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# Motivated by Others' Preferences? An Experiment on Imperfect Empathy

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# Motivated by Others' Preferences? An Experiment on Imperfect Empathy*

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**Abstract**

People care about others. But how do they assess the utility of others when making other-regarding decisions? Do they apply their own preferences or do they adopt the preferences of the other person? We study this question in a laboratory experiment where subjects in the role of senders can pay money to avoid harm arising to receivers. In a first step, we elicit all subjects' willingness to pay (WTP) for not having to eat food items containing dried insects. We then show senders the WTPs of receivers and repeat the elicitation procedure, but now with receivers having to eat the food items and senders stating their WTPs to spare the receivers from having to eat them. We find that not only receivers' preferences matter for decisions but also senders' own preferences, a phenomenon for which we use the term imperfect empathy. In motivating prosocial transfers, senders' and receivers' WTPs act as complements by reinforcing each other. Conversely, pairs of sender and receiver who are dissimilar generate lower transfers than others. Since transfers usually benefit receivers more than they cost senders, we also find that dissimilarity within pairs reduces welfare. Our results complement the extensive literature on prosocial preferences, which so far abstracts from heterogeneous valuations. The implications might be far-reaching. For public welfare systems, e.g., systematic differences in consumption preferences between net payers and recipients could undermine public support.

**Keywords:** altruism, empathy, prosocial giving
**JEL Codes:** D64, D90, D91

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> As we have no immediate experience of what other men feel, we can form no idea of the manner in which they are affected, but by conceiving what we ourselves should feel in the like situation. Though our brother is upon the rack, as long as we ourselves are at our ease, our senses will never inform us of what he suffers. They never did, and never can, carry us beyond our own person, and it is by the imagination only that we can form any conception of what are his sensations.
>
> —ADAM SMITH, *THE THEORY OF MORAL SENTIMENTS*[1]

# 1 Introduction

It is widely documented that people consider others when making decisions: They donate to charities, give blood, or volunteer. These behaviors have often been attributed to social preferences such as altruism (Becker, 1974, 1976), warm glow (Andreoni, 1990), inequity aversion (Fehr and Schmidt, 1999), or reciprocity (Rabin, 1993; Dufwenberg and Kirchsteiger, 2004; Falk and Fischbacher, 2006). All of these models have in common that the payoff of others is explicitly incorporated into an agent's utility function. Since we are often interested in the distribution of monetary payoffs, the assumption that people know what is good for others is very plausible. But—given that preferences on goods are not homogeneous—the question arises how these other persons' hedonic benefits, which are not experienced by the agent herself, are transformed into motives for personal prosocial behavior. It has been claimed that empathy, the ability to feel into others' emotions, is playing a central role. According to the empathy–altruism hypothesis, altruistic motivation arises from empathy felt for a person in need (Batson, 1987) and it has been shown empirically that induced empathy indeed increases prosocial behavior (Coke, Batson, and McDavis, 1978; Klimecki et al., 2016) and cooperation (Batson and Moran, 1999). However, the ability to sympathize with others' emotions is limited. We find evidence that people behave imperfectly empathic: They judge consequences for others not only by the

1. Smith, 1859, Part I, Section I, Chapter I.

utility that the other person attaches to it, but also by their own preferences.

In this paper, we show that in order to make a monetary transfer to help another person receive a specific good, two requirements have to be fulfilled: First, the receiver of the good needs to show a preference for the transferred good and second, the sender needs to have a preference for the good as well. This means that people do not only care about the utility that a prosocial action entails for the other person but also which utility they themselves attach to it. We call this type of behavior imperfect empathy (see also Bisin and Verdier, 2001), since people do not only use the other person's preferences to evaluate their actions' consequences on them (perfectly empathic behavior) but also take into account their own preferences.

We run a laboratory experiment in which participants can make prosocial monetary transfers to help other participants. The aim is to find out to which degree people are guided by their own rather than by the receivers' preferences when acting prosocially. Since our interest lies in the emotional accessibility of others' sensations, we use an experimental setup that cleanly isolates such experiences. Following Ambuehl (2017), we let subjects make choices about eating food items that might provoke feelings of disgust, namely dried insects and worms. These "bads" have several important and useful features. First, people have preferences about the consumption of such items. Second, disgust markedly varies between individuals and across items. Third, rational arguments have no power in arguing what is "more disgusting" among the items, e.g., a cricket or a worm. And fourth, we ask people to eat the items and thereby have tight control over consumption.

In Part 1 of the experiment, participants decide how much money between €0 and €20 they themselves would be willing to spend to avoid having to eat several different dried insects. They can decide between receiving a lower payoff and not eating the insect or receiving a high payoff and eating the insect. In Part 2, participants receive information on how much eight other subjects (*receivers*) would each be willing to pay to avoid the insects in the first part. The participants (as *senders*) then decide how much money between €0 and €20 they would be willing to spend on sparing these other subjects from

having to eat the dried insects. They can decide between receiving a lower payoff and the receiving subject not having to eat the insect or receiving a high payoff and the receiving subject having to eat the insect. We show that not only the receiver's willingness to pay for avoiding an item has a positive effect on the respective transfer but also the sender's own WTP, and—in particular—the interaction of the two. Calculating the distance between the vectors of subjects' WTPs, we can also show that dissimilarity between senders and receivers decreases expected transfers. Defining welfare as the sum of individual utility from personal consumption, we can further show that dissimilarity reduces welfare. In the last part of the experiment, subjects have the option to alter decisions which others have made for themselves, which gives us a measure of paternalism. We show that imperfect empathy is prevalent among both libertarians and paternalists.

We believe that our paper makes novel contributions to the literature on the role of empathy in generating prosocial behavior, and can inform models featuring altruism in conjunction with heterogeneous preferences like they are present in the literature on the intergenerational transmission of preferences (Bisin and Verdier, 2001; Doepke and Zilibotti, 2017). Our finding could furthermore be an explanation for the in-group–out-group bias (Tajfel et al., 1971); given that people have more similar preferences amongst their in-groups, imperfect empathy can explain why prosocial behavior is stronger towards members of in-groups than towards members of out-groups. Imperfect empathy is also in line with the literature on the false consensus effect (Ross, Greene, and House, 1977), a bias in which people commonly think that their own preferences and choices are relatively more common than other preferences and other choices. A potential implication of imperfect empathy is that heterogeneous preferences reduce the support for redistribution and lower expected welfare. It could therefore be an explanation for the finding that diversity has a negative effect on redistribution and donations (Dahlberg, Edmark, and Lundqvist, 2012; Andreoni et al., 2016) and is therefore meaningful from a policy perspective in ever more diverse societies.

The remainder of the paper is structured as follows. Section 2 presents a simple theoretical framework and derives our hypotheses. Section 3 describes the laboratory ex-

periment. Section 4 presents the results on the aggregate level, on the level of individuals, and distinguishing between libertarians and paternalists. Finally, Section 5 summarizes and discusses the results.

## 2 Theory and Hypotheses

We develop a simple theoretical model in which agents derive utility from own consumption as well as from another person's consumption. When evaluating the other person's consumption, agents use a combination of their own and of the other person's preferences. We use the model to formally derive our hypotheses regarding imperfectly empathic behavior and the consequences arising from dissimilar preferences for the size of transfers and for overall welfare.

Individual $i$ experiences utility from good $x_i$ and disutility from "bad" $y_i$; individual $j$ experiences utility from good $x_j$ and disutility from bad $y_j$. Utilities or disutilities are evaluated by utility functions which are specific to the combinations of individuals and domains. In computing overall utility, consumption value from goods enters additively, while disutility from bad experiences is subtracted. We use money as the numéraire. Therefore, utility from money is simply given by the particular nominal amount of currency.[2] If no consumption takes place, we assume that utility is given by zero. Individuals receive utility not only from their own consumption but also from the other person's consumption. The total utility of subject $i$ is given by the following expression:

$$U_i(x_i, y_i; x_j, y_j) = u_i(x_i) - v_i(y_i) + \alpha \left( u_j(x_j)^{\beta}\, u_i(x_j)^{1-\beta} - v_j(y_j)^{\beta}\, v_i(y_j)^{1-\beta} \right) \qquad (1)$$

The first part of overall utility, $u_i(x_i) - v_i(y_i)$, is utility and disutility derived from $i$'s own consumption. The remaining term is the utility that individual $i$ derives from the other individual $j$'s consumption. The general extent to which $i$ cares about $j$ is determined by her level of altruism $\alpha$. When evaluating $j$'s utility in a particular domain, $i$ partially relies on both her own relevant utility function and on $j$'s utility function in the respective

2. We later test the assumption of linear utility from money in our context.

domain. The degree of reliance on $j$'s preferences is captured by the empathy parameter $\beta \in [0, 1]$. If $\beta$ is zero, $i$ simply projects her own preferences upon $j$. If $\beta$ is one, she fully adopts $j$'s preferences and disregards her own.

The notation can of course be extended to further consumption items. We assume in the model above that subjective valuations are complements in generating vicarious (dis-)utility by modeling them multiplicatively, while other authors have assumed perfect substitutability (see, e.g., Bisin and Verdier, 2001). Our assumption means that, in order to enjoy someone else's consumption, both the sender and the receiver have to attach utility to the consumed good, or—conversely—they both have to attach disutility to a particular experience to feel that it is bad. Complementarity of assessments gives rise to additional predictions for our experiment, which we develop below and later also test.

## 2.1 Transfer Decisions

We now apply the utility function in Equation 1 to decisions about prosocial transfers in our experiment. In the experiment, subjects receive money, which corresponds to good $x$ above, and potentially eat food items, corresponding to bad $y$. A sender can decide between making a monetary transfer and a receiver not having to eat a food item, and not making a monetary transfer and a receiver having to eat a food item. Sender $i$ never has to consume any food item herself, i.e., $v_i(y_i) = 0$, and receiver $j$ always gets a monetary payoff of €20, i.e., $u_j(x_j) = 20$. The sender can now decide to make a monetary transfer $t \in [0, 20]$ so that the receiver does not have to consume item $k \in K$. If the potential transfer of $t \in [0, 20]$ (we abstract from discreteness of choice options) for item $k$ is accepted by the sender, the implied monetary payoff for herself is given by $x_i = 20 - t$ and the receiver does not have to eat, i.e., $v_j(y_j) = 0$ and also $v_i(y_j) = 0$. If she rejects, her payoff is $x_i = 20$ and the receiver has to eat item $k$, i.e., $y_j = k$. For a transfer to be made, it has to hold that the utility for the sender when making the transfer (expression on the left hand side of the equation below) is as least as high as the utility when not

making the transfer (expression on the right hand side).

$$20 - t + \alpha\, 20 \geq 20 + \alpha \left(20 - v_j(k)^{\beta}\, v_i(k)^{1-\beta}\right)$$

The highest proposed transfer that a sender still accepts, $t^{\star}$ (later simply *transfer*), is therefore given by

$$t^{\star} = \alpha\, v_j(k)^{\beta}\, v_i(k)^{1-\beta} \tag{2}$$

Our key hypothesis about decision making can now be formulated directly in terms of the model parameter $\beta$.

**Hypothesis 1.** *People typically exhibit imperfect empathy: transfer decisions depend not only on receivers' preferences but also on senders' own preferences. Formally,* $\beta \in (0, 1)$.

The above hypothesis can directly be tested by estimating the parameter $\beta$ on the individual level. Moreover, if the hypothesis was true, the partial derivatives of $t^{\star}$ with respect to *both* agents' valuations would be positive, as would be the cross partial derivative. This prediction thus lends itself to reduced-form testing on the level of the subject population, using OLS. We expect transfers to depend positively on both the respective sender's and the receiver's valuations, and—in particular—on their interaction.

## 2.2 Welfare

In the next step, we theoretically derive predictions about the effect of dissimilarity in preferences between senders and receivers on the size of transfers and on overall welfare. The welfare criterion which we employ is simply the sum of individual utilities from personal consumption.

$$\text{Welfare} \equiv u_i(x_i) - v_i(y_i) + u_j(x_j) - v_j(y_j) \tag{3}$$

We predict dissimilarity to decrease welfare through two channels: The size of transfers and the targeting of transfers. The first channel is based on the premise that transfers are on average too low from a planner's perspective. This simply follows from the fact

that the planner weighs individuals' welfare equally, while people usually care more about themselves than about others, i.e., $\alpha$ is smaller than one. As we show below, dissimilarity in preferences further decreases the size of transfers and thereby amplifies the welfare loss.

To understand the effect of dissimilarity on the size of transfers, consider two subjects, $i$ and $j$, behaving in accordance with our model and sharing the same parameter values for $\alpha$ and $\beta$. We denote their respective individual valuations of some item by $v_i(k) \equiv v_i$ and $v_j(k) \equiv v_j$, and we fix the total level of the two subjects' valuations of items such that $v_i + v_j \equiv \bar{v}$. Both subjects are with equal probability of $1/2$ either sender or receiver. We further assume that $v_i \geq v_j$. This allows us to express the valuations of subjects in terms of the total valuation of both subjects and the distance between the individual valuations: $v_i = \frac{\bar{v}+|v_i-v_j|}{2}$ and $v_j = \frac{\bar{v}-|v_i-v_j|}{2}$. Plugging into Equation 2, we can calculate the expected maximum transfer that this pair of subjects generates.

$$\mathbb{E}[t^\star] = \frac{\alpha}{4}\left[(\bar{v}+|v_i-v_j|)^\beta\,(\bar{v}-|v_i-v_j|)^{1-\beta} + (\bar{v}-|v_i-v_j|)^\beta\,(\bar{v}+|v_i-v_j|)^{1-\beta}\right] \quad (4)$$

Note that, if we had assumed that $v_i \leq v_j$, Equation 4 would be identical. During the derivation, only the order of the two summands would reverse. The assumption about which individual has the higher valuation is thus without loss of generality, as follows from the symmetry of the setup.

The expected maximum transfer given by Equation 4 is visualized by Figure 1 for $\alpha = 1/2$ and $\bar{v} = 20$. Along the x-axis of the graph, we vary the parameter $\beta$, going from a situation where both people fully project their own preferences ($\beta = 0$) to one where they fully adopt others' preferences ($\beta = 1$). On the z-axis, we vary the difference between both subjects' valuations, holding constant the total of the two. The graph starts at the maximum of 20 and ends at a distance of zero, i.e., a situation where both valuations are the same. On the y-axis, the resulting expected maximum transfer $\mathbb{E}[t^\star]$ is depicted. If $\beta$ is either zero or one, the expected transfer is always at its maximum value of 5. The same is always the case when the two subjects' valuations coincide. Thus, if we were only talking about money, the degree of empathy would not have any effect on expected transfers, because there would not exist any heterogeneity in valuations. This is, however,

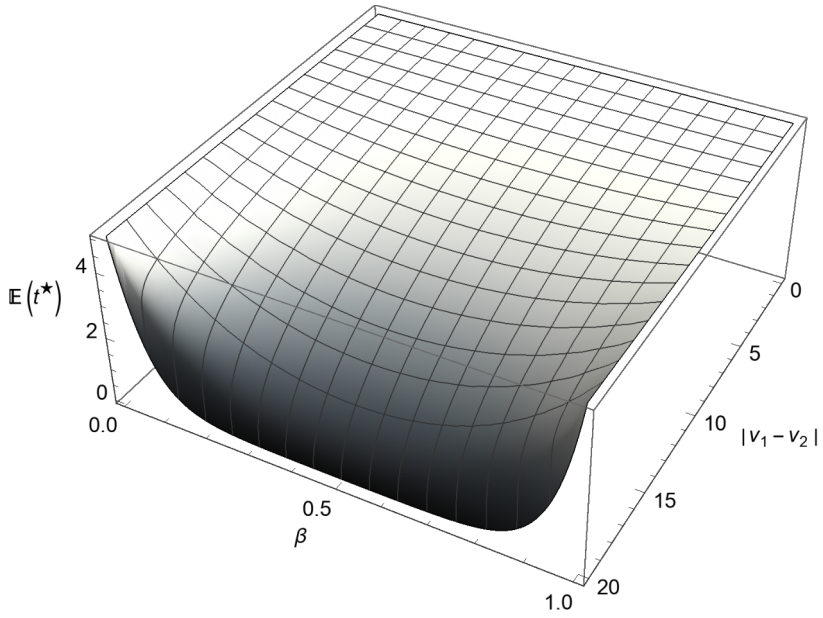



**Figure 1:** Similarity and expected transfers

only a special case. If, as we expect, $\beta$ typically lies in the interior of the interval from zero to one, dissimilarity in preferences strictly decreases expected transfers, which is our second hypothesis.

**Hypothesis 2.** *Transfers decrease with the dissimilarity of preferences within pairs of senders and receivers. Formally,* $\partial \mathbb{E}[t^\star] / \partial |v_i(k) - v_j(k)| < 0$.

*Proof.* See Appendix A □

The second channel through which dissimilarity in preferences decreases welfare is saying that—conditional on a given total amount of transfers that a subject is making—senders give for the wrong items. In the extreme case of $\beta = 0$, a sender might be willing to spend a positive amount when the receiver has no problem with eating the respective food item at all, while she gives nothing in case of an item which the receiver finds repulsive. More generally, values of $\beta$ which are smaller than one open up a wedge between how the sender evaluates consequences for the receiver and how the receiver himself—and consequently the social planner—evaluates them. This wedge becomes increasingly rele-

vant as valuations of senders and receivers diverge, leading to misallocation of transfers.[3] We thus arrive at the following hypothesis.

**Hypothesis 3.** *The expected net welfare gain from transfer decisions decreases in the dissimilarity of preferences within pairs of senders and receivers. Formally,* $\partial \mathbb{E}[\textit{net welfare gain}] / \partial |v_i(k) - v_j(k)| < 0$.

To summarize, we expect that senders base their transfer decisions partially on their own valuations, where the latter and the receiver's own valuation are complements in motivating senders to help. This leads transfers to be on average lower for pairs of senders and receivers who are more dissimilar than others. Reduced transfers and misallocation of existing transfers together lead to welfare losses, which again are larger when subjects are dissimilar.

# 3 Experiment

We conducted the experiment at the BonnEconLab in August, September, and December 2018. Subjects were recruited using the software hroot (Bock, Baetge, and Nicklisch, 2014) and a total of 146 participated. In the invitation email, subjects were asked not to sign up for the experiment in case they were vegetarian, followed a special diet due to health, ethical or religious reasons, or had any food allergy. For details on the composition of our sample of subjects, see the summary statistics in Appendix B. Before starting the computerized zTree experiment (Fischbacher, 2007), subjects were informed that they might be asked to eat several types of insects during the experiment. They were then shown a tray with all eight different food items (one buffalo worm, five buffalo worms, one meal worm, ten meal worms, one cricket, one grasshopper, three grasshoppers, and one granola bar containing buffalo worms; see Appendix C for pictures of all food items). Furthermore, they received information about the food items' nutritional innocuousness

3. A subtle refinement of the above point would be to consider vicarious experiences—i.e. the sender's feelings when considering consequences for the receiver—as part of welfare. This would reduce the power of the argument about misallocation but not alleviate it. With imperfect empathy and heterogeneous preferences, there always exists a wedge between vicarious valuations and valuations by people themselves, leading to misallocation.

and each participant signed a form of consent.

The experiment consisted of four parts. Subjects received a fixed show-up fee, which was set to be either €5 or €7 for everybody participating in the respective session. In addition, subjects were informed that a single decision among all four parts of the experiment would be randomly chosen for implementation and paid at the end of the experiment. All parts were kept as similar to each other as possible. Always, subjects were endowed with €20 and then used multiple price lists (MPLs) in steps of €1 ranging from €1 to €20 to make payments off this amount. Appendix D includes screenshots of the decision screens of all four parts.

In Part 1, we employed separate MPLs to elicit subjects' reservation prices for not having to eat any of the eight food items. Subjects saw one screen per item (see Figure 8 for an example of a decision screen). On each screen, subjects saw an informative stimuli picture of the respective item on the left and a list of choices in the middle of the screen. The list of choices was made up of 20 rows; each row containing the choice between a payment (going from €1 up to €20) and eating the food item. Subjects had to indicate their choice for one of the two options for each row; a unique switching point was enforced. The order in which the eight items were shown was randomized between subjects. In case Part 1 was selected for implementation at the end of the experiment, one of the 160 rows (20 rows each for eight items) was randomly drawn for implementation. If the subject had chosen to pay the amount indicated in the specific row, she received her show-up fee as well as €20 minus the amount indicated in the row as payment. She did then not have to eat the item. If the subject had chosen to eat the item, she received the show-up fee as well as €20 as payment. She furthermore had to eat the item. Subjects who indicated that they would eat the item and refused to do so at the end of the experiment only received their show-up fee.

In Part 2, subjects took the role of a *sender* who had the option to pay for a *receiver* not having to eat a food item. The decision screens were kept very similar to the ones in Part 1 and again contained the same respective stimuli pictures on the left hand side of the MPLs (see Figure 9 for an example of a decision screen). On the right side of the

screen, subjects additionally saw the WTPs for all eight items that the relevant receiver himself had reported in Part 1. Again, each subject saw eight screens—one for each item. The eight decisions were each made for a different receiver. Receivers were sampled from the pool of subjects taking part in the same session and each participant appeared as a receiver at least once to allow for potential implementations of a decision in this part. However, receivers were sampled in such a way that heterogeneity of WTPs between senders and receivers was larger than in the population of subjects.[4] The assignment of receivers to food items was done without any further sophistication. As in Part 1, subjects had to indicate for each row of the choice list if they chose the payment or the insect. In case Part 2 was selected for implementation at the end of the experiment, one of the 160 rows was randomly drawn for implementation. If the sender had chosen to pay the amount indicated in the specific row, she received her show-up fee as well as €20 minus the amount indicated in the row as payment. The receiver of the row did then not have to eat the item and received his show-up fee and €20. If the sender had chosen not to pay, she received the show-up fee as well as €20 as payment. The receiver furthermore had to eat the item and received his show-up fee and €20. Receivers who refused to eat the item even though their senders had indicated that they would not pay only received their show-up fee.

Part 3 elicited subjects' general level of altruism in the domain of money in a way which mimicked the other parts of the experiment as closely as possible. As a default, receivers got an amount which was less than €20, mirroring a situation where they had to eat a food item for which they have a certain willingness to pay, and senders could decide whether they wanted to pay amounts from €1 and €20 to secure the receiver €20 instead of €15, €10, €5, or €0. The order of amounts was again randomized. Since we are not using Part 3 for the analysis, we will not go into more detail here.

4. Receivers were sequentially sampled among subjects in the same experimental session. For each sender, we made eight independent draws pertaining to a specific criterion, and found the remaining subject who came closest to the respective point. During four session, the criterion was the Euclidean distance towards the potential sender's vector of WTPs. In five sessions, it was a vector of WTPs. Note that identification with senders fixed effects—or on the level of the individual sender—uses only variation in WTPs among receivers of a given sender. The latter variation is the result of simple random matching with fixed, equal probabilities.

Finally, in Part 4, subjects were again shown the same eight receivers as in Part 2. This time, however, they did not decide about engaging in helping behavior but had the option to alter receivers' self-regarding choices from Part 1 without any consequences for themselves. Decision screens looked almost the same as the ones from Part 2 and contained the stimuli picture on the left, the MPL in the middle, and the list of the receiver's WTPs from Part 1 on the right (see Figure 11 for an example of a decision screen). However, the MPL already contained the choices that the respective receiver had marked for himself in Part 1. In case Part 4 was selected for payment at the end of the experiment, one of the 160 rows was randomly drawn for implementation for the receiver. If the sender had chosen the payment indicated in the specific row, the receiver received his show-up fee as well as €20 minus the amount indicated in the row as payment. The receiver did then not have to eat the item. If the sender had chosen the item, the receiver received the show-up fee as well as €20 as payment. He furthermore had to eat the item. Receivers who refused to eat the item even though the other subject had not chosen the payment only received their show-up fee.

After all subjects had made their decisions, they were ultimately matched to unilateral pairs of senders and receivers for whom a payoff was implemented. For each subject, a single decision was drawn to be paid out. If Part 1 was implemented for the sender, Part 4 was implemented for the receiver. If Parts 2 or 3 were implemented for the sender, the respective part was also implemented for the receiver. After answering a final survey on the Big Five traits and the items of the Interpersonal Reactivity Index which measures empathy (Davis, 1980), subjects—if necessary—ate their food items and then received their payoffs. If subjects did not comply and refused to eat their food items, they were penalized by only receiving the show-up fee.

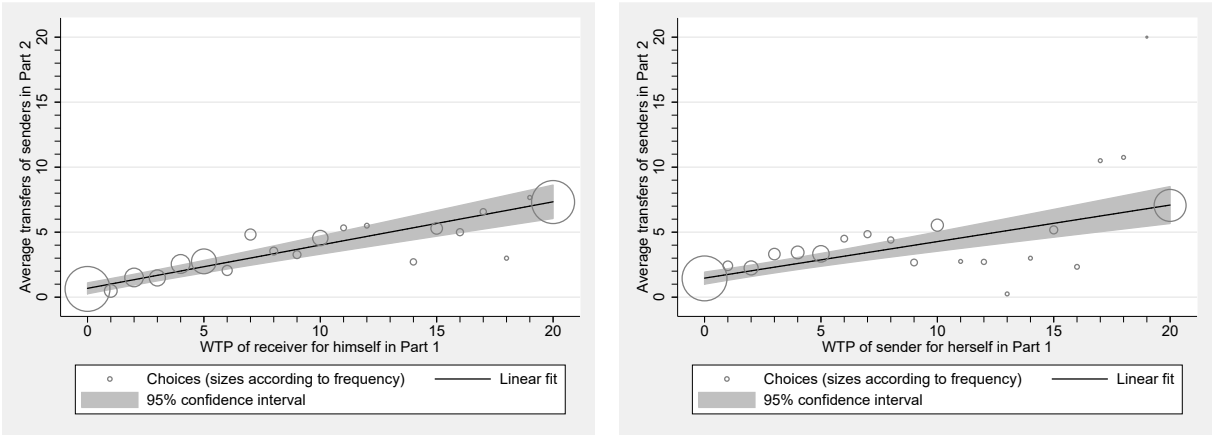
# 4 Results

We start our empirical analysis by estimating the determinants of transfers on the aggregate level by pooling decisions from all individuals. We then proceed by estimating the relationship for each individual separately and recovering individual structural parame-

ters. Next, we turn to the welfare implications by first looking at the effect of dissimilarity on the size of transfers and then directly on net welfare gains. Finally, we show the pervasiveness of imperfect empathy separately among libertarian and paternalist subjects.

## 4.1 Transfer Decisions

In Part 1, participants spend on average €6.57 per item to avoid eating it; 78% of them have a positive WTP for some item. In Part 2, senders spend on average €3.44 per item to spare receivers from eating it; 75% of senders have a positive WTP for some item-receiver combination. Appendix B shows histograms of WTPs for all items separately for Part 1 and Part 2.




**(a)** Receiver's WTP **(b)** Sender's WTP

*Note:* Panel (a) shows the average size of transfers made for a receiver in Part 2 for every possible WTP of the *receiving* subject in Part 1. Panel (b) again shows the average size of transfers made for a receiver in Part 2, this time for every possible WTP of the *sending* subject in Part 1. The lines show fits from OLS estimations, and shaded areas correspond to 95% confidence intervals for standard errors which are clustered at the subject level. Both positive relationships are significant at the 1% level.

**Figure 2:** Individual willingness to pay (WTP) and average transfers

Figure 2 visualizes how transfers towards receivers in Part 2 depend on the WTPs of receivers and senders from Part 1. Figure 2a shows the average size of transfers made for a receiver in Part 2 for every possible WTP of the receiving subject from Part 1. The higher the receiver's WTP, the higher is the average transfer made towards him. The positive relationship is statistically significant at the 1% level. Figure 2b shows the average size of transfers made for a receiver in Part 2 for every possible WTP of the sending subject from

Part 1. The higher the sender's WTP, the higher is the average transfer made towards the receiver. Again, the positive relationship is significant at the 1% level.

To test Hypothesis 1, we regress the maximum transfer accepted in Part 2, $t^\star$, on the receiver's willingness to pay $\text{WTP}_{\text{receiver}}$ elicited in Part 1 as well as on the sender's willingness to pay $\text{WTP}_{\text{sender}}$, also elicited in Part 1. Column 1 Table 1 shows the results

| | *Dependent variable:* Transfer | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Receiver's WTP | 0.308**** | 0.309**** | 0.163**** | 0.160**** | 0.100*** |
| | (0.0311) | (0.0364) | (0.0300) | (0.0354) | (0.0359) |
| Sender's WTP | 0.252**** | 0.176**** | 0.0627 | -0.0156 | -0.0578 |
| | (0.0345) | (0.0466) | (0.0394) | (0.0582) | (0.0576) |
| $\sqrt{\text{Sender's} \times \text{receiver's WTP}}$ | | | 0.381**** | 0.369**** | 0.364**** |
| | | | (0.0646) | (0.0693) | (0.0702) |
| Sender fixed effects | No | Yes | No | Yes | Yes |
| Receiver fixed effects | No | Yes | No | Yes | Yes |
| Item fixed effects | No | No | No | No | Yes |
| Observations | 1168 | 1168 | 1168 | 1168 | 1168 |
| Clusters | 146 | 146 | 146 | 146 | 146 |
| (Within-)$R^2$ | 0.362 | 0.197 | 0.417 | 0.285 | 0.171 |

*Note:* Standard errors are clustered for senders; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$.

**Table 1:** Aggregate analysis of transfers

without any fixed effects. We see that both WTPs, of the receiver and the sender, enter with large and highly significant coefficients, which in fact are not so different in size. An increase of €1 in the WTP of the receiver increases the transfer on average by €0.31, while the same increase in the sender's WTP increases the average transfer by €0.25. Column 2 adds sender and receiver fixed effects. Receiver fixed effects allow to account, e.g., for some receivers having generally low WTPs and receiving low transfers. Due to sender fixed effects, identification only comes from differences in WTPs between receivers of the same senders and from variation in WTPs of senders across items. The coefficient for the receiver remains almost unchanged, while the coefficient referring to the WTP of the sender somewhat decreases. The latter points to some degree of "spillovers" in

empathy: e.g., a sender who feels strong disgust for worms might also better understand why somebody would strongly dislike eating a grasshopper, even if the grasshopper itself does not seem repulsive for the sender. Despite the proximity of preference domains which we use, variation in preferences within individuals is sufficient to show that there is a strong and significant effect of senders' WTPs on transfers. In Column 3, the square root of the product of the sender's and the receiver's WTP is added to the regression without fixed effects. The coefficient of the receiver's WTP drops by half but is still highly significant, whereas the coefficient of the sender's WTP is not significantly different from zero anymore. However, the interaction term enters with a large and highly significant coefficient. This confirms that WTPs of receivers and senders act as complements in generating transfers. Column 4 again adds sender and receiver fixed effects. In Column 5, we additionally add fixed effects for the eight different food items, accounting for differences in the general levels of transfers. In both Columns 4 and 5, coefficients stay similar and the qualitative results remain unchanged.

We show in Section 4.4 that the above qualitative results also hold within subsamples of the our subject populations where senders are restricted to only libertarians or paternalists, respectively. Our empirical results are also insensitive to the size of the show-up fee (see Appendix E), and the assumption of utility from money being linear in the relevant range thus seems innocent. Overall, we find clear support for Hypothesis 1. We interpret this as evidence that imperfect empathy is a pervasive phenomenon among our subject population.

## 4.2 Individual-level Analysis

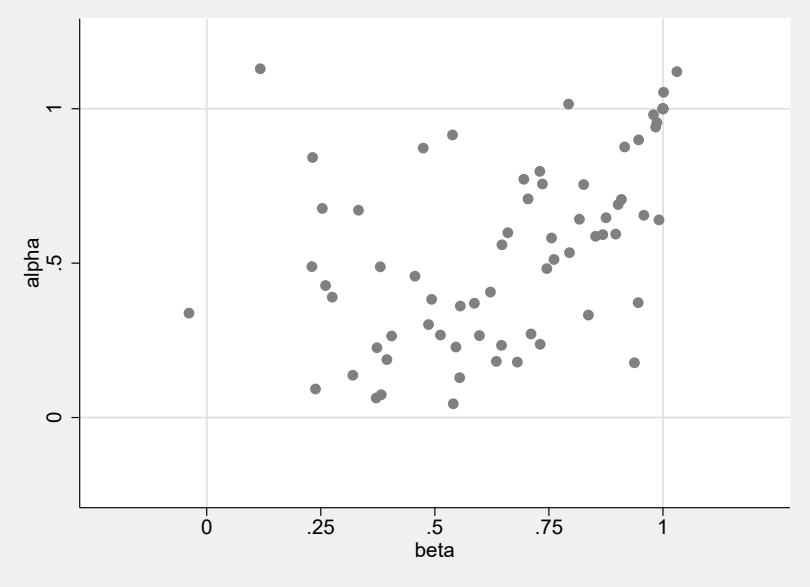
In the next step, we analyze behavior at the level of individuals and recover estimates for the model parameters. To do so, we first linearize Equation 2 for the size of transfers by taking the logarithm on both sides.

$$\ln(t^\star) = \ln(\alpha) + \beta \, \ln[v_j(k)] + (1-\beta) \ln[v_i(k)] \tag{5}$$

We estimate Equation (5) separately for each individual subject. Note that all quantities except the parameters in the equation are directly observed in our experimental data. $\ln(t^\star)$ is the logarithm of the maximum transfer accepted in Part 2, $\ln[v_j(k)]$ equals the logarithm of the receiver's willingness to pay $\text{WTP}_{\text{receiver}}$ elicited in Part 1, and $\ln[v_i(k)]$ is the logarithm of the sender's willingness to pay $\text{WTP}_{\text{sender}}$ elicited in Part 1.[5] We thus estimate the following linear equation.

$$\ln(t^\star) = \gamma_0 + \gamma_1 \ln(\text{WTP}_{\text{receiver}}) + (1 - \gamma_1) \ln(\text{WTP}_{\text{sender}}) + \epsilon \tag{6}$$

The estimates for the general level of altruism are given by $\hat{\alpha} = \exp(\hat{\gamma}_0)$ and those for empathy by $\hat{\beta} = \hat{\gamma}_1$.




*Note:* The figure shows estimated parameter values for $\alpha$ and $\beta$. Only those subjects entered the analysis who made varying choices within Part 1 and Part 2. In addition, six subjects were excluded due to implausible parameter estimates and three further subject were excluded due to large standard deviations of the parameter estimates, leaving 71 observations.

**Figure 3:** Estimates for individual parameters

Figure 3 shows parameter estimates for $\beta$ on the horizontal axis and $\alpha$ on the vertical axis. Variation in senders' WTPs and transfers in principle allows us to identify parame-

5. To avoid missing values at zero, we added 0.1 to all WTPs and transfers.

ters for 80 subjects, of whom we get reasonable estimates for 71. Among the latter, the vast majority of subjects is assigned estimates which lie inside the ranges of expected values from zero to one. We see large heterogeneity in parameter estimates, and the variation in estimates for $\beta$ indicates that the effects that we find in the analysis on the aggregate level are not only driven by a small number of subjects. Moreover, the figure shows that, for any given level of general of altruism, there exists marked heterogeneity in the empathy parameter. The two thus appear to be distinct characteristics of the individuals.

## 4.3 Welfare

We now turn to study the welfare implications of the decisions that were observed in the experiment. To test Hypothesis 2, we regress transfers on two different measures of dissimilarity between sender and receiver. We define partial dissimilarity as the absolute difference between sender $i$'s and receiver $j$'s WTP regarding the relevant item $k$, divided by its maximum of 20.

$$\text{Partial dissimilarity}_{ijk} = \frac{|\text{WTP}_{ik} - \text{WTP}_{jk}|}{20}$$

Total dissimilarity is the Euclidean distance between the full vectors of sender $i$'s and receiver $j$'s WTPs for all items $k$, again divided by its potential maximum value.

$$\text{Total dissimilarity}_{ij} = \frac{\sqrt{\sum_{k=1}^{8} \left(\text{WTP}_{ik} - \text{WTP}_{jk}\right)^2}}{20\sqrt{8}}$$

Table 2 shows the results. Odd-numbered columns use partial dissimilarity, while even-numbered columns use total dissimilarity. Columns 1 and 2 present the baseline results without any fixed effects. Column 1 uses the receiver's and the sender's WTP to control for level effects. The effect of partial dissimilarity is thus conditional on both parties' own valuations, and it shows that dissimilarity decreases the size of transfers. In Column 2, level effects are correspondingly controlled for by using the receiver's and the sender's

| | *Dependent variable:* Transfer | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Partial dissimilarity | -4.156**** | | -4.046**** | | -3.724**** |
| | (0.718) | | (0.728) | | (0.718) |
| Total dissimilarity | | -4.244**** | | -4.393**** | -0.652 |
| | | (0.970) | | (0.973) | (0.789) |
| Receiver's WTP | 0.378**** | | 0.305**** | | 0.301**** |
| | (0.0341) | | (0.0428) | | (0.0418) |
| Sender's WTP | 0.285**** | | 0.145*** | | 0.143*** |
| | (0.0357) | | (0.0442) | | (0.0447) |
| Receiver's average WTP | | 0.393**** | | | |
| | | (0.0419) | | | |
| Sender's average WTP | | 0.310**** | | | |
| | | (0.0470) | | | |
| Sender fixed effects | No | No | Yes | Yes | Yes |
| Receiver fixed effects | No | No | Yes | Yes | Yes |
| Item fixed effects | No | No | Yes | Yes | Yes |
| Observations | 1168 | 1168 | 1168 | 1168 | 1168 |
| Clusters | 146 | 146 | 146 | 146 | 146 |
| (Within-)$R^2$ | 0.429 | 0.305 | 0.208 | 0.0773 | 0.208 |

*Note:* Standard errors are clustered for senders; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$.

**Table 2:** Similarity and transfers

average WTP, because total similarity also refers to all items. Total dissimilarity enters negatively and with a similar effect size as partial dissimilarity in Column 1. Columns 3 and 4 replicate the previous two with fixed effects for senders, receivers, and items, making controls for average WTPs redundant. The effects of dissimilarity remain almost unchanged. In Column 5, regressors from the previous two columns are combined. Total dissimilarity has no significant effect beyond the effect through partial dissimilarity, which is line with Hypothesis 2. Interestingly, this means that senders descriptively discriminate against receivers whose preferences are different but only because of imperfect empathy and not because they generally dislike them.

To test Hypothesis 3, we first need to derive the welfare consequences of decisions over any proposed transfer level $t$. The net welfare gain from no transfer is—by definition—zero. If the proposed transfer (i.e. the row on the decision screen) is accepted, the net welfare gain can be calculated according to Equation 3. If a transfer of $t$ is made, welfare is given by $20 - t + 20$. If the transfer is not made, welfare is given by $20 + 20 - v_j(k)$,

where the latter valuation corresponds to the WTP of the receiver. For any proposed transfer (a row in the MPL), the welfare impact can thus be calculated as follows.

$$\text{Net welfare gain} \equiv \begin{cases} \text{WTP}_{\text{receiver}} - t & \text{if transfer of } t \text{ is made} \\ 0 & \text{if transfer of } t \text{ is not made} \end{cases}$$

By the design of the MPLs used in the experiment, the probability of a transfer being made for a given item and receiver is the maximum size of the transfer, $t^\star$, divided by the number of rows, which is 20. If a transfer is made, the receiver experiences a welfare gain equivalent to his corresponding WTP. The sender loses the transfer amount of the respective row. We can thus calculate the expected net welfare gain of any transfer decision made by senders as follows.

$$\mathbb{E}[\text{net welfare gain}] = \underbrace{\frac{t^\star}{20}}_{\mathbb{P}\,(\text{transfer made})} \left( \text{WTP}_{\text{receiver}} - \underbrace{\frac{t^\star + 1}{2}}_{\mathbb{E}\,[\text{transfer} \,|\, \text{transfer made}]} \right)$$

Table 3 shows the results of regressing the expected net welfare gain on partial dissimilarity or total dissimilarity. Columns correspond to the ones in Table 2. Columns 1 and 2 present the baseline results without any fixed effects. Column 1 uses the receiver's and the sender's WTPs to control for level effects. We find that partial dissimilarity decreases the expected net welfare gain. In Column 2, level effects are controlled for by using the receiver's and the sender's average WTP. Total dissimilarity also enters negatively, with a magnitude that is comparable to that of partial dissimilarity. Columns 3 and 4 replicate the previous two columns with fixed effects for senders, receivers, and items. The estimated effects remain stable. Columns 5 combines the regressors from Columns 3 and 4, showing that the effect of total dissimilarity is entirely driven by the effect of partial dissimilarity regarding the relevant item. Thus, Hypothesis 3 is confirmed. Moreover, we again find no evidence for taste-based discrimination against receivers with different preferences.

| | *Dependent variable:* $\mathbb{E}$[net welfare gain] | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Partial dissimilarity | -2.648**** | | -2.460**** | | -2.398**** |
| | (0.373) | | (0.370) | | (0.378) |
| Total dissimilarity | | -2.490**** | | -2.484**** | -0.126 |
| | | (0.481) | | (0.504) | (0.352) |
| Receiver's WTP | 0.270**** | | 0.260**** | | 0.260**** |
| | (0.0183) | | (0.0224) | | (0.0224) |
| Sender's WTP | 0.0878**** | | 0.0805**** | | 0.0802**** |
| | (0.0141) | | (0.0183) | | (0.0186) |
| Receiver's average WTP | | 0.267**** | | | |
| | | (0.0214) | | | |
| Sender's average WTP | | 0.0915**** | | | |
| | | (0.0204) | | | |
| Sender fixed effects | No | No | Yes | Yes | Yes |
| Receiver fixed effects | No | No | Yes | Yes | Yes |
| Item fixed effects | No | No | Yes | Yes | Yes |
| Observations | 1168 | 1168 | 1168 | 1168 | 1168 |
| Clusters | 146 | 146 | 146 | 146 | 146 |
| (Within-)$R^2$ | 0.536 | 0.331 | 0.397 | 0.0665 | 0.397 |

*Note:* Standard errors are clustered for senders; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$.

**Table 3:** Similarity and welfare

## 4.4 Libertarians vs. Paternalists

Since we have shown that people partially rely on their own preferences in choosing the level to which they provide others with help, it is natural to ask whether and how this might be related with paternalistic behavior: if people are not willing to support choices that seem strange to them, they might also want to change them. However, imperfect empathy and paternalism are different concepts. First, imperfect empathy pertains to a certain kind of preferences, whereas paternalism is a certain kind of behavior. Second, the ranges of relevant applications of both phenomena might overlap (see, e.g., Jacobsson, Johannesson, and Borgquist, 2007) but are not identical: Imperfect empathy is relevant in many situations where restricting others' freedom is not even an option; and paternalism occurs in many contexts where empathy is not relevant but is often driven by, e.g., asymmetric information. Third, it is not clear whether people who make helping behavior depend on their own valuations regard the latter as normatively warranted or

would rather—if they were aware of it—object to such behavior and therefore also not want to restrict others' freedom.

To study the relationship between imperfect empathy and paternalism empirically, we use subjects' choices from Part 4 to classify them as paternalists or libertarians. A subject is only classified as a libertarian if she abstained from altering any other subjects' decisions. All subjects that altered any decision are classified as paternalists. According to this definition, we end up with 74 libertarian subjects and 72 paternalists.

| | *Dependent variable:* Transfer | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Libertarians | | | | Paternalists | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Receiver's WTP | 0.412**** | 0.398**** | 0.210**** | 0.219**** | 0.207**** | 0.179**** | 0.134**** | 0.105** |
| | (0.0482) | (0.0528) | (0.0554) | (0.0583) | (0.0356) | (0.0386) | (0.0315) | (0.0428) |
| Sender's WTP | 0.238**** | 0.156*** | 0.0283 | -0.0434 | 0.251**** | 0.209*** | 0.127* | 0.0862 |
| | (0.0451) | (0.0574) | (0.0470) | (0.0792) | (0.0550) | (0.0657) | (0.0669) | (0.0808) |
| $\sqrt{\text{Sender's} \times \text{receiver's WTP}}$ | | | 0.442**** | 0.387**** | | | 0.236*** | 0.224** |
| | | | (0.0894) | (0.0979) | | | (0.0888) | (0.0964) |
| Sender fixed effects | No | Yes | No | Yes | No | Yes | No | Yes |
| Receiver fixed effects | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 592 | 569 | 592 | 569 | 576 | 558 | 576 | 558 |
| Clusters | 74 | 74 | 74 | 74 | 72 | 72 | 72 | 72 |
| (Within-)$R^2$ | 0.451 | 0.269 | 0.516 | 0.357 | 0.267 | 0.142 | 0.291 | 0.177 |

*Note:* Standard errors are clustered for senders; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Columns with fixed effects include fewer observations than others because some receivers were only matched to a single paternalist or libertarian sender, respectively.

**Table 4:** Libertarians vs. paternalists

Table 4 replicates our main results on transfer decisions from the first four columns of Table 1 separately for libertarians in Columns 1–4 and paternalists in Columns 5–8. Comparing Columns 1 and 2 with columns 5 and 6, respectively, we see that the role of senders' WTPs is slightly weaker among libertarians as compared to paternalists, although the differences in coefficients are not statistically significant. More importantly, the effect of senders' WTPs enters with considerable magnitude and high statistical significance within both subsamples. Proceeding towards the comparison of Columns 3 and 4 with Columns 7 and 8, it turns out that the effect of the interactions between senders' and receivers' WTPs is in fact stronger among libertarians than among paternalists. Within our experimental setup, imperfect empathy thus need not lead people to engage in paternalism

and is also prevalent among people who leave others' choices unaltered.

# 5 Conclusion

In this paper, we show that people behave imperfectly empathic when acting prosocially. They assess consequences arising to others based on a combination of their own and the other persons' preferences. In particular, own and others' preferences act as complements in bringing about helping behavior. We show that this property of imperfect empathy leads to the effect that dissimilar preferences lower the size of transfers as well as overall welfare.

The mechanism of imperfect empathy is not only relevant for individual behaviors such as charitable giving or volunteering. It also allows for an alternative perspective on the phenomenon of in-group bias. We observe that transfers are lower if other people have overall different preferences. Within our experiment, however, this effect is entirely driven by imperfect empathy and not by a dislike against subjects who are different. Imperfect empathy might also have implications on the aggregate level for the working of welfare states. If people cannot relate to the consumption choices made by recipients of welfare benefits, this could decrease the willingness to finance such redistributive policies. An implication for policy might be that exposure to individuals with different sets of preferences, e.g. due to cultural or religious backgrounds, could be central for the political sustainability of welfare states in increasingly diverse societies.

# References


Ambuehl, Sandro. 2017. *An Offer You Can't Refuse? Incentives Change How We Inform Ourselves and What We Believe.* CESifo Working Paper 6296. Munich: Center for Economic Studies & Ifo Institute, October.

Andreoni, James. 1990. "Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving." *The Economic Journal* 100 (401): 464–477.

Andreoni, James, A. Abigail Payne, Justin Smith, and David Karp. 2016. "Diversity and donations: The effect of religious and ethnic diversity on charitable giving." *Journal of Economic Behavior and Organization* 128:47–58.

Batson, C. Daniel. 1987. "Prosocial Motivation: Is it ever Truly Altruistic?" *Advances in Experimental Social Psychology* 20 (C): 65–122.

Batson, C. Daniel, and Tecia Moran. 1999. "Empathy-induced altruism in a prisoner's dilemma." *European Journal of Social Psychology* 29 (7): 909–924.

Becker, Gary S. 1974. "A Theory of Social Interactions." *Journal of Political Economy* 82 (6): 1063–1093.

———. 1976. "Altruism, Egoism, and Genetic Fitness: Economics and Sociobiology." *Journal of Economic Literature* 14 (3): 817–826.

Bisin, Alberto, and Thierry Verdier. 2001. "The Economics of Cultural Transmission and the Dynamics of Preferences." *Journal of Economic Theory* 97 (2): 298–319.

Bock, Olaf, Ingmar Baetge, and Andreas Nicklisch. 2014. "hroot: Hamburg Registration and Organization Online Tool." *European Economic Review* 71:117–120.

Coke, Jay S., C. Daniel Batson, and Katherine McDavis. 1978. "Empathic Mediation of Helping: A Two-Stage Model." *Journal of Personality and Social Psychology* 36 (7): 752–766.

Dahlberg, Matz, Karin Edmark, and Heléne Lundqvist. 2012. "Ethnic Diversity and Preferences for Redistribution." *Journal of Political Economy* 120 (1): 41–76.

Davis, Mark H. 1980. "A Multidimensional Approach to Individual Differences in Empathy." *JSAS Catalog of Selected Documents in Psychology* 10:85.

Doepke, Matthias, and Fabrizio Zilibotti. 2017. "Parenting with Style: Altruism and Paternalism in Intergenerational Preference Transmission." *Econometrica* forthc.

Dufwenberg, Martin, and Georg Kirchsteiger. 2004. "A theory of sequential reciprocity." *Games and Economic Behavior* 47:268–298.

Falk, Armin, and Urs Fischbacher. 2006. "A theory of reciprocity." *Games and Economic Behavior* 54:293–315.

Fehr, Ernst, and Klaus M. Schmidt. 1999. "A Theory of Fairness, Competition, and Cooperation." *Quarterly Journal of Economics* 114 (3): 817–868.

Fischbacher, Urs. 2007. "z-Tree: Zurich toolbox for ready-made economic experiments." *Experimental Economics* 10 (2): 171–178.

Jacobsson, Fredric, Magnus Johannesson, and Lars Borgquist. 2007. "Is Altruism Paternalistic?" *The Economic Journal* 117 (520): 761–781.

Klimecki, Olga M., Sarah V. Mayer, Aiste Jusyte, Jonathan Scheeff, and Michael Schönenberg. 2016. "Empathy promotes altruistic behavior in economic interactions." *Scientific Reports* 6:31961.

Rabin, Matthew. 1993. "Incorporating Fairness into Game Theory and Economics." *American Economic Review* 83 (5): 1281–1302.

Ross, Lee, David Greene, and Pamela House. 1977. "The "False Consensus Effect": An Egocentric Bias in Social Perception and Attribution Processes." *Journal of Experimental Social Psychology* 13 (3): 279–301.

Smith, Adam. 1859. *The Theory of Moral Sentiments.* Glasgow.

Tajfel, Henri, M. G. Billig, R. P. Bundy, and Claude Flament. 1971. "Social categorization and intergroup behaviour." *European Journal of Social Psychology* 1 (2): 149–178.

# Appendix A Proof of Hypothesis 2

The partial derivative of expected transfers given by Equation 4 with respect the distance between subjects' valuations is negative whenever $\beta$ lies in the open interval from zero to one and the distance between individual valuations is larger than one. Valuations are denoted by $v_i, v_j > 0$ and $\bar{v} = v_i + v_j$ denotes the total of both valuations.

*Proof.*

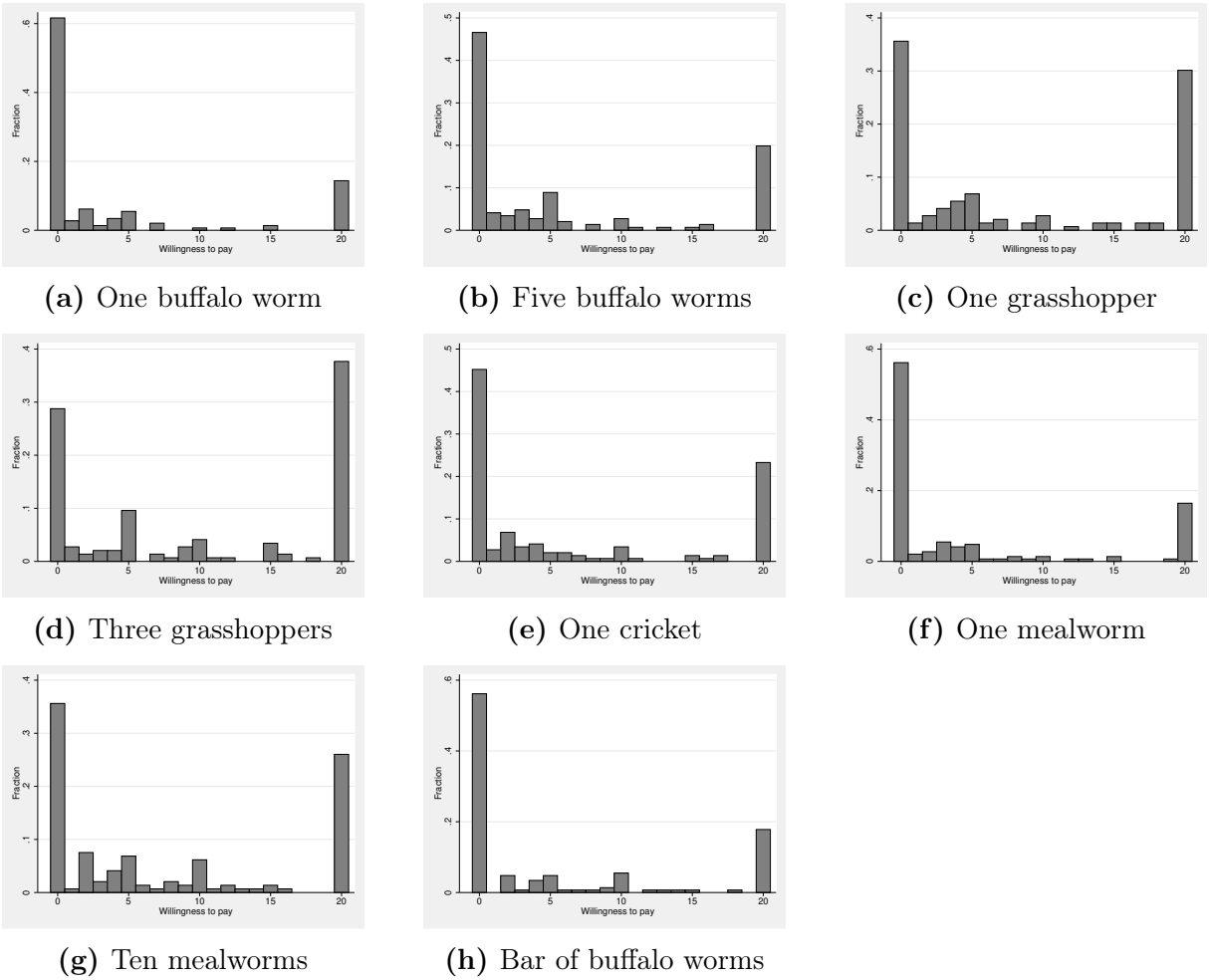
$$\begin{aligned}
\frac{\partial\,\mathbb{E}[t^\star]}{\partial\,|v_i - v_j|} &= \frac{\alpha}{4}\Bigg[\beta\left(\frac{\bar{v} - |v_i - v_j|}{\bar{v} + |v_i - v_j|}\right)^{1-\beta} - (1-\beta)\left(\frac{\bar{v} + |v_i - v_j|}{\bar{v} - |v_i - v_j|}\right)^{\beta} \\
&\quad - \beta\left(\frac{\bar{v} + |v_i - v_j|}{\bar{v} - |v_i - v_j|}\right)^{1-\beta} + (1-\beta)\left(\frac{\bar{v} - |v_i - v_j|}{\bar{v} + |v_i - v_j|}\right)^{\beta}\Bigg] \\
&= \frac{\alpha}{4}\Bigg\{\beta\Bigg[\Bigg(\underbrace{\frac{\bar{v} - |v_i - v_j|}{\bar{v} + |v_i - v_j|}}_{\in(0,1]}\Bigg)^{1-\beta} - \left(\frac{\bar{v} - |v_i - v_j|}{\bar{v} + |v_i - v_j|}\right)^{-(1-\beta)}\Bigg] \\
&\quad + (1-\beta)\Bigg[\left(\frac{\bar{v} - |v_i - v_j|}{\bar{v} + |v_i - v_j|}\right)^{\beta} - \left(\frac{\bar{v} - |v_i - v_j|}{\bar{v} + |v_i - v_j|}\right)^{-\beta}\Bigg]\Bigg\} \\
&\begin{cases} < 0 & \text{if } \beta \in (0,1) \wedge |v_i - v_j| > 0 \\ = 0 & \text{if } \beta \in \{0,1\} \vee |v_i - v_j| = 0 \end{cases}
\end{aligned}$$

□

# Appendix B Descriptive Statistics

| Variable | Mean | Minimum | Maximum | Standard deviation | Observations |
|---|---|---|---|---|---|
| Female | .5 | 0 | 1 | .5017212 | 146 |
| Age | 25.63014 | 18 | 69 | 7.740635 | 146 |
| Partial distance | .4156678 | 0 | 1 | .3859555 | 1168 |
| Total distance | .4929304 | 0 | 1 | .281335 | 1168 |

**Table 5:** Summary statistics



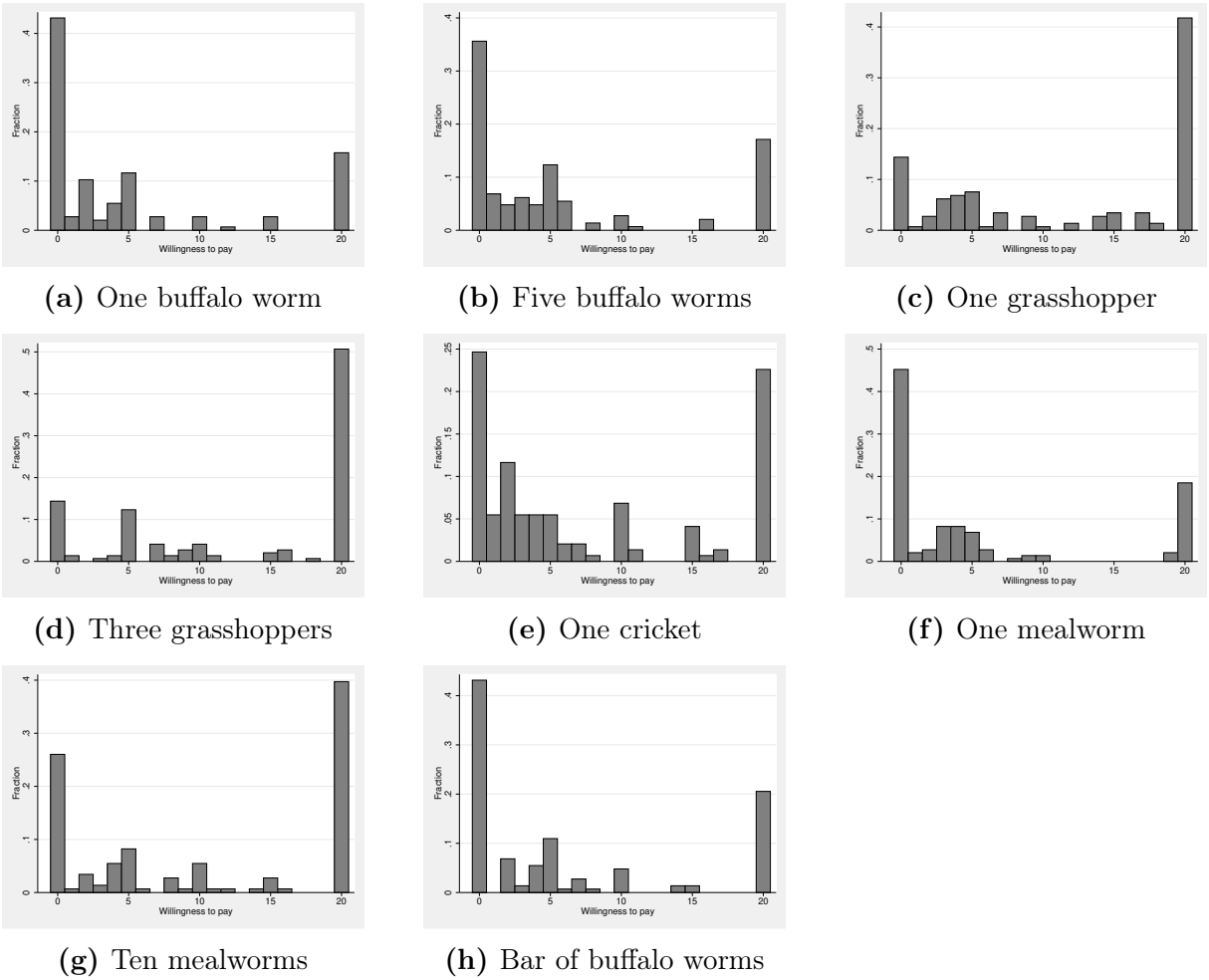

**(a)** One buffalo worm **(b)** Five buffalo worms **(c)** One grasshopper

**(d)** Three grasshoppers **(e)** One cricket **(f)** One mealworm

**(g)** Ten mealworms **(h)** Bar of buffalo worms

*Note:* The figure shows the distribution of the WTPs for the eight food items of all subjects who acted as senders in Part 2. Shown are the decisions they made for themselves in Part 1.

**Figure 4:** Senders' willingness to pay (Part 1)



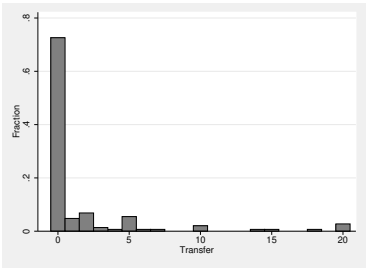

**(a)** One buffalo worm **(b)** Five buffalo worms **(c)** One grasshopper

**(d)** Three grasshoppers **(e)** One cricket **(f)** One mealworm

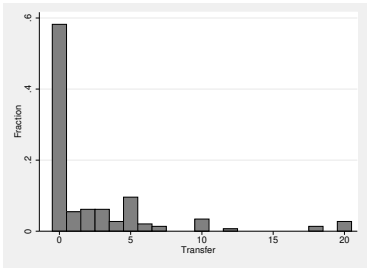
**(g)** Ten mealworms **(h)** Bar of buffalo worms

*Note:* The figure shows the distribution of the WTPs for the eight food items of all subjects who acted as receivers in Part 2. Shown are the decisions they made for themselves in Part 1.

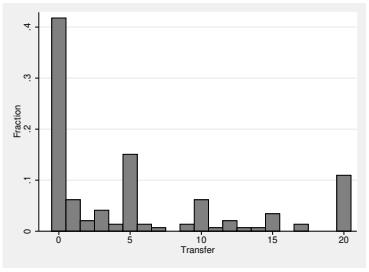
**Figure 5:** Receivers' willingness to pay (sampled from Part 1)



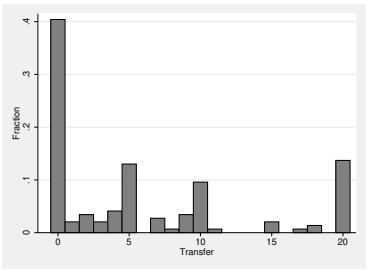

**(a)** One buffalo worm



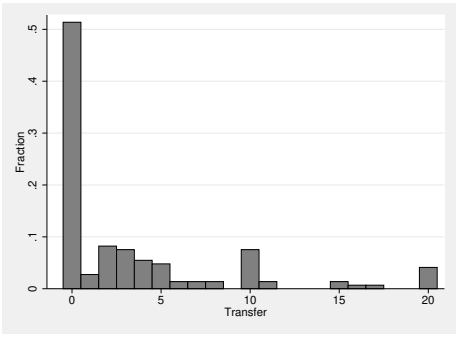

**(b)** Five buffalo worms



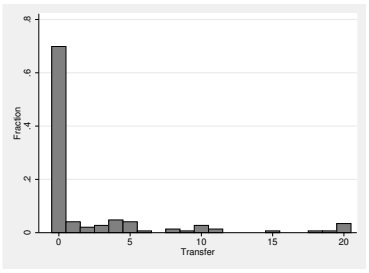

**(c)** One grasshopper



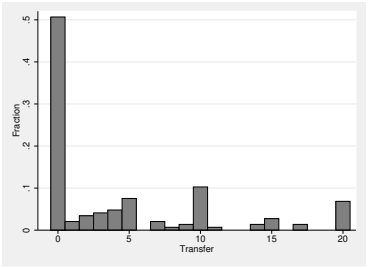

**(d)** Three grasshoppers



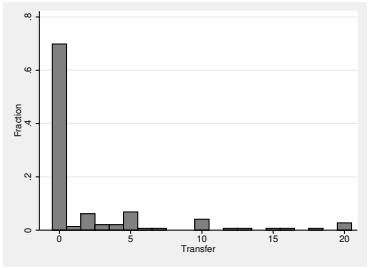

**(e)** One cricket




**(f)** One mealworm




**(g)** Ten mealworms




**(h)** Bar of buffalo worms

**Figure 6:** Transfers (Part 2)

# Appendix C Stimuli Pictures

**(a)** One buffalo worm

**(b)** Five buffalo worms

**(c)** One mealworm

**(d)** Ten mealworms

**(e)** One grasshopper

**(f)** Three grasshoppers

**(g)** One cricket

**(h)** Bar of buffalo worms

**Figure 7:** Stimuli pictures of insects

# Appendix D Screenshots


**Figure 8:** Screenshot of Part 1


**Figure 9:** Screenshot of Part 2

**Teil 3 - 2. Zahlung an einen Teilnehmer/eine Teilnehmerin**

Im Folgenden interessiert uns, inwiefern Sie bereit dazu sind, Geld dafür zu zahlen, dass ein Teilnehmer/eine Teilnehmerin statt eines kleineren Betrags **20€** erhält. Markieren Sie für jede der folgenden Situationen, ob Sie die Option "Zahlung" oder die Option "keine Zahlung" wählen.

**Zahlung:** Sie zahlen den in der jeweiligen Zeile angegebenen Betrag und der Teilnehmer/die Teilnehmerin erhält 20€ - **keine Zahlung:** der Teilnehmer/die Teilnehmerin erhält 0€

**Ihre Zahlungen an den/die Teilnehmer/in**

| | | | |
|---|---|---|---|
| Zahlung: | **1€** | ○ ○ | Teilnehmer/in erhält lediglich 0€ |
| Zahlung: | **2€** | ○ ○ | lediglich 0€ |
| Zahlung: | **3€** | ○ ○ | lediglich 0€ |
| Zahlung: | **4€** | ○ ○ | lediglich 0€ |
| Zahlung: | **5€** | ○ ○ | lediglich 0€ |
| Zahlung: | **6€** | ○ ○ | lediglich 0€ |
| Zahlung: | **7€** | ○ ○ | lediglich 0€ |
| Zahlung: | **8€** | ○ ○ | lediglich 0€ |
| Zahlung: | **9€** | ○ ○ | lediglich 0€ |
| Zahlung: | **10€** | ○ ○ | lediglich 0€ |
| Zahlung: | **11€** | ○ ○ | lediglich 0€ |
| Zahlung: | **12€** | ○ ○ | lediglich 0€ |
| Zahlung: | **13€** | ○ ○ | lediglich 0€ |
| Zahlung: | **14€** | ○ ○ | lediglich 0€ |
| Zahlung: | **15€** | ○ ○ | lediglich 0€ |
| Zahlung: | **16€** | ○ ○ | lediglich 0€ |
| Zahlung: | **17€** | ○ ○ | lediglich 0€ |
| Zahlung: | **18€** | ○ ○ | lediglich 0€ |
| Zahlung: | **19€** | ○ ○ | lediglich 0€ |
| Zahlung: | **20€** | ○ ○ | lediglich 0€ |

Weiter

**Figure 10:** Screenshot of Part 3

**Teil 4 - 1. Entscheidung für einen Teilnehmer/eine Teilnehmerin**

Im Folgenden interessiert uns, inwiefern Sie die Entscheidungen eines anderen Teilnehmers/einer anderen Teilnehmerin aus Teil 1 darüber, wieviel Geld er oder sie selbst zahlen würde, um eine getrocknete **Grille** (siehe Abbildung) nicht essen zu müssen, ändern möchten. Die bereits markierten Felder entsprechen der eigenen Entscheidung des Teilnehmers/der Teilnehmerin. Sie können diese beliebig ändern.

**Zahlung:** der Teilnehmer/die Teilnehmerin zahlt den in der jeweiligen Zeile angegebenen Betrag - **Grille:** der Teilnehmer/die Teilnehmerin verzehrt eine getrocknete Grille

*Eine getrocknete Grille*

**Entscheidungen für den/die Teilnehmer/in**

| | | | |
|---|---|---|---|
| Zahlung: | **1€** | ◉ ○ | Grille |
| Zahlung: | **2€** | ◉ ○ | Grille |
| Zahlung: | **3€** | ◉ ○ | Grille |
| Zahlung: | **4€** | ◉ ○ | Grille |
| Zahlung: | **5€** | ◉ ○ | Grille |
| Zahlung: | **6€** | ◉ ○ | Grille |
| Zahlung: | **7€** | ○ ◉ | Grille |
| Zahlung: | **8€** | ○ ◉ | Grille |
| Zahlung: | **9€** | ○ ◉ | Grille |
| Zahlung: | **10€** | ○ ◉ | Grille |
| Zahlung: | **11€** | ○ ◉ | Grille |
| Zahlung: | **12€** | ○ ◉ | Grille |
| Zahlung: | **13€** | ○ ◉ | Grille |
| Zahlung: | **14€** | ○ ◉ | Grille |
| Zahlung: | **15€** | ○ ◉ | Grille |
| Zahlung: | **16€** | ○ ◉ | Grille |
| Zahlung: | **17€** | ○ ◉ | Grille |
| Zahlung: | **18€** | ○ ◉ | Grille |
| Zahlung: | **19€** | ○ ◉ | Grille |
| Zahlung: | **20€** | ○ ◉ | Grille |

**Entscheidungen des Teilnehmers/der Teilnehmerin**

Der Teilnehmer/die Teilnehmerin hat in Teil 1 für sich selber entschieden, maximal die unten stehenden Geldbeträge zahlen zu wollen.

| | |
|---|---|
| Ein getrockneter **Buffalowurm**: | **€ 6** |
| Fünf getrocknete **Buffalowürmer**: | **€ 7** |
| Ein getrockneter **Grashüpfer**: | **€ 4** |
| Drei getrocknete **Grashüpfer**: | **€ 5** |
| Eine getrocknete **Grille**: | **€ 6** |
| Ein getrockneter **Mehlwurm**: | **€ 4** |
| Zehn getrocknete **Mehlwürmer**: | **€ 6** |
| Ein **Riegel mit Buffalowürmern**: | **€ 7** |

Weiter

**Figure 11:** Screenshot of Part 4

# Appendix E Robustness Regarding Income Levels

In Section 2.1, we have made the assumption that utility from money is linear, which we have used throughout the paper. We believe that this assumption is innocent since we are concerned with monetary amounts in a range of €0 to €27. However, as a simple robustness exercise, we varied the fixed show-up fee that subjects received between sessions. In four sessions, subjects received €7 and in five sessions, they received €5. If the level of earnings during the experiment mattered for subjects' decision making, this should voice itself in results that differ between sessions depending on the size of the show-up fee.

| | *Dependent variable:* Transfer | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Show-up fee = €7 | | | | Show-up fee = €5 | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Receiver's WTP | 0.292**** | 0.285**** | 0.135*** | 0.120** | 0.321**** | 0.328**** | 0.179**** | 0.188**** |
| | (0.0491) | (0.0605) | (0.0428) | (0.0515) | (0.0403) | (0.0450) | (0.0412) | (0.0488) |
| Sender's WTP | 0.259**** | 0.202** | 0.0808 | 0.0121 | 0.250**** | 0.156*** | 0.0433 | -0.0407 |
| | (0.0590) | (0.0878) | (0.0645) | (0.109) | (0.0386) | (0.0506) | (0.0483) | (0.0604) |
| $\sqrt{\text{Sender's} \times \text{receiver's WTP}}$ | | | 0.363**** | 0.359*** | | | 0.415**** | 0.384**** |
| | | | (0.0933) | (0.113) | | | (0.0859) | (0.0824) |
| Sender fixed effects | No | Yes | No | Yes | No | Yes | No | Yes |
| Receiver fixed effects | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 528 | 528 | 528 | 528 | 640 | 640 | 640 | 640 |
| Clusters | 66 | 66 | 66 | 66 | 80 | 80 | 80 | 80 |

*Note:* Standard errors are clustered for senders; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$.

**Table 6:** High show-up fee vs. low show-up fee

Table 6 shows the results corresponding to the ones in Table 1 split according to the size of the show-up fee. Qualitative results are robust within both subsamples; all differences in coefficients are insignificant. Differences in the income level during the experiment therefore do not seem important for our results.