Contents

Can Mental Accounting facilitate greater levels of charitable giving?

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Abstract

A charitable giving experiment is conducted to benchmark and combine the foot-in-the-door, gift exchange, and mental accounting effect. A model is developed that predicts these effects via reciprocal incentives and "crowding in" of altruistic motives. Donation levels do not follow the prediction neither in means nor in their distribution. Still, participants react reciprocally to gifts and show sensitivity to social pressure but only as an extrinsic motive.

1 Introduction

Despite being long considered a marginal phenomenon by Expected Utility Theory (EUT), economic theory has evolved to reflect the importance of charitable giving in the world. It is estimated that 76% of people in the UK regularly give to charity and the most common method of giving is via an ad hoc donation (CAF, 2013; de Las Casas *et al.*, 2013). Other-regarding incentives as well as the social nature of donations made this an interesting field for behavioural economics and so far biases that encourage philanthropy have been well-studied but the size of their strength is still open to debate. Interaction effects between biases have been mostly avoided in experiments in order not to corrupt the validity of results. But this also prevents prediction in the frequent case that a charity campaign strives to exploit several effects. Such interactions might be of an additive or neutral nature and its effects might differ among subgroups of a population. And if policy makers seek to avoid this and only employ one effect, they have no reliable information which is the strongest. This paper provides a way to not only measure the relative strength of effects but also to investigate whether a combination might impair or facilitate donation levels.

A donation experiment was conducted to benchmark and combine the foot-in-the-door, gift exchange, and mental accounting effect while offsetting their disincentives. The effects were measured by the change in altruistic behaviour in the form of donations for a charity. The foot-in-the-door and the gift exchange effect were tested against a control group and then combined to create a scenario in which mental accounting is theoretically possible by regarding this combination as an previous economic exchange. The hypotheses are that these biases are replicable in an experimental setting and that the effect of their combination is not additive. Instead, individuals are hypothesised to donate more because of a change in their preferences towards a higher utility of charitable giving but not out of reciprocal behaviour.

For a theoretical basis, a model is devised that incorporates these effects by varying preferences and incentives governing an optimal choice of a donation level. The foot-in-the-door effect is assumed to increase an individual's preference for giving which leads to

a higher donation despite a small disutility resulting from being subject to the treatment. The gift exchange effect is assumed not to change preferences but to increase donations via participants' desire to act reciprocal after receiving a gift. Combining both effects is assumed to lead to mental accounting which eliminates any reciprocal incentives but still features a "spill-over" of an increase in utility of giving.

The foot-in-the-door effect could not be replicated and evidence for mental accounting was not found in the experiment. Evidence for increased donation levels was statistically significant if a gift was given but not via a "crowding in" of small reciprocal donations as predicted by the model. This was driven by participants who would usually abstain from donating while frequent donators do not respond to a gift with more generosity. Participants primarily donate more if they interact with a charity in a social setting and experience social pressure but a reliable predictor for sensitivity to social pressure was not found.

These findings provide grounds for a discussion whether the mentioned effects increase altruism or instead primarily exert social pressure in the context of charitable giving. In addition, they show that a behavioural strategy is not necessarily successful if it does not factor in the motives of its recipients.

This paper is structured as follows: After a literature review in this Section, Section 2 describes the procedure of the experiment and the different treatments. Section 3 explains the theoretical foundations for constructing a model. Section 4 summarises the results and Section 5 concludes with a discussion.

Literature Review

This paper uses insights from streams of literature on charitable giving, reciprocity in economics, and behavioural biases. Although several of these topics have been theorised to be explained by a single model, there is currently no general model that accounts for all behavioural regularities which are observed by the literature.

1.1 Charitable Giving

The relevant literature on charitable giving uses the fundamental assumptions that a donation increases a donor's utility by the "warm-glow" of giving and reduces her disutility caused by a concern for charitable causes. However, these are not the only factors[1]: Social pressure, which can be created with a variety of procedures, poses a strong incentive to donate[2]. Most importantly in the context of this proposal, two natural field experiments found regularities which are not accounted for: DellaVigna *et al.* (2012) demonstrated that social pressure is a cost associated with refusing a donation and Andreoni *et al.* (2011) showed that donations substantially increase if potential donors are actively approached. The first experiment thereby provided evidence that altruism and warm-glow were not fully explaining donation levels but that social norms are also a significant factor. In the second experiment, altering the "giver-receiver interaction" (Andreoni *et al.*, 2011) greatly increased donations. Behavioural models that only include altruism and warm-glow therefore falsely predict procedure indifference of donors and do not account for the resulting incentives for donating.

1.2 Reciprocity

Although reciprocity enables cooperation and therefore higher levels of utility in long-term equilibria, people regularly violate EUT by exhibiting reciprocal behaviour even if they do not benefit from it[3] (Fehr & Gächter, 2000). Leading theories of reciprocity assume that reciprocity "goes both ways", i.e., an agent can alter other people's utility out of pity or envy[4]. This is neither compatible with the effects of the foot-in-the-door technique (see 1.4)

[1] Note that other crucial aspects which influence charitable giving are excluded from this literature review as they are controlled for in the experiment, notably status concerns, tax incentives, income effects, substitution via volunteering, crowding-out by expansion of government services, efficiency concerns and responses to donation levels of other donors. For an overview see Andreoni (2006).

[2] This also explains why many potential donors actively avoid situations in which they experience social pressure for donations (e.g., DellaVigna et al., 2012; Andreoni et al., 2011).

[3] E.g., by refusing a profitable offer in the Ultimatum Game: If payout differences are too large in an offer to share an amount of money between a proposer and an acceptor, usually an 80-20 allocation, the majority of participants refuse the offer and choose a payout of zero for both players (Camerer and Thaler, 1995). EUT however predicts that any nonzero amount should be accepted as it increases the acceptor's utility.

[4] ERC (Bolton and Ockenfels, 2000), Inequality Aversion (Fehr and Schmidt, 1999), and Maxi-Min preferences (Charness and Rabin, 2002) allow for this. Efficiency concerns as described by Engelmann and Strobel (2004) do not feature this property but they will not be further addressed as they are not applicable

nor with the fact that gifts increase donations by far more than their monetary value (Falk, 2007). However, this theory can still successfully predict behaviour in a wide variety of economic problems, e.g., in trust games (Berg *et al.*, 1995) and even in competitive markets if reciprocating behaviour is possible but not subgame perfect (Fehr *et al.*, 1997, 1998). The most interesting finding about reciprocity in the context of charities is that gifts have an effect that is stronger if the gift is not explicitly linked to achieving a monetary goal but instead to strengthening a relationship (Kube, 2012). If the same dynamics hold in a charitable context, this would suggest that a charity should be careful to present gifts in a context of informing about its goals instead of linking the gift to a subsequent request for donations.

1.3 Behavioural Biases

Foot-in-the-Door Technique

First documented by Freedman & Fraser (1966), the foot-in-the-door effect describes the phenomenon that people are more likely to comply with a request if they had complied with a trivial request before, notably a request that is too small to be refused. Interestingly, it is not a counterexample to reciprocal behaviour, as the effect still remains if requests are made by unrelated entities. This effect is in fact replicable in the context of charitable giving (e.g., Pliner *et al.*, 1974), it is however not reliable across all settings (in some settings even negative) and usually quite weak (Weyant, 1996). Despite its lack of strength, this effect is especially interesting because it clearly goes against economic intuition: It seemingly violates the assumption that individuals follow incentives. Instead, individuals follow their desire to act consistently with their realised behaviour and tend to change their preferences rather than altering their behaviour to offset previously experienced disutility (Harmon-Jones & Harmon-Jones, 2008).

to the context of this experiment.

Gift-Exchange in Charitable Giving

Building on the frequent observation of reciprocal behaviour of participants in economic experiments (see Section 1.3), Falk (2007) conducted a field experiment in which recipients of a fund-raising campaign were presented with gifts before being asked for a donation to a charity. Recipients did react with more frequent donations, even exceeding the value of the gift. Falk also accounts for the theoretical risk of "crowding out" intrinsic motivation for gift-giving in a charitable context, spurred by the fact that the percentage of relatively small donations was higher if a gift was given and vice versa for large donations. A Kruskall-Wallis test confirms that the difference is statistically significant which suggests two effects: First, more individuals might be pushed over a certain threshold in order to make a donation, which leads to more small donations. Secondly, the gift might crowd out prosocial motivation that leads donors to make less large donations and cease to donate if gifts are not provided in the future[5]. A usually generous donor suddenly subjected to extrinsic motivation would then switch from making usually large donations to making small donations if a gift is not provided again (Frey & Jegen, 2001). However, in a follow-up Falk (2007) documented that the same donors did not donate less in subsequent requests for donations, ruling out such an effect.

It will be shown that a comparable follow-up is not feasible in the context of the experimental design but behaviour towards unsolicited gifts in the experiment versus professed donation behaviour in the past of individuals will be investigated in this experiment

Mental Accounting

Developed mostly by Richard Thaler, the theory of mental accounting assumes that individuals allocate their funds to mental accounts specific to expenditure types, time periods, and settings to ease economic decision making (Thaler, 1999). Assuming that each account yields its own utility and a propensity of people to divide their funds into too many accounts (Read *et al.*, 1999), this can lead to suboptimal decisions[6]. These behavioural biases could

[5] A similar effect has already been observed in a labour market experiment (Gneezy & List, 2006).

[6] For instance, Thaler (1999) recommends framing expenditure for charity on a per-day level rather than on a yearly level, to activate people's daily account instead of their budget for a year. The daily expenditure

then be exploited to generate higher donation levels (Thaler, 1999). This was already documented by Wunderink (2002) in a dataset of Dutch households where average donations were higher if they were a part of a household's mental accounting rather than a response to a prompt donation request. Wunderink hypothesised that individuals that do not have a mental account for donations do not factor in charitable giving into their budget and therefore are not able to donate as much as they would like to in hindsight because they do not have sufficient funds left. This implies that most individuals are not able to commit themselves to a certain budget for charity without creating a mental account.

2 Experiment

A laboratory setting in the Behavioural Design Laboratory at Warwick Business School was used for the experiment, drawing on the subject pool of the University of Warwick's Research Participation System as well as students and employees recruited from the local area. Participants were promised GBP 7 for their participation in the experiment[7] and over the course of two days, 86 individuals participated in the experiment.

Participants were assigned to a control group and four treatment groups. Each treatment was administered individually to the participant and their choices and answers were not observable by other participants. The differences in treatments are shown in Figure 1 and are described as follows:

2.1 Control Group and Measurement of Charitable Giving

Participants completed a simple questionnaire which covered biographical questions on disposable income, expenses for charity, and charity preferences, a short questionnaire on reciprocal behaviour (Weinhardt & Richter, 2013), a questionnaire on altruism (Rushton *et al.*, 1981), and a Big Five personality trait questionnaire (John *et al.*, 2008).

would then be experienced as smaller since expenditures are not added up to the total yearly level, which would deter people from committing to such a large donation. Note that this contrasts the property of "diminishing sensitivity" of Prospect Theory which is also context-dependent but applies a higher disutility to a number of expenditures than to the one-off sum of those expenditures (Tversky and Kahneman, 1992).

[7]This was an unusually high but necessary compensation because of a low participation level when the experiment was scheduled in August 2014.

Reciprocal behaviour was measured by standardised instruments both in the dimension of positive as well as negative reciprocity. Altruistic behaviour was measured using a scale over self-reported altruistic behaviour (Rushton *et al.*, 1981). Although a measurement of altruism via hypothetical or actual decisions over interdependent utilities[8] would yield more precise estimations, it bears the risk that it is influenced by treatment effects. Treatment effects might influence social value orientation and therefore lead an individual to act more prosocial than she would outside the lab. The self-report scale avoids this by referring to actually realised behaviour in the individual's past.

For an estimation of the Big Five personality traits, participants completed a standard questionnaire by John & Donahue (1991) which was shown to be replicable across different contexts and cultural groups (Benet-Martinez & John, 1998).

Furthermore, the control and the foot-in-the-door treatment group also saw a picture of a pen that was given as a gift to participants in the other treatments and had to submit a personal valuation of it in GBP.

After completion of the questionnaire, all participants were presented with a windfall gain of additional GBP 2, bringing their total earnings to GBP 9. In accordance with Reinstein & Riener (2012), this would increase the propensity to donate equally across treatments while preserving external validity of financial choices by avoiding house money effects.

Following this windfall gain, participants had to answer a decision problem asking how to divide their final payoff between a cash payment and a donation to the British Red Cross. Two sliders let the participant choose an allocation (see Figure 2) which had to exhaust all earnings for the participant to finish the experiment.

2.2 Treatment 1: Foot-in-the-door Effect

Before being led into the laboratory, participants were asked for a negligible action for a charity at t_0, specifically to give their signature if they supported a heavier involvement of the British Red Cross in the student's union at the University of Warwick. After this

[8] E.g., via the slider measure of Murphy *et al.* (2011).

treatment, they followed the same procedure as the control group.

2.3 Treatment 2: Gift Exchange Effect

Participants were being presented with a small, unsolicited gift at t_0 with the British Red Cross named as the provider. This gift was a pen which was given out together with a promotional leaflet of the British Red Cross in order to associate the gift with the charity.

2.4 Treatment 3: Mental Accounting Effect

Participants were asked for a supportive signature for the British Red Cross at t_0 **and then** received the described gift at t_1.

2.5 Treatment 4: Mental Accounting Control Group

Participants received a gift at t_0 **and then** were asked for a supportive signature for the British Red Cross at t_1.

Figure 1: Experimental Design

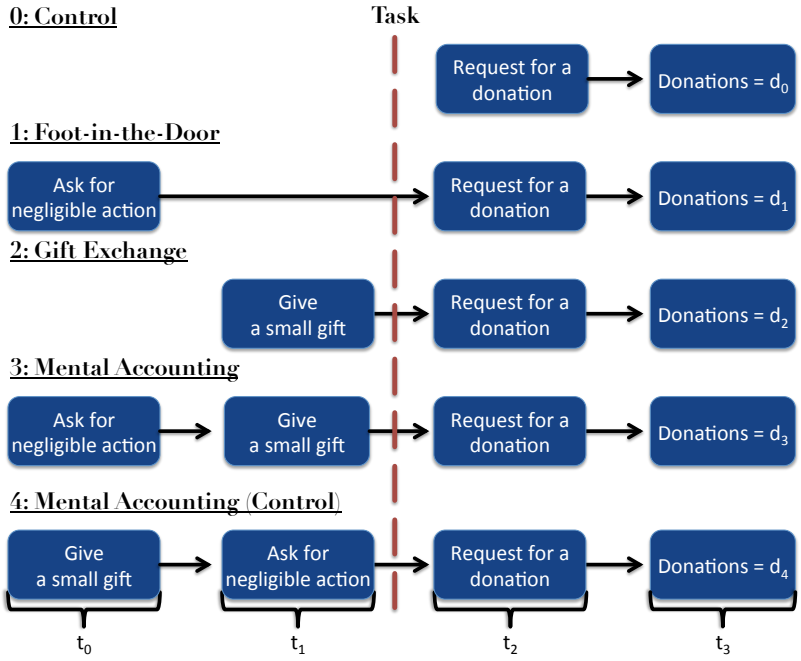
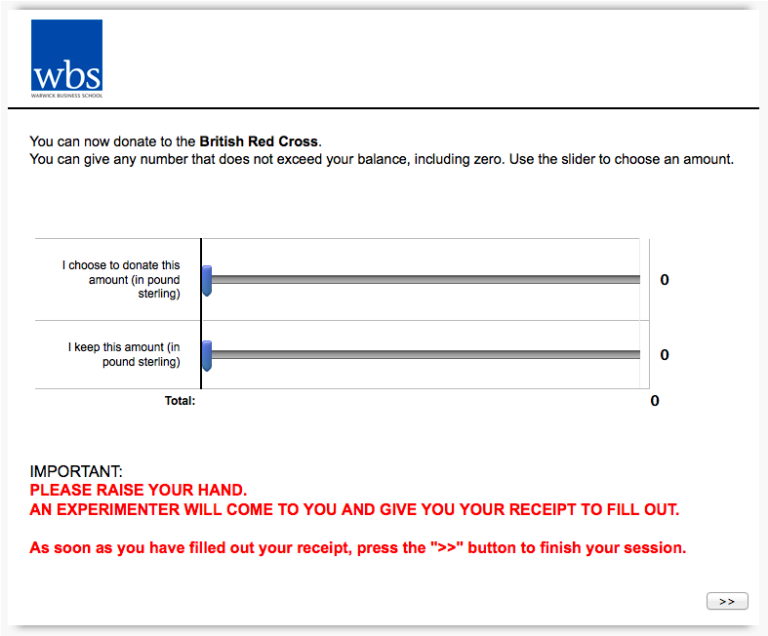


Figure 2: Screen shot of donation request (default position)



3 Theoretical Hypotheses

The central hypothesis states that participants experience a higher utility in giving if they previously performed a favour for a charity and/or received a gift associated with the same charity and therefore give higher donations. However, this hypothesis alone does not cover mental accounting. The second hypothesis states that mental accounting can lead individuals to disregard their reciprocal preferences over previous exchanges of wealth. This happens if a mental account is closed because performing a favour and receiving a gift are consolidated into one account. After that, an individual would not consider reciprocal behaviour anymore but still have a higher utility of giving, thereby donating more.

A model that would account both for charitable giving and for treatment effects would need to assume non-constant preferences, a utility for charitable giving (which can in theory be separated into warm-glow and other-regarding preferences), a utility of reciprocal behaviour, and mental accounting in addition to the usual assumptions of EUT.

Suitable ways of describing the latter three assumptions are detailed in the literature review, however non-constant preferences are usually avoided in economic theory to ease computation. Habit formation, advertising effects, and social influences for instance show that preferences do in fact change but can still be assumed to be negligible in a static setting (Schokkaert, 1985). However, since the foot-in-the-door treatment would affect both a reciprocal and rational individual to regard a charity as being "in debt" to them, a theory with constant preferences would predict that her donation level would either decrease (if reciprocity is allowed) or stay the same with the treatment. But if individuals do donate more in the foot-in-the-door treatment, a model needs to account for a change in preferences towards a higher utility of donating.

As mentioned in the literature review, the utility of charitable giving is not only attributed to a single factor. Hypothetically, an individual could donate large amounts of money without caring about efficient or appropriate distribution of the donations because she only experiences utility due to warm-glow and status-concerns. On the other end of the spectrum, another individual might only care about the effect that her donation has on other individuals and therefore prefers to donate in order to marginally increase total utility of all individuals in need. Theory on charitable giving assumes that usually both effects exist and developed models that incorporate both (Andreoni, 2006). The experimental design enables a model that treats both preferences the same, whether it is the first kind: "giving for the sake of giving" or the second kind: "giving for the sake of helping". Participant groups in the treatments are assumed to have the same unknown distribution of preferences over charitable giving which is true in large samples and since both kinds of preferences become manifest in donation levels, the model can combine this into a single utility of giving despite possibly large differences between individuals.

3.1 The Model

To describe the effects, the model needs three components: Two components to model agent i's utility of own consumption $v_x(x_i)$ and donating[9] $v_y(y_i|action)$ over the budget $e \epsilon \mathbb{R}^+$. The index function $v_y(y_i|action)$ signifies that an individual who has performed an action for a charity has a potentially different preferences for donations (in line with the observations of the foot-in-the-door effect). Also needed is a third component to model the agent's reciprocity, following Fehr and Schmidt (1999) with γ^+, γ^- as positive and negative reciprocity parameters, but since the agent deals without envy to a charity's wealth, the term is altered to only account for **exchanges** in goods between the entity of the charity and the agent.

Rank-dependent expected utility value functions $v_x(c) > v'_y(c) > v_y(c) > 0$, $\forall c \epsilon \mathbb{R}^+$ (Quiggin, 1982) are used to model the allocation choices, which leads to the following function:

$$u_i(x_i, y_i) = v_x(x_i) + v_y(y_i|action) + \gamma^+ min\{y_i - v(action); 0\} - \gamma^- min\{y_i - v(gift); 0\}$$

with $v_y(y_i|action) = v_y(y_i) \cdot (1 - \mathbf{1}(action)) + v'_y(y_i) \cdot \mathbf{1}(action)$
and $x_i + y_i = e > 0$ and $\gamma^+ \geq \gamma^- \geq 0$

In the "classical" EUT case (which is a special case of rank-dependent utility), dismissing any preferences apart from own consumption, the allocation choice would be trivial. Utility is only experienced through x_i, i.e., $u_i(x_i, y_i) = v_x(x_i)$, which leads to the optimal choice of $x_i = e > 0 = y_i$.
In the EUT case with any preference for charitable giving[10], we consolidate any utility of

[9] Warm-glow and altruistic or inequality concerns over public utility are merged since they are controlled for. This yields a best response over x_i and y_i, given a certain perceived level of social income, as described by Andreoni (2006).
[10] Assuming that past costs are sunk and that receipt of a gift only negligibly increases total wealth.

giving into a utility experienced through the donated amount. Therefore we can treat the utility of donating the same as any other utility from the consumption of a normal good. Following that, the model could also be expanded to cover any finite number of goods and different causes to donate. This can also apply to situations where individuals have the choice to allocate a voluntary amount to several charities. To simplify the model to correspond to the experiment, we would only include the relevant "goods" x_i and y_i:

$$u_i(x_i, y_i) = v_x(x_i) + v_y(y_i)$$

$$with\ x_i + y_i \leq e$$

But further incorporating parameters for reciprocity and assuming a mental accounting effect, the model simplifies under H_1 for each treatment to the following:

3.2 Control Group

$$u_i(x_i, y_i) = v_x(x_i) + v_y(y_i)$$

$$with\ x_i + y_i = e$$

The control group does not experience any interaction with the charity and enters the experiment with their a-priori utility function unaffected by any previous actions.

3.3 Treatment 1: Foot-in-the-door Effect

$$u_i(x_i, y_i) = v_x(x_i) + v'_y(y_i) + \gamma^+ min\{y_i - v_y(action); 0\}$$

$$with\ x_i + y_i = e\ and\ \gamma^+ \geq \gamma^- \geq 0$$

The foot-in-the-door treatment group experiences two effects. First, they perform an action for the charity. Lowering their payoff by the value they perceive appropriate would then restore their level of utility if they feel disadvantaged by having performed the

action. Second, they update their preferences, specifically substituting $v_y(y_i)$ by $v'_y(y_i) > v_y(y_i) \, \forall y_i > 0$. So their increased preference for donating, stemming from a desire to act in consistence with their previous charitable action, leads them to choose a higher y_i than in the control group, thereby creating the foot-in-the-door effect.

3.4 Treatment 2: Gift Exchange Effect

$$u_i(x_i, y_i) = v_x(x_i) + v_y(y_i) - \gamma^- min\{y_i - v_x(gift); 0\}$$

$$with \; x_i + y_i = e \; and \; \gamma^+ \geq \gamma^- \geq 0$$

Analogous to an action in the foot-in-the-door treatment, individuals have a reciprocal term enter into their utility function. This time the reciprocal reaction is positive as in the standard theory behind the gift-exchange effect (Fehr & Schmidt, 1999). But unlike in the previous treatment, individuals are assumed not to update their preferences. Since no action is taken and a gift is passively received, the individual's attitude towards charitable giving is assumed not to change, thereby not altering preferences over donations and own consumption. Note that this assumption is in accordance with Festinger's (1957) popular theory of cognitive dissonance (for an overview see Harmon-Jones & Harmon-Jones, 2008).

3.5 Treatment 3: Mental Accounting Effect

$$u_i(x_i, y_i) = v(x_i) + v'_y(y_i)$$

$$with \; x_i + y_i = e \; and \; \gamma^+ \geq \gamma^- \geq 0$$

3.6 Treatment 4: Mental Accounting Control Group

$$u_i(x_i, y_i) = v_x(x_i) + v'_y(y_i)$$

$$with \; x_i + y_i = e \; and \; \gamma^+ \geq \gamma^- \geq 0$$

In treatment 3 and 4, it is assumed that the mental account over exchanges in goods and

actions towards the charity has been closed before or during the questionnaire. This means that reciprocal behaviour is not stable across contexts, much in contrast to the assumption that a change in preferences can be. It might seem paradoxical that the model treats these two phenomena differently in their permanence across contexts but exactly this behaviour is described in the literature (Thaler, 1999; Beaman *et al.*, 1983). The novelty of this hypothesis simply lies in the assumption that these two effects do not interact by cancelling out or amplifying each other. If this holds, the individual has both a higher preference for giving and is also unaffected by negative reciprocity.

Possible Value Functions for the Utility Function

Since choices in the experiment do not involve risk, risk aversion does not need to be estimated and the complexity of choice problems is greatly reduced. Also, the actual level of an individual's utility is not of importance as only the optimum allocation between donation and own consumption to achieve the maximum needs to be measured. It is possible that the absolute utility of an individual is higher in the control treatment than in the gift treatment but this is not estimated in the experiment. The information of interest is which allocation optimal for the participant conditional on the treatment, manifesting itself in the donation levels.

Note that if loss aversion is allowed, which can be included in the framework of rank-dependent utility (Blavatskyy, 2011), donations in treatment 1 will be predicted to be lower. The model used will rule out loss aversion as the experimental findings did not show effects sufficiently strong enough for an estimation. See the Appendix (Section 6.1) for a theoretical discussion.

3.7 The EUT Case

The utility function can be modelled with a variety of functions within rank-dependent utility. In the EUT case, assume that no reciprocity exists, i.e., $\gamma^+ = \gamma^- = 0$, and that the value functions are $v_x(x_i) = ln(x_i^\alpha)$ and $v_y(x_i) = ln(x_i^\beta)$. α, β are parameters to measure

utilities of own consumption and donations. Assume $\alpha > \beta > 0$, i.e., the marginal utility of own consumption exceeds the marginal utility of charitable giving and a budget constraint $x_i + y_i = e$ with endowment e. However, the condition $\alpha > \beta > 0$ might be violated in individual cases since house money effects and the intangibility of earnings before the donation might cause individuals to donate significantly more, as documented by Reinstein & Riener (2012). Also, corner solutions can exist, i.e., either $\alpha = 0$ or $\beta = 0$, leading to $x_i = e$ or $y_i = e$, respectively. But given their description of donation levels, it can be assumed that on average $\alpha/\beta > 1$.

This simplifies to:

$$u_i(x_i, y_i) = v_x(x_i) + v_y(y_i|action) + \gamma^+ min\{y_i - v(action); 0\} - \gamma^- min\{y_i - v(gift); 0\}$$

with $x_i + y_i = e > 0$ and $\gamma^+ = \gamma^- = 0$

into:

$$u_i(x_i, y_i) = ln(x_i^\alpha) + ln(y_i^\beta)$$

with $x_i + y_i = e$

Note that this utility function does not vary with treatments. Therefore all donation levels across groups should be the same as the income effect of a gift and/or favour is sunk and negligible in the individual's total budget if EUT with a preference for philanthropy is assumed.

It is also simple to infer values for α and β from the observed donation levels if an inner solution exists. Using the marginal rate of substitution, the ratio of α to β can be inferred through the ratio of donation to own consumption. For instance, an individual that chooses optimally and donates GBP 1, therefore keeping GBP 8, would have the ratio $\alpha/\beta = 8/1 = MRS$. If the parameters are normed to $\alpha + \beta = 1$, this would imply that $\alpha = 8/9$ and $\beta = 1/9$.

3.8 The Foot-on-the-door Effect in the Model

It is assumed, following the interpretation of Beaman *et al.* (1983), that the foot-in-the-door technique has two consequences: First, the individual has performed an action and has therefore a slightly lower utility. Note that this first effect would lead a reciprocal person to give slightly less to the charitable organisation for which she has performed an action. Second, the individual's norm to behave prosocially is enforced. This leads her to be more disposed to altruistic actions towards **any** person or organisation.

If only the individual's utility of giving is rewarded, e.g., using the utility function from 8.1, β is increased to $\beta' > \beta$, yielding $v'_y(y_i) = ln(y_i^{\beta'}) > ln(y_i^{\beta})\ \forall y_i \epsilon \mathbb{R}^+$ and the optimal allocation is shifted in favour of y_i, thereby benefitting the charity (see Figure 3[11]). Consider the control group and the foot-in-the-door treatment **without** reciprocity effects:

Control Group

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta})\ with\ x_i + y_i = e$$

This yields an optimal allocation of $x_i/y_i = \alpha/\beta \iff y_i = \beta/\alpha \cdot x_i$ which maximises the agent's utility, given the budget constraint.

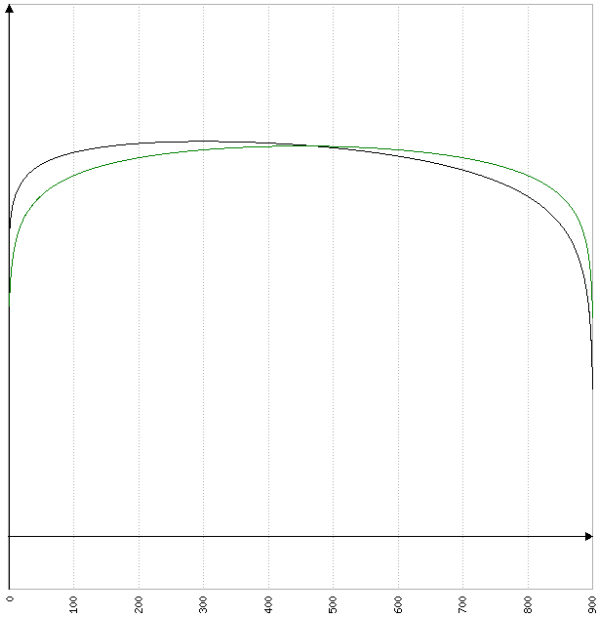
Treatment 1: Foot-in-the-door Effect

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta'})\ with\ x_i + y_i = e$$

This yields an optimal allocation of $x'_i/y'_i = \alpha/\beta' \iff y'_i = \beta'/\alpha \cdot x'_i$ with $y'_i > y_i$ since $\beta' > \beta$, given the same budget.

[11] Note that figures of utility functions are stilised. GBP 1.00 is equal to 100 units and the graph has been shifted 1 unit to the left to prevent negative values. Since only the order of magnitude of effects and their differences are used, this does not alter predictions.

Figure 3: Utility Function of the control group in black ($\alpha = 2$,$\beta = 1$);
Utility Function of the foot-in-the-door group in green ($\alpha = 2$,$\beta' = 2$)



3.9 The Utility function with Inequality Aversion

The utility function from 8.1. is altered so that $\gamma^+ \geq \gamma^- \geq 0$, i.e., reciprocity over the exchange of goods or services is included in the model, building on Fehr & Schmidt (1999) as discussed in Section 3.1. In addition, a utility increase triggered by an interaction with a charitable organisation as in 4.8 is assumed (therefore $\beta' > \beta$). An unsolicited gift by a charity is not assumed to trigger an enforcement of a prosocial norm, instead it is assumed that such a gift triggers a reciprocal preference, i.e., the individual feels "in debt". In this case, each treatment group will act dependent on the prior exchange of goods and services. Note that functions now have a "kink" in case that a donation amount exceeds the perceived value of the gift of action. This also predicts that individuals with an already high β will **not** donate significantly more[12]. Higher donation levels will be achieved because individuals with a relatively low β are crowded in.

[12]This was in fact observed in Falk's (2007) field experiment on gift exchange effects in a charity campaign (see 1.4).

Control Group

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta})$$

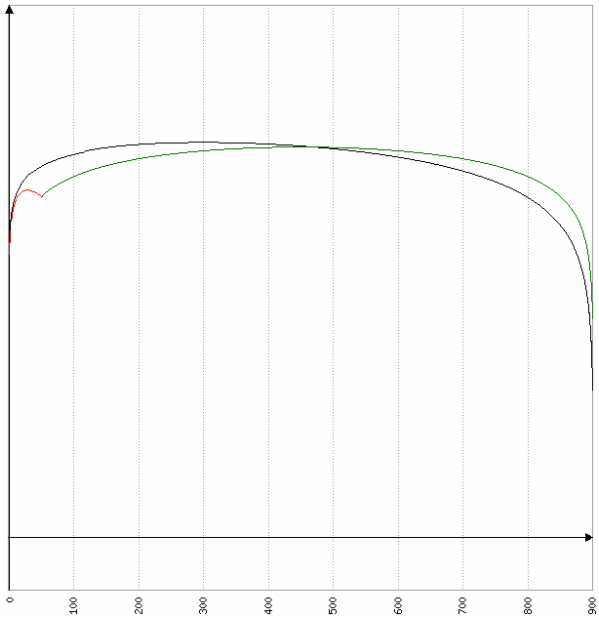
with $x_i + y_i = e$

Treatment 1: Foot-in-the-door Effect

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta'}) + \gamma^{+} min\{y_i - value(action); 0\}$$

with $x_i + y_i = e$ and $\gamma^{+} \geq \gamma^{-} \geq 0$

Figure 4: Utility Function of the control group in black ($\alpha = 2$,$\beta = 1$);
Utility Function of the foot-in-the-door group in red and green ($\alpha = 2$,$\beta' = 2$)

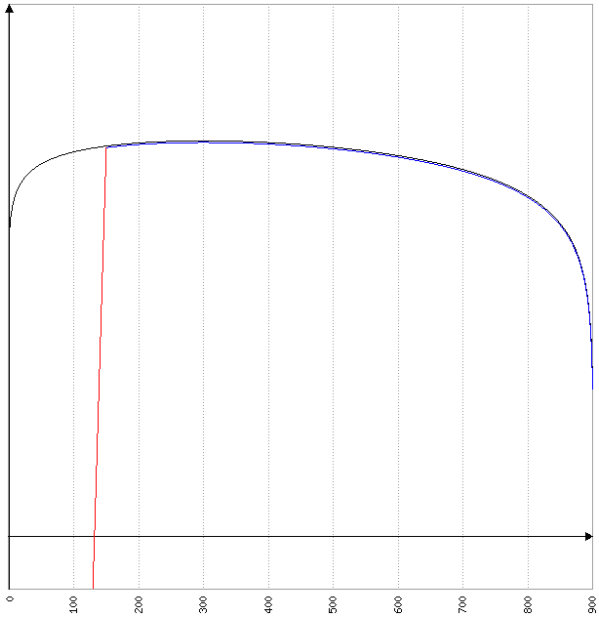


Treatment 2: Gift Exchange Effect

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta}) - \gamma^{-} min\{y_i - value(gift); 0\}$$

with $x_i + y_i = e$ and $\gamma^{+} \geq \gamma^{-} \geq 0$

Figure 5: Utility Function of the control group in black ($\alpha = 2$,$\beta = 1$);
Utility Function of the gift exchange group in red and blue ($\alpha = 2$,$\beta = 1$)



Treatment 3: Mental Accounting Effect

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta'}) + \gamma^{+} min\{y_i - value(action); 0\} - \gamma^{-} min\{y_i - value(gift); 0\}$$

with $x_i + y_i = e$ and $\gamma^{+} \geq \gamma^{-} \geq 0$

Treatment 4: Mental Accounting Control Group

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta'}) + \gamma^{+} min\{y_i - value(action); 0\} - \gamma^{-} min\{y_i - value(gift); 0\}$$

with $x_i + y_i = e$ and $\gamma^{+} \geq \gamma^{-} \geq 0$

3.10 The Utility function with Inequality Aversion and Mental Accounting

In this case, the utility function identical to 3.9 except for the "mental accounting treatments" 3 and 4. It is assumed that the balance of the prior exchange is assigned to another mental account and therefore not included in the decision. What remains however, is the "spill-over" effect of the foot-in-the-door effect as described by Beaman *et. al.* (1983). Now,

individuals in treatment 3 and 4 have an increased utility of giving, which leads to higher donations regardless whether individuals had a high or low β before the treatment:
(see Figures 6-9 for examples of inner solutions depending on the treatment)

Control Group

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta})$$
$$\text{with } x_i + y_i = e$$

Treatment 1: Foot-in-the-door Effect

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta'}) + \gamma^{+} min\{y_i - value(action); 0\}$$
$$\text{with } x_i + y_i = e \text{ and } \gamma^{+} \geq \gamma^{-} \geq 0$$

Treatment 2: Gift Exchange Effect

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta}) - \gamma^{-} min\{y_i - value(gift); 0\}$$
$$\text{with } x_i + y_i = e \text{ and } \gamma^{+} \geq \gamma^{-} \geq 0$$

Treatment 3: Mental Accounting Effect

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta'})$$
$$\text{with } x_i + y_i = e \text{ and } \gamma^{+} \geq \gamma^{-} \geq 0$$

Treatment 4: Mental Accounting Control Group

$$u_i(x_i, y_i) = ln(x_i^{\alpha}) + ln(y_i^{\beta'})$$
$$\text{with } x_i + y_i = e \text{ and } \gamma^{+} \geq \gamma^{-} \geq 0$$

Figure 6: Utility Function of the control group ($\alpha = 2$,$\beta = 1$)

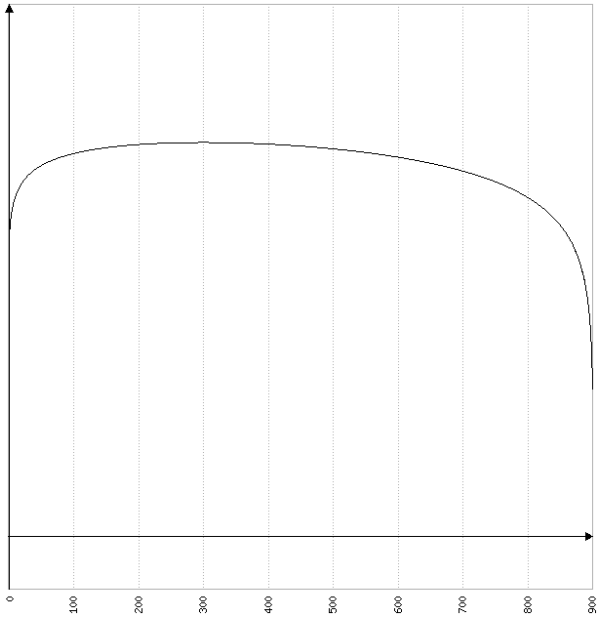


Figure 7: Utility Function in case of foot-in-the-door treatment ($\alpha = 2$,$\beta' = 2$)

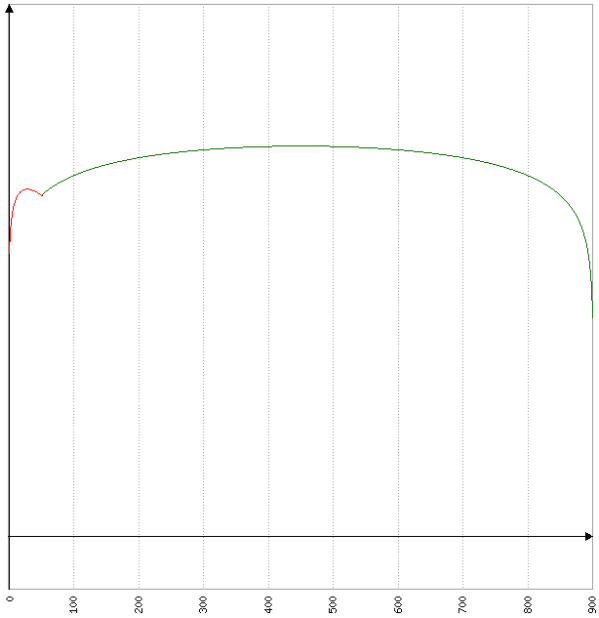


Figure 8: Utility Function in case of gift exchange treatment ($\alpha = 2$,$\beta = 1$)

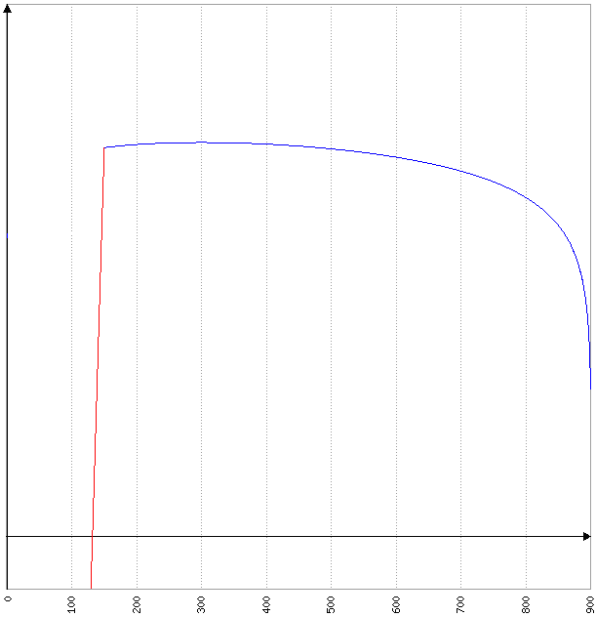
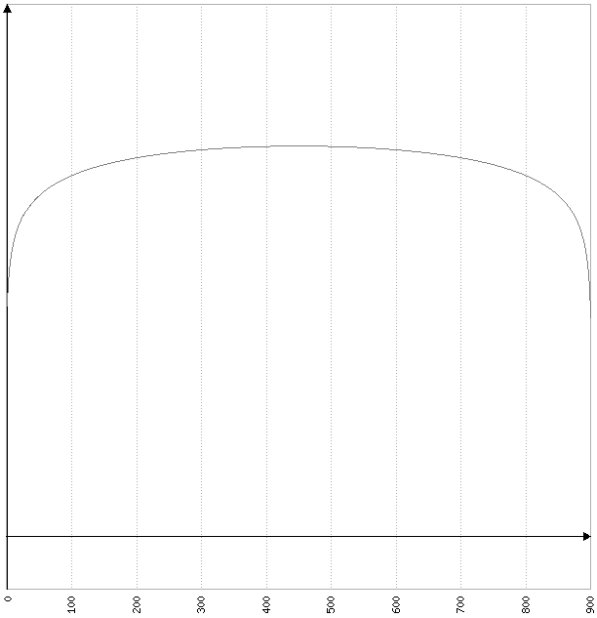


Figure 9: Utility Function in case of mental accounting treatment($\alpha = 2$,$\beta' = 2$)



3.11 Separating the Mental Accounting Effect

Note that 3.9 and 3.10 can be distinguished from the data given sufficient observations. Assume donation levels $\bar{d}_0, \bar{d}_1, \bar{d}_2, \bar{d}_3, \bar{d}_4$ for respective treatment groups 0 to 4.

If 3.9 is the case, $\bar{d}_3 - \bar{d}_1 = -\gamma^- min\{y_i - value(gift); 0\} = \bar{d}_2 - \bar{d}_0$.

However, if 3.10 is the case, i.e., we observe a mental accounting effect among the others, $\bar{d}_3 - \bar{d}_1 \neq -\gamma^- min\{y_i - value(gift); 0\} = \bar{d}_2 - \bar{d}_0$. $\bar{d}_3 - \bar{d}_1$ equals now to the disutility effect of performing the requested favour, i.e., $\bar{d}_3 - \bar{d}_1 = -\gamma min\{y_i - value(action); 0\} > 0$ whereas $\bar{d}_2 - \bar{d}_0$ remains unchanged, equalling to the reciprocity effect towards the gift in the utility.

Also of interest, $\bar{d}_3 - \bar{d}_0$ equals to the increase in donations by a change in donation behaviour from β to β', now "cleaned" from the negative reciprocity effect. In Figure 10, it was assumed that $\bar{d}_3 - \bar{d}_0 > \bar{d}_2 - \bar{d}_0$, i.e., the **net** change in donation behaviour because of the foot-in-the-door effect is stronger than the reciprocity effect from a gift. It is also possible that $\bar{d}_3 - \bar{d}_0 < \bar{d}_2 - \bar{d}_0$, which also allows the mental accounting effect to be distinguishable, however with different donation levels (see Figure 11).

Figure 10: Predicted donation levels according to parameters (simplified inner solution, given $\bar{d}_3 - \bar{d}_0 > \bar{d}_2 - \bar{d}_0$ in mental accounting case)

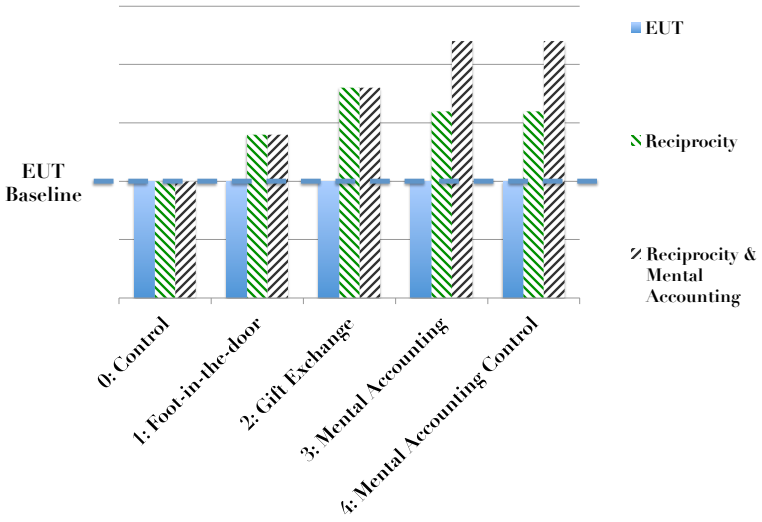
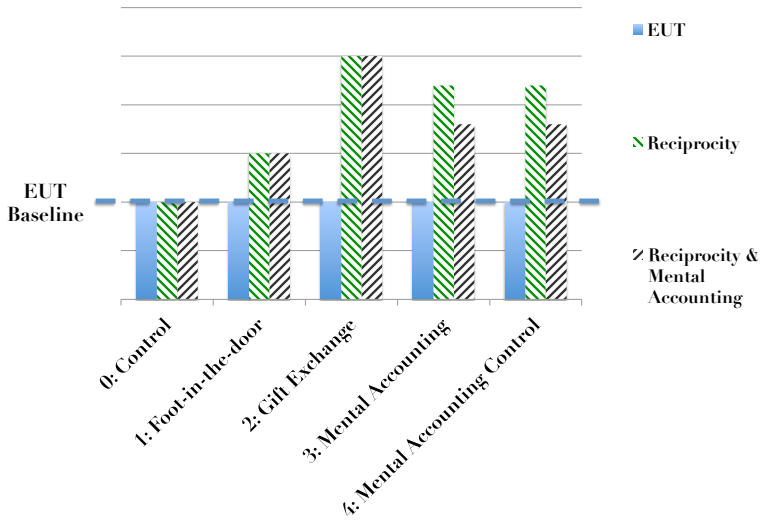


Figure 11: Predicted donation levels according to parameters (simplified inner solution, given $\bar{d}_3 - \bar{d}_0 < \bar{d}_2 - \bar{d}_0$ in mental accounting case)



4 Results

4.1 Treatment Effects

Treatment Groups

Although the averages of the experimental groups (see Table 1 and Figure 12) suggest a treatment effect, a Wilcoxon test does not reject the null hypothesis that no systematic treatment effect has been observed with $p = 0.680,0.393,0.910,0.336$ for treatments 1,2,3,4. The same result is generated by a Kruskal-Wallis test jointly over all treatments ($p = 0.86$). If corner solutions, i.e., observations where individuals chose to donate either all or nothing, are eliminated from the sample, 61 observations remain and a treatment effect is still not statistically observable with these tests. Also, the group averages do not even suggest an order of magnitude of treatment effects according to the prediction anymore (see Table 2 and Figure 13, test statistics are listed in the Appendix, Section 6.2).

Table 1: Summary statistics of donation levels

Treatment_No	0	1	2	3	4	
Treatment Group	Control	Foot-in-the-door	Gift Exchange	Mental Accounting	Mental Accounting Control	Sum
Mean	1.684	1.850	2.167	2.165	2.500	2.078
Std. Dev.	1.677	1.516	2.065	2.629	2.618	2.134
Min	0	0	0	0	0	0
Max	5	4	9	9	9	9
Observations	19	14	18	17	18	86

Table 2: Summary statistics of donation levels **without** corner solutions

Treatment_No	0	1	2	3	4	
Treatment Group	Control	Foot-in-the-door	Gift Exchange	Mental Accounting	Mental Accounting Control	Sum
Mean	2.462	2.590	2.143	2.527	2.077	2.340
Std. Dev.	1.464	1.092	0.949	1.974	0.954	1.296
Min	1	0.9	1	1	1	0.9
Max	5	4	4	6.8	4	6.8
Observations	13	10	14	11	13	61

The model would predict a trend across treatments since each subsequent treatment would yield a higher donation level, given $0 < \beta < \beta' < \alpha$ and $value(action) < value(gift)$. Assuming that this trend exists (which the means of the treatment group suggest), Cuzick's (1985) extension of the Wilcoxon test would be less conservative but still in order. Using this test, H_0 however is still not rejected at $p = 0.467$ and the hypotheses are not confirmed.

Figure 12: Average donations per treatment (including corner solutions)

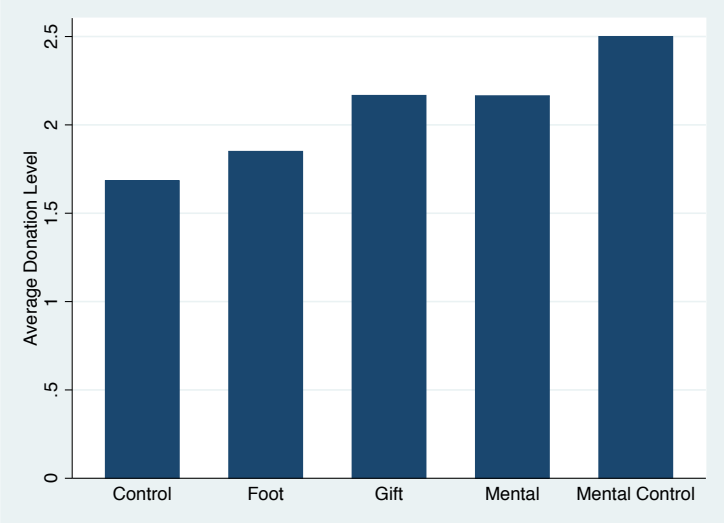
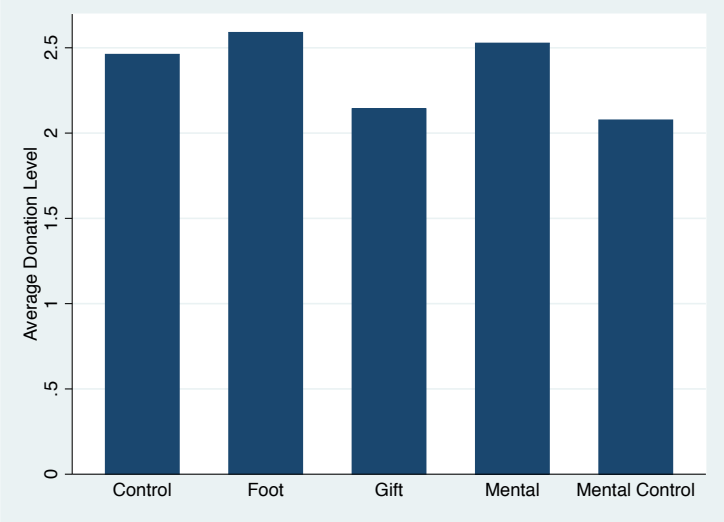


Figure 13: Average donations per treatment (excluding corner solutions)



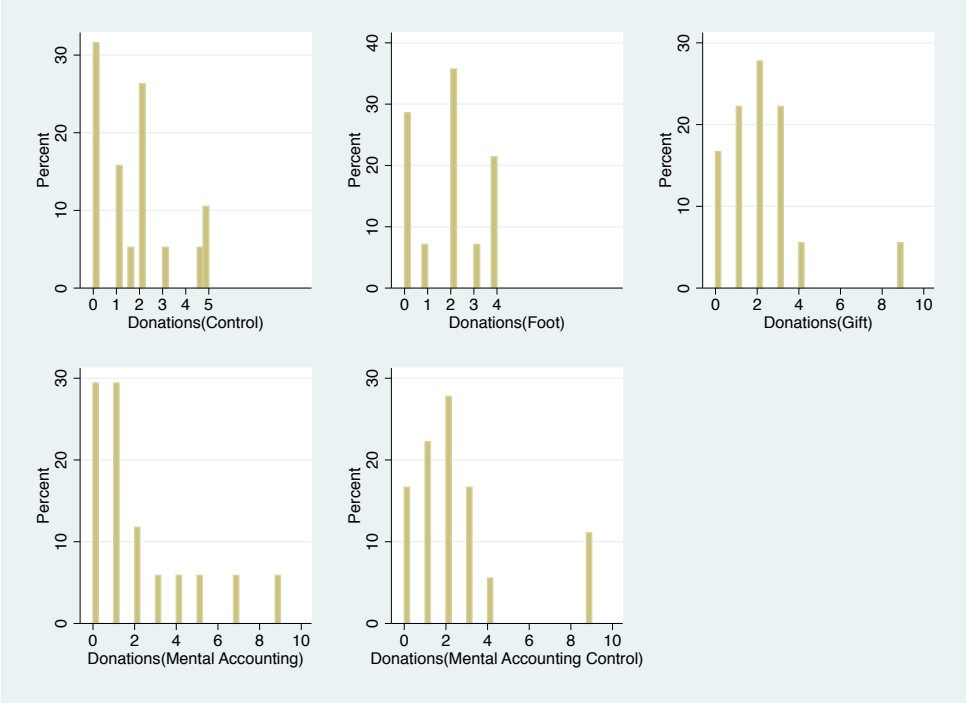
Distribution of Donation Levels

The distributions of donation choices do suggest that participants were prone to an anchor since they all are centred close to the value 2, equal to the windfall gain before the donation request (see Figure 14 for a histogram). If this is the case, one would expect donation choices to either lie at 0, 2, or 9, meaning that participants either behave fully selfish, follow the anchor, or behave fully altruistic. For this, donations between 0 and 9 have to be analysed. Considering these, a t-test for a mean at the value 2 does not show significance for each treatment individually with p-values between 0.4 and 0.8. If the test is conducted using the whole sample, H_0 assuming a mean of 2 is rejected with $p = 0.045$ (see Appendix, Section 6.2, for test statistics).

Another possibility exists that participants might be motivated to share their windfall gain equally between themselves and the charity. Again for all donations between 0 and 9, a t-test is conducted and accepts a mean at 1 with $p < 0.05$ in each treatment and $p < 0.01$ jointly over all treatments.

But these results have to be viewed with caution because the tests merely state that a mean was found around these values. Since the t-test is less strict than a Wilcoxon test, it could also document the lack of a treatment effect which was already determined by the Wilcoxon test. In addition, it does not carry any information which circumstance is causative for the effect on the mean. It might both be an anchor effect or a treatment effect that was too small to be tracked by a nonparametric test. A larger sample size is needed to assess this problem but given the information from the t-tests, it is more sensible to assume that this effect is either caused by anchoring or an exogenous preference of individuals for a donation level near GBP 1. This is in line with the results of the Wilcoxon test.

Figure 14: Histogram of donations by treatment



Consolidated Treatment Groups according to Gifts

If the treatment groups are consolidated into the condition whether or not a gift was given (to be described by a dummy variable "gift_dummy"), an effect is however observable (see table 3). An OLS regression with clustered standard errors, i.e., where the assumption of within-group independence is relaxed, yields a significant ($p = 0.013$) effect of providing a gift. Given that one pen cost GBP 0.23, the effect accounts for GBP 0.52 higher average donations and let the gifts pay for themselves with an impressive return of 128%.

Table 3: Regression of donation levels contingent on "gift_dummy" with clustered standard errors

Donation Level	Coefficient	Rob. Std. Error	t-Statistic	p>|t|	[95% Confidence Interval]	
gift_dummy	0.52	0.12	4.31	0.013	0.19	0.86
constant	1.75	0.06	27.24	0.000	1.58	1.93

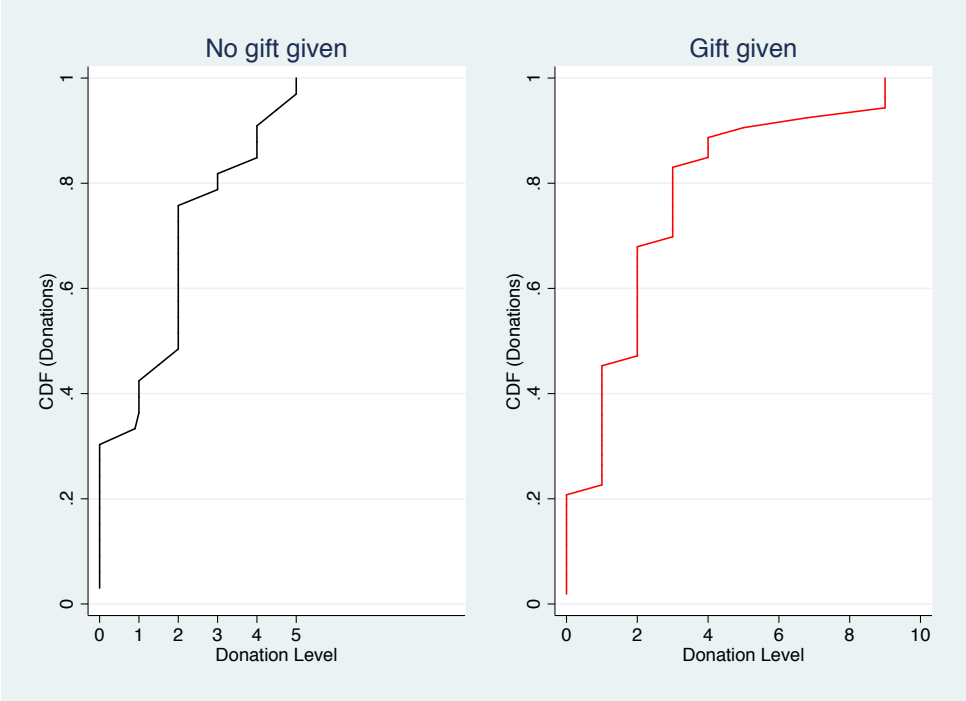
It is however debatable whether this return stems from a preference to reciprocate disproportionately high. Individuals from the remaining two groups valuated the gift at GBP 1.74[13], meaning that a donation above this amount is needed to relieve an individual of the disutility of not reciprocating. If only Fehr & Gächter's (2000) model of reciprocity would be considered[14] this would suggest a reciprocity or "guilt" factor of 0.30 in this sample, at the lower end of the spectrum of measured factors between 0.1 and 0.75.

Following this logic, the model would only predict higher donation levels for individuals with $\beta < 1.74$ as any individual with a higher β would already intrinsically choose a higher donation level. Thereby the model would predict an increase of donations between 0 and 1.74, a decrease in refusals to donate, and no change in the distribution of donations above 1.74. But this is not observed in the data (see Figure 15): Although the probability for non-zero donations below GBP 1.74 is almost twice as high, the effect of a gift is mainly caused by large donations above GBP 5 which were not given in the treatments without gifts. A two-sample Kolmogorov-Smirnov test also does not reject H_0 of equal distribution functions with $p = 0.549$. This is in clear contrast to the prediction of the model.

[13] With a 95% confidence interval of $[1.13; 2.36]$, showing a standard deviation of 0.3. All except one of the 33 observations were larger than zero.

[14] However, still with the assumption that only transfers between wealth are of importance (see Section 3.1).

Figure 15: Cumulative distribution functions separated by existence of gift



"Crowding in" of Small Donations

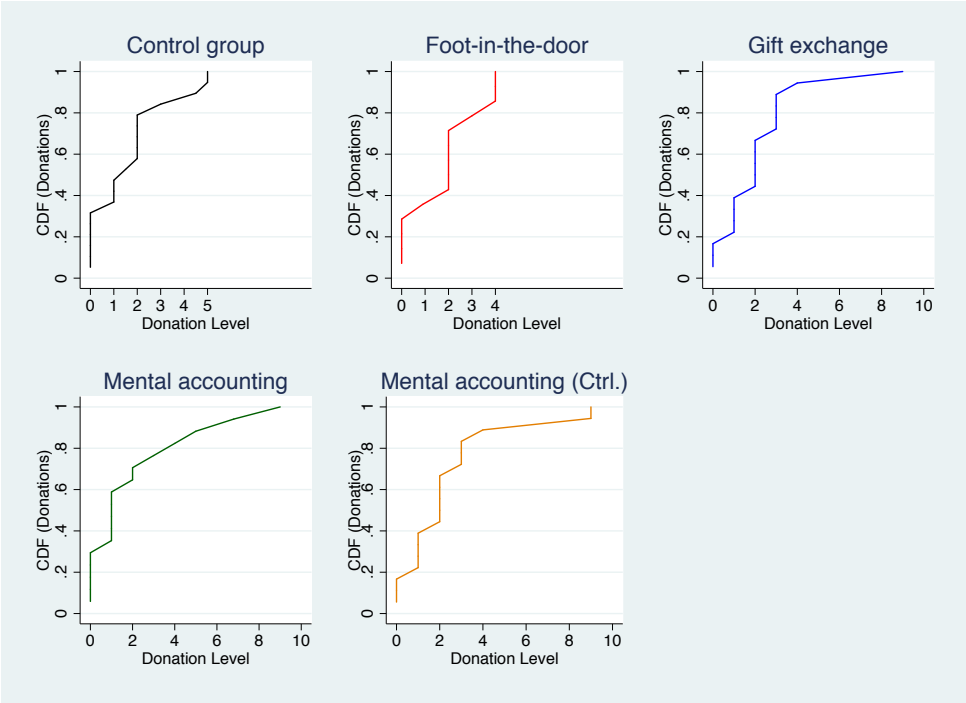
Another prediction of the model would be the "crowding in" of small donations across treatments, i.e., individuals who would follow a lower corner solution and donate nothing are be "nudged" to donate a little amount. This would be induced by a higher β', i.e., preference for donating, in the foot-in-the-door and mental accounting groups and an aversion to donate an amount much smaller than the value of the pen in the gift treatment as described in the previous paragraph. This means that the cumulative distribution function (CDF) of the control treatment would be highest for donations equalling zero and between the CDFs of the foot-in-the-door group and the groups with gifts in the interval $(0; 1.74)$. Afterwards, the control CDF is predicted to be equal to the gift exchange group's CDF above 1.74 but below the CDFs of the remaining groups. Again, this is refuted by the data (see Figure 16). Although a slight crowding in effect can be observed in the Gift Exchange and mental accounting control treatment, it is not observed in the mental accounting group.

Also, unlike predicted, high donations prevail in treatments with gifts and not only in the foot-in-the-door and mental accounting groups. A two-sample Kolmogorov-Smirnov test does not reject H_0 of equal distribution functions with p-values consistently above 0.95 for all treatments compared to the control group. Therefore it is not advisable to over interpret individual parts of the CDFs but the hypotheses can be rejected.

Prevalence of Large Donations

Even more against the predictions of the model, Cuzick's (1985) extension of the Wilcoxon test finds a weak treatment effect on the propensity of participants to donate all of their earnings with $p = 0.080$. Still, a Wilcoxon test rejects this notion with $p = 0.141$ if no trend is considered and only 4 participants in the sample of 86 did donate everything. Given that 94% of participants donated GBP 5 or less, the reason might be that these outliers distorted the test statistic since they are much more weighted given a mean of GBP 2.08 and a lower bound of zero. A larger sample would be needed to see whether this effect persists.

Figure 16: Cumulative distribution functions of donations by treatment



Order Effects of Gift Giving

Another statistically significant effect is found when the order of the parts of the experimental treatment is taken into account. Assuming clustered standard errors, the treatments that start off with a gift (gift exchange and mental accounting control) show a significant ($p = 0.037$) effect of 0.50 on donation levels compared to the remaining treatments. Following Kube's (2012) hypothesis that gift exchange effects work via strengthening a relationship, a possible explanation could be that any social capital that has been built by a gift is again destroyed when the individual realises that she might have received it as a payment for an action. However, the effect loses significance if only the subgroups with gifts are considered and not the whole sample ($p = 0.370$) and the effect also becomes weaker (only 0.17).

This still provides insight: individuals seem to donate more if the preceding interaction with a charity is less about an exchange in things of value and more if a gift incentivised them to act more cooperatively towards the charity. Of course, all individuals were asked for money, it is just observed that donations are higher if this request is resolved out of a setting that seems more social and where the charity seems less self-interested.

Table 4: Regression of donation levels contingent on treatment starting with a gift, signified by the dummy variable "giftfirst", with clustered standard errors

Donation Level	Coefficient	Rob. Std. Error	t-Statistic	p>|t|	[95% Confidence Interval]	
giftfirst	0.44*	0.19	2.30	0.083*	-0.09	0.97
constant	1.89	0.14	13.76	0.000	1.51	2.28

*p<0.1

4.2 Inter-individual Differences

Interaction Effects

The predictions for the treatment effects build both on extrinsic and intrinsic motivation. One of the risks of extrinsic motivation is that it can crowd out intrinsic motivation and thereby induce unintended behaviour (Frey & Jegen, 2001). Intrinsic motivation in this

experiment can be inferred from a variety of answers: Reported altruistic behaviour, preferences over charities, and reported donation levels.

The self-report altruism score (Rushton *et al.*, 1981) showed a positive effect of 0.50 on donation levels but was not statistically significant. Participants also filled out a survey over their preferences towards charities, marking them on a scale from 1 (lowest) to 5 (highest). On average, participants rated "Efficient Management of Funds" (1.6) and "Transparent Structure" (1.7) as the lowest and "Contact to fundraisers and other donators" (3.1) and "Show other people that you donate" (4.1) among the highest, suggesting a strong preference towards warm-glow effects and not towards other-regarding preferences (see Table 5).

Table 5: Preferences of participants towards charities (1 - lowest, 5 - highest)

Item	Mean	Std. Dev.	Min	Max
Efficient Management of Funds	1.60	0.83	1	5
Transparent Structure	1.66	0.89	1	5
Reputation of charity	1.87	1.09	1	5
Specialised Purpose	1.94	0.99	1	5
Goals reflect own political worldview	2.76	1.07	1	5
Contact to fundraisers and other donators	3.14	1.13	1	5
Charity acts in accordance with own religious beliefs	3.22	1.29	1	5
Show other people that you donate	4.13	1.16	1	5

Table 6 shows the results of a within-group regression with clustered standard errors to estimate the influence of these preferences along with their habitual level of donating: Efficiency concerns over a charity's management have a significant negative effect on donations (contingent on the mean of the treatment group) while a priority for a reflection of religious beliefs has a highly significant positive effect. This cannot be interpreted conclusively: Individuals who care about efficient spending of a charity are likely to be well informed in that respect. They might save their gains to spend a part of them to their preferred charity instead of having a low motivation for donating.

Table 6: Within-group regression of donation levels on charity preferences, with clustered standard errors

Donation Level	Coefficient	Rob. Std. Error	t-Statistic	p>|t|	[95% Confidence Interval]	
Usual Charity Spending (6-point scale)	0.31	0.34	0.92	0.41	-0.63	1.26
Efficienct Management of Funds	-0.37**	0.07	-5.37	0.01**	-0.55	-0.18
Transparency	0.37	0.33	1.10	0.33	-0.56	1.30
Reputation of Charity	0.44	0.44	1.00	0.38	-0.79	1.67
Specialised Purpose	-0.49	0.39	-1.26	0.28	-1.57	0.59
Political Purpose	0.20	0.26	0.76	0.49	-0.52	0.92
Establishes Contact to other Donators	-0.42	0.24	-1.76	0.15	-1.09	0.24
In Accordance with religious Beliefs	0.47*	0.19	2.42	0.07*	-0.07	1.01
Show that you donate	0.20	0.15	1.32	0.26	-0.23	0.63
constant	0.40	1.47	0.27	0.80	-3.67	4.47

*p<0.1; **p<0.05

Furthermore, approximately 67% of participants donated GBP 30 or less during the last 12 months for charity[15]. 13 individuals (15%) donated GBP 61 or more and were considered to have a high preference for donations. Therefore it is assumed that the sample mainly consists of individuals with a low intrinsic motivation for charitable giving and a subset of 13 individuals with a high motivation in this regard. A dummy variable "char_high" for this subset of individuals could not predict donation levels ($p = 0.306$). But when treatments with gift effects are taken out of the sample, the dummy variable char_high shows a weakly significant ($p = 0.079$) effect on donation levels, increasing them GBP 1.13 (see Table 7). Vice versa, it does **not** show a significant effect in treatments where gifts were given out ($p = 0.734$, see Table 8). This suggests two things: First, a gift treatment does not induce higher donations among individuals with an already high preference for giving. Second, it also does not decrease their donations. This is especially important as a crowding out of intrinsic motivation can pose a long-term risk towards a charity's earnings[16]. If this mechanism holds for larger samples, a gift treatment would only affect individuals that are

[15]This was measured by a 6-point scale, where every GBP 30 within the last 12 months scored one point, starting at GBP 0-30 and ending at 6 points for more than GBP 180.

[16]As already discussed by Falk (2007) who argued that crowding out does not occur on average over the sample of a fund-raising campaign in Switzerland in 2001 (see Section 1.3).

unaccustomed (but not unwilling) to donate.

Table 7: Regression of donation levels contingent on char_high in **non-gift** treatments

Donation Level	Coefficient	Rob. Std. Error	t-Statistic	p>|t|	[95% Confidence Interval]	
char_high	1.13*	0.62	1.82	0.079*	-0.14	2.40
constant	1.48	0.31	4.82	0.000	0.85	2.11

*p<0.1; **p<0.05

Table 8: Regression of donation levels contingent on char_high in **gift** treatments

Donation Level	Coefficient	Rob. Std. Error	t-Statistic	p>|t|	[95% Confidence Interval]	
char_high	0.34	1.58	0.21	0.851	-6.45	7.12
constant	2.23	0.11	20.20	0.002	1.76	2.71

*p<0.1; **p<0.05

Social Pressure and Personality Dimensions

An incentive to donate does not necessarily increase the utility of an individual during this experiment. Any gift or action towards a participant also increases social pressure. In a feedback form to be completed after finishing the experiment, one participant (in the gift exchange group) complained that the experiment was a "guilt trip into donating money" instead of a well-meaning experiment. Others were justifying their low donation levels even though anonymity was guaranteed and their identity could not be determined. These reactions can be explained as a rationalisation of their action in response to a disutility of not having donated "enough" and the avoidance of social sanctions in case their choices might be discovered.

The other obvious way to avoid this social pressure would be to give in and actually donate more. And the more someone is exposed to social pressure, the higher the incentive is to conform to a request for donations (DellaVigna *et al.*, 2012). A within-group regression with clustered standard errors shows that individuals with a high Big Five score for

neuroticism did indeed donate GBP 0.59 more for every step on the 5-point scale towards higher neuroticism (although only weakly significant with p=0.097). This would imply that these individuals do not donate solely out of altruism but are susceptible to social cues that force them to give up part of their earnings. If this is the case, these treatments would have an effect but might also trigger strong avoidance reactions if employed in the field.

Still another driver for conforming to donation requests is the preference to comply with norms, in this case assumed to be correlated with conscientiousness. This can be compared with the effect that participants in experiments often adhere to social norms despite no negative consequences if they choose not to (List, 2005). But instead, the same regression yields a weakly significant ($p = 0.055$) negative coefficient on donation levels by the conscientiousness score. Checking correlations between the personality dimensions yields a strong correlation of -0.32 between conscientiousness and neuroticism in the sample, which the Big Five scale is built to rule out. If the regression is expanded to cover all five personality dimensions, no significant effect remains.

From this follows that neither neuroticism nor conscientiousness are adequate to predict donation levels in this sample. However, another measure could serve as a proxy for participants' sensitivity towards social pressure. Especially because of the observed rationalisation behaviour of participants, a short version of the repression-sensitisation scale (Byrne, 1961) might provide better results although repressing behaviour is also possibly correlated to neuroticism (Lazarus-Mainka *et al.*, 1980).

Table 9: Regression of donation levels contingent on Big Five personality dimensions in gift treatments

Donation Level	Coefficient	Rob. Std. Error	t-Statistic	p>|t|	[95% Confidence Interval]	
Conscientiousness	-0.68*	0.17	-4.09	0.055*	-1.39	0.03
Agreeableness	-0.12	0.59	-0.20	0.863	-2.67	2.43
Openness	-0.11	0.27	-0.40	0.728	-1.25	1.04
Neuroticism	1.17*	0.39	2.98	0.097*	-0.52	2.86
Extraversion	1.36	0.58	2.35	0.143	-1.13	3.85
constant	-3.01	1.27	-2.36	0.142	-8.48	2.47

*p<0.1; **p<0.05

4.3 Criticism

The biggest weakness of this experiment lies in the instance that individuals usually only donate a part of their earnings and therefore the differences in average donation levels between treatments are not large enough for an effect to be observed. Especially if the foot-in-the-door and the gift exchange effect behave additive and mental accounting does not work in this experiment, it would require a very large sample to find a statistically significant effect. This is further obstructed by the large inter-individual differences in preferences of charitable giving: Individuals that donate all of their earnings distort test statistics where inner solutions are to be investigated and other participants prefer to choose whole numbers that only partly reflect their exact optimal choice.

Another detriment is that people have different preferences over causes for charity. Participants that were regularly donating to charity might be well-educated about opportunities for giving and might keep their earnings in order to donate them for another cause or at another time as they are used to giving regularly.

The truthfulness of participants' answers can always distort findings, especially in case of socially desired behaviour like charity spending. Individuals with a high preference for the item "show other people that you donate" might have an incentive to overreport their usual donation levels. In fact, this item is a weakly significant positive predictor for reported levels of giving (see Appendix, Section 6.3, for the regression). Then they could be mistakenly assigned to have a high motivation for giving because they want to be perceived as giving despite not actually doing it. If this is the case, past donation behaviour is underestimated in this sample as a predictor for the ad hoc donation in this experiment.

A further risk lies in the experimental design: including a windfall effect poses a large risk that individuals follow the windfall as an anchor instead of deliberately deciding which amount they find optimal. Even in a larger sample where no anchoring effect is found as by Reinstein *et al.* (2012), there is still a risk that a subpopulation is prone to this effect.

Another issue might lie in "material priming" effects (Kay *et al.*, 2004). Individuals that received a gift or provided their signature were exposed to items that were associated

with the charity, unlike the control group. Therefore their interaction was closer with the charity, which might also exhibit undocumented effects. Also, participants in the control and foot-in-the-door group were asked to valuate the gift in GBP. An exposure to monetary problems has been documented to influence participants of experiments to behave more selfish (Vohs *et al.*, 2006) which has not been accounted for in this experimental design.

5 Discussion

In this paper, a model was developed which is able to predict the foot-in-the-door, gift exchange, and mental accounting effect. The assumptions of normal but non-constant preferences and reciprocal preferences predict that the foot-in-the-door effect leads individuals to increase their preference for charitable giving and donate more unless they previously had a very low preference (corner solutions are still possible). In case of a gift exchange treatment, the model predicts that individuals who would otherwise give relatively little would increase their donations to avoid disutility out of an aversion not to act reciprocal, while actual preferences for charitable giving remain unchanged. In case of the mental accounting treatment, the model assumes that previously experienced exchanges become irrelevant but that the change in preferences is subject to a spill-over which increases all individuals' preferences for donations, leading to higher donations for each individual short of corner solutions.

These predictions were tested in a laboratory setting where a foot-in-the-door setting was created by asking people for a supportive signature and a gift was given in form of a pen. After a questionnaire to measure personality dimensions, charity preferences, reciprocal and altruistic motives, participants' donation choices were recorded to measure a treatment effect on charitable giving.

Neither a foot-in-the-door effect nor a mental accounting effect could be documented and the distribution of donation choices did not follow the predictions of the model. Instead, providing a gift significantly increased the number of large donations but only among participants who did not report to regularly donate high amounts. Therefore gifts provide

an incentive for large donations only to extrinsically motivated participants. This stands in contrast to Falk's (2007) findings where a gift exchange effect crowded in smaller donations but left the frequency of large donations unaffected. However, Falk observed recipients of letters from a charity campaign who did not act in a social setting. In this experiment, if a gift was not preceded by an action for the charity and thus entirely unsolicited, participants donated significantly more. This suggests that a more social setting can increase reciprocal behaviour if it creates a social relationship, in accordance with Kube (2012). It can be argued that this explains why participants with a high neuroticism score donated more, potentially out of a feeling of obligation. However, intercorrelations among personality dimensions in this sample prevented a conclusion whether this was a causal factor.

If social settings and social pressure do play a role and its effects differ among subpopulations, a measure for both needs to be found and inter-individual differences need to be controlled. For the former, order effects can only provide a weak intuition and further research would need to formalise a model to at least provide a rough estimation. For the latter, sensitivity to social pressure, difference between actual and professed donation behaviour, and an intrinsic motivation for donating would need to be measured. Together, interaction effects could be explored that would predict behaviour according to individual characteristics and with more precision. To provide a recommendation for charity campaigns in the field, this also needs to be applied to a large sample due to the high variance in donation choices which further impedes an efficient estimation.

In conclusion, social pressure and social interactions can be deemed crucial in measuring behavioural biases towards charitable giving but are still poorly understood. Further research also needs to account for the possibility that individual dispositions are not supplemental but decisive in reactions to these factors. These two key aspects could then be applied to economic theory in general.

6 Appendix

6.1 Loss Aversion

If loss aversion is allowed, rank-dependent expected utility value functions (Quiggin, 1982) would need to satisfy not only:

$v_x(c) > v'_y(c) > v_y(c) > 0, \forall c \epsilon \mathbb{R}^+$

But also:

$-v_y(-c) > v_y(c), \forall c \epsilon \mathbb{R}^+$

This means that losses exert a higher disutility than equal gains. Expanding the utility function from Section 3.10, this would be problematic as the logarithm converges to $-\infty$ while approaching zero. Still, a workaround could be used. E.g.:

$$u_i(x_i, y_i) = \begin{cases} ln(x_i^\alpha) + ln(y_i^\beta + 1) & for\, y_i > 0 \\ ln(x_i^\alpha) + -bln(-y_i^\beta + 1) & for\, y_i < 0 \end{cases} \text{ with } b > 1.$$

However, loss aversion over earnings and donations does not need to be defined in this experiment as both x_i and y_i are always larger than or equal to zero. In this model, loss aversion can be experienced in the negative reciprocity term.

Modifying

$\gamma^+ min\{y_i - value(action); 0\}$

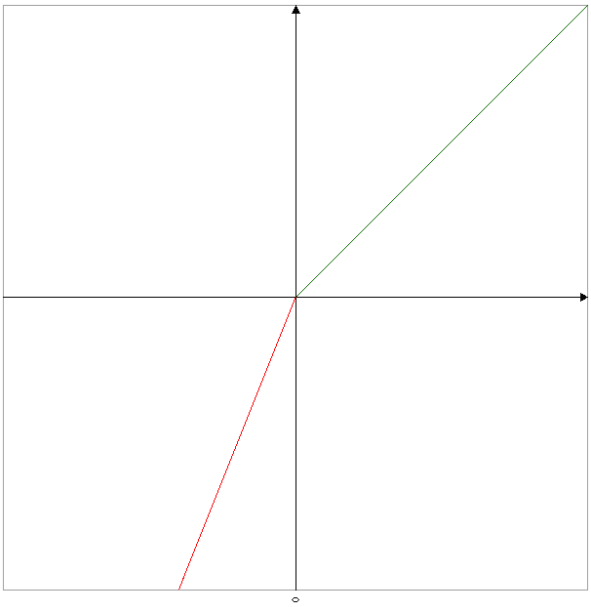
to

$$neg.reciprocity(y_i; action) = \begin{cases} \gamma^+ min\{y_i - value(action); 0\} & for\ -value(action) < y_i \\ \gamma^{++} min\{y_i - value(action); 0\} & for\ -value(action) > y_i \end{cases}$$

with $\gamma^{++} > \gamma^+$.

This is a very simple measure of loss aversion and unlikely to predict sensible results for multiple items and large sums. But in case of this experiment it serves as a simple measure to model a higher disutility over losses, as seen in the stylised function in Figure 17:

Figure 17: Stylised utility function over gains and losses in the negative reciprocity term with constant y_i and utility on the y-axis. $value(action)$ on the x-axis.



This leads to a slightly higher utility for values of y_i that are still smaller than $-value(action)$, i.e., an individual regards her own action as more of a favour than she would if she was on the receiving end. This leaves individuals with a high β' unaffected but individuals close to the corner solution are further incentivised to give less which predicts a lower average level of donations over the whole population of the foot-in-the-door treatment.

For an overview of differences in predictions with different constraints, see Figure 17 and 18. Refer to Section 3.11 for an explanation of the differences in predictions:

Figure 18: Predicted donation levels according to parameters (simplified inner solution, given $\bar{d}_3 - \bar{d}_0 > \bar{d}_2 - \bar{d}_0$ in mental accounting case)

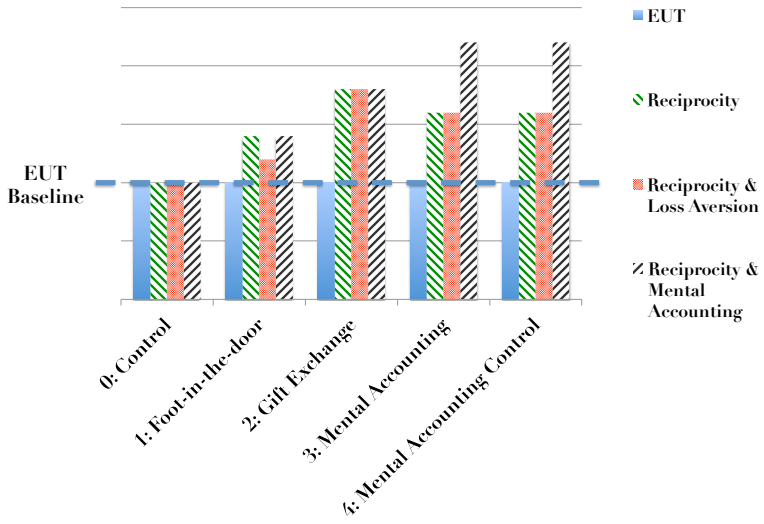
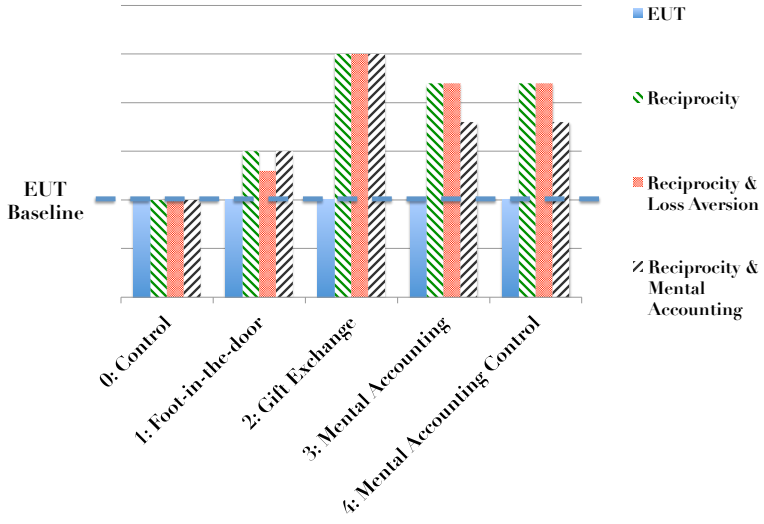


Figure 19: Predicted donation levels according to parameters (simplified inner solution, given $\bar{d}_3 - \bar{d}_0 < \bar{d}_2 - \bar{d}_0$ in mental accounting case)



6.2 Test Statistics

Wilcoxon Test

Table 10: Two-sample Wilcoxon rank-sum test over donation levels: Control Group vs. Foot-in-the-door Group

H0: donate(Control) = donate (Foot-in-the-door)

Treatment	Observations	Rank Sum	Expected
Control	19	312	323
Foot-in-the-door	14	249	238
Combined	33	561	561
Unadjusted Variance	753.67		
Adjustment for Ties	-42.83		
Adjusted Variance	710.84		
z-Statistic	-0.413		
p > |z|	0.680		

Table 11: Two-sample Wilcoxon rank-sum testover donation levels: Control Group vs. Gift Exchange Group

H0: donate(Control) = donate (Gift Exchange)

Treatment	Observations	Rank Sum	Expected
Control	19	334	361
Foot-in-the-door	18	370	342
Combined	37	703	703
Unadjusted Variance	1083.00		
Adjustment for Ties	-47.47		
Adjusted Variance	1036.53		
z-Statistic	-0.854		
p > |z|	0.393		

Table 12: Two-sample Wilcoxon rank-sum testover donation levels: Control Group vs. Mental Accounting Group

H0: donate(Control) = donate (Mental Accounting)

Treatment	Observations	Rank Sum	Expected
Control	19	348	352
Foot-in-the-door	17	318	315
Combined	36	666	666
Unadjusted Variance	995.92		
Adjustment for Ties	-46.78		
Adjusted Variance	949.13		
z-Statistic	-0.114		
p > |z|	0.910		

Table 13: Two-sample Wilcoxon rank-sum testover donation levels: Control Group vs. Mental Accounting Control Group

H0: donate(Control) = donate (Mental Accounting Control)

Treatment	Observations	Rank Sum	Expected
Control	19	330	361
Foot-in-the-door	18	373	342
Combined	37	703	703
Unadjusted Variance	1083.00		
Adjustment for Ties	-45.32		
Adjusted Variance	1037.68		
z-Statistic	-0.962		
p > |z|	0.336		

Kruskal-Wallis Test

Table 14: Kruskal–Wallis equality-of-populations rank test by treatment group

H0: all samples from the same population

Treatment	Observations	Rank Sum
Control	19	753
Foot-in-the-door	14	609
Gift Exchange	18	833
Mental Accounting	17	696
Mental Accounting Control	18	851

Chi-squared Statistic	1.253	(4 degr. of. freedom)
Probability	0.869	
Chi-squared Statistic with ties	1.304	(4 degr. of. freedom)
Probability	0.861	

Table 15: Kruskal–Wallis equality-of-populations rank test by treatment group, excluding corner solutions, i.e., samples where donations equal 0 or 9.

H0: all samples from the same population

Treatment	Observations	Rank Sum
Control	13	415
Foot-in-the-door	10	355
Gift Exchange	14	421
Mental Accounting	11	326
Mental Accounting Control	13	376

Chi-squared Statistic	0.953	(4 degr. of. freedom)
Probability	0.917	
Chi-squared Statistic with ties	1.025	(4 degr. of. freedom)
Probability	0.906	

Cuzick's Extension of the Wilcoxon Test

Table 16: Cuzick's (1985) test for a trend in donations across ordered groups

H0: no trend in donation levels across treatment groups

Treatment Group	Observations	Score	Sum of Ranks
Control	19	1	754
Foot-in-the-door	14	2	609
Gift Exchange	18	3	833
Mental Accounting	17	4	696
Mental Accounting Control	18	5	851
z-Statistic	0.730		
p > |z|	0.467		

*p<0.1; **p<0.05

Table 17: Cuzick's (1985) test for a trend in "**donate all**" decisions across ordered groups

H0: no trend in "donate all" choices across treatment groups

Treatment Group	Observations	Score	Sum of Ranks
Control	19	1	789
Foot-in-the-door	14	2	581
Gift Exchange	18	3	790
Mental Accounting	17	4	749
Mental Accounting Control	18	5	833
z-Statistic	1.750		
p > |z|	0.080*		

*p<0.1; **p<0.05

t-Test

Table 18: One-sample t-test for a mean at 2, excluding corner solutions, i.e., samples where donations equal 0 or 9

H0: mean(Donation)=2

Variable	Observations	Mean	Std. Error	Std. Dev.	[95% Confidence Interval]	
Donation	61	2.34	0.17	1.30	2.01	2.67

t= 2.0546 (60 degr. of freedom)

Hypothesis			
	mean(Donation)<2	mean(Donation)≠2	mean(Donation)>2
	P(T<t)= 0.977	P(|T|>|t|)=0.045**	P(T>t)= 0.023**

*p<0.1; **p<0.05; ***p<0.01

Table 19: One-sample t-test for a mean at 1, excluding corner solutions, i.e., samples where donations equal 0 or 9

H0: mean(Donation)=1

Variable	Observations	Mean	Std. Error	Std. Dev.	[95% Confidence Interval]	
Donation	61	2.34	0.17	1.30	2.01	2.67

t= 8.0735 (60 degr. of freedom)

Hypothesis			
	mean(Donation)<1	mean(Donation)≠1	mean(Donation)>1
	P(T<t)= 1.000	P(|T|>|t|)=0.000***	P(T>t)= 0.000***

*p<0.1; **p<0.05; ***p<0.01

6.3 Evidence for socially desired Answering

The item "show other people that you donate" on a 5-point score, to be called "char_status", could serve as a proxy to measure participants willingness to overreport their usual frequency and amount of charitable giving. As with the variable for frequency of giving, "char_status" cannot predict donations in the experiment with $p > 0.23$. Neither can a regression with both variables.

The statistically significant effects of a higher score in "char_status" on reported charity spending and being sorted into the subset of intrinsically motivated donators are detailed in Tables 21 and 22:

Table 20: Regression of reported charity spending (6-point scale) on desire for status in charitable giving (5-point scale) with clustered standard errors

Reported Level of Charitable Giving	Coefficient	Rob. Std. Error	t-Statistic	p>|t|	[95% Confidence Interval]	
"Show other people that you donate"	0.28*	0.10	2.69	0.055*	-0.01	0.56
constant	-0.46	0.33	-1.38	0.239	-1.37	0.46

*p<0.1; **p<0.05

Table 21: Regression of being assigned the dummy variable "char_high" for high motivation for donating on desire for status in charitable giving (5-point scale) with clustered standard errors

Assigned dummy variable "char_high"	Coefficient	Rob. Std. Error	t-Statistic	p>|t|	[95% Confidence Interval]	
"Show other people that you donate"	0.06*	0.03	2.46	0.07*	-0.01	0.13
constant	-0.08	0.09	-0.94	0.402	-0.33	0.16

*p<0.1; **p<0.05

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