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Moral relativism as a disconnect between behavioural and experienced warm glow

Eamonn Ferguson [a], Niall Flynn [b,*]

[a] School of Psychology, University of Nottingham, University Park Campus, Nottingham NG7 2RD, United Kingdom
[b] Department of Economics, University of Innsbruck, Univeritaetsstrasse 15, Innsbruck 6020, Austria

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ABSTRACT

We examine the robustness of warm glow preferences to changes in the choice set. Behavioural warm glow is measured using the crowded-out charity dictator game of Crumpler and Grossman (2008). In the give treatment, subjects could donate any part of their endowment to charity where their donations completely crowd out the charity's own initial endowment. In the give/take treatment, the option to take any part of the charity's endowment was added to the subjects' choice set. Experienced warm glow is measured by a series of post-decision self-reports of positive affect. Within each treatment behavioural and experienced warm glow are positively correlated, such that the more subjects donated to charity the better they claimed to feel about themselves. However, when comparing across treatments the addition of the take option results in a fall in behavioural warm glow but a rise in experienced warm glow. We interpret these results as evidence for (i) a utility function increasing in both money and morality and (ii) a type of moral relativism whereby the morally good action is defined in relation to the available options. This means that utility is derived from both the chosen option and from foregone opportunities, the implication of which is that the transitivity axiom becomes practically unfalsifiable.
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1. Introduction

The existence of warm glow preferences, where utility is derived from the act of giving as opposed to its consequences, has significant implications for economics. In the theoretical literature, the more commonly assumed consequentialist motivation for giving, called altruism, results in the complete crowding out of an individual's voluntary donation by donations from other sources. Termed the neutrality hypothesis, consequentialist altruism can render governments' charitable donations as completely ineffectual (Bergstrom, Blume, & Varian, 1986; Warr, 1982) and, when applied to intergenerational transfers, results in Ricardian equivalence (Barro, 1974).

* Corresponding author.
E-mail addresses: eamonn.ferguson@nottingham.ac.uk (E. Ferguson), niall.flynn@uibk.ac.at (N. Flynn).

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Andreoni (1989, 1990) shows that when warm glow preferences are at least part of the motivation for giving then the complete crowding out result no longer holds. He contrasts altruistic preferences, where giving is motivated entirely by its outcome, with warm glow preferences, where the motivation is independent of the outcome. In the context of public goods, altruistic preferences can be defined by $u(x_i, G)$ and warm glow preferences by $u(x_i, g_i)$, where in each case utility is increasing in both of its arguments. Here, x_i is an individual's own income, g_i is their own contribution to the public good and G is the total level of the public good. This distinction gives complete crowding out with altruistic preferences, zero crowding out with warm glow preferences and partial crowding out when both types are present.

The label "warm glow" (Andreoni, 1989) and its description as a "joy of giving" (Ribar & Wilhelm, 2002) both allude to some kind of positive experienced utility. However, as defined by Andreoni (1989), warm glow preferences are entirely behavioural, explicitly defined as the act as opposed to the outcome and are independent of any actual experienced emotions, warm or otherwise. For the purpose of clarity, in this paper we define warm glow preferences as behavioural warm glow and any associated positive affect as experienced warm glow. By measuring each type separately in a dictator game where the choice set varies between treatments, we examine further the nature of warm glow preferences, their connection to experienced positive affect and the importance of this relationship in explaining violations of menu independence in allocation decisions.

Our procedure for measuring behavioural warm glow is taken from Crumpler and Grossman (2008). In their charity dictator game experiment both dictator subjects and charity recipients each begin with an initial $10 endowment. Dictators are given the opportunity to give all, part or none of their endowment to the charity recipients. However, their donations are subject to one-to-one crowding out, whereby for every dollar they give the charity's initial endowment falls by one dollar, meaning the final outcome of a $10 donation to charity is independent of subjects' choices. Hence, any donation to the charity is assumed to be motivated solely by the act of giving rather than its consequences and is interpreted as a measure of behavioural warm glow. Their results indicate extensive behavioural warm glow with 57% of subjects making a positive donation and a mean allocation of $2.08.

We repeat the Crumpler and Grossman design with two notable additions: post-decision measures of experienced warm-glow and an alternative treatment with an expanded choice set. In our design subjects are randomly allocated to one of two treatments. In the first treatment, termed the give treatment, subjects initially receive a £2 earned endowment for themselves and also choose a charity to receive a provisional £2 donation, termed the experimenter donation. They are then given the opportunity to give all, part or none of their £2 endowment to the charity on the understanding that whatever amount they give the experimenter donation will fall by the same amount, meaning the charity will always receive exactly £2 irrespective of their decision.

In the second treatment, termed the give/take treatment, the procedure is identical except that subjects also have the opportunity to take all, part or none of the initial experimenter donation for themselves. Hence, the choice set in the give treatment ranges from £0 to +£2, whereas its range is expanded to −£2 to +£2 in the give/take treatment. Although giving is still crowded out in the give/take treatment, there is no crowding in or out for taking. In both treatments, post-decision measures of experienced warm glow are taken in the form of three questions, which ask subjects to rate their degree of positive affect.

In the give treatment, our results are similar to Crumpler and Grossman (2008) with 54% of subjects displaying behavioural warm glow by making positive allocations, with a mean allocation of £0.54. The addition of the take option significantly reduces allocations, as is the case in the dictator games of Bardsley (2008) and List (2007). In the give/take treatment 27% of subjects make positive allocations, 3% (one subject) choose to take, while the remainder does neither.[1] Here the mean allocation falls to £0.24. The proportion of subjects giving zero rises from 46% in the give treatment to 70% in the give/take treatment. Given any conventional outcome-based formulation of utility, this significant increase suggests a failure of expansion consistency and intransitive preferences.

Within each treatment behavioural warm glow is positively correlated with experienced warm glow, and a cursory analysis of this relationship may suggest that each type should be subject to the same treatment effect. However, this is not the case. Whereas the take option reduces behavioural warm glow, its inclusion increases experienced warm glow. The aggregate measure of experienced warm glow is significantly higher in the give/take treatment than in the give treatment, and this difference and significance are increased once the lower level of allocations in the give/take treatment is controlled for.

We contend that this pattern, of counter-directional treatment effects, is consistent with a model of decision making that is as emotional as it is reasoned, whereby a desire for experienced warm glow is the motivation behind behavioural warm glow. In our model, utility is increasing in both money and morality, where larger donations to charity buy a greater sense of morality in the form of higher experienced warm glow. However, the connection between giving and morality, that is the connection between behavioural and experienced warm glow, is subject to a form of moral relativism, such that the morally good action is defined in relation to the available alternatives.

In the experiment, being given the opportunity to do a bad thing, such as taking money from a charity, and not taking this opportunity is itself viewed as a good thing, and good to a sufficient degree such that subjects feel less need to make what are inconsequential donations. Expanding the lower bound of the choice set means any given donation is further away from the

[1] Luccasen and Grossman (2013) report a behaviourally similar design, expect that subjects' income is crowded out if they take from the charity. Even in the absence of a financial incentive to take, they still find reduced allocations in their give/take treatment.

morally worst possible option and is, consequently, viewed as being relatively better. This relationship can be thought of as being similar to lowering the price of morality, meaning that any given level of experienced warm glow can be achieved with a lower donation in the give/take treatment than in the give treatment. In this sense, expanding the choice set alters the morality of any absolute action, which acts as a disconnect between behavioural and experienced warm glow.

In Section 5 we argue that given the positive correlation between behavioural and experienced warm glow, their counter-directional changes across the treatments are inconsistent with alternative explanations such as experimenter demand effects or an inherent middle bias. The moral relativism interpretation we report not only describes the nature of the behavioural and experienced warm glow relationship, but also offers an explanation for the menu independence violations observed in other allocation type games.

The remainder of the paper proceeds as follows. Section 2 reviews much of the relevant previous literature, concentrating on both field and experimental evidence for warm glow preferences, measures and effects of experienced warm glow and the implications of choice sets on decisions. Section 3 describes the specifics of the experimental design. Section 4 outlines the results. And in Section 5 we discuss our interpretation of these results, in the form of a desire by subjects to make moral choices, the definition of which are subject to comparisons made against the available options. We conclude in Section 6 and discuss the implications of our results for the falsifiability of the transitivity axiom.

2. Previous literature

Evidence for warm glow preferences often takes the form of lack of evidence for the alternative, namely the failure to observe the implications of altruistic preferences. Andreoni (1988) shows that in a public good model, consequentialist motivations for giving imply that as the economy becomes large the fraction of individuals making voluntary contributions approaches zero. Yet for the US, data on the prevalence of donators seems to refute this, with estimates generally above two thirds.[2] However, the major failing of the altruistic formulation of utility, and the initial motivation for the warm glow alternative, is the failure to observe complete crowding out.

Section 2.1 reviews the empirical literature on crowding out, both the initial work based on field data and the subsequent experimental studies. Section 2.2 outlines research on experienced warm glow using both self-reported and neuroscientific measures and shows how these measures are connected and how they affect behaviour. While Section 2.3 concludes this section by examining the literature related to menu effects, both generally and more specifically for allocation experiments.

2.1. Behavioural warm glow

Field data studies on crowding out generally take the form of estimates of the effect of government grants on individuals' donations. While their results vary widely, these studies all categorically reject the complete crowding prediction of altruistic preferences, with most finding only partial crowding out but some finding none or even crowding in. In the first study to use individual data, Kingma (1989) uses a single cross section of contributions to public radio stations, finding that income from other sources significantly crowds out individual donations by 13%. However, using the same methodology on a similar data set, Manzoor and Straub (2005) find no significant crowding out for donations to public radio.

Ribar and Wilhelm (2002) use US panel data on individuals' donations to international development charities, estimating significant crowding out of 13% for government contributions and 5% for contributions from other organisations.[3] Khanna, Posnett, and Sandler (1995) use similar longitudinal data for individuals' donations to various UK charities, they find no evidence for crowding out but, for some charity sectors, significant estimates of government crowding in. Okten and Weisbrod (2000) find comparable results of no crowding out but some significant crowding in for US longitudinal data on donations to domestic non-profit organisations.

Payne (1998) argues that direct correlations of the type outlined above suffer from a possible endogeneity problem that underestimates the degree of crowding out. Using instrumental variables to control for this, she estimates a figure of 50% crowding out for US government grants to domestic charities. Yet even with partial crowding out it is still possible that preferences are completely non-consequentialist. Andreoni and Payne (2011) illustrate this point with panel data for donations to domestic US charities, estimating a figure of 76% crowding out for government grants. However, they decompose this figure into crowding out stemming from donator preferences and crowding out stemming from charities' reduced fund raising, concluding that all of the crowding out comes from a fall in fund raising activity.[4]

A number of studies have used experiments to examine the issue of crowding out and act vs. outcome preferences. Bolton and Katok (1998) use a between subject variation of the dictator game, where \$20 is initially distributed between dictator and recipient in two different ways. In the first treatment dictators begin with \$15 and recipients with \$5, whereas in the second treatment dictators begin with \$18 and recipients with \$2. Allocations are higher in the 18/2 treatment, but significantly less than the \$3 difference implied by consequential altruistic preferences, with partial crowding out of 74%.

[2] Mayr, Harbaugh, and Tankersley (2009) cite a figure of 89% of US households making charitable donations in 2003. Andreoni (2006) cites a comparable figure of 68% for 1995.

[3] See Ribar and Wilhelm (2002), Table 2, column e.

[4] See Andreoni and Payne (2011), Table 5, column 1.

In a repetition of this design with a charity as the recipient, Eckel, Grossman, and Johnston (2005) find average contributions almost identical in each treatment and an insignificant level of crowding out of only 3%. In a second version where dictators are told that from an initial allocation of $20 the charity has received a tax of either $5 or $2, crowding out increases to almost 100%. Carpenter, Liati, and Vickery (2010) report a similar design where in the first treatment dictators begin with $20 and recipients with zero, whereas in the second treatment both dictators and recipients are each endowed with $20. The results suggest zero crowding out, with more people sending more money in the second treatment. Andreoni (1993) applies the same methodology of altering initial endowments between otherwise identical treatments by shifting the payoff matrix in a public good game. Results indicate significant partial crowding out of 71%. In Andreoni (1995) he varies the frame rather than the initial endowments, where results from a standard public good game are compared with those from a consequentially identical, but differently framed, negative public good game. Preferences over outcomes would predict identical contributions in each case, whereas they are significantly lower in the negative public good game, consistent with a preference for the perception of giving.

2.2. Experienced warm glow

In Section 5 we argue that behaviour in our experiment is motivated by a desire to act morally which creates positive emotions, which we describe as experienced warm glow. This subsection outlines some of the literature that relates to emotion's role in moral judgments and their subsequent effect on behaviour. Early work in moral psychology was characterised by a reasoned, rationalist approach whereby *moral judgments* (i.e. whether an action is morally good or bad) were arrived at via conscious, contemplative deliberation. However, more recent work has emphasised the importance of both emotions and instinctive reactions.

Haidt (2001, 2007) incorporates these developments into moral psychology in his social intuitionist model of moral judgments, which distinguishes between *moral intuition*, defined as rapid, emotion driven, instinctive responses, and *moral reasoning*, defined as conscious, rational, deliberation. He concludes that it is *moral intuitions* that are the major determinant behind *moral judgments*, with *moral reasoning* often applied after the fact in order to justify decisions.

Much of the evidence cited for this conclusion comes from neuroscience.[5] Using fMRI techniques it is possible to associate subjects' decisions or responses to stimuli with changes in activity in different areas of the brain. Moll et al. (2006) demonstrate a measurable physiological basis for experienced warm glow that is comparable to that of receiving money. They use a variation of the charity dictator game to show increased activity in the ventral striatum, a reward centre associated with the control of dopamine, when subjects receive money for themselves but also similar increases when subjects give money to charity.

In a further variation on the charity dictator game, Harbaugh, Mayr, and Burghart (2007) illustrate the importance of responsibility for an outcome, in the form of the additional emotional payoff warm glow preferences have over altruistic ones. In the voluntary trials, subjects choose to accept or reject various charitable donations of a pre-determined size. In the mandatory trials, equivalently sized donations are imposed on the subjects' endowments. After controlling for income, voluntary donations produced significantly higher activity in the ventral striatum than comparable mandatory donations with identical outcomes. Furthermore, self-reported satisfaction is significantly higher in the voluntary trials than in comparable mandatory ones, suggesting that self-reports can be a valid proxy for measures of experienced warm glow.

The importance of emotions as a cause of moral decision making, as opposed to just a consequence of it, is illustrated by Greene, Sommweville, Nystrom, Darley, and Cohen (2001). In their experiment subjects listened to numerous pairs of moral dilemmas, with either a personal or impersonal frame, where each pair had the same consequentialist outcome.[6] Their results show that regions associated with emotions are significantly more active in the personal frame than the impersonal frame and that subjects are more likely to rate the impersonal frame as morally appropriate. In the personal frame subjects took significantly longer to rate the dilemma as appropriate rather than inappropriate, whereas in the impersonal frame response times were equal. Greene et al. argue that the higher neurological emotional activity and inappropriate ratings in the personal frame are evidence for emotions having a causal influence on moral judgments, whereby the longer response time is explained by the cognitive dissonance arising from contradictory *moral intuitions* (e.g. pushing a stranger from a bridge is murder) and *moral reasoning* (e.g. one death is better than five).

Some confirmation of Greene et al.'s (2001) results and their interpretation is provided by Koenigs et al. (2007), who undertake the same experiment but use subjects with damage to the ventromedial prefrontal cortex (VMPC), an area associated with the processing of emotions. Compared to a control group of subjects without brain damage, those with VMPC damage were significantly more likely to give the consequentialist answer in the personal frame but were no more likely to give either answer in the impersonal frame. The authors conclude that the higher incidence of utilitarian answers results from the inability of the VMPC damaged subjects to experience moral emotions.

Outside of experiments, Ferguson, Farrell, and Lawrence (2008) show how self-reported personal benefit can predict charitable behaviour. Participants were asked to rate the degree to which donating blood benefitted both society and the donor.

[5] See Greene and Haidt (2002), Mayr et al. (2009) and Moll, Zahn, De Oliveria-Souza, Krueger, and Grafman (2005) for reviews of these issues.

[6] The dilemmas were variations of the"trolley problem". A trolley is travelling along a track towards five people, who will be killed if the trolley hits them. In the impersonal frame, the only way to save the five is by deploying a switch that reroutes the trolley onto an alternate set of tracks where it will hit one person, who will be killed. In the personal frame, the only way to save the five is to push a stranger from a bridge onto the tracks in front of the trolley. The stranger will be killed. In terms of utilitarian calculus, both frames are identical: kill one, to save five.

The probability of donating blood was significantly positively correlated with a belief in donor benefit, whereas it had no association to a belief in societal benefit. Hence, here self-reported warm glow predicts blood donation but self-reported altruism does not.

2.3. Menu effects

The property of menu independent preferences, derived from the transitivity axiom, is one of the major implications of rational choice theory. For choice, the property can be characterised by the conditions of expansion consistency, whereby if only a is chosen from $\{a, b\}$ then b is not chosen from $\{a, b, c, \ldots\}$, and contraction consistency, whereby if only a is chosen from $\{a, b, c, \ldots\}$ then b is not chosen from $\{a, b\}$. However, numerous experimental results have indicated clear, systematic violations of menu independence in domains such as consumer goods and risk.

For choices involving multi-attributed consumer durables, Simonson (1989), Simonson and Tversky (1992) and Tversky and Simonson (1993) show that when evaluating the trade-off between price and quality a middle bias, which they refer to as a "compromise effect" or "extremeness aversion", can occur. In a series of experiments involving both hypothetical and incentivised choices, their results show that the proportion of subjects choosing x_2 is significantly higher in the ordered choice set $\{x_1, x_2, x_3\}$ than in the set $\{x_1, x_2\}$.

Birnbaum (1992), Stewart, Charter, Stott, and Reimers (2003), Vlaev, Charter, and Stewart (2006), and Vlaev, Charter, and Stewart (2007) all document similar evidence for a distinct middle bias when choosing from an ordered set for decisions involving risk. Their experimental designs are variations on the choice between a binary lottery (e.g. $L = \{z, p; 0, (1-p)\}$) and its minimum certainty equivalent amount, chosen from a subset of an ordered set of options, where either z, p or the subset of certainty equivalent options is varied between treatments. In all of their variations, the results indicate a strong bias for the middle options and in some cases choices can be explained entirely by the certainty equivalent's position in the choice set with no role for its absolute value.

For allocative choices, both Bardsley (2008) and List (2007) report evidence suggestive of a middle bias in dictator games. However, in neither case is expansion consistency technically violated, as there is no significant increase in the proportion of subjects choosing an option in the expanded treatment that was available in the baseline.[7] In Bardsley's (2008) version of this design, dictators and recipients each initially receive a £4 show up fee with dictators endowed with a further £7. In the give treatment dictators can give all, part or none of their endowment to the recipients, whereas in the give/take treatment the choice set is expanded to allow them to take up to £2 of the recipients' show up fee. In the give treatment 70% of dictators give positive amounts but this figure is significantly lower at 47% in the give/take treatment.

List (2007) also finds a similar middle bias in his design, which expands the above to three treatments with the choice set extended in the take direction each time. In all treatments dictators are initially endowed with $10 and recipients with $5. In the give treatment dictators' choice sets vary from $0 to $5, in the take$1 treatment their choice set is extended to the range −$1 to $5 and in the take$5 treatment it is extended further to −$5 to $5. Positive allocations fall significantly each time from 71% to 35% to 10%, respectively. Hence, for consumer durables, risk and, albeit insignificantly, allocations to others, there is evidence of violations of the expansion/contraction consistency conditions, and for ordered choice sets a prominent bias toward the middle options and away from corner solutions.

3. Experiment

Our experimental design uses a between subject, crowded-out charity dictator game with two treatments. Both treatments are identical aside from a variation in the choice set. The experiment was run using subjects recruited from the student population at the University of Nottingham.[8] Subjects were randomly allocated between the two treatments and each subject participated individually, resulting in 74 sessions with 37 subjects in each treatment. Each session lasted approximately 20 minutes, with a mean payment of £4.61 per subject.

Sessions began with subjects answering three questionnaires, followed by the crowded-out dictator game and ending with the post-decision measures of experienced warm glow.[9] The surveys consisted of a set of questions relating to participants' demographics and their past experiences with charities, and two personality surveys, one measuring empathy and the other alexithymia. The experimental task was split into two parts and involved two separate decisions.

In part one, subjects were asked to choose a charity from a list of ten, on the understanding that their chosen charity would be provisionally allocated a £2 donation which was referred to as the"experimenter donation". In part two, subjects received £5, a £3 show up fee and a £2 "participation fee" made up of ten £0.2 coins. In the give treatment, subjects were given the opportunity to donate all, part or none of their £2 participation fee to the charity they had selected in part one, on the understanding that any donation they made from their participation fee would result in an equal sized reduction in the experimenter donation, such that irrespective of their decision their chosen charity would always receive exactly

[7] The results of both Bardsley (2008) and List (2007) can technically be explained by non-monotonic preferences over others' income and are therefore consistent with rational choice.

[8] Subjects were recruited using ORSEE – Greiner (2004).

[9] A full set of instructions are available in Appendix A.

£2. For example, if a subject donated £1.2 from their participation fee to their charity then the provisional experimenter donation would fall to £0.8 and the charity would receive a total of £1.2 plus £0.8.

In the give/take treatment the options available to subjects were expanded so that they were also able to take all, part or none of the experimenter donation for themselves. As in the give treatment, any amount they gave was completely crowded out by an equivalent fall in the experimenter donation. However, taking from the experimenter donation was not subject to crowding in. For example, if a subject took £1.2 from the experimenter donation then this would fall to £0.8 and the charity would receive a total of £0.8. A set of control questions were included, which asked subjects to state final outcomes for the charity and subject for some hypothetical choices. Subjects who answered one or more of these questions incorrectly were asked to reread the instructions and attempt the questions again.[10]

Allocation decisions were made in private. Subjects were given two envelopes, one labelled "charity" and the other labelled "keep". The charity envelope contained the provisional experimenter donation in the form of ten £0.2 coins. In the give treatment, subjects were instructed to place any amount of their participation fee they wanted to donate to the charity into the charity envelope and place the remainder into the keep envelope. In the give/take treatment, subjects were given the additional option of taking any amount from the charity envelope and placing it in the keep envelope.

Subjects then completed the measures for experienced warm glow, which involved stating the extent to which various types of positive affect could explain their allocation decision. The question asked: "*Why did you choose to divide the money between yourself and your charity in the way you did?*". Subjects were instructed to consider three possible answers – "*It made me feel good about myself*", "*It made me feel emotionally positive about myself*" and "*It left me with a feeling warm glow inside*"[11] – rating each one on a Likert-type scale ranging from (1) "*Not at all*" to (7) "*Completely*".[12] They then left the experiment taking the keep envelope with them.

4. Results

36 male and 38 female subjects ranging in age from 18 to 32 years old were randomly allocated between the two treatments. This gave similar gender and age profiles for each treatment: 17/37 male, mean age 19.7 and 19/37 male, mean age 20.2 years in the give and give/take treatments, respectively. Table 1 summarises the results from the crowded-out charity dictator game for each of the treatments. Both treatments show significant levels of behavioural warm glow. In the give treatment, 54% of subjects sent positive amounts to the charity, with a mean allocation of 27% of the endowment. These figures are comparable to the 57% of subjects giving positive amounts and a mean allocation of 21% of the endowment, found by Crumpler and Grossman (2008). In the give/take treatment allocations fell significantly: 27% of subjects gave positive allocations with a mean allocation of 12% of the endowment.

Fig. 1 outlines the distributions in each treatment. Given the opportunity, only one subject chose to take money from the charity's provisional experimenter donation, taking £1 for themselves. However, the inclusion of the take option still resulted in a significant fall in behavioural warm glow. Using a binary categorisation of coding subjects as exhibiting behavioural warm glow if they make positive allocations and not otherwise, a Mann–Whitney rank-sum test has $z = 2.352$ and $p = 0.019$. Similar results, of a fall in average behavioural warm glow, are found using the full allocation results of units given – $z = 2.205$ and $p = 0.027$.[13]

The proportion of subjects choosing an allocation of zero is also significantly higher in the give/take treatment (70%) than in the give treatment (46%) – $z = 2.10$ and $p = 0.036$. This significant increase is a violation of expansion consistency and, given any conventional outcome based formulation of utility, a failure of the transitivity axiom. Although not reported here, a number of regressions, which controlled for various demographics and personality measures, resulted in the same conclusion of significantly lower behavioural warm glow in the give/take treatment.[14]

For experienced warm glow, the three measures ranged from one to seven with higher values representing higher experienced warm glow. Comparing the distributions of experienced warm glow across the treatments shows that subjects experienced higher warm glow in the give/take treatment than in the give treatment. The three Mann–Whitney rank-sum tests have $z = 2.741$ and $p = 0.006$, $z = 0.489$ and $p = 0.625$, and $z = 0.578$ and $p = 0.563$, for *good about self*, *emotionally positive* and *warm inside*, respectively.[15] By assuming cardinality in the answers, we can sum them so as to create a single aggregate

[10] Two subjects answered one or more of the control questions incorrectly on their first attempt. However, both of these subjects answered all of the control questions correctly on their second attempt.

[11] A fourth possible answer, "*I would feel guilty if I didn't*" was also included. However, as opposed to the other three measures, this question asks for an assessment of emotion if subjects had made a different decision. Consequently, it cannot be included as a measure of experienced warm glow.

[12] Ferguson, Taylor, Keatley, Flynn, and Lawrence (2012) find that answers to these questions are positively correlated with allocations in standard charity dictator games.

[13] For the treatments to be comparable in this particular test, the one subject in the give/take treatment who took £1 is coded as giving zero, rather than −100. This imposes identical censoring of 0 and 200 in both treatments.

[14] With either units given or the binary measure of behavioural warm glow as the dependent variable, regressed on the treatment, empathy and alexithymia scores, and various demographics such as age, gender and religious beliefs and experience, only the treatment variable proved to be significant.

[15] The equivalent figures for *guilt* are $z = 2.203$ and $p = 0.028$.

Table 1
Average allocations by treatment.

Treatment	Behavioural warm glow (%)	Mean allocation	Median allocation
Give	54	£0.54	£0.20
Give/take	27	£0.27	£0.00

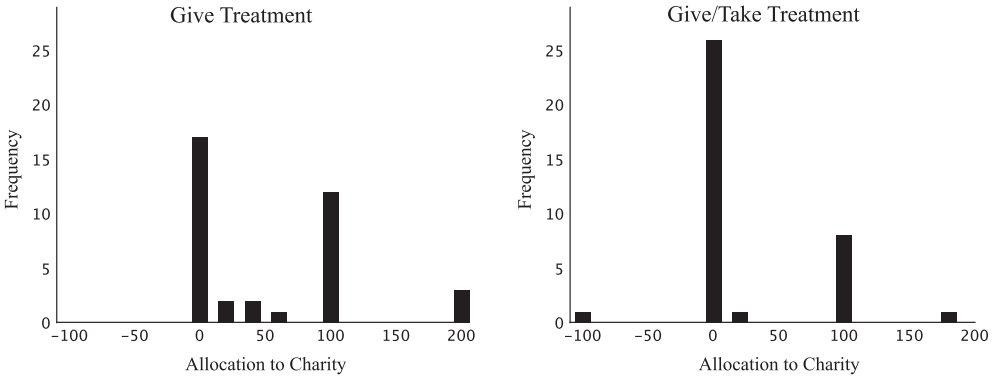

Fig. 1. Allocations by treatment.

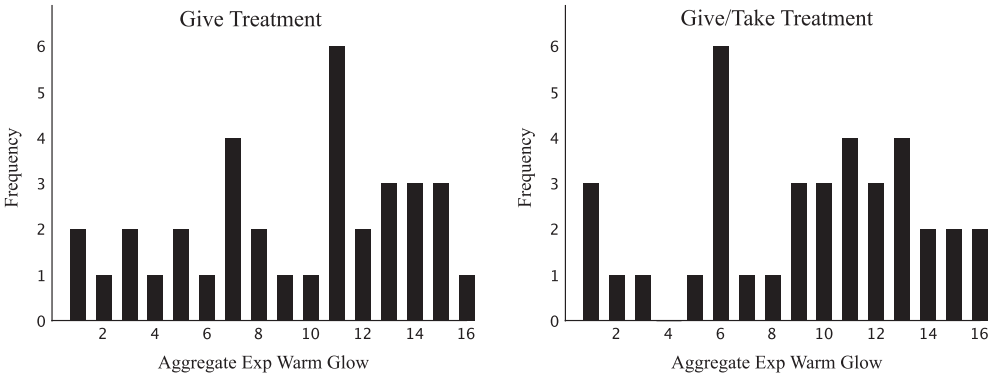

Fig. 2. Aggregate experienced warm glow by treatment.

measure of experienced warm glow incorporating all three questions. This has a Cronbach's alpha of 0.860. This aggregate measure shows significantly higher experienced warm glow in the give/take treatment than in the give treatment – give treatment mean = 10.595, give/take treatment mean = 12.270, $t = 1.668$, $p = 0.099$.[16] Fig. 2 outlines the distributions of the three question aggregate measure of experienced warm glow in each treatment.

Table 2 shows the treatment effect on experienced warm glow, while controlling for the higher monetary allocations in the give treatment.[17] The *Treatment* variable is a dummy taking a value of 0 for the give treatment and 1 for the give/take treatment. In all four variations the results show significantly higher experience warm glow in the give/take treatment for any given monetary allocation to the charity. We control for the allocation to the charity with the variable *Units given* and an interaction between *Units given* and the *Treatment* variable.[18] The results show a positive correlation between behavioural and experienced warm glow within each treatment. Additionally, the negative coefficients for the interaction term show a lower correlation between behavioural and experienced warm glow in the give/take treatment than in the give treatment, suggesting that an additional unit of experienced warm glow "costs" more in the give/take treatment than in the give treatment.

[16] Based on the results of a punishment variation of the dictator game, Eckel and Grossman (1996) argue that men exhibit a more absolute sense of morality, whereas women seem more context dependent. In repeating our behavioural and experienced warm glow tests separately for each gender, we find the same directional changes for both men and women and no significant differences in the scale of these effects.

[17] Extending these regressions to include controls for demographics, alexithymia and empathy, results in similar conclusions, with the additional controls being insignificant.

[18] The variable *Units given* is measured at the level of number of £0.2 coins.

Table 2
Experienced warm glow regressions.

	1. Good about self	2. Emotionally positive	3. Warm inside	4. Aggregate experienced warm glow (1 + 2 + 3)
Treatment	2.288	1.042	1.147	3.749
	(0.000)	(0.043)	(0.036)	(0.001)
Units given	0.374	0.346	0.312	0.870
	(0.000)	(0.001)	(0.003)	(0.000)
Treatment ∗ units given	−0.291	−0.224	−0.277	−0.661
	(0.070)	(0.122)	(0.052)	(0.044)
(Pseudo) R^2	0.086	0.053	0.039	0.237

Notes: $n = 74$ in all columns. Initial figures are estimated coefficients, with p values in parentheses. Columns 1–3 are ordered logits, column 4 is OLS. Bottom row gives pseudo R^2 for columns 1–3 and R^2 for column 4.

5. Discussion

Section 4 outlines three main results: (i) a positive correlation between behavioural and experienced warm glow in each treatment, with a higher correlation in the give treatment than in the give/take treatment; (ii) a decrease in behavioural warm glow in the give/take treatment; and (iii) an increase in experienced warm glow in the give/take treatment.

This section outlines some of the previous explanations for why changes in the choice set can lead to violations of expansion consistency in allocation games. It also describes some alternative accounts for the behavioural warm glow interpretation of the crowded-out charity dictator game. Issues such as status quo aversion, an intrinsic middle bias and experimenter demand effects are all possible reasons for our behavioural results. However, we argue that the best fit for our data is a utility function increasing in both income and morality, where the payoff from morality is experienced warm glow and the moral act is defined in relation to the available alternatives.

Carpenter et al. (2010) present evidence suggesting subjects in dictator games can be characterised by a form of status quo aversion, where given the choice between an active (i.e. giving) and a passive (i.e. doing nothing) alternative there is a tendency to prefer the active option. Applied to our baseline treatment, this would suggest that giving to the charity represents a preference for action rather than a preference for giving *per se*. However, such an interpretation is inconsistent with the subsequent fall in active choices in the give/take treatment. A further critique of the behavioural warm glow interpretation, raised by Crumpler and Grossman (2008) and examined by Tonin and Vlassopoulos (2014), is that subjects might have altruistic distributional preferences over the experimenter's budget. Again, if this was the only explanation there should be no decrease in charitable donations in response to the addition of the take option. Hence, the treatment effect gives some weight to the warm glow preferences interpretation of the crowded-out dictator game.

The literature on menu effects, reviewed in Section 2.3, largely concludes that when faced with an ordered choice set there is a tendency to prefer the middle options. Why this occurs is often explained as a form of hedging between multiple attribute goods. However, studies examining choices between identical options, which should result in uniform distributions if the indifferent choose randomly, find the same bias. Christenfeld (1995) shows that in rows of adjacent supermarket shelves stocking an identical product, the middle shelves are restocked a disproportionally large number of times compared to the end shelves. He records a similar result in an experiment where subjects are asked to circle one X in a row of four Xs (i.e. X X X X). 71% chose one of the two middle Xs. Attali and Bar-Hillel (2003) note the same bias in multiple-choice exams, where answers B and C account for a disproportionally large number of incorrect answers to ordered four-option questions of the type A, B, C or D.

These results suggest that any bias for the middle options is to an extent unconscious and in some sense intrinsic, requiring no further explanation based on deliberation or maximisation. Applying such a bias to our experiment could explain both the existence of positive allocations in the give treatment and their subsequent fall in the give/take treatment. However, an intrinsic middle bias cannot explain the rise in experienced warm glow when the choice set is expanded in the allocation game, given that the choice set that records experienced warm glow is constant across the treatments – i.e. one to seven each time.

The same argument can be used to question experimenter demand as the sole explanation for the treatment effects. Experimenter demand can be loosely defined as subjects undertaking behaviour they believe to be appropriate in terms of the experimenter's expectations, where expectations are taken from cues in the design. In our experiment, the change in the choice set could be interpreted as a change in the cues. Hence, such a process may be a plausible explanation for the fall in donations between the treatments, and is in fact the explanation favoured by Bardsley (2008). However, given the between subject design and the consistent framing of the experience measures across the treatments, it is far from clear what cues subjects might be adhering to that would lead them to report an increase in experienced warm glow in the give/-take treatment.

Our preferred explanation for the results is to model utility as an increasing function of both money and morality, similar to the function proposed by Levitt and List (2007). In our version, the payoff from undertaking the moral action is a sense of having done the right, good or virtuous thing, creating a positive self-image, which we label experienced warm glow. Hence, in the give treatment money is traded for a positive emotional payoff in the form of donations to charity. However, such a

simple function cannot explain the seemingly contradictory, opposite directional-changes in behavioural and experienced warm glow across the treatments. For this, we propose that what defines experienced warm glow is subject to a degree of a particular form of moral relativism, where the moral action is defined relative to the alternative options. Here, morality becomes less an issue of good or bad and more an issue of better or worse, in that the best possible action is perceived as morally good and the worst possible action as morally bad.

Applying such a process to the treatments means that any given absolute action is relatively further away from the worst possible action and relatively closer to the best possible action when the choice set is expanded solely in a negative direction. As such, any given absolute action, such as donating nothing to the charity, results in higher experienced warm glow in the give/take treatment than it does in the give treatment. This increase in emotional payoffs is equivalent to a fall in the price of experienced warm glow and with appropriately defined convex preferences for money and morality will result in greater consumption of each.

Evidence for a more conventional form of moral relativism, where morality is judged relative to the actions of others rather than the choice set, is given in Cubitt, Drouvelis, Gachter, and Kabalin (2011). In their experiment, subjects rate the morality of a free rider in a simultaneous two-person public good game for differing contributions from the other player. The aggregate results show the free rider rated as being significantly less moral the more the other player contributed. Parducci (1968) shows similar evidence of moral judgments being dependent on context. Again, subjects rated the morality of different acts in two treatments, one where most of the acts were mild (e.g. fishing without a licence) and the other where most were more severe (e.g. murdering your mother). Acts that appeared in both lists were all rated worse in the mild list than they were in the severe list, consistent with morality being defined relative to other salient acts.

In modelling morality as being defined relative to the choice set, we use the range principle taken from Parducci's (1965) Range Frequency Theory (RFT). This was initially developed as a model of perception, rather than value, and proposes that judgments of magnitudes are made in relation to the relevant context. It consists of a weighted average of the range principle, an element's proportional distance along the range of context, and the frequency principle, its ordinal ranking within the range. As the frequency principle is normalised for one and as the choice sets we use all have constantly spaced options of £0.2 then only the range principle will apply in our context.[19] To introduce moral relativism to the decision process, we define utility as an additively separable, increasing function of both wealth and morality, where morality is measured in units of experienced warm glow:

$$U_i = f(e - x_i) + g(w_i) \tag{1}$$

where e is an individual's endowment, x_i is the amount they donate to charity, and w_i is their level of experienced warm glow. Both wealth and morality are subject to either constant or diminishing marginal utility:

$$f' > 0,\ f'' \leqslant 0,\ g' > 0,\ \text{and } g'' \leqslant 0 \tag{2}$$

with at least one of them being strictly concave to allow for unique interior solutions, such that:

$$\frac{\partial^2 U}{\partial x_i^2} < 0 \tag{3}$$

Applying the range principle to the definition of experienced warm glow, gives morality as a function of the allocation made to the charity and the maximum and minimum possible donations, where allocations are made from an ordered set x, such that: $x = \{x_{\min}, \ldots, x_{\max}\}$. This gives[20]:

$$w_i = w(x_i, x_{\min}, x_{\max}) = \frac{x_i - x_{\min}}{x_{\max} - x_{\min}} \tag{4}$$

which has partial derivatives:

$$\frac{\partial w_i}{\partial x_i} = \frac{1}{x_{\max} - x_{\min}} > 0 \tag{5}$$

$$\frac{\partial^2 w_i}{\partial x_i \partial x_{\min}} = \frac{1}{(x_{\max} - x_{\min})^2} > 0 \tag{6}$$

$$\frac{\partial w_i}{\partial x_{\min}} = \frac{x_i - x_{\max}}{(x_{\max} - x_{\min})^2} \leqslant 0 \tag{7}$$

[19] An alternative to RFT is Helson's (1964) Adaptation Level Theory (ALT), where judgments of magnitudes are made in relation to a weighted mean. This would produce similar results in our case but empirical evidence suggests RFT is often a better fit. When applied to data on within-firm wage distributions, Brown, Gardner, Oswald, and Qian (2008) find RFT outperforms ALT in predicting both employees' self-reported satisfaction with pay and their probability to quit.

[20] An alternative formulation for w_i, using ALT, could be the absolute difference between the amount given and a, possibly weighted, average of the choice set, such as: $w_i = x_i - \lambda\left(\frac{x_{\max}+x_{\min}}{2}\right)$, where $0 < \lambda \leqslant 1$. Here, λ measures the degree of relativity in experienced warm glow, a concept missing from the formulation used in (4), which assumes that w_i is defined in an entirely relative sense with no role for the absolute level of x_i. However, applying the ALT formulation to the additively separable function in (1) requires that $g'' < 0$, in order to replicate the $dx_i^*/dx_{\min} > 0$ treatment effect.

(5) states that, for any given choice set, experienced warm glow is an increasing function of the amount given to charity, (6) states that the positive correlation between experienced warm glow and the amount given to charity is higher for choice sets with higher minimum options, and (7) states that, for any given donation, experienced warm glow is higher the lower is the minimum option in the choice set. Hence, (5)–(7) give the empirical results outlined in Table 2 of a positive correlation between behavioural and experienced warm glow within each treatment, a lower positive correlation in the give/take treatment than in the give treatment, and higher experienced warm glow in the give/take treatment holding the level of charitable donation constant.

The treatment effect on behavioural warm glow, whereby the addition of the take option reduces donations, can be shown formally as the sign of $dx_i^*/dx_{\min}$, where x_i^* is the optimal allocation and the solution to the first order condition of (1). The implicit differentiation of this first order condition gives:

$$\frac{dx_i^*}{dx_{\min}} = \frac{\frac{-1}{(x_{\max}-x_{\min})^2}\left[g'(w_i) + \frac{x_i - x_{\max}}{(x_{\max}-x_{\min})}\ g''(w_i)\right]}{\partial^2 U/\partial x_i^2} > 0 \tag{8}$$

The denominator in (8) is the second order condition of (1), which is assumed negative in (3) so as to achieve a unique maximum. The first term in the numerator is negative while the second bracketed term is positive. With both denominator and numerator negative, $dx_i^*/dx_{\min}$ is positive, implying that a fall in the lowest option in the choice set, such as the addition of the take option, results in a fall in charitable allocations.[21] Hence, the utility function given in (1) combined with the morally relative definition of experienced warm glow given in (4) are able to explain the fall in charitable donations observed in the give/take treatment outlined in Section 4.

The treatment effect on experienced warm glow, where the addition of the take option increases the post-decision self-reports of positive affect, can be shown formally as the sign of $dw_i^*/dx_{\min}$, where w_i^* is the value of w_i given the optimal donation x_i^* found from the solution to the optimisation of (1). For the function and constraints defined in (1)–(3), the sign of $dw_i^*/dx_{\min}$ is ambiguous. We illustrate this result by way of an example, which uses a simple parametric function, nested in (1), assuming an iso-elastic function for $f(e - x_i)$ and linearity in $g(w_i)$.[22] This gives a utility function of:

$$U_i = a\ \frac{(e - x_i)^{1-\phi}}{1-\phi} + (1-a)w_i \tag{9}$$

where $\phi > 0,\ \phi \neq 1$ and $0 < a < 1$. The solution to the first order condition of (9) gives an explicit function for x_i^*. Substituting this expression into (4) gives w_i^*, which is the equilibrium value of experienced warm glow, and differentiating w_i^* with respect to $x_{\min}$ gives:

$$\frac{dw_i^*}{dx_{\min}} = \frac{\frac{1-\phi}{\phi}\left[\frac{a}{1-a}\ (x_{\max} - x_{\min})\right]^{\frac{1}{\phi}} + e - x_{\max}}{(x_{\max} - x_{\min})^2} \tag{10}$$

where (10) measures the change in equilibrium warm glow in response to a change in the minimum available option in the choice set. For our results, experienced warm glow is higher in the give/take treatment, implying that $dw_i^*/dx_{\min} < 0$. The sign of (10), however, is undetermined and depends on the specific parameter values in (9) and the scale of the choice set. The sign of $dw_i^*/dx_{\min}$ is given by the sign of the numerator in (10). If we interpret e as the endowment in the experiment, such that $e = x_{\max}$, then the sign of $dw_i^*/dx_{\min}$ is determined entirely by the value of ϕ, which measures the elasticity of the marginal utility of income or, for risk, the coefficient of relative risk aversion. Here, $\phi > 1$ is sufficient for $dw_i^*/dx_{\min} < 0$ and a rise in aggregate experienced warm glow in the give/take treatment.

6. Conclusion

In this paper we examine further the nature of warm glow preferences, how this behaviour is related to experienced positive affect, and what effect the choice set has on this relationship. We extend the crowded-out charity dictator game of Crumpler and Grossman (2008) by including a second treatment with the additional option of taking money from the charity, and also by the inclusion of a series of self-reported measures of positive affect, labelled experienced warm glow. This gives three main results: (i) within each treatment behavioural warm glow is positively correlated with experienced warm glow, such that the more money subjects donate to the charity, the better they claim to feel about themselves; (ii) behavioural warm glow is reduced by extending the choice set in a negative direction, in that the addition of the take option low-

[21] (8) assumes and holds for interior solutions. For the inclusion of corner solutions, the strict inequality is replaced by a weak inequality, such that $dx_i^*/dx_{\min} \geqslant 0$. For example, consider the solution $x_i^* = x_{\max}$ in the give treatment, here a rise or fall in $x_{\min}$ results in no change in w_i, and subsequently no change in x_i^*. For the alternative corner solution $x_i^* = x_{\min}$, a fall in $x_{\min}$ results in a rise in w_i, and with $g'' \leqslant 0$, this gives either a decrease or no change in the marginal utility of donations and subsequently a decrease or no change in x_i^*.

[22] Intuitively, there seems no *a priori* reason to believe that w should be subject to diminishing marginal value. Given the abstract nature of experienced warm glow and the absence of any identifiable conceptual upper or lower bounds, arguments for diminishing marginal value based on perception and comparisons to zero seem invalid in this case. In (9), however, we assume linearity merely for simplicity. It is not a necessary condition, given (1), for the replication of the $dw_i^*/dx_{\min} < 0$ treatment effect.

ers the incidence and levels of charitable donations, and (iii) experienced warm glow is increased by the inclusion of the take option, both holding donations constant and at the aggregate level.

These results are inconsistent with a purely experimenter demand effect or an intrinsic middle bias explanation for the observed expansion inconsistency, as neither of these would predict a treatment effect for experienced warm glow. In (i) the positive correlation between charitable allocations and positive affect is consistent with the implicit motivation expressed within the "warm glow" label, yet in of itself implies no direction for the causality of this relationship. Similarly, in (ii) the positive allocations in the crowded-out dictator game and their violation of expansion consistency when the choice set is expanded merely represent anomalies to conventional theory when viewed in isolation. Yet when (i) and (ii) are viewed simultaneously, together with the counter-directional treatment effect for experience warm glow in (iii), they offer a more coherent and somewhat more rational explanation for both behavioural warm glow and the apparent failure of expansion consistency.

In our model behavioural warm glow is driven by an individuals desire for acting morally, measured by experienced warm glow, which is simply treated as a good to be bought through the medium of charitable donations. Given such preferences, the treatment effects in (ii) and (iii) occur entirely through the relativistic, menu-dependent definition of experienced warm glow, which we describe as a form of moral relativism. Here, the morality of an action, and its subsequent level of experienced warm glow, depends not only on the option chosen but also on other options that were available but were not chosen. In the context of the experiment, being given the opportunity to take money from a charity and refraining from taking this opportunity creates an additional amount of experienced warm glow compared to the same action undertaken when the taking option is unavailable. Such a concept of morality, where foregone opportunities form part of the definition, is one of the defining features in much of the theoretical literature on reciprocity. For example, in both Rabin (1993) and Cox, Friedman, and Gjerstad (2007) players seek to match the kindness of others in strategic situations. Here kindness is not only a function of actions but also of foregone opportunities and is defined in comparison to the upper and lower bounds in some subset of the choice set.

With such a relativistic definition of morality, individuals that seek to maximise preferences defined over the goods of money and morality can have less incentive to make positive charitable donations once the choice set is extended in a negative direction. These relationships produce intransitivity in the observable action of charitable donations, yet this apparent intransitivity is derived from a set of transitive preferences defined over the two goods of money and morality. It is questionable whether such preferences can really be termed irrational or inconsistent. Given the abstract nature of experienced warm glow and its inability to be commodified and resold, it is not obvious how a relativistic definition of morality could be exploited within a market through a money-pump type argument.

In a wider context, our results highlight a problem in the capacity of observed choices to reveal preferences. They raise the question of what exactly is being chosen under observed choice? Is the observed chosen element a good in itself or is it just a single element in a multi-element good? Both Anand (1990) and Sen (1993, 1997) show that without a definitive answer to this question the transitive preferences axiom becomes practically unfalsifiable, in that if you allow for the existence of menu dependent goods then any pattern of seemingly intransitive choices can be described by a set of transitive preferences, as long as the menu dependence is defined appropriately. The patterns observed in our results suggest that utility can be derived from foregone opportunities and that menu dependent goods do exist.

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Appendix A. Instructions

The experimental task includes decisions both about charities and monetary charitable donations. The task is in two parts and involves two separate decisions.

A.1. Part One

You are required to choose one charity from a list of ten different charities. The charity you choose will be provisionally allocated a £2.00 donation which we will send to your chosen charity once all sessions of this experiment are complete. This provisional donation is referred to as the "experimenter donation".

Please choose the charity that you want to receive the experimenter donation. Highlight your choice by circling one of the following charities:

- Amnesty International
- UNICEF
- British Heart Foundation
- Help the Aged

- Cancer Research UK
- Save the Children
- Oxfam
- Asthma UK
- Barnados

A.2. Part Two

(*Instructions for the give treatment are in standard font, instructions for the give/take treatment are in both standard and bold font.*)

For participating in this study you will be paid a total of £5.00. This includes a £3.00 show up fee and a £2.00 participation fee. This £2.00 is referred to as "your participation fee". The choice you face in Part Two involves decisions regarding **both** "your participation fee" **and the "experimenter donation**".

The choice you face in Part Two is to decide how much of your participation fee you wish to donate to the charity you chose in Part One and how much you wish to keep for yourself, **or how much of the experimenter donation you wish to take for yourself and how much you wish to leave for the charity you chose in Part One**. You can choose to donate or keep all, part or none of your participation fee. **Or, you can choose to take or leave all, part or none of the experimenter donation.**

However, note that **donating to the charity and taking from the experimenter donation both have the same effect on the size of the experimenter donation. That is,** any donation you make to your nominated charity from your participation fee will result in an equal sized reduction in the size of the experimenter donation. **Similarly, any money you take from the experimenter donation will result in an equal sized reduction in the size of the experimenter donation.**

For example, if you decide to donate £2.00 and keep none of your participation fee, then the experimenter donation is reduced by £2.00; if you decide to donate £1.00 and keep £1.00, then the experimenter donation is reduced by £1.00; or if you decide to donate nothing and keep £2.00, then the experimenter donation is not reduced.

Similarly, if you decide to take £2.00 and leave none of the experimenter donation, then the experimenter donation is reduced by £2.00; if you decide to take £1.00 and leave £1.00, then the experimenter donation is reduced by £1.00; or if you decide to take nothing and leave £2.00, then the experimenter donation is not reduced.

The net effect of this is that **if you take money from the experimenter donation then we will send your nominated charity whatever remains of the experimenter donation. However, if you do not take money from the experimenter donation then** we will always send the charity you nominated in Part One a donation of exactly £2.00 irrespective of **if and** how much you donated from you participation fee. That is, your nominated charity will receive the sum of the experimenter donation plus however much you decide to donate from your participation fee.

In practice, the decision process will work as follows. You will be paid your participation fee of £2.00 as ten 20 pence pieces and then given two envelopes, one labelled "keep" and one labelled "charity". The "charity" envelope contains the provisional experimenter donation of £2.00.

If you wish to take money from the experimenter donation then you must place whatever proportion you wish to take into the keep envelope along with your participation fee. Alternatively, however much of your participation fee you wish to donate to your nominated charity you must place in the "charity" envelope and however much you want to keep you must place in the "keep" envelope.

Before proceeding please answer the following questions:
Of her £2 participation fee Ashley donates £1 to her nominated charity:

1. How much will Ashley's nominated charity receive in total? £_____
2. How much will Ashley keep? £_____

Of the £2 experimenter donation Ashley takes £1 from her nominated charity:

1. **How much will Ashley's nominated charity receive in total?** £_____
2. **How much will Ashley keep?** £_____

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