43	0.66$^\diamond$	0.49$^\diamond$	-0.41	38.02	416.31***
10	5.007***	(0.932)	0.990***	(0.106)	-0.260**	(0.118)	0.10***	(0.01)	0.21	0.78	0.50	-1.26	21.91	177.93***
11	258.048	(480.166)	1.874**	(0.777)	-2.510***	(0.767)	0.23***	(0.05)	0.72	0.83	0.55	-3.51	-11.53	35.92***
12	1.865***	(0.190)	1.002***	(0.091)	-0.349***	(0.084)	0.09***	(0.01)	0.26	0.61	0.50	-1.35	30.88	297.53***
13	1.079×10^{3}	(1.870×10^{3})	1.127***	(0.079)	-0.092	(0.088)	0.07***	(0.01)	0.09	1.00	0.53	-1.09	8.74	240.73***
14	1.076***	(0.057)	1.018***	(0.054)	-0.559***	(0.048)	0.05***	(0.01)	0.36	0.51	0.50	-1.56	48.09	956.19***
15	1.091×10^{3}	(2.222×10^{3})	0.829***	(0.132)	0.995***	(0.230)	0.13***	(0.03)	-185.52	1.00$^\diamond$	0.45$^\diamond$	-0.01	-3.80	93.22***
16	11.983*	(6.579)	1.650***	(0.421)	-1.087***	(0.301)	0.19***	(0.03)	0.52	0.77	0.56	-2.09	-2.94	58.00***
17	52.950***	(19.366)	0.978***	(0.048)	0.980***	(0.068)	0.04***	(0.01)	-48.04	0.98$^\diamond$	0.50$^\diamond$	-0.02	32.23	629.34***
19	8.691***	(1.599)	1.009***	(0.088)	0.995***	(0.116)	0.07***	(0.01)	-203.33	0.90$^\diamond$	0.50$^\diamond$	-0.01	30.81	244.25***
20	49.218*	(27.840)	1.042***	(0.208)	-2.068***	(0.369)	0.13***	(0.02)	0.67	0.78	0.50	-3.07	0.57	93.69***
21	4.400×10^{29}	(0.000)	1.000***	(0.025)	-39.683***	(4.838)	0.01**	(0.00)	0.98	0.84	0.50	-40.68	-8.91	1.62×10^{3}***
23	4.513×10^{3}	(2.000^{4})	1.946	(1.319)	-2.208**	(1.045)	0.40***	(0.11)	0.69	0.93	0.55	-3.21	-19.91	16.09***
24	0.702***	(0.150)	1.155***	(0.307)	-1.434***	(0.251)	0.18***	(0.03)	0.59	0.46	0.52	-2.43	4.40	124.12***
25	2.216***	(0.310)	0.922***	(0.115)	-0.734***	(0.121)	0.11***	(0.02)	0.42	0.61	0.49	-1.73	19.77	196.12***
26	1.763×10^{3}**	(885.380)	1.002***	(0.007)	0.989***	(0.010)	0.01***	(0.00)	-87.44	1.00$^\diamond$	0.50$^\diamond$	-0.01	44.29	2.80^{4}***
28	15.707***	(4.403)	1.092***	(0.087)	0.679***	(0.104)	0.07***	(0.01)	-2.12	0.96$^\diamond$	0.53$^\diamond$	-0.32	29.92	240.27***
29	28.150	(21.457)	0.996***	(0.130)	0.897***	(0.199)	0.11***	(0.02)	-8.67	0.97$^\diamond$	0.50$^\diamond$	-0.10	19.27	129.46***
30	10.930***	(3.913)	1.664***	(0.199)	0.209	(0.138)	0.11***	(0.01)	-0.26	0.95	0.66	-0.79	24.43	136.27***
31	2.213**	(1.111)	0.995	(1.179)	0.402	(0.873)	1.13	(0.00)	-0.67	0.79	0.50	-0.60	-29.92	4.89
32	7.354***	(2.011)	1.239***	(0.150)	0.193	(0.136)	0.11***	(0.02)	-0.24	0.92	0.57	-0.81	22.58	141.63***
33	4.446***	(0.810)	1.188***	(0.122)	-0.609***	(0.116)	0.10***	(0.01)	0.38	0.72	0.53	-1.61	28.00	202.68***
34	5.996***	(2.343)	0.752*	(0.430)	-0.851	(0.000)	0.40***	(0.10)	0.46	0.72$^\diamond$	0.46$^\diamond$	-1.85	-17.13	45.78***
35	8.383	(6.809)	0.870***	(0.283)	-3.936***	(0.860)	0.17***	(0.04)	0.80	0.61	0.49	-4.94	-8.47	66.30***
36	2.921***	(0.710)	0.985***	(0.187)	-0.353*	(0.189)	0.18***	(0.02)	0.26	0.69	0.50	-1.35	5.93	98.86***
37	1.135***	(0.052)	1.001***	(0.046)	-0.105***	(0.040)	0.04***	(0.01)	0.10	0.53	0.50	-1.11	51.02	1.03×10^{3}***
38	1.086***	(0.026)	0.984***	(0.023)	0.993***	(0.024)	0.02***	(0.00)	-152.49	0.52$^\diamond$	0.50$^\diamond$	-0.01	74.53	4.83×10^{3}***
39	3.812***	(1.301)	0.731***	(0.159)	-1.024***	(0.236)	0.19***	(0.03)	0.51	0.66	0.46	-2.02	1.21	92.50***
40	5.605***	(0.943)	1.239***	(0.129)	-0.898***	(0.117)	0.09***	(0.01)	0.47	0.71	0.53	-1.90	24.04	206.94***
41	5.613×10^{3}	(6.671×10^{3})	0.972**	(0.445)	-4.263***	(0.865)	0.24**	(0.10)	0.81	0.84	0.50	-5.26	-18.80	37.99***
42	1.486***	(0.155)	0.945***	(0.097)	0.199**	(0.089)	0.10***	(0.01)	-0.25	0.62	0.48	-0.80	27.30	247.77***
43	1.128***	(0.081)	1.247***	(0.090)	-0.372***	(0.063)	0.07***	(0.01)	0.27	0.52	0.54	-1.37	38.38	492.15***
45	2.868***	(0.314)	1.018***	(0.090)	-0.549***	(0.087)	0.08***	(0.01)	0.36	0.66	0.50	-1.55	32.97	306.46***
46	1.862***	(0.218)	1.014***	(0.099)	-0.978***	(0.109)	0.09***	(0.01)	0.49	0.58	0.50	-1.98	31.13	294.24***
47	0.596***	(0.216)	0.690***	(0.217)	-1.176***	(0.312)	0.25***	(0.04)	0.54	0.44	0.46	-2.18	-8.90	79.44***
49	3.700×10^{38}	(0.000)	0.999	(1.800)	-59.732***	(1.892)	0.56**	(0.26)	0.98	0.81	0.50	-60.73	-21.95	1.00^{3}***
50	8.033***	(2.757)	1.088***	(0.176)	-0.632***	(0.186)	0.14***	(0.02)	0.39	0.78	0.51	-1.63	6.64	97.50***
51	3.439×10^{3}	(2.680×10^{3})	0.998***	(0.008)	0.995***	(0.011)	0.01***	(0.00)	-194.65	1.00$^\diamond$	0.50$^\diamond$	-0.01	42.99	2.20×10^{4}***
54	3.417***	(0.385)	0.989***	(0.078)	0.316***	(0.080)	0.08***	(0.01)	-0.46	0.86	0.50	-0.68	35.06	294.48***
55	7.000×10^{7}	(1.300×10^{8})	0.915***	(0.218)	-11.098***	(1.247)	0.10***	(0.02)	0.92	0.82	0.50	-12.10	1.58	801.02***
56	572.028	(1.620×10^{3})	0.815***	(0.167)	0.608**	(0.285)	0.19***	(0.03)	-1.55	1.00$^\diamond$	0.44$^\diamond$	-0.39	-6.30	61.28***
57	7.467***	(1.974)	1.239***	(0.137)	0.068	(0.125)	0.11***	(0.01)	-0.07	0.90	0.56	-0.93	24.92	155.81***
58	9.653***	(2.756)	1.792***	(0.315)	-1.111***	(0.222)	0.12***	(0.02)	0.53	0.75	0.57	-2.11	7.54	80.26***
60	1.137***	(0.037)	1.035***	(0.033)	0.935***	(0.032)	0.03***	(0.00)	-14.38	0.53$^\diamond$	0.51$^\diamond$	-0.07	65.19	2.58×10^{3}***
61	7.658***	(2.715)	1.277***	(0.184)	-0.199	(0.173)	0.14***	(0.02)	0.17	0.85	0.55	-1.20	9.65	102.08***
62	19.659	(18.842)	1.037***	(0.174)	0.021	(0.207)	0.16***	(0.02)	-0.02	0.95	0.51	-0.98	8.54	88.98***
63	4.008**	(1.868)	2.470	(0.000)	-0.372	(0.666)	0.57***	(0.13)	0.27	0.73	0.66	-1.37	-28.39	42.87***
65	9.899**	(4.600)	1.119***	(0.152)	-0.553***	(0.198)	0.13***	(0.02)	0.36	0.81	0.52	-1.55	17.69	121.80***
66	115.562	(188.996)	1.879*	(1.105)	-3.514***	(1.199)	0.26***	(0.04)	0.78	0.74	0.54	-4.51	-9.14	70.99***
67	1.648***	(0.462)	1.038***	(0.257)	-1.621***	(0.360)	0.18***	(0.02)	0.62	0.55	0.50	-2.62	6.44	96.95***

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Table 16 – continued from previous page

ID	A	(sd_A)	B	(sd_B)	t	(sd_t)	σ	(sd_σ)	θ	α	β	η^θ	LogL	Wald-χ^2
68	1.350^{***}	(0.431)	1.013^{***}	(0.368)	-0.821^{***}	(0.316)	0.29^{***}	(0.04)	0.45	0.54	0.50	-1.82	-8.48	69.89^{***}
69	2.351^{***}	(0.558)	0.897^{***}	(0.178)	0.020	(0.181)	0.19^{***}	(0.03)	-0.02	0.71	0.47	-0.98	2.36	92.33^{***}
70	0.986^{***}	(0.167)	1.121^{***}	(0.190)	-2.300^{***}	(0.227)	0.10^{***}	(0.02)	0.70	0.50	0.51	-3.30	9.39	194.00^{***}
71	1.077^{***}	(0.089)	1.007^{***}	(0.085)	0.307^{***}	(0.074)	0.08^{***}	(0.01)	-0.44	0.53	0.50	-0.69	33.53	355.65^{***}
72	1.584^{***}	(0.300)	1.160^{***}	(0.224)	-0.640^{***}	(0.176)	0.17^{***}	(0.02)	0.39	0.57	0.52	-1.64	7.56	113.49^{***}
73	30.131	(29.084)	1.104^{***}	(0.186)	-0.768^{***}	(0.233)	0.15^{***}	(0.03)	0.43	0.87	0.51	-1.77	1.05	86.82^{***}
74	33.122^{**}	(15.133)	1.125^{***}	(0.088)	-0.874^{***}	(0.108)	0.07^{***}	(0.01)	0.47	0.87	0.52	-1.87	27.32	281.33^{***}
75	161.213	(1.689^{3})	1.646	(17.958)	-207.938^{***}	(75.409)	2.14^{*}	(1.11)	1.00	0.51	0.50	-208.94	-26.47	18.11^{***}
76	732.151	(1.349^{3})	1.183^{***}	(0.079)	-0.509^{***}	(0.085)	0.06^{***}	(0.01)	0.34	0.99	0.53	-1.51	22.55	315.35^{***}
77	39.936	(51.429)	1.132^{***}	(0.126)	-0.107	(0.139)	0.11^{***}	(0.02)	0.10	0.97	0.53	-1.11	13.40	126.96^{***}
78	1.181^{***}	(0.074)	0.928^{***}	(0.057)	0.458^{***}	(0.056)	0.06^{***}	(0.01)	-0.84	0.58	0.47	-0.54	43.01	606.20^{***}
79	5.768	(4.286)	1.304^{**}	(0.632)	-2.002^{***}	(0.596)	0.32^{***}	(0.06)	0.67	0.64	0.52	-3.00	-15.09	40.42^{***}
80	1.200^{8}	(1.600^{11})	1.020^{***}	(0.159)	1.000	(0.000)	0.13^{***}	(0.02)	-5.9^{10}	1.00	0.50	-0.00	7.68	85.18^{***}
81	8.383^{***}	(2.411)	0.984^{***}	(0.109)	0.745^{***}	(0.147)	0.10^{***}	(0.01)	-2.92	$0.92^{\diamond}$	$0.50^{\diamond}$	-0.26	26.32	160.28^{***}
82	1.171×10^{3}	(3.364×10^{3})	0.691^{**}	(0.319)	-1.482^{**}	(0.589)	0.32^{***}	(0.08)	0.60	0.95	0.46	-2.48	-17.63	29.70^{***}
83	20.652^{*}	(12.491)	1.059^{***}	(0.114)	0.117	(0.132)	0.10^{***}	(0.01)	-0.13	0.97	0.52	-0.88	22.23	143.42^{***}
84	32.329	(48.247)	1.465^{***}	(0.249)	0.210	(0.213)	0.16^{***}	(0.02)	-0.27	0.99	0.62	-0.79	4.77	78.71^{***}
86	1.613^{***}	(0.363)	1.200^{***}	(0.240)	-0.821^{***}	(0.198)	0.18^{***}	(0.02)	0.45	0.57	0.53	-1.82	8.83	120.15^{***}
87	3.193×10^{3}	(4.221×10^{3})	0.702^{**}	(0.335)	-4.567^{***}	(1.027)	0.23^{***}	(0.06)	0.82	0.81	0.48	-5.57	-15.60	60.10^{***}
89	1.886^{3***}	(463.259)	1.000^{***}	(0.002)	0.999^{***}	(0.002)	0.00^{***}	(0.00)	1.70×10^{3}	$1.00^{\diamond}$	$0.50^{\diamond}$	0.00	63.94	$5.20\times10^{5***}$
90	1.073^{***}	(0.164)	1.133^{***}	(0.172)	0.304^{**}	(0.136)	0.15^{***}	(0.02)	-0.44	0.53	0.55	-0.70	15.40	147.73^{***}
91	$1.010\times10^{3***}$	(262.204)	1.001^{***}	(0.001)	0.002	(0.002)	0.00^{***}	(0.00)	0.00	1.00	0.50	-1.00	62.87	$4.70\times10^{5***}$
92	826.318	(1.000×10^{4})	1.000	(1.236)	-36.915	(66.39)	0.44^{***}	(0.09)	0.97	0.54	0.50	-37.92	-19.52	37.47^{***}
93	0.843^{***}	(0.081)	1.014^{***}	(0.095)	-0.857^{***}	(0.094)	0.08^{***}	(0.01)	0.46	0.48	0.50	-1.86	32.47	401.73^{***}
94	4.356^{***}	(1.342)	1.084^{***}	(0.234)	0.680^{***}	(0.223)	0.19^{***}	(0.03)	-2.12	$0.83^{\diamond}$	$0.53^{\diamond}$	-0.32	0.07	72.98^{***}
96	282.537	(672.633)	0.843^{***}	(0.111)	-0.605^{***}	(0.166)	0.12^{***}	(0.02)	0.38	0.97	0.47	-1.61	11.63	131.72^{***}
97	1.024×10^{3}	(3.143×10^{3})	1.112^{***}	(0.284)	-0.787^{**}	(0.351)	0.23^{***}	(0.04)	0.44	0.98	0.52	-1.79	-7.79	55.37^{***}
98	119.961	(113.332)	1.424^{***}	(0.481)	-5.355^{***}	(1.100)	0.14^{***}	(0.03)	0.84	0.68	0.51	-6.36	-8.88	135.44^{***}
99	2.750^{***}	(0.570)	1.080^{***}	(0.172)	-0.425^{***}	(0.152)	0.15^{***}	(0.02)	0.30	0.67	0.51	-1.43	12.30	125.65^{***}
100	1.439^{***}	(0.123)	0.964^{***}	(0.077)	0.613^{***}	(0.078)	0.07^{***}	(0.01)	-1.58	$0.61^{\diamond}$	$0.50^{\diamond}$	-0.39	35.54	375.97^{***}
101	678.485^{***}	(184.084)	0.991^{***}	(0.003)	-0.008^{**}	(0.004)	0.00^{***}	(0.00)	0.01	1.00	0.50	-1.01	51.94	$9.40\times10^{4***}$
102	20.557^{**}	(9.136)	1.140^{***}	(0.120)	0.691^{***}	(0.137)	0.10^{***}	(0.01)	-2.23	$0.96^{\diamond}$	$0.54^{\diamond}$	-0.31	22.95	158.65^{***}
103	143.377^{***}	(20.284)	0.995^{***}	(0.008)	0.985^{***}	(0.011)	0.01^{***}	(0.00)	-67.36	$0.99^{\diamond}$	$0.50^{\diamond}$	-0.02	89.76	$2.30\times10^{4***}$
104	501.396	(1.120×10^{3})	0.793^{***}	(0.093)	-0.057	(0.144)	0.11^{***}	(0.02)	0.05	1.00	0.45	-1.06	7.21	114.24^{***}
105	540.108	(1.982×10^{3})	0.783^{***}	(0.159)	-0.550^{**}	(0.260)	0.18^{***}	(0.03)	0.36	0.98	0.46	-1.55	1.23	81.87^{***}
106	958.235	(839.479)	1.027^{***}	(0.033)	0.890^{***}	(0.045)	0.03^{***}	(0.01)	-8.13	$1.00^{\diamond}$	$0.51^{\diamond}$	-0.11	21.78	1.30^{3***}
107	1.132×10^{3}	(3.632×10^{3})	1.037^{***}	(0.288)	-0.693^{**}	(0.340)	0.25^{***}	(0.05)	0.41	0.99	0.51	-1.69	-10.83	48.60^{***}
108	746.162	(2.090×10^{3})	1.012^{***}	(0.279)	-0.327	(0.333)	0.26^{***}	(0.05)	0.25	0.99	0.50	-1.33	-13.73	38.52^{***}
109	16.752^{**}	(7.954)	0.982^{***}	(0.153)	-1.051^{***}	(0.208)	0.13^{***}	(0.02)	0.51	0.80	0.50	-2.05	12.45	125.08^{***}
110	17.648^{***}	(4.290)	0.879^{***}	(0.048)	0.421^{***}	(0.069)	0.05^{***}	(0.01)	-0.73	0.99	0.45	-0.58	41.76	418.83^{***}
113	23.075^{**}	(11.617)	0.841^{***}	(0.168)	-1.301^{***}	(0.307)	0.15^{***}	(0.03)	0.57	0.80	0.48	-2.30	-2.15	81.24^{***}
114	544.686	(1.051×10^{3})	1.093^{***}	(0.093)	-0.217^{**}	(0.107)	0.08^{***}	(0.01)	0.18	0.99	0.52	-1.22	16.57	191.32^{***}
115	993.940	(1.008×10^{3})	1.018^{***}	(0.033)	0.825^{***}	(0.044)	0.03^{***}	(0.01)	-4.73	$1.00^{\diamond}$	$0.51^{\diamond}$	-0.18	27.44	$1.27\times10^{3***}$
116	14.562^{**}	(7.157)	0.978^{***}	(0.194)	-1.169^{***}	(0.287)	0.16^{***}	(0.02)	0.54	0.78	0.50	-2.17	5.89	90.59^{***}
117	0.943^{***}	(0.135)	1.163^{***}	(0.167)	0.315^{***}	(0.126)	0.14^{***}	(0.02)	-0.46	0.48	0.56	-0.69	17.23	159.42^{***}
118	238.420	(872.835)	0.920^{***}	(0.231)	-1.815^{***}	(0.507)	0.17^{***}	(0.03)	0.65	0.88	0.49	-2.82	-1.72	64.71^{***}
119	708.426	(937.558)	1.067^{***}	(0.082)	0.579^{***}	(0.100)	0.07^{***}	(0.01)	-1.38	$1.00^{\diamond}$	$0.53^{\diamond}$	-0.42	8.03	218.07^{***}
120	2.018^{***}	(0.423)	0.928^{***}	(0.177)	-1.050^{***}	(0.222)	0.16^{***}	(0.02)	0.51	0.59	0.49	-2.05	9.47	114.42^{***}
121	8.325^{***}	(1.305)	1.077^{***}	(0.069)	0.346^{***}	(0.074)	0.06^{***}	(0.01)	-0.53	0.96	0.53	-0.65	41.63	343.15^{***}
123	293.466	(633.454)	387.964	(0.000)	1.000	(0.000)	0.50^{***}	(0.09)	n.d.	n.d.	n.d.	n.d.	-21.52	34.30^{***}
124	7.407^{***}	(1.227)	0.948^{***}	(0.076)	0.772^{***}	(0.095)	0.07^{***}	(0.01)	-3.39	$0.90^{\diamond}$	$0.49^{\diamond}$	-0.23	32.18	265.30^{***}
125	2.168^{***}	(0.288)	0.918^{***}	(0.101)	0.608^{***}	(0.108)	0.10^{***}	(0.01)	-1.55	$0.72^{\diamond}$	$0.48^{\diamond}$	-0.39	25.66	206.77^{***}
127	6.536^{***}	(2.094)	1.110^{***}	(0.223)	-1.038^{***}	(0.236)	0.16^{***}	(0.03)	0.51	0.72	0.51	-2.04	2.65	84.53^{***}
128	12.095^{**}	(6.147)	0.956^{***}	(0.145)	-0.360^{**}	(0.179)	0.14^{***}	(0.02)	0.27	0.86	0.49	-1.36	9.05	101.00^{***}
130	4.869^{**}	(2.462)	0.941^{***}	(0.196)	0.283	(0.273)	0.20^{***}	(0.03)	-0.40	0.90	0.48	-0.72	0.25	71.56^{***}
131	1.110^{**}	(0.086)	0.947^{***}	(0.072)	0.796^{***}	(0.075)	0.07^{***}	(0.01)	-3.91	$0.53^{\diamond}$	$0.49^{\diamond}$	-0.20	38.32	484.65^{***}
132	377.131	(1.329×10^{3})	1.023^{***}	(0.226)	0.851^{***}	(0.301)	0.19^{***}	(0.03)	-5.69	$1.00^{\diamond}$	$0.51^{\diamond}$	-0.15	1.30	74.12^{***}
133	1.381×10^{3}	(3.330×10^{3})	1.027^{***}	(0.108)	-0.085	(0.131)	0.10^{***}	(0.02)	0.08	1.00	0.51	-1.09	2.65	123.72^{***}
134	1.321×10^{3}	(4.709×10^{3})	1.496	(1.049)	-5.425^{*}	(2.956)	0.25^{***}	(0.05)	0.84	0.75	0.52	-6.43	-12.57	103.19^{***}

Continued on next page

Table 16 – continued from previous page

ID	A	(sd_A)	B	(sd_B)	t	(sd_t)	σ	(sd_σ)	θ	α	β	η^θ	LogL	Wald-χ^2
135	2.938^{***}	(0.400)	0.889^{***}	(0.104)	-0.720^{***}	(0.116)	0.10^{***}	(0.01)	0.42	0.65	0.48	-1.72	22.17	213.32^{***}
136	7.906^{***}	(1.825)	1.300	(0.000)	-0.574^{**}	(0.294)	0.16^{***}	(0.04)	0.37	0.79	0.54	-1.57	-12.97	93.01^{***}
137	1.034^{***}	(0.401)	0.885^{**}	(0.396)	-4.333^{***}	(1.022)	0.19^{***}	(0.04)	0.81	0.50	0.49	-5.33	-8.84	44.02^{***}
138	1.455^{***}	(0.209)	0.859^{***}	(0.115)	0.365^{***}	(0.125)	0.13^{***}	(0.02)	-0.58	0.64	0.44	-0.64	19.07	164.37^{***}
139	1.001^{***}	(0.045)	1.035^{***}	(0.047)	-0.053	(0.039)	0.04^{***}	(0.01)	0.05	0.50	0.51	-1.05	51.30	$1.05\times10^{3***}$
140	941.967	(2.441×10^{3})	0.753^{***}	(0.153)	0.418	(0.260)	0.19^{***}	(0.04)	-0.72	1.00	0.38	-0.58	-8.38	54.06^{***}
141	4.178^{***}	(0.885)	0.917^{***}	(0.120)	-0.122	(0.134)	0.13^{***}	(0.02)	0.11	0.78	0.48	-1.12	19.53	142.69^{***}
142	719.361	(1.241×10^{3})	0.755^{***}	(0.112)	-0.875^{***}	(0.200)	0.13^{***}	(0.02)	0.47	0.97	0.46	-1.88	-2.70	107.90^{***}
143	18.056^{***}	(4.463)	0.971^{***}	(0.048)	-0.141^{**}	(0.061)	0.05^{***}	(0.01)	0.12	0.93	0.49	-1.14	48.67	501.21^{***}
144	2.451^{***}	(0.711)	1.058^{***}	(0.278)	-0.683^{***}	(0.252)	0.23^{***}	(0.03)	0.41	0.63	0.51	-1.68	-2.98	74.61^{***}
145	35.039	(23.555)	1.074^{***}	(0.376)	-2.581^{***}	(0.581)	0.18^{***}	(0.04)	0.72	0.73	0.51	-3.58	-7.18	62.64^{***}
146	1.459^{***}	(0.161)	0.949^{***}	(0.106)	-0.708^{***}	(0.102)	0.10^{***}	(0.01)	0.42	0.56	0.49	-1.71	27.13	275.86^{***}
147	0.943^{***}	(0.194)	1.336^{***}	(0.286)	-0.301	(0.187)	0.20^{***}	(0.03)	0.23	0.49	0.56	-1.30	5.99	108.46^{***}
148	1.069^{3}	(6.247^{3})	1.033^{***}	(0.211)	-0.540^{**}	(0.266)	0.19^{***}	(0.03)	0.35	0.99	0.51	-1.54	-1.76	69.27^{***}
149	2.431^{***}	(0.214)	0.980^{***}	(0.074)	-0.390^{***}	(0.072)	0.07^{***}	(0.01)	0.28	0.66	0.50	-1.39	36.97	397.91^{***}
150	2.342^{***}	(0.363)	0.773^{***}	(0.103)	0.060	(0.121)	0.13^{***}	(0.02)	-0.06	0.71	0.43	-0.94	19.67	158.29^{***}
151	1.232^{***}	(0.328)	1.539^{***}	(0.549)	-1.423^{***}	(0.351)	0.22^{***}	(0.04)	0.59	0.52	0.54	-2.42	-5.43	64.04^{***}
152	894.386	(1.937^{3})	0.823^{***}	(0.131)	0.578^{***}	(0.212)	0.14^{***}	(0.03)	-1.37	$1.00^{\diamond}$	$0.46^{\diamond}$	-0.42	-2.71	73.87^{***}
153	1.346^{***}	(0.413)	0.718^{***}	(0.271)	-2.957^{***}	(0.615)	0.18^{***}	(0.03)	0.75	0.52	0.48	-3.96	-2.44	61.39^{***}
154	106.034	(72.904)	1.085	(0.000)	0.873^{***}	(0.246)	0.03	(0.03)	-6.90	$1.00^{\diamond}$	$0.50^{\diamond}$	-0.13	22.76	497.12^{***}
155	184.060	(353.470)	1.176	(0.746)	-7.107^{***}	(2.555)	0.24^{***}	(0.05)	0.88	0.66	0.51	-8.11	-13.31	86.60^{***}
156	1.740^{3}	(5.256^{3})	0.914^{***}	(0.164)	-1.056^{***}	(0.279)	0.15^{***}	(0.03)	0.51	0.97	0.49	-2.06	-2.10	80.65^{***}
157	6.200^{7}	(1.300^{8})	0.999^{***}	(0.358)	-11.870^{***}	(1.485)	0.15^{***}	(0.04)	0.92	0.80	0.50	-12.87	-11.76	852.12^{***}
158	9.337^{**}	(4.544)	0.983^{***}	(0.170)	0.791^{***}	(0.229)	0.16^{***}	(0.02)	-3.78	$0.92^{\diamond}$	$0.50^{\diamond}$	-0.21	5.93	86.78^{***}
159	1.046^{3}	(2.027×10^{3})	1.018^{***}	(0.141)	-0.630^{***}	(0.183)	0.13^{***}	(0.02)	0.39	0.99	0.50	-1.63	-0.62	101.37^{***}
160	1.955^{***}	(0.207)	1.115^{***}	(0.106)	0.086	(0.087)	0.09^{***}	(0.01)	-0.09	0.68	0.53	-0.91	29.13	257.95^{***}
161	21.623	(14.316)	1.080^{***}	(0.251)	-1.718^{***}	(0.353)	0.17^{***}	(0.03)	0.63	0.76	0.51	-2.72	3.04	91.04^{***}
163	3.800×10^{13}	(4.100×10^{16})	0.004	(0.000)	-10.658^{***}	(1.726)	0.23^{***}	(0.03)	0.91	0.94	0.38	-11.66	1.22	85.13^{***}
164	750.247	(1.334×10^{3})	0.955^{***}	(0.304)	-1.652^{***}	(0.456)	0.22^{***}	(0.06)	0.62	0.92	0.50	-2.65	-14.34	36.06^{***}
165	2.700×10^{8}	(1.200×10^{9})	5.231	(7.948)	-12.031^{***}	(3.733)	0.78	(0.71)	0.92	0.82	0.53	-13.03	-21.64	22.79^{***}
166	532.884	(908.621)	1.118^{***}	(0.157)	-0.298^{*}	(0.175)	0.13^{***}	(0.02)	0.23	0.99	0.52	-1.30	-1.48	86.78^{***}
167	5.934^{***}	(1.851)	0.552^{***}	(0.100)	-0.756^{***}	(0.210)	0.14^{***}	(0.02)	0.43	0.73	0.42	-1.76	13.76	134.39^{***}
168	37.165	(39.360)	0.881^{*}	(0.534)	-1.754^{*}	(0.926)	0.35^{***}	(0.08)	0.64	0.79	0.49	-2.75	-18.68	25.36^{***}
170	254.407	(548.539)	1.138^{***}	(0.064)	0.431^{***}	(0.073)	0.05^{***}	(0.01)	-0.76	1.00	0.56	-0.57	39.06	378.80^{***}
171	5.868^{***}	(0.642)	0.990^{***}	(0.059)	0.864^{***}	(0.072)	0.05^{***}	(0.01)	-6.36	$0.87^{\diamond}$	$0.50^{\diamond}$	-0.14	45.79	471.02^{***}
172	1.490×10^{3}	(0.000)	1.320×10^{3}	(0.000)	-2.306	(6.779)	0.53^{***}	(0.09)	0.70	0.90	0.90	-3.31	-22.22	32.37^{***}
173	12.510^{***}	(2.656)	0.979^{***}	(0.090)	0.998^{***}	(0.123)	0.08^{***}	(0.01)	-524.32	$0.93^{\diamond}$	$0.50^{\diamond}$	0.00	19.93	207.22^{***}
174	9.845^{**}	(4.431)	1.572^{***}	(0.408)	-1.269^{***}	(0.295)	0.19^{***}	(0.03)	0.56	0.73	0.55	-2.27	-3.51	54.46^{***}
175	1.271	(809.022)	0.985^{***}	(0.014)	0.968^{***}	(0.021)	0.01^{***}	(0.00)	-30.18	$1.00^{\diamond}$	$0.50^{\diamond}$	-0.03	33.70	6.51^{3***}
177	4.147^{***}	(0.386)	0.992^{***}	(0.060)	0.413^{***}	(0.066)	0.06^{***}	(0.01)	-0.70	0.92	0.50	-0.59	43.33	442.97^{***}
178	1.090^{***}	(0.276)	0.801^{***}	(0.207)	-0.858^{***}	(0.225)	0.22^{***}	(0.03)	0.46	0.51	0.47	-1.86	-4.10	86.66^{***}
179	8.447^{***}	(1.050)	0.999^{***}	(0.072)	1.000	(0.000)	0.06^{***}	(0.01)	-1.100×10^{7}	$0.89^{\diamond}$	$0.50^{\diamond}$	-0.00	21.49	284.98^{***}
180	1.800×10^{8}	(2.400×10^{8})	5.102^{**}	(2.064)	-15.126^{***}	(1.400)	0.14^{***}	(0.04)	0.94	0.77	0.53	-16.13	-12.31	300.74^{***}
182	3.498×10^{3}	(3.624×10^{3})	1.111^{***}	(0.357)	-3.724^{***}	(0.675)	0.17^{***}	(0.05)	0.79	0.85	0.51	-4.72	-15.46	50.76^{***}
183	5.039^{***}	(1.152)	0.978^{***}	(0.153)	-1.581^{***}	(0.204)	0.11^{***}	(0.02)	0.61	0.65	0.50	-2.58	17.98	153.89^{***}
184	9.000×10^{7}	(0.000)	9.267	(1.150×10^{3})	-14.548	(123.867)	1.73×10^{3}	(6.80×10^{4})	0.94	0.77	0.54	-15.55	-20.80	0.01
185	1.936^{***}	(0.060)	1.013^{***}	(0.028)	-0.066^{***}	(0.025)	0.03^{***}	(0.00)	0.06	0.65	0.50	-1.07	65.83	2.41^{3***}
186	1.738^{***}	(0.184)	1.060^{***}	(0.103)	0.281^{***}	(0.089)	0.09^{***}	(0.01)	-0.39	0.68	0.52	-0.72	28.61	252.80^{***}

Table 16: Estimated coefficients per individual of the combined D-P- and D-V-experiment; $^{\diamond}$ α and β values were estimated with the generalised Rawlsian utility function; significance: ***1%, **5%, *10%.

B APPENDIX: FURTHER RESULTS

B.1 *Results for the complete data set*

This section presents further results for all 88 males and 100 females, respectively.

B.1.1 *Pooling*

Table 17 shows the KW test results between the distributions of the amounts allocated to the recipient in the D-experiment.

COMPARISON OF TREATMENTS: DICTATOR EXPERIMENT ALL PARTICIPANTS						
	MALES			FEMALES		
BUDGET	1-2-3-4	1,2-3,4	1,3-2,4	1-2-3-4	1,2-3,4	1,3-2,4
1	0.8642	0.5469	0.6562	0.6531	0.6434	0.7105
	(0.738)	(0.363)	(0.198)	(1.628)	(0.214)	(0.138)
2	0.2766	0.3019	0.9507	0.2603	0.8590	0.7611
	(3.864)	(1.066)	(0.004)	(4.011)	(0.032)	(0.092)
3	0.3877	0.9440	0.6931	0.2168	0.2611	0.8230
	(3.026)	(0.005)	(0.156)	(4.450)	(1.263)	(0.050)
4	0.7457	0.6280	0.8270	0.3194	0.5342	0.9074
	(1.231)	(0.235)	(0.048)	(3.510)	(0.386)	(0.014)
5	0.3284	0.1667	0.4747	0.1749	0.2977	0.5154
	(3.442)	(1.913)	(0.511)	(4.958)	(1.084)	(0.423)
6	0.2743	0.3032	0.4040	0.8251	0.8382	0.9032
	(3.884)	(1.060)	(0.696)	(0.901)	(0.042)	(0.015)
7	0.7353	0.4290	0.5518	0.1745	0.4036	0.5486
	(1.274)	(0.626)	(0.354)	(4.964)	(0.698)	(0.360)
8	0.2123	0.0877*	0.7042	0.2200	0.3894	0.8348
	(4.500)	(2.916)	(0.144)	(4.415)	(0.741)	(0.044)
9	0.1797	0.1587	0.6173	0.4181	0.5697	0.2711
	(4.894)	(1.987)	(0.250)	(2.833)	(0.323)	(1.211)
10	0.1564	0.0907*	0.5580	0.6758	0.9091	0.9234
	(5.219)	(2.863)	(0.343)	(1.528)	(0.013)	(0.009)
11	0.4695	0.2187	0.3665	0.8748	0.4786	0.7862
	(2.532)	(1.513)	(0.816)	(0.693)	(0.502)	(0.074)
12	0.6379	0.5756	0.8580	0.4767	0.2318	0.8047
	(1.696)	(0.313)	(0.032)	(2.492)	(1.430)	(0.061)
13	0.2371	0.2913	0.2040	0.8112	0.7530	0.9345
	(4.235)	(1.114)	(1.613)	(0.959)	(0.099)	(0.007)
14	0.4174	0.2171	0.9123	0.9257	0.5641	0.7599
	(2.838)	(1.524)	(0.012)	(0.469)	(0.333)	(0.093)
15	0.3379	0.3200	0.6108	0.6577	0.6569	0.8693
	(3.371)	(0.989)	(0.259)	(1.607)	(0.197)	(0.027)
Prob.	-	0.2833	-	-	-	-

Table 17: Comparison of amount allocated to the recipient in the D-experiment (x_o) between different treatments and per budget for all participants. 1,2-3,4 indicates the column with the results for treatments 1 and 2 (pooled) vs. 3 and 4 (pooled), etc. The table shows the p-values (test statistic in parentheses) for the Kruskal-Wallis test. The last line is the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%.

Tables 18 and 19 show the KW test results between the distributions of the amounts allocated to B in the P-V- experiment.

B.1.2 *Giving and allocation behaviour*

Table 20 shows the amounts allocated to the recipient (x_o) for each budget of the D-experiment and per gender, respectively. Table 21 gives the amounts allocated to B for the P- and V-experiment.

COMPARISON OF TREATMENTS: SOCIAL PLANNER AND VEIL OF IGNORANCE EXPERIMENT ALL MALE PARTICIPANTS									
BUDGET	1-2-3-4	multiple comparisons between treatments						1,2-3,4	1,3-2,4
		1-2	1-3	1-4	2-3	2-4	3-4		
1	0.7638	-	-	-	-	-	-	0.9059	0.4348
	(1.155)	-	-	-	-	-	-	(0.014)	(0.610)
2	0.6151	-	-	-	-	-	-	0.8894	0.1906
	(1.799)	-	-	-	-	-	-	(0.019)	(1.713)
3	0.9089	-	-	-	-	-	-	0.9695	0.9257
	(0.545)	-	-	-	-	-	-	(0.002)	(0.009)
4	0.8743	-	-	-	-	-	-	0.6895	0.9459
	(0.695)	-	-	-	-	-	-	(0.160)	(0.005)
5	0.9780	-	-	-	-	-	-	0.6902	0.9864
	(0.198)	-	-	-	-	-	-	(0.159)	(0.000)
6	0.3340	-	-	-	-	-	-	0.2173	0.3000
	(3.400)	-	-	-	-	-	-	(1.522)	(1.074)
7	0.3132	-	-	-	-	-	-	0.7290	0.0665*
	(3.559)	-	-	-	-	-	-	(0.120)	(3.368)
8	0.2013	-	-	-	-	-	-	0.1216	0.1970
	(4.627)	-	-	-	-	-	-	(2.397)	(1.664)
9	0.7334	-	-	-	-	-	-	0.7171	0.2874
	(1.282)	-	-	-	-	-	-	(0.131)	(1.132)
10	0.1146	-	-	-	-	-	-	0.8522	0.0221**
	(5.939)	-	-	-	-	-	-	(0.035)	(5.240)
11	0.3289	-	-	-	-	-	-	0.1563	0.7487
	(3.438)	-	-	-	-	-	-	(2.010)	(0.103)
12	0.3736	-	-	-	-	-	-	0.3601	0.2691
	(3.119)	-	-	-	-	-	-	(0.838)	(1.221)
13	0.0822*	0.3902	0.0200	0.4432	0.0347	0.3317	0.0114	0.2438	0.1356
	(6.698)	(2.20)	(16.04)	(1.12)	(13.84)	(3.32)	(17.15)	(1.358)	(2.228)
14	0.4024	-	-	-	-	-	-	0.3757	0.2569
	(2.931)	-	-	-	-	-	-	(0.785)	(1.286)
15	0.3151	-	-	-	-	-	-	0.6557	0.1679
	(3.544)	-	-	-	-	-	-	(0.199)	(1.902)
Prob.	0.6000	-	-	-	-	-	-	-	0.2593

Table 18: Comparison of amount allocated to B in the P- and V-experiment (y_2) between different treatments and per budget for all male participants. 1,2-3,4 indicates the column with the results for treatment 1 and 2 (pooled) vs. 3 and 4 (pooled), etc. The Kruskal-Wallis test identifies overall effects between multiple treatments; when appropriate, the multiple comparison test identifies differences between individual treatments. Grey columns are included for completeness only. The table shows the p-values (test statistic in parentheses) for the Kruskal-Wallis test. The last line is the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%; adjusted significance for multiple comparisons: ***0.083%, **0.42%, *0.83% accordingly.

COMPARISON OF TREATMENTS: SOCIAL PLANNER AND VEIL OF IGNORANCE EXPERIMENT ALL FEMALE PARTICIPANTS									
BUDGET	1-2-3-4	multiple comparisons between treatments						1,2-3,4	1,3-2,4
		1-2	1-3	1-4	2-3	2-4	3-4		
1	0.7012	-	-	-	-	-	-	0.4157	0.4065
	(1.419)	-	-	-	-	-	-	(0.662)	(0.689)
2	0.1253	-	-	-	-	-	-	0.0859*	0.1173
	(5.734)	-	-	-	-	-	-	(2.950)	(2.453)
3	0.9102	-	-	-	-	-	-	0.5147	0.7477
	(0.539)	-	-	-	-	-	-	(0.425)	(0.104)
4	0.5496	-	-	-	-	-	-	0.5959	0.2126
	(2.111)	-	-	-	-	-	-	(0.281)	(1.553)
5	0.0984*	0.2183	0.1623	0.0573	0.0424	0.0115	0.2666	0.0216**	0.8345
	(6.289)	(6.15)	(7.86)	(13.21)	(14.01)	(19.36)	(5.35)	(5.279)	(0.044)
6	0.2194	-	-	-	-	-	-	0.2842	0.0689*
	(4.421)	-	-	-	-	-	-	(1.147)	(3.310)
7	0.4156	-	-	-	-	-	-	0.8836	0.1367
	(2.848)	-	-	-	-	-	-	(0.021)	(2.215)
8	0.6720	-	-	-	-	-	-	0.7427	0.2744
	(1.545)	-	-	-	-	-	-	(0.108)	(1.195)
9	0.4331	-	-	-	-	-	-	0.1410	0.4927
	(2.742)	-	-	-	-	-	-	(2.167)	(0.471)
10	0.5950	-	-	-	-	-	-	0.2924	0.4075
	(1.893)	-	-	-	-	-	-	(1.109)	(0.686)
11	0.5019	-	-	-	-	-	-	0.3259	0.6901
	(2.356)	-	-	-	-	-	-	(0.965)	(0.159)
12	0.2053	-	-	-	-	-	-	0.0961*	0.2225
	(4.580)	-	-	-	-	-	-	(2.769)	(1.488)
13	0.5115	-	-	-	-	-	-	0.3162	0.3119
	(2.306)	-	-	-	-	-	-	(1.004)	(1.023)
14	0.2489	-	-	-	-	-	-	0.0797*	0.3891
	(4.119)	-	-	-	-	-	-	(3.072)	(0.742)
15	0.2650	-	-	-	-	-	-	0.1254	0.1969
	(3.967)	-	-	-	-	-	-	(2.349)	(1.665)
Prob.	0.6519	-	-	-	-	-	-	0.1186	0.6364

Table 19: Comparison of amount allocated to B in the P- and V-experiment (y_2) between different treatments and per budget for all female participants. 1,2-3,4 indicates the column with the results for treatment 1 and 2 (pooled) vs. 3 and 4 (pooled), etc. The Kruskal-Wallis test identifies overall effects between multiple treatments; when appropriate, the multiple comparison test identifies differences between individual treatments. Grey columns are included for completeness only. The table shows the p-values (test statistic in parentheses) for the Kruskal-Wallis test. The last line is the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%; adjusted significance for multiple comparisons: ***0.083%, **0.42%, *0.83% accordingly.

D-EXPERIMENT: ALL PARTICIPANTS							
		Males		Females			
BUDGET	$\frac{p_o}{p_s}$	mean (sd)	median	mean (sd)	median	z	A^2
1	0.222	5.955 (6.151)	3.012	4.299 (4.786)	3.012	1.084	2.601^{**}
2	0.333	3.621 (4.604)	1.170	2.893 (3.671)	1.500	0.494	0.768
3	0.500	1.899 (2.325)	1.000	1.626 (2.012)	1.000	0.339	0.458
4	0.500	2.315 (2.700)	0.500	2.029 (2.491)	0.500	−0.233	1.935
5	0.500	2.658 (3.229)	1.550	2.137 (2.600)	2.000	0.598	0.971
6	0.833	1.086 (1.319)	0.090	1.189 (1.399)	0.600	−0.897	0.982
7	1.000	1.118 (1.440)	0.000	1.347 (1.339)	1.000	-1.659^{*}	3.531^{**}
8	1.000	1.238 (1.720)	0.000	1.485 (1.587)	1.000	−1.415	2.418^{*}
9	1.200	0.990 (1.205)	0.500	1.090 (1.120)	0.500	−1.284	2.354^{*}
10	2.000	0.593 (0.940)	0.000	0.825 (0.933)	0.500	-2.550^{**}	6.599^{***}
11	2.000	0.650 (1.012)	0.000	0.744 (0.977)	0.250	−1.139	1.375
12	2.000	0.641 (1.098)	0.003	0.800 (0.999)	0.250	-2.391^{**}	5.221^{***}
13	2.000	0.825 (1.336)	0.000	1.036 (1.215)	0.875	-2.224^{**}	5.626^{***}
14	3.106	0.381 (0.684)	0.039	0.528 (0.679)	0.361	-2.691^{***}	5.780^{***}
15	4.496	0.355 (0.745)	0.000	0.524 (0.734)	0.111	-3.049^{***}	8.176^{***}
Total		1.622 (1.604)	1.133	1.503 (1.382)	1.187	−0.027	1.269
Prob.							1.79%

Table 20: Average amounts given to the recipient for each gender and budget in the D-experiment. Total reports the statistics assuming one mean observation over all budgets per individual. z is the test statistic of the MW test, A^2 reports the test statistic of the 2-sample AD test comparing the distributions of the choices between males and females for each budget separately. The last line gives the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%.

B.2 *Separate results for the* P- *and* V-*experiment*

B.2.1 *Allocation behaviour*

Table 22 presents the amounts allocated to B for the restricted set, for the P- and the V-experiment separately.

B.2.2 *Notions of justice*

Figure 8 shows the demand for equality for each gender and for the P- and V-experiment.

B.2.3 *Notions of justice*

Table 23 shows the distribution of the preferences for each experimental task and for men and women, separately.

Table 24 shows the average estimation results separately for the P- and the V-experiment.

It can be seen that on average the weights β indicate that males and females satisfy Symmetry and that β comes close to 0.5 for both, the P- and the V-experiment. The parameter ς which describes the curvature of the notion of justice, is greater than zero for men and for women in both experiments. The resulting elasticity of substitution is in both cases greater in absolute terms for males than for females.

Comparing the distributions of all male β vs. all female β coefficients, we neither find differences in the P-experiment ($A^2 = 0.436, p = 0.5532$; $z = 0.079, p = 0.9367$) nor in the V-experiment

p- and v-experiment: All participants							
		Males		Females			
Budget	$\frac{p_b}{p_a}$	mean (sd)	median	mean (sd)	median	z	A^2
1	0.290	7.951 (3.652)	8.458	6.367 (3.385)	6.041	2.758***	5.434***
2	0.400	5.702 (2.837)	5.247	4.707 (2.293)	4.623	2.371**	4.287***
3	0.500	5.248 (2.510)	4.700	4.377 (2.020)	3.000	2.385**	4.054***
4	0.500	6.374 (2.825)	5.500	5.276 (2.261)	4.750	2.579***	5.289***
5	0.573	4.471 (2.003)	3.996	3.719 (1.316)	3.228	2.708***	5.290***
6	0.833	3.424 (1.459)	3.000	3.242 (0.936)	3.000	0.686	1.158
7	1.000	3.249 (1.327)	3.500	3.453 (0.660)	3.500	−0.584	0.887
8	1.000	3.952 (1.361)	4.000	3.958 (0.746)	4.000	−0.833	0.990
9	1.200	2.461 (1.188)	3.000	2.749 (0.636)	3.000	−2.102**	4.070***
10	2.000	1.704 (1.193)	2.000	2.260 (0.971)	2.500	−3.056***	6.580***
11	2.000	1.965 (1.380)	2.313	2.590 (1.056)	2.750	−3.059***	6.514***
12	2.000	2.131 (1.611)	2.375	2.792 (1.291)	3.000	−2.554**	5.473***
13	2.382	1.911 (1.481)	2.061	2.418 (1.186)	2.555	−2.284**	4.743***
14	3.528	1.277 (1.195)	1.036	1.824 (1.168)	1.902	−2.970***	5.740***
15	4.496	1.155 (1.154)	0.895	1.559 (1.121)	1.446	−2.502**	4.268***
Total		3.532 (0.554)	3.534	3.419 (0.464)	3.399	1.978**	2.961**
Prob.							0.01%

Table 21: Average amounts allocated to B for each gender and budget in the p- and v-experiment. Total reports the statistics assuming one mean observation over all budgets per individual. z is the test statistic of the MW test, A^2 reports the test statistic of the 2-sample AD test comparing the distributions of the choices between males and females for each budget separately. The last line gives the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%.

($A^2 = 0.557, p = 0.5039; z = -0.221, p = 0.8250$) indicating that both, men and women, satisfy Symmetry.

Using the transformed ς values of all participants, we find significant differences between the male and the female distributions, for both the p-experiment ($A^2 = 2.772, p = 0.0334$; $z = 1.959, p = 0.0501$) and the v-experiment ($A^2 = 2.986, p = 0.0255$; $z = 2.047, p = 0.0406$).

Figures 9 and 10 show the predicted amounts for the p- and the v-experiment, respectively.

b.2.4 *Separate results for the* d-p-*experiment, and the* d-v-*experiment*

For a comparison of the estimated coefficients consider the average estimation results presented in Table 5 and Table 24. We first compare the distributions of the α and β coefficients between the d- and p-experiment (dp). In the (dp) experiment we have 39 males and 46 females when comparing all data. In case of the weak types only, we have 27 males and 38 females who have weak preferences both in the d- and in the p-experiment. When comparing the weak types we find highly significant differences in the distributions and in the medians for males ($z = 4.300, p < 0.00$) and females ($z = 5.257$, $p < 0.00$). These differences are even more pronounced when also considering the strong types ($z = 5.303$, $p < 0.00$ for males and $z = 5.818$, $p < 0.00$ for females).

When comparing the distributions between the d- and v-experiment (dv) we have 38 males and 41 females. In case of the weak types only, we have 25 males and 33 females with weak preferences in both experiments. Considering the weak types only, we find highly significant differences between the α and β coefficients: $z = 4.103$, $p < 0.00$ for males and $z = 4.905$, $p < 0.00$

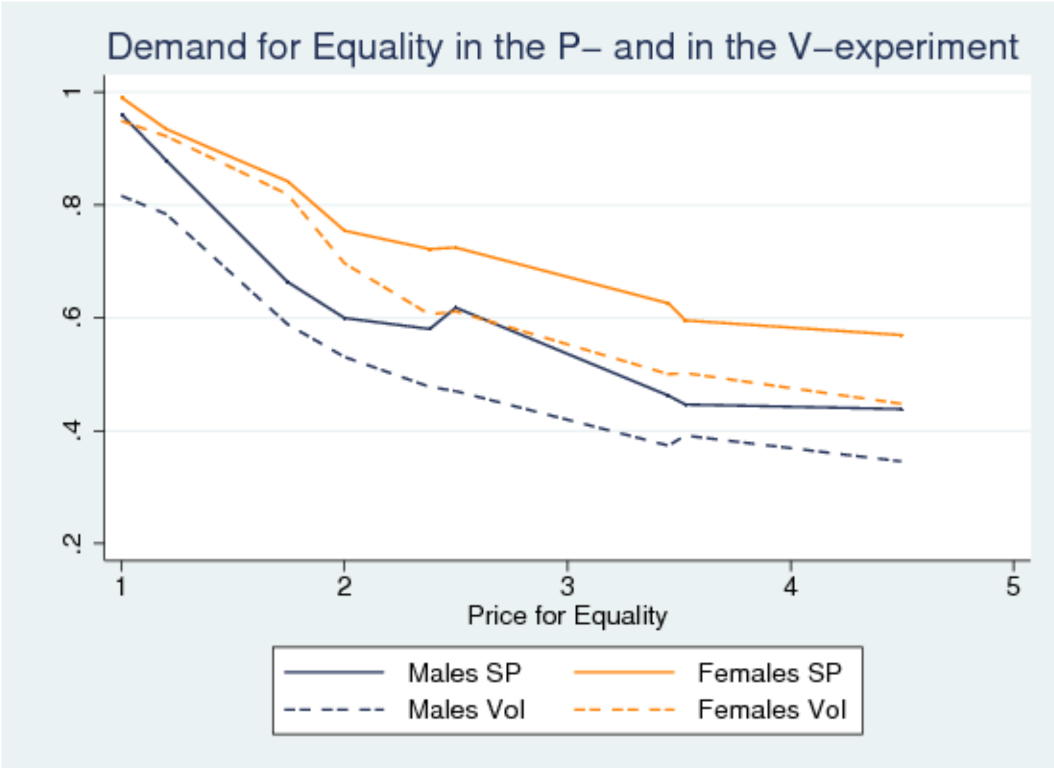


Figure 8: Demand of equality for the P- and V- experiment for the restricted set of participants, pooled over each price ratio, respectively, and for males and females separately.

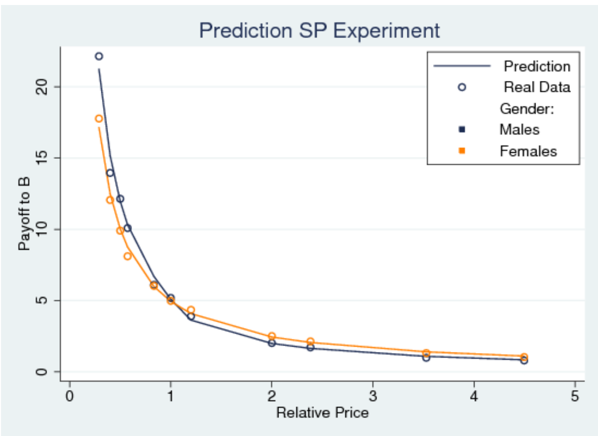


Figure 9: Predicted allocation to B with ten Euro endowment.

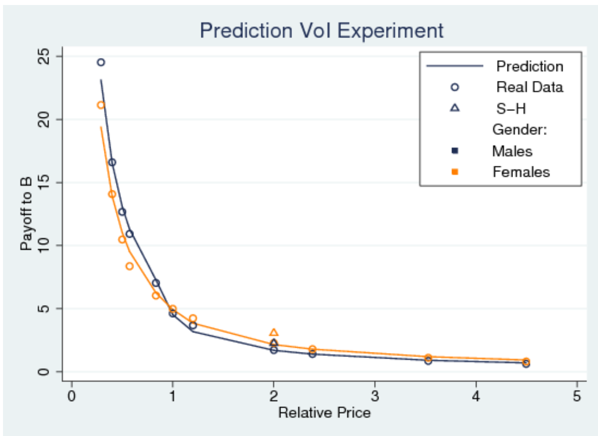


Figure 10: Predicted allocation to B with ten Euro endowment.

for females. These differences persist when also considering the strong types ($z = 5.228$, $p < 0.00$ for males and $z = 5.501$, $p = 0.00$ for females).

Comparing the distributions of ρ- and ς- parameters in the DP-experiment we find no significant differences for males ($z = 1.297$, $p = 0.1945$) but significant differences for females ($z = 2.400$, $p = 0.0164$). For reasons explained in Section 4.2.2 we can only compare the weak ρ and ς parameters. In order to compare the data of all participants we use the transformed paramters and find significant differences between the DP-experiments ($z = 1.739$, $p = 0.0820$ for males and $z = 2.289$, $p = 0.0221$ for females).

When comparing the justice parameters ρ and ς of the DV-experiment we find no significant differences for males ($z = 0.578$, $p = 0.5629$) and females ($z = 0.027$, $p = 0.9786$). We confirm this results when considering the transformed justice paramters of all participants ($z = 0.290$, $p = 0.7715$ for males and $z = 0.758$, $p = 0.4483$ for females).

Our results indicate that there are no differences in the distributions of the transformed ρ and ς parameters between the DV-experiment but that there are significant differences between the notions of justice of the DP-experiment.

We are particularly interested in the equality of the ρ- and ς-parameters for each individual separately. Therefore we take a closer look at the individual between-treatment comparisons. On the individual level we take the estimated r- and s-paramters and use the non-linear Wald test to test for equality of the transformed ρ- and ς-parameters This results in 69 comparisons in the DP-experiment (30 males, 39 females) and in 67 comparisons in the DV-experiment (31 males, 36 females). We report the results for all established significance levels: In the DP-experiment we find: At a significance level of 10% we cannot reject the hypothesis of equality for 53.33% of all men and for 51.28% of all women. At a significance level of 5% we cannot reject equality in 60.00% of all male and in 51.28% of all female comparisons. At a significance level of 1% we cannot reject equality for 60.00% of all men and 64.10% of all women.

In the DV-experiment we find: At a significance level of 10% we cannot reject the hypothesis of equality for 45.16% of all men and for 50.00% of all women. At a significance level of 5% we cannot reject equality in 45.16% of all male and in 52.78% of all female comparisons. At a significance level of 1% we cannot reject equality for 51.61% of all men and 61.11% of all women.

It can be seen that the rejection rates of equality are lower in the DP-experiment than in the DV-experiment, the difference however is not significant ($z = -0.193$, $p = 0.8469$). We choose to accept a significance level of at least 5%.

We also find a clear relationship between these parameters in the DP-experiment (Spearman's rho= $0.7014, p < 0.000$ for males, Spearman's rho= $0.7908, p < 0.000$ for females) and in the DV-experiment (Spearman's rho= $0.5871, p < 0.000$ for males, Spearman's rho= $0.6973, p < 0.000$ for females).

Therefore the separate analysis of the coefficients of the DP- or DV-experiment yiels the same conclusion as the analysis of the combined data set. We conclude that the both experimental tasks are equally suited to elicit an individual's notion of justice.

B.3 *Non-parametric comparison: Additional results*

B.3.1 *Strength of justice: additional results*

Figure 11 shows the distribution of the number of times male and female participants, respectively, fall into the "stronger" category in the pooled within-treatment comparisons. The figure shows the empirical cumulative distribution function, the Gaussian kernel density estimate, and the 5% and 10% confidence band based on a Monte Carlo simulation (bootstrap) with 10,000 draws.

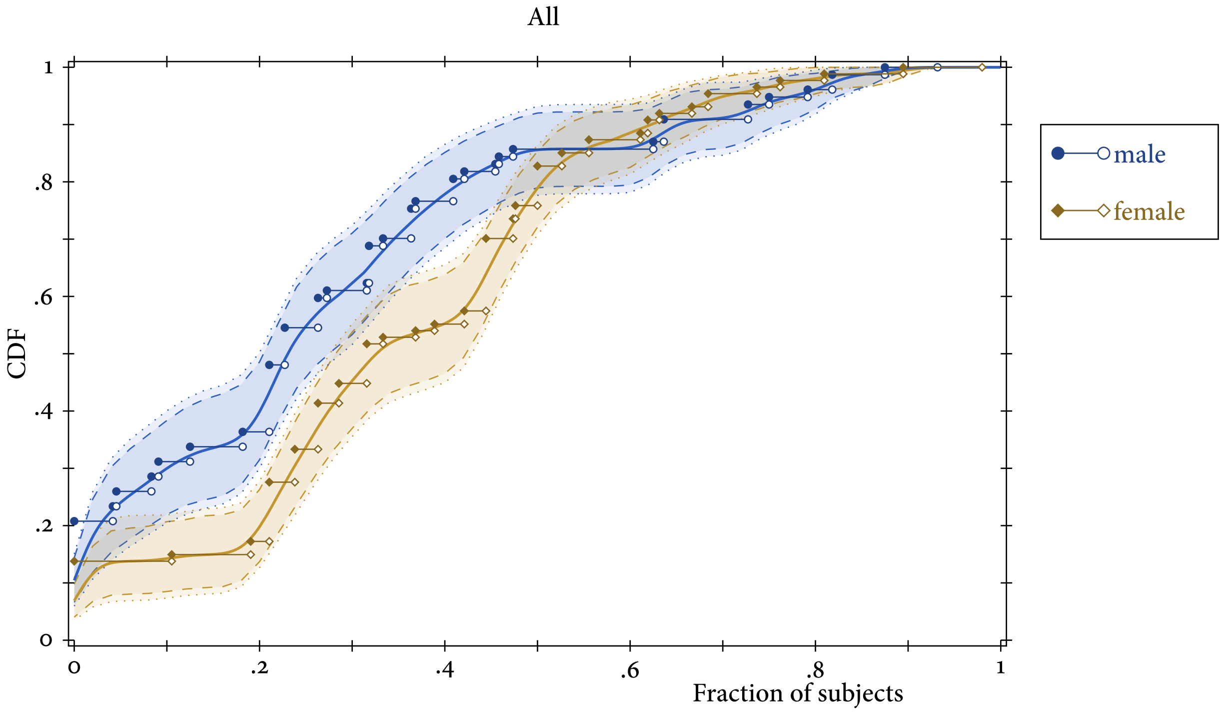


Figure 11: Pooled within-treatment comparison: Empirical cumulative distribution function, Gaussian kernel density estimate, and 5% and 10% confidence band.

Figure 12 shows the same as Figure 11 but for the comparisons between all participants across treatments. Figure 13 in Appendix B.3 shows the results for four combinations of two treatments.

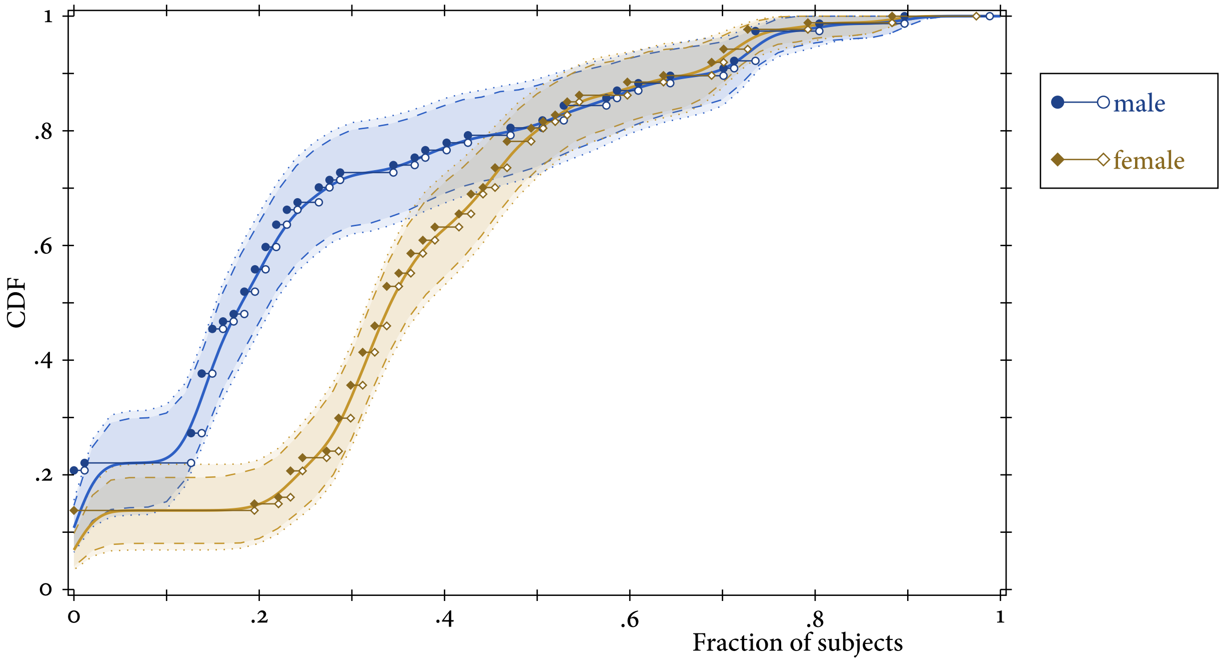
Figure 12 shows the same as Figure 13 but for the comparisons between all participants across treatments. These figures can also be interpreted in the following way: The n percent of most just men (1-CDF) have a stronger sense of justice than m percent of all women. For example, Figure 12 shows that the 60% of most just men have a stronger sense of justice than only 15.2% of women, while the 60% of most just women have a stronger sense of justice than 31.7% of men. The 91% of most just women, on the other hand, have a stronger sense of justice than 70.4% of men, while the 91% of most just men have a stronger sense of justice than 70.3% of women.

Figure 13 shows the distribution of the number of times male and female participants, respectively, fall into the "stronger" category for four combinations of two treatments.

B.3.2 *Money metric*

In Becker et al. (2013a) we also introduce a non-parametric way to measure the strength of justice and to compare two individuals based on money metric utility. In particular, we ask "given the most just choice y^i on budget $B(q^i)$, what is the money metric *utility* of y^i on $B(q^i)$? The money metric utility is normalised such that the money metric utility of the optimal choice according to an individual's utility function is always 1. The greater the money metric utility of the most just choice, the smaller the loss of utility compared to the actually preferred choice, and thus, the closer the most just choice to the most preferred choice. A high money metric utility of the most just choice therefore indicates a higher strength of the sense of justice.

As the complete utility function of subjects is unknown, we can only provide upper and lower bounds on the money metric based on revealed preference relations (Varian (1982) called these the



(a)

Figure 12: Across treatments comparison: Empirical cumulative distribution function, Gaussian kernel density estimate, and 5% and 10% confidence band.

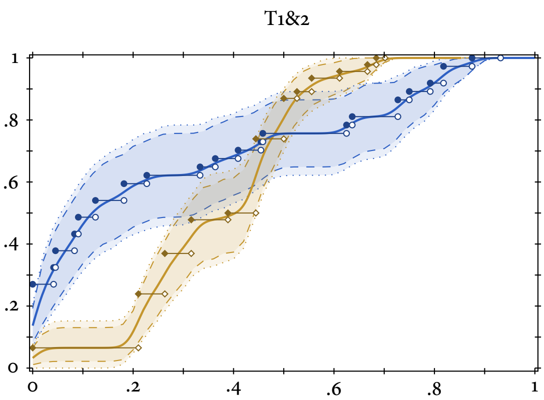
under- and overcompensation function, respectively). We report the average of these two values. Figure 14 shows the result. The figure shows, for each log-price-ratio, the average money metric utility of men and women. The figure also shows the result of a kernel regression (Nadaraya Watson estimator, Gaussian kernel), with 5% and 10% confidence bands. Around a price ratio of 1, male and female subjects have a similar money metric utility of the most just choice. For a budget with a price ratio of 1 (standard dictator game), the most just choice is typically an equal split; when evaluated with their revealed preference relation, subjects lose on average about 25% of their utility if they were forced to make this choice in the dictator game.

For lower price ratios (when it is cheap to give), women enjoy a significantly higher utility from their most just choice, even though they tend to give less money than men, and vice versa for higher price ratios. This can be explained with the different notions of justice: While men give more money than women when it is cheap to do so, they should, according to their notion of justice, give *even more*. Women, according to their notion of justice, should give much less than men, and indeed they do. As it turns out, their choices in the dictator game when giving is cheap is closer to their most just choice in money metric terms. When giving is expensive, men, according to their notion of justice, should give nothing or almost nothing, which is indeed what they do in the dictator game, resulting in a relatively high money metric utility on average.

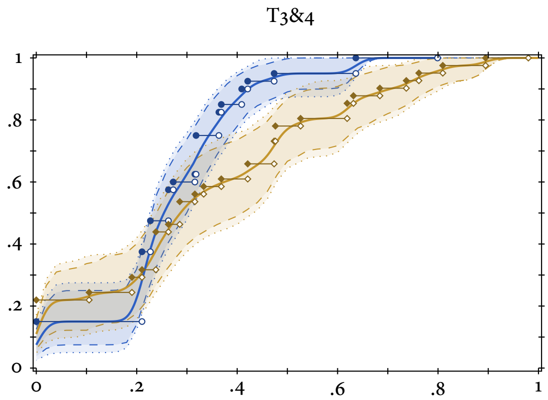
C APPENDIX: INSTRUCTIONS

C.1 *English translation of instructions*

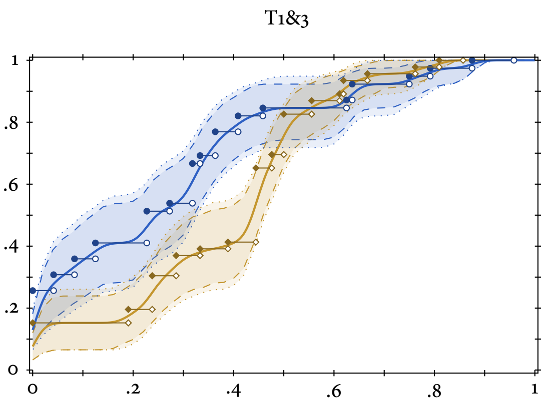
This is a translation of the original German instructions for the veil of ignorance experiment (V) played as the first part of a session (as in treatment 4). The instructions for the dictator



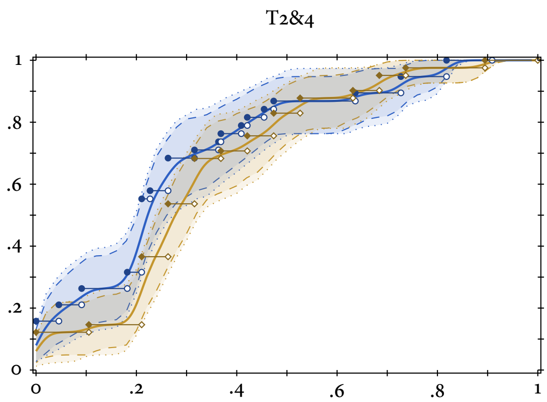
(a)



(b)



(c)



(d)

Figure 13: Within treatments comparison: Empirical cumulative distribution function, Gaussian kernel density estimate, and 5% and 10% confidence band.

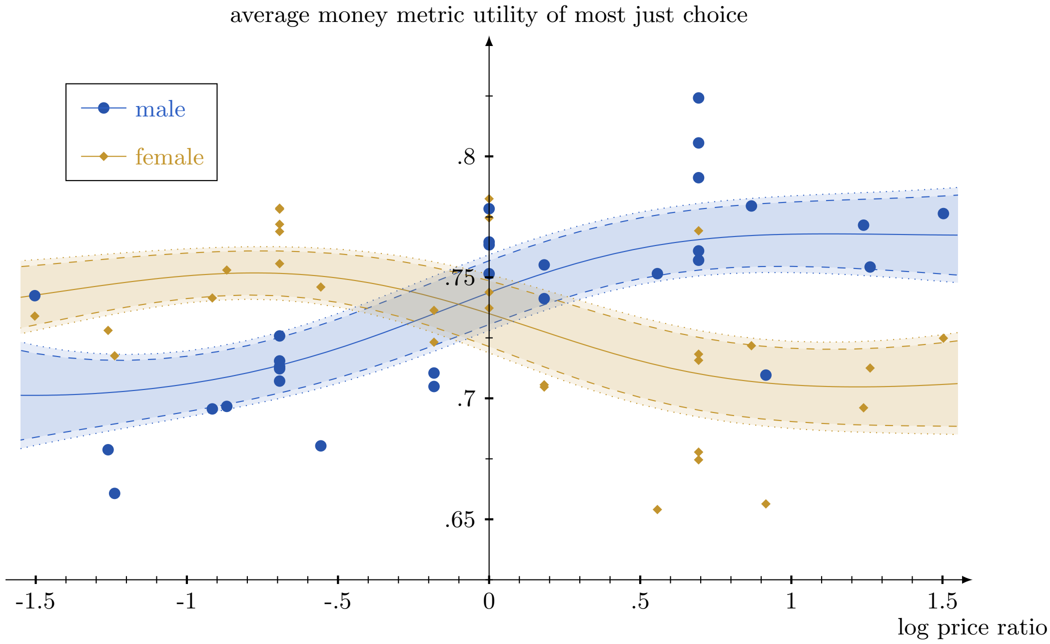


Figure 14: Average money metric utility of men and women for different price ratios, and the result of a kernel regression (Nadaraya Watson estimator, Gaussian kernel) with 5% and 10% confidence bands.

experiment (D) and the social planner experiment (P) were as similar as possible and only changed where necessary (marked in italics). If a game was played as the second part of a session, the introduction and end of the instructions were changed accordingly.

Part 1

Welcome to the experiment and thank you for your participation! This experiment is jointly run by researchers of the Chair for Empirical and Experimental Economics (University of Jena), TU Dortmund University, and the Ruhr Graduate School in Economics (RGS).

You can earn an amount of money in this experiment which will depend on your decisions and on the decisions of other participants. **Therefore, it is very important that you thoroughly and accurately read these instructions.**

If you have a question please raise you hand. We will come to you and answer your question. Please do not pose your question(s) aloud. All participants of the experiments get the same instructions. However, the information provided on the screen during the experiment is only for the respective participant. Thus, you are **not allowed to look at the screen of other participants** and you are **not allowed to talk to other participants**. If you violate these rules we are unfortunately forced to exclude you from the experiment. Please also switch off your mobile phones now.

The experiment comprises **two** parts. These are for the time being the instructions for the first part. Once the first part is finished you will receive the instructions for the second part. At the end of the experiment you will be paid for **both** parts. The payments for both parts are independent from each other, that is, your decisions in the first part will not influence your payments in the second part.

All information during the experiment will be in €.

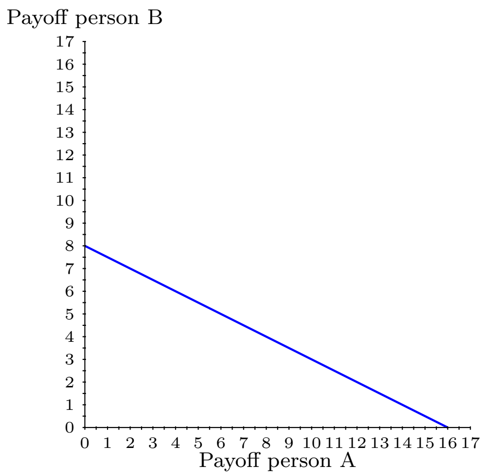
In the coming part of the experiment you will in each round divide one budget **between two participants** in this room for 15 rounds. *You will be one of them. In every round you will be randomly matched with a new person. You will never learn the identity of this person.* Also, your identity will never be disclosed.

In every round you will divide a given budget which varies from round to round *between two persons (henceforth person A and person B). You will be one of these persons, that is, you will be either randomly allocated to the role of person A or to the role of person B. You will be assigned each of the roles with equal probability. However, you do not know which role you will be assigned when you make your decision.*

The budget will be independent from your decisions as well as from the decisions of the other participants. The minimum amount for each of *these two persons* is 0 €. The maximum amount for each of *these two* will be shown on the right hand side of the screen. You find the maximum amount for *person A* at the top of the left column and the maximum amount for *person B* at the top of the right column. The maximum amount for *person A and for person B* can be unequal in a given round.

On the left hand side of the screen you find a graph. This graph displays the same information as shown on the right hand side in a different way: The payoffs *of person A* are shown on the horizontal axis and the payoffs *of person B* are shown on the vertical axis. The different payoff combinations for *person A and person B* are shown with a blue straight line. The maximum amount for *person A* is the intersection of the blue line with the horizontal axis and the maximum amount for *person B* is the intersection of the blue line with the vertical axis. Since the maximum amounts of *person A and B* vary from round to round, the trend and slope of the blue line which shows the possible payoff combinations changes from round to round, too.

The following graph shows an example: Here you can either allocate *€ 16 to person A* and *person B* then receives € 0, you can allocate € 0 to *person A* and *person B then receives € 8*, or you can choose any allocation between these two values (up to two decimals) along the blue line. Here you have to keep in mind that one unit of payoff less for *person A* does not automatically mean that *person B* receives one unit of payoff more, but that this value can change from round to round. In the example € 1 more for *person A* means *€ 0.50 less for person B*. The other way around, if you want to allocate € 1 more to *person B*, you have to allocate *€ 2 less to person A*. This is due to the different maximum amounts for *person A and person B* and the resulting slope of the blue line.



Your task is now to divide the given budget between *person A and person B without knowing which role will later be drawn for you. The payoff for person A or person B will be drawn with equal probability.* To do this, enter into the respective field on the right hand side of the screen the amount you would like to allocate to *person A* (maximal 2 decimals possible). If you now press the button "Show" it will be shown on the right hand side of the screen how much *person A and person B* would each get if you confirm this distribution. At the same time you will see the distribution of the budget marked with red lines in the graph on the left hand side of the screen: On the horizontal axis the *payoff for person A* will be marked; on the vertical axis the payoff *for person B* will be marked. You can have as many distributions computed and shown in the graph as you wish until you decide for one distribution. If that is the case, press the "Confirm"-button which appears after a possible distribution has been shown for the first time. You will then get to the next round in which you will be matched with *a new person.*

The computation of the payoff will be done for all participants in the room in the same way: After the experiment has been completed **one** of these 15 rounds will be randomly drawn for you *as well as your role (either person A or person B).* For this round you will receive *the amount that you allocated to the role that has been drawn for you, as well as the amount that another participant in this room (not the person that you assigned an amount to) allocated to the other role. If role A is randomly drawn for you, you will receive the amount that you allocated to person A in the respective round, as well as the amount that another participant allocated to person B in the respective round. If role B is randomly drawn for you, you will receive the amount that you allocated to person B in the respective round, as well as the amount that another participant assigned to person A in the respective round.*

Before the real payoff-relevant experiment begins you can try the handling of the software and the experimental task for two rounds.

At the end of the experiment your earnings will be paid out in cash. This money will be paid privately. No other participant will learn from us how much you earn or which decisions you have taken. Neither will you learn about the decisions of the other participants.

Once you have read the instructions carefully, please start to answer the questions of the comprehension test. When you are done with this test, please raise your hand and one of the experimenters will come to you and correct the test. You can only participate in the experiment if you have understood the rules.

C.2 *Original German instructions*

These are the original German instructions for the veil of ignorance experiment (V) played as the first part of a session (as in treatment 4). The instructions for the dictator experiment (D) and the social planner experiment (P) were as similar as possible and only changed where necessary (marked in italics). If a game was played as the second part of a session, the introduction and end of the instructions were changed accordingly.

Teil 1

Herzlich willkommen zum Experiment und vielen Dank für Ihre Teilnahme! Dieses Experiment wird gemeinschaftlich von Forschern des Lehrstuhls für Empirische und Experimentelle Wirtschaftsforschung (FSU Jena), der TU Dortmund und der Ruhr Graduate School in Economics (RGS) durchgeführt.

Sie können in diesem Experiment einen Geldbetrag verdienen, der abhängig ist von Ihren Entscheidungen und denen der anderen Teilnehmer. **Es ist daher sehr wichtig, dass Sie diese Instruktionen gründlich und genau durchlesen.**

Sollten Sie eine Frage haben, heben Sie bitte Ihre Hand. Wir werden dann zu Ihnen kommen und Ihre Frage beantworten. Bitte stellen Sie Ihre Frage(n) auf keinen Fall laut. Alle Teilnehmer des Experiments erhalten dieselben Instruktionen. Die Informationen im Verlauf des Experiments auf dem Bildschirm sind jedoch nur für die jeweiligen Teilnehmer bestimmt. Sie dürfen also **nicht auf den Bildschirm anderer Teilnehmer sehen** und **nicht mit anderen Teilnehmern reden**. Sollten Sie gegen diese Regeln verstoßen, sind wir leider dazu gezwungen, Sie vom Experiment auszuschließen. Bitte schalten Sie jetzt auch Ihre Mobiltelefone aus.

Das Experiment besteht aus **zwei** Teilen. Dies sind zunächst die Instruktionen für den ersten Teil. Wenn der erste Teil beendet ist, erhalten Sie die Instruktionen für den zweiten Teil. Am Ende des Experiments werden Sie für **beide** Teile entlohnt. Die Auszahlungen der beiden Teile sind unabhängig voneinander, d.h. Ihre Entscheidungen im ersten Teil haben keinen Einfluss auf Ihre Auszahlungen im zweiten Teil.

Alle Angaben während des Experiments sind in €.

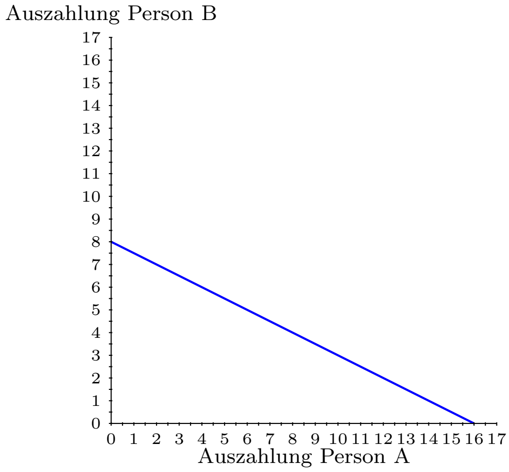
Im kommenden Teil des Experiments teilen Sie 15 Runden lang jeweils ein Budget ***zwischen zwei Teilnehmern*** in diesem Raum auf. *Einer davon werden Sie sein. In jeder Runde wird Ihnen eine neue Person zufällig zugelost. Sie werden deren Identität nicht erfahren.* Auch Ihre Identität wird zu keinem Zeitpunkt bekannt gegeben.

In jeder Runde teilen Sie ein gegebenes Budget, das von Runde zu Runde variiert, zwischen *zwei Personen (im Folgenden Person A und Person B) auf. Sie werden eine der Personen sein, also entweder die Rolle von Person A oder die Rolle von Person B zugelost bekommen. Jede der Rollen erhalten Sie mit gleicher Wahrscheinlichkeit. Allerdings wissen Sie zum Zeitpunkt Ihrer Entscheidung nicht, welche dies sein wird.*

Das Budget ist sowohl unabhängig von Ihren Entscheidungen als auch unabhängig von den Entscheidungen der anderen Teilnehmer. Der Mindestbetrag für *jede dieser beiden Personen* beträgt dabei €0. Der Höchstbetrag für *jeden der beiden* wird Ihnen auf der rechten Seite des Bildschirms angezeigt. In der linken Spalte oben finden Sie den Höchstbetrag für *Person A*; in der rechten Spalte oben finden Sie den Höchstbetrag für *Person B*. Der Höchstbetrag in einer Runde kann für *Person A und für Person B* unterschiedlich hoch sein.

Auf der linken Seite des Bildschirms befindet sich eine Grafik. In dieser Grafik werden dieselben Informationen wie auf der rechten Seite in einer anderen Weise dargestellt: Die Auszahlungen von *Person A* werden an der waagerechten Achse dargestellt, die Auszahlungen von *Person B* an der senkrechten Achse. Die verschiedenen Auszahlungskombinationen für *Person A und Person B* werden mit einer blauen Gerade dargestellt. Der Höchstbetrag für *Person A* ist der Schnittpunkt der blauen Geraden mit der waagerechten Achse und der Höchstbetrag für *Person B* ist der Schnittpunkt der blauen Geraden mit der senkrechten Achse. Da die Höchstbeträge von *Person A und Person B* von Runde zu Runde variieren, ändert sich auch der Verlauf und die Steigung der blauen Geraden, die die möglichen Auszahlungskombinationen abbildet, von Runde zu Runde.

Die folgende Grafik stellt ein Beispiel dar: Hier können Sie entweder *Person A €16* zuteilen und *Person B* bekommt dann €0, Sie können *Person* A €0 zuteilen und *Person B* bekommt *€8* oder Sie können jede beliebige Aufteilung zwischen diesen Werten (bis zu zwei Nachkommastellen genau) entlang der blauen Gerade wählen. Hierbei ist zu beachten, dass eine Einheit Auszahlung weniger für *Person A* nicht automatisch eine Einheit mehr Auszahlung für *Person B* bedeutet, sondern dass dieser Wert von Runde zu Runde variieren kann. Im Beispiel bedeutet €1 mehr für *Person A €0.50 weniger für Person B*. Umgekehrt heißt das, wenn Sie *Person B* €1 mehr zuteilen möchten, müssen Sie *Person A €2 weniger* zuteilen. Das liegt an den unterschiedlichen Höchstbeträgen für *Person A und Person B* und der daraus resultierenden Steigung der blauen Geraden.



Ihre Aufgabe ist es nun, das vorhandene Budget zwischen *Person A und Person B* aufzuteilen *ohne zu wissen, welche der Rollen Sie später zugelost bekommen. Sie werden die Auszahlung von Person A oder Person B mit gleicher Wahrscheinlichkeit zugelost bekommen.* Hierzu geben Sie nun in das entsprechende Eingabefeld auf der rechten Seite des Bildschirms ein, wie viel Sie *Person A* zuteilen (maximal 2 Nachkommastellen möglich). Wenn Sie nun auf den Knopf "Anzeigen" klicken, wird Ihnen auf der rechten Seite des Bildschirms angezeigt, wie viel *Person A und Person B* jeweils bekommen würden, falls Sie diese Aufteilung bestätigen. Gleichzeitig wird Ihnen die Aufteilung des Budgets in der Grafik auf der linken Seite des Bildschirms mit roten Linien angezeigt: An der waagerechten Achse wird die *Auszahlung für Person A* markiert; an der senkrechten Achse wird die Auszahlung für *Person B* markiert. Sie können solange verschiedene Aufteilungen berechnen und in der Grafik anzeigen lassen bis Sie sich für eine Aufteilung entschieden haben. Wenn dies der Fall ist, klicken Sie auf den "Bestätigen"-Knopf, der nach dem ersten Anzeigen einer möglichen Aufteilung erscheint. Danach gelangen Sie zur nächsten Runde in der Ihnen *eine neue Person zugelost wird*.

Die Berechnung der Auszahlung erfolgt für alle Teilnehmer im Raum auf die gleiche Weise: Nach dem Experiment wird **eine** dieser 15 Runden *sowie Ihre Rolle (entweder Person A oder Person B)* zufällig ausgelost. Für diese Runde bekommen Sie den Betrag ausgezahlt, den Sie *der Ihnen zugelosten Rolle zugeteilt haben sowie den Betrag, den ein anderer Teilnehmer in diesem Raum (nicht die Person, der Sie einen Betrag zugeteilt haben) der anderen Rolle zugeteilt hat. Falls Sie also Rolle A zugelost bekommen haben, erhalten Sie den Betrag, den Sie in der ausgelosten Runde Person A zugeteilt haben, sowie den Betrag, den ein anderer Teilnehmer in dieser Runde Rolle B zugeteilt hat. Falls Sie Rolle B zugelost bekommen haben, erhalten Sie den Betrag, den Sie in der ausgelosten Runde Person B zugeteilt haben, sowie den Betrag, den ein anderer Teilnehmer in dieser Runde Rolle A zugeteilt hat.*

Bevor das eigentliche auszahlungsrelevante Experiment beginnt, können Sie zwei Runden lang die Handhabung der Software und die Experimentalaufgabe ausprobieren.

Am Ende des Experiments bekommen Sie Ihren Verdienst bar ausgezahlt. Dieses Geld wird Ihnen privat ausgezahlt. Kein anderer Teilnehmer wird von uns erfahren, wie viel Sie verdienen oder welche Entscheidungen Sie getroffen haben. Sie werden auch nichts über die Entscheidungen der anderen Teilnehmer erfahren.

Wenn Sie die Instruktionen gründlich gelesen haben, beginnen Sie bitte damit, die Fragen des Verständnistests zu beantworten. Wenn Sie mit dem Test fertig sind, melden Sie sich und einer der Experimentleiter wird zu Ihnen kommen und den Test kontrollieren. Sie dürfen nur dann am Experiment teilnehmen, wenn Sie die Regeln verstanden haben.

C.3 *Screenshot*

Figure 15 shows a screenshot of the user interface.

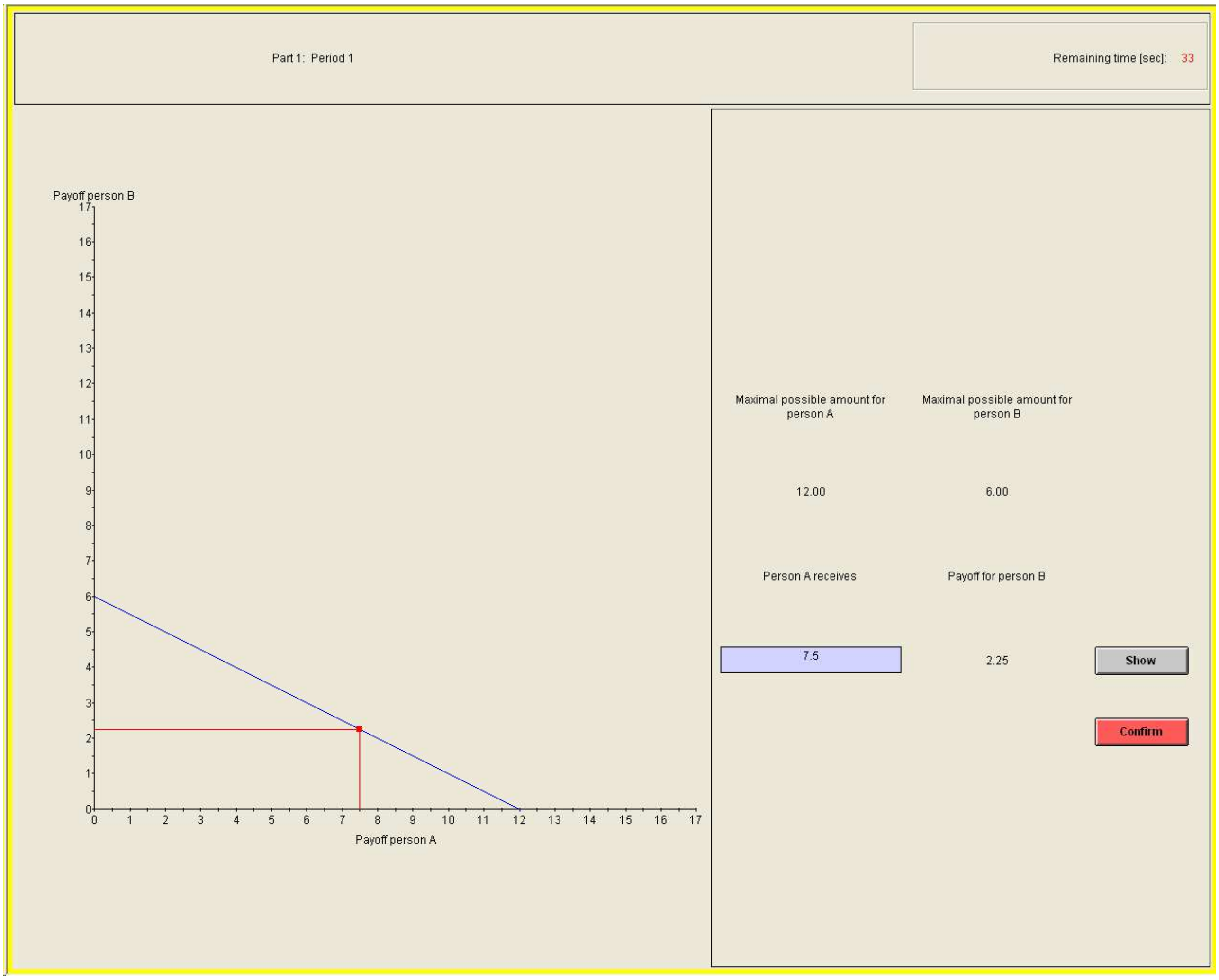


Figure 15: Screenshot of the experimental user interface (translation of the original German screen), Treatment 3/4, part 1 (social planner/veil of ignorance).

p–experiment							
		Males		Females			
Budget	$\frac{p_b}{p_a}$	mean (sd)	median	mean (sd)	median	z	A^2
1	0.290	7.642 (3.543)	8.147	6.132 (3.024)	5.523	1.700*	2.904**
2	0.400	5.374 (2.387)	5.072	4.644 (2.068)	4.360	1.558	1.697
3	0.500	5.360 (2.348)	5.000	4.511 (1.849)	4.410	1.602	1.943*
4	0.500	6.496 (2.652)	5.600	5.141 (1.694)	5.350	2.220**	4.029***
5	0.573	4.591 (1.795)	4.240	3.691 (1.068)	3.403	2.489**	4.281***
6	0.833	3.356 (0.996)	3.000	3.317 (0.640)	3.000	-0.846	1.027
7	1.000	3.679 (0.782)	3.500	3.489 (0.247)	3.500	0.595	0.379
8	1.000	4.093 (0.644)	4.000	3.984 (0.111)	4.000	-0.072	0.034
9	1.200	2.572 (0.961)	3.000	2.871 (0.337)	3.000	-1.143	1.316
10	2.000	2.010 (1.146)	2.100	2.367 (0.816)	2.750	-1.438	1.716
11	2.000	2.027 (1.334)	2.375	2.607 (0.953)	2.688	-1.582	2.418*
12	2.000	2.280 (1.482)	2.750	2.895 (1.104)	3.000	-1.798*	2.753**
13	2.382	2.043 (1.421)	2.376	2.542 (0.992)	2.764	-1.353	2.658**
14	3.528	1.451 (1.199)	1.335	1.934 (1.082)	1.997	-1.706*	2.216*
15	4.496	1.316 (1.160)	1.446	1.710 (1.081)	1.835	-1.593	1.992*
Total		3.619 (0.372)	3.566	3.456 (0.328)	3.408	1.861*	1.992*

v-experiment							
		Males		Females			
Budget	$\frac{p_b}{p_a}$	mean (sd)	median	mean (sd)	median	z	A^2
1	0.290	8.460 (3.254)	8.458	7.291 (3.256)	7.422	1.446	1.347
2	0.400	6.390 (2.800)	6.134	5.420 (2.340)	4.623	1.579	2.517**
3	0.500	5.726 (2.365)	5.000	4.590 (2.000)	4.000	2.233**	3.950***
4	0.500	6.625 (2.781)	5.500	5.649 (2.512)	5.000	1.590	2.410*
5	0.573	4.970 (2.004)	4.450	3.808 (1.306)	3.228	2.521**	4.470***
6	0.833	3.872 (1.512)	3.000	3.323 (0.984)	3.000	2.393**	4.838***
7	1.000	3.138 (1.429)	3.500	3.396 (0.846)	3.500	0.608	1.078
8	1.000	3.816 (1.490)	4.000	4.098 (0.550)	4.000	-1.398	2.081*
9	1.200	2.429 (1.285)	3.000	2.800 (0.579)	3.000	-2.140**	3.899***
10	2.000	1.528 (1.155)	1.750	2.077 (0.979)	2.250	-2.063**	2.872**
11	2.000	1.889 (1.349)	2.000	2.512 (1.131)	3.000	-2.218**	3.245*
12	2.000	2.020 (1.638)	2.000	2.573 (1.314)	3.000	-1.360	2.097
13	2.382	1.682 (1.408)	1.683	2.134 (1.301)	2.292	-1.428	1.720
14	3.528	1.272 (1.223)	1.036	1.632 (1.187)	1.335	-1.363	1.607
15	4.496	1.038 (1.128)	0.612	1.344 (1.079)	1.001	-1.415	1.534
Total		3.657 (0.414)	3.704	3.510 (0.348)	3.402	1.506	2.032*

Table 22: Average amounts allocated to B for each gender and budget in the p- and in the v-experiment respectively, for the restricted set of participants. Total reports the statistics assuming one mean observation over all budgets per individual. z reports the test statistic of the MW test, A^2 reports the test statistic of the Anderson-Darling test. The last line gives the probability of observing the number of significant differences by chance. Significance: ***1%, **5%, *10%.

p-experiment						
	Males			Females		
Justice Function	strong	weak	total	strong	weak	total
Rawls	1 (2.56%)	8 (20.51%)	9 (23.08%)	1 (2.17%)	18 (39.13%)	19 (41.30%)
Perfect Substitutes	3 (7.69%)	7 (17.95%)	10 (25.64%)	0 (0.00%)	2 (4.35%)	2 (4.35%)
Nash	0 (0.00%)	20 (51.28%)	20 (51.28%)	1 (2.17%)	24 (52.17%)	25 (54.35%)

v-experiment						
	Males			Females		
Justice Function	strong	weak	total	strong	weak	total
Rawls	2 (5.26%)	7 (18.42%)	9 (23.68%)	3 (7.32%)	8 (19.51%)	11 (26.83%)
Perfect Substitutes	6 (15.79%)	7 (18.42%)	13 (34.21%)	0 (0.00%)	7 (17.07%)	7 (17.07%)
Nash	1 (2.63%)	15 (39.47%)	16 (42.11%)	0 (0.00%)	23 (56.10%)	23 (56.10%)

Table 23: Distribution of preferences in the p- and v-experiment, respectively, for the restricted set of participants.

p-experiment						
	Males			Females		
	mean	sd	median	mean	sd	median
B	1.0397	0.2225	1.0051	1.0407	0.2176	1.0016
s	-0.6540	1.4691	-0.3518	-0.1483	1.1654	-0.0770
σ	0.1239	0.0922	0.1186	0.0928	0.0563	0.0760
β	0.5059	-	0.5009	0.5087	-	0.5004
ς	0.3954	-	0.2602	0.1291	-	0.0715
η_ς	-1.6540	-	-1.3518	-1.1483	-	-1.0770

v-experiment						
	Males			Females		
	mean	sd	median	mean	sd	median
B	1.5923	3.0657	1.0361	1.0558	0.2345	1.0269
s	-3.3099	12.2113	-0.6893	-1.0509	2.9965	-0.3890
σ	0.1445	0.0987	0.1353	0.1346	0.0723	0.1282
β	0.5270	-	0.5052	0.5066	-	0.5048
ς	0.7680	-	0.4080	0.5124	-	0.2801
η_ς	-4.3099	-	-1.6893	-2.0509	-	-1.3890

Table 24: Average values resulting from the estimation of the weak preference types.

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