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Sacrifice, Benefit, and Reciprocity: Evidence from a Trust Game

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Abstract

Social preferences have generated much interest in recent economic literature. While reciprocity has been closely examined by several economists using gift exchange and other games, much of their focus is on the effect of intentions and motivations. Instead, I focus on two strictly outcome-based factors in the context of a trust game: sacrifice made by the giver and benefit received by the recipient. I attempt to isolate these influences by varying the multiplier across variations of the trust game to create comparison groups that differ in one of these factors, but not both. Unable to control for all expected sources of bias, I use two different specifications that I suspect to have negative and positive signs of bias. I find that both sacrifice and benefit seem to matter, meaning that the recipient of a gift seems to account for both the cost and the value of the gift. Specifically, I estimate $1 of additional sacrifice to increase reciprocal giving by $0.35 under the first specification and $0.57 under the second, and that $1 of additional benefit from a gift increases reciprocal giving by $0.28 and $0.34 under the first and second specification, respectively. Robustness checks incorporating other data such as order effects, session effects, and demographic and personality type controls raise some room for doubt, but do not provide a strong refutation of my qualitative results.

Keywords: Experimental economics; behavioral economics; social preferences; reciprocity; trust game

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1 Introduction

It is now a long time since the notion that people act as rational agents only interested in material payoffs has been challenged. Behavioral economists have found substantial evidence that people make decisions for a variety of more social reasons (Fehr and Schmidt 2006). For example, some people wish to help others out of an altruistic desire to make them better off; others favor fair outcomes and will try to make payoffs more equitable, whether it materially benefits them or not. Perhaps one of the most commonly observed social behaviors in everyday life is reciprocity, the tendency for people to reward or punish generous or selfish behavior, respectively.

Several economists have found that reciprocity can be decomposed into an outcome-based component, consisting of actual realized payoffs, and an intention-based component, reflecting the degree of control the first player had over the outcome. For example, Falk et al. [2003] find that second players in an ultimatum game are much more tolerant of unfair offers if the first player choses the least unfair allocation, or if the alternative requires a substantial sacrifice from the first player. Along similar lines, Charness and Levine [2007] find that in a gift exchange game with stochastic outcomes, "employees" (recipients of the first gift, interpreted as a wage) are more likely to cooperate (i.e. choose to exert effort on their job) with their "employer" if the employer meant to pay a high wage, keeping actual payments fixed. These findings are reflected by Falk and Fischbacher [2006], who lay out a theory of reciprocity in which the strength of the reciprocal response to an action depends on the perceived "kindness" of the action. More recently, Orhun [2017] extends the list of possible factors by finding that when deciding whether to reciprocate, players also respond to the likely motivations of the other player, such as whether that player is seeking to avoid punishment or acting altruistically.

However, laying aside the role of intention, little seems to have been done in trying to examine what constitutes "kindness" in terms of outcomes. Two things in particular seem to come up as natural candidates: an agent's sacrifice in helping a recipient, and the benefit accruing to the recipient because of it. In this paper I estimate how relevant each of these two factors are in a situation where the first player has near complete control over their own actions. While philosophers have considered these two possible sources of reciprocity (Becker 2005), I do so in a quantitative manner.

Determining the importance of sacrifice and benefit on reciprocity could shed light on many relevant situations, both in the social sphere and in the economic sphere. For example, is a person more likely to appreciate a gift from a friend when the gift required a substantial cost on the friend's part (effort, money, etc.) or when it was easily acquired but benefits the recipient greatly? Are employers more likely to reward workers who put in significant effort, or those who take their jobs only half seriously but are incredibly productive? Are nations more likely to be motivated to pitch in to mitigate climate change because of other countries making good progress towards carbon neutrality or because of those who invest the most resources in trying to do so? Acquiring a better understanding of how sacrifice and benefit each factor into reciprocity may increase both our understanding of how economic agents behave and our prescriptive power for optimal individual decision-making in a strategic setting.

I attempt to answer this question in an experimental setting. By having players participate in the trust game and modifying the game parameters, I can separately change the relative sacrifice and benefit across treatment groups, and thus estimate the effect of each factor on the second player's response. However, it is impossible to vary sacrifice and benefit without also varying other potentially significant variables, namely the initial and intermediate distributions among players. These omitted factors introduce potential bias in the estimation of the effect. However, under certain theoretical assumptions the expected signs of the two biases oppose one another, so that by doing two sets of treatments, I obtain a lower bound and an upper bound estimate for the effects of sacrifice and benefit. My main results are consistent with this expectation, and I find effects in each case that are significant at the 10% if not 5% level. My lower estimates suggest that on the margin, \$1 in additional cost of a gift and benefit from the gift generates an additional reciprocal gift of about \$0.35 and \$0.28, respectively; my upper estimates suggest these figures are \$0.57 and \$0.34, respectively. By running different statistical models, I find some reason to doubt the accuracy of my results, particularly in terms of the order of treatments I chose, but I don't find strong evidence that the significance of my results should be disregarded. This paper is the first I am aware of to try to measure the effect of sacrifice and benefit in this context, and more research could tell us more about how people behave reciprocally by reducing the weaknesses in sample size (and perhaps design) of this work.

The paper is structured as follows: Section 2 lays out the theoretical model that I will rely on for interpreting my results. Section 3 explains the experimental and measurement methodology. Section 4 describes my data and results and Section 5 concludes.

2 The Model

In my experiment, participants play a two-player trust game. Both players begin with a personal endowment. Player 1 (P1) may send a gift, which is multiplied by some factor M, to Player 2 (P2), and P2 may send a gift back. We will focus on P2 because only they have the option of acting in a reciprocal manner.

As acknowledged in the literature, a person's utility in a gift-exchange scenario can depend on many things (Fehr and Schmidt 2006). I will denote the general utility function for P2 as a combination of preferences for the final distribution $D(\cdot)$ and reciprocity-based preferences $R(\cdot)$:

$$U(\pi_1, \pi_2, \pi_1', \pi_2', w_1, w_2) = D(\pi_1, \pi_2) + R(\pi_1, \pi_2, \pi_1', \pi_2', w_1, w_2),$$

where π_1 and π_2 represent final material payoffs to P1 and P2 , respectively, w_1 and w_2 represent the initial material endowments of the two players, and π_1' and π_2' represent the intermediate allocations after P1 has made their gift.

I impose structure on $D(\cdot)$ in accordance with the main types of preferences found in the literature. Let $D(\cdot) = p(\pi_2) + a(\pi_1) + f(\pi_1, \pi_2)$, where $p(\cdot)$ and $a(\cdot)$ represent materially self-centered and altruistic sources of utility, respectively. It seems reasonable to assume that $p''(\cdot), a''(\cdot) < 0$, as most things exhibit decreasing marginal utility, so that giving money away becomes decreasingly attractive as the player gives more and more to another player. $f(\cdot)$ represents preferences in terms of fairness. Assuming decreasing marginal utility again for fairness (i.e. moving closer to the "fair" allocation), we have $\frac{\partial^2 f(\pi_1,\pi_2)}{\partial {\pi_1}^2}, \frac{\partial^2 f(\pi_1,\pi_2)}{\partial {\pi_2}^2} < 0 < \frac{\partial^2 f(\pi_1,\pi_2)}{\partial \pi_1 \partial \pi_2}$. These assumptions taken together imply that

$$\frac{\partial^2 D(\pi_1,\pi_2)}{\partial {\pi_1}^2}, \frac{\partial^2 D(\pi_1,\pi_2)}{\partial {\pi_2}^2} < 0 < \frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1 \partial \pi_2}. \tag{1}$$

That is, increasing a player's material payoff becomes decreasingly attractive as that person becomes materially better off, and increasingly attractive as the other person becomes worse off.

2.1 Reciprocity

Since it seems to me that sacrifice and benefit play a special role in reciprocity aside from corresponding distributional factors, it is useful to further specify $R(\cdot)$ as the sum of two reciprocal components. Let $g(\cdot)$ be based on sacrifice and benefit; let $d(\cdot)$ be based on initial distributional factors.

$$R(\pi_1,\pi_2,\pi_1',\pi_2',w_1,w_2) = g(s,b,\pi_1-\pi_1') + d(w_1,w_2,\pi_1-\pi_1'), \tag{2}$$

where $s \equiv w_1 - \pi_1'$ is the sacrifice P1 incurs and $b \equiv \pi_2' - w_2$ is the benefit P2 receives from P1's gift. Define $r \equiv \pi_1 - \pi_1' = \pi_2' - \pi_2 \geq 0$ as P2's gift back to P1, which I will refer to as the player's reciprocal action or response. We will assume that the derivatives with respect to $r = \pi_1 - \pi_1'$ are decreasing in r. That is, $\frac{\partial^2 g(\cdot)}{\partial r^2}, \frac{\partial^2 d(\cdot)}{\partial r^2} < 0$. That is, distributional concerns aside, giving back involves decreasing marginal returns. Note that for this and other components of the utility function, we might expect the first derivatives to be positive, but we do not make any such assumptions.

Note that if P2 is optimizing, their problem becomes:

$$\max_r U(\pi_1,\pi_2,w_1,w_2,r) = D(\pi_1,\pi_2) + g(s,b,r) + d(w_1,w_2,r),$$

s.t. $r = \pi_1 - \pi_1' = \pi_2' - \pi_2 \geq 0$. This is equivalent to allowing P2 to choose P1's final payoff in the following manner:

$$\max_{\pi_1} U(\pi_1,\pi_2,\pi_1',\pi_2',w_1,w_2) = D(\pi_1,\pi_2) + g(s,b,\pi_1-\pi_1') + d(w_1,w_2,\pi_1-\pi_1'),$$

s.t. $\pi_1 - \pi_1' = \pi_2' - \pi_2 \geq 0$ (note that π_1', π_2' are fixed from P2 perspective). Solving this constrained optimization problem and using the definition of r will give us the optimal reciprocal action.

The first order condition is:

$$\frac{dU(\cdot)}{dr} = \frac{\partial D(\pi_1,\pi_2)}{\partial \pi_1} - \frac{\partial D(\pi_1,\pi_2)}{\partial \pi_2} + \frac{\partial g(s,b,r)}{\partial r} + \frac{\partial d(w_1,w_2,r)}{\partial r} = 0. \tag{3}$$

Note that the first equality is true by construction, while the second is from the first order condition. This condition may not apply if the left-hand side is too small or to large for any value of r, in which case there will be a corner solution, with r either zero or the maximum feasible value. Going forward we ignore these trivial cases. However, if the left-hand side is strictly decreasing, then we can in general expect to find a unique solution. This result follows directly from the assumptions we have made about $\frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1{}^2}$, $\frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_2{}^2}$, $\frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1 \partial \pi_2}$, $\frac{\partial^2 g(\cdot)}{\partial r^2}$, and $\frac{\partial^2 d(\cdot)}{\partial r^2}$ (See Appendix). We can use (3) to derive the function $r(s, b, \pi_1', \pi_2', w_1, w_2)$, which we will use as a starting point for the regression model in Section 3.2. Below, we use (3) to sign the partial derivative of r with respect to $\pi_1', \pi_2', w_1,$ or w_2 where possible. We will later use these comparative statics to discuss our results:

- $\left[\frac{\partial r(\cdot)}{\partial \pi_1'}\right]$ $\rightarrow$ Note that we can determine the sign by fixing r and evaluating the change in $\frac{dU(\cdot)}{dr}$ from (3) . Since $\frac{dU(\cdot)}{dr}$ is strictly decreasing in r, r must move in the same direction as the change in $\frac{dU(\cdot)}{dr}$ in order to satisfy (3). In this case the last two terms do not change (This involves some abuse of notation because s and b *do* depend on the other variables, but I am treating them as independent as far as these partial derivatives are concerned). Note that while holding r fixed, differentiating with respect to intermediate or final payoff allocations is equivalent ($r = \pi_1 - \pi_1' = \pi_2' - \pi_2$). Thus, to sign $\frac{\partial r(\cdot)}{\partial \pi_1'}$ we must simply consider $\frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1{}^2} - \frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_2 \partial \pi_1}$. By assumption, each component is negative so $\frac{\partial r(\cdot)}{\partial \pi_1'} < 0$.

- $\left[\frac{\partial r(\cdot)}{\partial \pi_2'}\right]$ $\rightarrow$ Again, only the first two components can change, so we must simply consider $\frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1 \partial \pi_2} - \frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_2{}^2}$. By our assumption, each component is positive so $\frac{\partial r(\cdot)}{\partial \pi_2'} > 0$.

- $\left[\frac{\partial r(\cdot)}{\partial w_1}\right]$ $\rightarrow$ Here the sign depends solely on $\frac{\partial d(w_1,w_2,r)}{\partial r \partial w_1}$. Although we have made no assumption that guarantees a negative sign, I would expect that gifts from participants who are wealthier to begin with will generate less gratitude than those who are less well off, since it is easier to help from good circumstances than from poor ones. Therefore, I propose that $\frac{\partial r(\cdot)}{\partial w_1} < 0$.

- $\left[\frac{\partial r(\cdot)}{\partial w_2}\right]$ $\rightarrow$ Here the sign depends solely on $\frac{\partial d(w_1,w_2,r)}{\partial r \partial w_2}$. Again, we can only speculate as to the sign. Two main arguments seem to come to mind. On one hand, the more P2 begins with, the less obliged P1 is to give anything and therefore the more genuinely kind P1 may seem. On the other hand, if P2 is already well off to begin with, a gift by P1 may come across as a self-interested gamble to increase material payoffs. While it's not clear which factor dominates the other in practice, I think the first case seems more likely, so that $\frac{\partial r(\cdot)}{\partial w_2} > 0$.

3 Methodology

3.1 The Experiment

In this experiment, we randomly and anonymously pair participants with each other and have them play several rounds of a trust game on the computer using oTree (Chen et al. 2016). After the game, they are asked to answer a survey with a few demographic questions as well as questions that allow us to assess their personality in the context of the Big Five personality traits.

Participants were recruited through the existing participant pool in the Colby Economics Learning Lab (CELL) as well as through Colby's general announcements system, emails sent by me and faculty, and word of mouth. In all, I ran 7 experimental sessions, ranging from 12 to 16 participants in each, with a total of 94 participants. See the Appendix for instructions for the participants.

This study uses a simple variation of the trust game, designed by Berg et al. [1995], to separate sacrifice- and benefit-based reciprocity. The trust game involves the exchange of gifts between two players, and is thus appropriate for the study of reciprocity, although different games such as the ultimatum, centipede, and employer/employee gift-exchange games are frequently used (Falk and Fischbacher). Notably, Cox [2004] used the trust game to disentangle reciprocity from altruism; I am now trying to disentangle two factors of reciprocity. My goal was to modify the game parameters so that the second player is faced with different levels of benefit received from P1's gift and sacrifice incurred by P1 from that gift.

First, we allow P1 to send a gift s to P2; this gift is multiplied by a certain factor M (which ranged from 2 to 5), so that P2 receives a gift or benefit of $b = s * M$. In the second part of the game, the second player may transfer some or all of their money to the first player. Tables 1 and 2 illustrate the different treatments as well as what variables are being controlled for in each treatment.

For my first experimental session, I had every P2 play the game five times, experiencing each of my five chosen treatments (see Section 3.1.1 below) exactly once. For every subsequent session, I added a sixth round, in which players repeated one of the five treatments at random. I use this information to test whether players change their behavior with experience in Section 4.

3.1.1 Analytical approach

P1 faces a choice: they can either keep the initial endowment (w_1, w_2) or give P2 a gift, resulting in a second stage distribution (intermediate allocation) of $(\pi_1', \pi_2') = (w_1 - s, w_2 + b)$, where s is P1's sacrifice and can be any positive integer up to w_1, and b is the benefit to P2 associated with it. Note that $b = s * M$, where M is the multiplication factor of the gift. The bold rows in Table 1 yield control treatments (T0) for the rows immediately above and below, respectively. While P1 can choose from at least 8 options, the analysis focuses on P2's stated response to one particular choice of s for each treatment. For example, in T0, T2, and T4, we only look at observations in which P2 is responding to $s = 2$, while in T1 and T3 we look at $s = 4$. These specific values are chosen to provide controlled comparisons, as shown in Table 2.

The variable of interest in each case is how much P2 sends back in each of the five treatments, which we interpret as reciprocity. I use the strategy method to maximize the richness of the data available, so that players in the role of P2 specify their optimal response under each possible gift by P1, and after P1's gift is made, the experimental program selects P2's appropriate response. Thus, when we talk about observing a certain gift from P1 in the data analysis, it is not the actual gift we are referring to, but the hypothetical gift that P2 is responding to. This allows us to control for individual fixed effects when analyzing the data. Note that because each of P2's specifications may be called

Treatment	(w_1, w_2)	(π'_1, π'_2)	s	b	M
T1	(10,12)	(6,20)	4	8	2
T0	**(8,12)**	**(6,20)**	**2**	**8**	**4**
T2	(8,10)	(6,20)	2	10	5
T3	(8,12)	(4,20)	4	8	2
T0	**(8,12)**	**(6,20)**	**2**	**8**	**4**
T4	(8,12)	(6,22)	2	10	5

Table 1: T0 is the control and T1-T4 correspond to the treatment effects. The second and third columns indicate the endowed allocation and the allocation after P1's gift in each treatment, respectively. s, b, and M represent the sacrifice, benefit, and multiplication factor in each case

Comparison Treatment (to T0)	Variable of interest	Controlling for (Yes/No)						Confounding Factor	Expected sign of bias
		w_1	w_2	π_1	π_2	s	b		
1	s	N	Y	Y	Y		Y	w_1	Negative
2	b	Y	N	Y	Y	Y		w_2	Negative
3	s	Y	Y	N	Y		Y	π_1	Positive
4	b	Y	Y	Y	N	Y		π_2	Positive

Table 2: This table indicates the different treatments in terms of what effects they are estimating (column 2), what they are controlling for (column 3), what is omitted (column 4), and the expected sign of bias (column 5)

upon, P2 has an incentive to be truthful about their preferences. Nonetheless, a minority of studies do find differences between the strategy method and the direct-response treatment, including smaller punishment or reward rates with the strategy method (Brandts and Charness 2011). Therefore, there is some evidence that people may react less emotionally in our context, with smaller reciprocal actions. As a result, my findings should be interpreted with more caution if being applied to situations in which emotions are likely to play a large role, as it is unclear how emotions would affect results.

By varying the multiplication factor and the endowments across treatments we can create comparison groups that do not differ in the distribution of wealth following the first round of gifting, but differ in either the sacrifice from the giver or the benefit to the receiver associated with the gift (but not both). I refer to this set of treatments as Specification 1, in which we compare Treatment 1 (T1) and Treatment 2 (T2) to the control (T0). The basic intuition is that relative to a given treatment, we can increase P1's endowment while reducing the multiplication factor in such a way so that, given a gift with a certain associated benefit, the players' distributions do not change, but the level of sacrifice increases. Conversely, we can decrease P2's endowment and increase the multiplication factor such that, after the gifts, the distributions and sacrifice levels do not change, but the level of benefit increases.

In Specification 2, comparing T3 and T4 to T0, we instead hold the endowments constant across groups. To increase the sacrifice, we simply lower the multiplier and allow P1's allocation after their gift to fall; to increase the benefit, we raise the multiplier so that P2's allocation after P1's gift rises.

3.2 The regression model

First, I approximate the function $r(s, b, \pi_1', \pi_2', w_1, w_2)$ from Section 2 as a linear function, in order to make measurement tractable:

$$r = \beta_0 + \beta_1 s + \beta_2 b + \beta_3 \pi_1' + \beta_4 \pi_2' + \beta_5 w_1 + \beta_6 w_2 + \epsilon, \tag{4}$$

or equivalently

$$r = \beta_0 + \beta_1 (w_1 - \pi_1') + \beta_2 (\pi_2' - w_2) + \beta_3 \pi_1' + \beta_4 \pi_2' + \beta_5 w_1 + \beta_6 w_2 + \epsilon. \tag{5}$$

I am using this form because as I mentioned in Section 2, it seems probable that the amount sacrificed and the benefit received plays a special role in reciprocity, and that this role is best divorced from distributional effects.[1]

However, in practice it is not possible to test (4) directly, because of collinearity problems that are evident in (5). That is, by construction, knowing any four of the six variables would give us the other two, so it is impossible to separate all these factors statistically. Instead, we will regress on the four different treatment effects to estimate β_1 and β_2 and only use (4) to help us analyze the potential bias of doing so. Each treatment involves a specific set of endowments, multiplier, and (hypothetical) gift from P1. While the strategy method gives us the response to several possible P1 gifts for each player for each round, we only focus on the small fraction that align with these selected factors. Thus, my actual regression will look something like

$$r = \gamma_0 + \gamma_1 T_1 + \gamma_2 T_2 + \gamma_3 T_3 + \gamma_4 T_4 + \epsilon, \tag{6}$$

As I show below, each of the two sets of treatments controls for four out of the six variables. Tables 1 and 2 in Section 3.1.1 clarify the different treatments:

Recall from Section 3.1 that Specification 1 (T1 and T2) involves varying either w_1 or w_2, respectively, so that we can change either s or b while holding all other variables fixed. Consider comparing T_1 to T_0. As shown in Table 1, w_1 and s both increase by 2. As a result, in estimating γ_1 we are actually estimating $2(\beta_1 + \beta_5)$. Similarly, when we observe T_2, w_2 decreases by 2 while b increases by 2. Thus, $\gamma_2 = 2(\beta_2 - \beta_6)$.

Note that β_5 and β_6 are simply linear approximations of $\frac{\partial r(\cdot)}{\partial w_1}$ and $\frac{\partial r(\cdot)}{\partial w_2}$ from Section 2. Although I cannot sign these with confidence, I expect $\beta_5 < 0 < \beta_6$, so that if we use γ_1 and γ_2 to estimate β_1 and β_2, we will have negative bias. The intuition is that having less money to begin with and having the other player have more money to begin with are both likely to decrease the feeling of gratitude that would fuel a reciprocal response, as it arguably reveals a lower level of compassion in the partner. That is, P1 "had" to give something because they were ahead, and therefore do not

[1] Note that, although in reality one would expect each individual to have different coefficients, this equation implicitly assumes one value for each coefficient, so that I am estimating the average of the coefficients for sacrifice and benefit.

receive much gratitude. Thus, I believe it is reasonable to consider our Specification 1 results to be conservative estimates.

Specification 2 (T3 and T4) involves varying either π_1' or π_2', respectively, so that we can change either s or b while holding all other variables fixed. Using Table 1 again, we can see that $\gamma_3 = 2(\beta_1 - \beta_3)$ and $\gamma_4 = 2(\beta_2 + \beta_4)$. Note that β_3 and β_4 are linear approximations of $\frac{\partial r(\cdot)}{\partial \pi_1'}$ and $\frac{\partial r(\cdot)}{\partial \pi_2'}$ from Section 2, from which we can expect that $\beta_3 < 0 < \beta_4$. That is, other things equal, people should be more generous when they currently have more and the other player has less, due to preferences for fairer outcomes. Thus, if we use γ_3 and γ_4 to estimate β_1 and β_2, respectively, we should expect an upward bias. Thus, Specifications 1 and 2 give us what we may think of as lower and upper bound estimates, respectively.

4 Results

4.1 The Data

The data were downloaded from the server after each session. Variables measured included P1 gifts, P2 responses, endowments, multipliers, and many survey answers. In the analysis that follows, we drop all P1 observations, as they do not give us data on reciprocity. Furthermore, observations are grouped by person-round, so that 5 observations will typically correspond to one individual.[2] The dependent variable of interest, r from (4), is P2's response in specific circumstances corresponding to the treatments as defined in Table 1. For example, our Treatment 2 observation would correspond to a round in which the endowed allocation was $(8, 10)$ and $M = 5$, and would only include P2's response to a gift (sacrifice) of 2 points (generating a benefit of 10 points) from P1 (note that because we are using the strategy method, it doesn't matter if P1's gift actually *was* 2 or not).

[2] In general, I exclude Round 6 observations, as they effectively count some people twice. The exceptions are when I am controlling for the sixth round in Table 7, and in the summary statistics of Tables 3 and 4.

Table 3: This table summarizes the decisions made by the participants. Sent amount refers to gifts (sacrifices) made by P1, sent back indicates actual reciprocal responses to these gifts, and response x represents P2's response to a hypothetical sacrifice of x. Note that observations are player-rounds. This number drops towards the bottom because only a small number of rounds played involved P1 having the option of giving up to 10

Variable	observations	Mean	Standard Deviation	Min	Max
sent amount	276	3.80	2.90	0	10
sent back	276	6.39	7.59	0	44
response 0	276	.91	2.79	0	12
response 1	276	2.37	3.56	0	17
response 2	276	3.74	4.47	0	22
response 3	276	5.15	5.47	0	27
response 4	276	6.65	6.56	0	32
response 5	276	7.97	7.64	0	37
response 6	276	9.17	8.68	0	42
response 7	276	10.50	9.67	0	47
response 8	276	11.85	11.07	0	52
response 9	61	8.90	7.23	0	30
response 10	61	9.62	8.03	0	32

Table 4: Distribution of Treatments

Treatment	Observations	Percent
0	53	19.20
1	61	22.10
2	57	20.65
3	55	19.93
4	50	18.12
Total	276	100

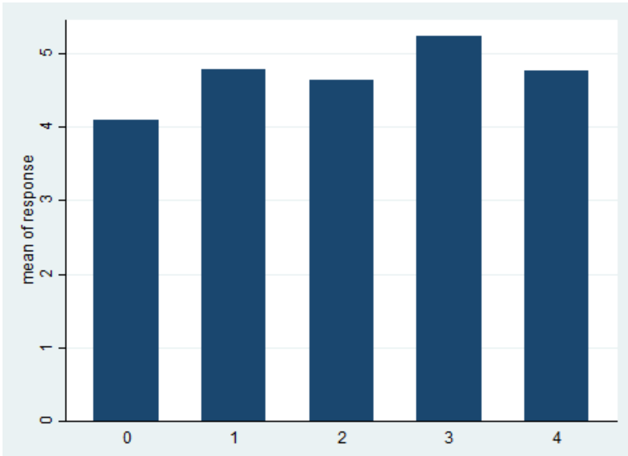

Figure 1: Reciprocity by treatment number

4.2 Findings

Following the strategy described in Section 3.2, I generated variables T0, T1,...,T4 as treatment dummies. Compared to T0, T1 and T2 provide a Specification 1 estimate, while T3 and T4 provide a Specification 2 estimate. As a first step, it is useful to compare the response in each treatment group to that of the control (Figure 1). The response that I use as my dependent variable is obtained by selecting the P2 response that matches the specific combination of multiplier, endowments, and intermediate allocations, as shown in Table 1 in Section 3.1.1. The coefficients for T2 and T4 can be interpreted as estimates for $2\beta_2$ (since the treatments increased benefit by 2), and T1 and T3 analogously relate to $2\beta_1$.

As a first pass, we can perform a simple t-test comparison to see what the differences are and if they are significant.

The differences between the means of the control treatment with Treatment 1,2,3, and 4 are roughly 0.70,0.55,1.15, and 0.68, respectively. While these differences are economically significant, none of the p values are significant at the 10% level. A Wilcoxon rank-sum test generates stronger but still relatively weak levels of significance, with only one estimate significant at the 10% level. Given that I only observe each treatment 47 times (half of the 94 participants were P2s), this initial lack of significance is not too surprising. However, we can do better by switching to a regression framework and taking advantage of the additional information we have.

If we run the most basic regression from (6):

$r = \beta_0 + \beta_1 T_1 + \beta_2 T_2 + \beta_3 T_3 + \beta_4 T_4 + \epsilon,$

we get coefficients identical to the mean differences found above, and a similar lack of statistical significance. The results are shown in (1) of Table 5. This is likely because, with the relatively small sample size, there is too much noise in the response relative to the treatment effect. This problem is resolved as soon as we exploit one of the key features of the experiment: that every

Table 5: Primary Regressions

Control	(1)	(2)
T1	0.702	0.702**
	(0.989)	(0.333)
T2	0.553	0.553*
	(0.979)	(0.277)
T3	1.149	1.149***
	(1.012)	(0.395)
T4	0.681	0.681*
	(1.039)	(0.339)
_cons	4.085***	4.085***
	(0.710)	(0.219)
Person FE	N	Y

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

player received every treatment. This design allows us to add participant-level fixed effects to our regression. The result is shown in (2). While the point estimates remain unchanged, the standard error is much smaller since the explanatory power of the model is greatly improved. Now the four treatment effects are statistically significant at the 10% level if not the 5% level.

Based on this regression, we have a lower and upper estimate for the effect of one point of benefit of 0.277 and 0.340 respectively (obtained by dividing the coefficients by 2), and a lower and upper estimate for the sacrifice coefficient of 0.351 and 0.574, respectively. Assuming the truth is somewhere between these estimates, they indicate that a marginal sacrifice of one unit would induce an average increase in reciprocity of about 0.45 units, and that a marginal unit of benefit would have an effect on reciprocity of about 0.3.

While my speculation about upper and lower bounds is consistent with the data, if we test the coefficients against each other, we see that the differences between the two specifications and between the two estimated effects are statistically insignificant. This could either indicate that the omitted biases are small and sacrifice and benefit are of similar importance, or that we have insufficient statistical power to see starker contrasts. I believe the latter to be the case, given my small sample size and the sensitivity of my results, discussed below.

4.3 Robustness checks

There are several more data fields that we have at our disposal from this experiment, and it is interesting to see if their inclusion changes our results. In this section, we will consider order effects, session effects, and a variety of demographics, including personality type.

Table 6: Summary Statistics of Demographics

Gender	Frequency	Percent
Female	120	51.06
Male	110	46.81
Prefer not to answer	5	2.13
Total	235	100
Race	**Frequency**	**Percent**
Asian	80	34.04
Black or African American	10	4.26
Prefer not to answer	5	2.13
White	140	59.57
Total	235	100
Age	**Frequency**	**Percent**
18	30	12.77
19	40	17.02
20	25	10.64
21	60	25.53
22	60	25.53
23	10	4.26
24	10	4.26
Total	235	100
Academic Division	**Frequency**	**Percent**
Arts and Humanities	50	21.28
Interdisciplinary Studies	5	2.13
Natural Sciences and Engineering	70	29.79
Other	10	4.26
Social Sciences	100	42.55
Total	235	100

4.3.1 Order and session effects

I designed the experiment to randomly assign one of 3 possible orders to each P2. Unfortunately, a coding error resulted in only Order 2 and Order 3 to realize. To investigate the concern that my results may be driven by the orders I have chosen, I include order-treatment interaction dummies in my empirical model. The results are in (2) of Table 7. While most of the coefficients do not change dramatically, all of them lose their statistical significance. Perhaps more concerning, the interaction of the second order with T3 and T4 is significant at the 5% level. This suggests that having a treatment relatively earlier or later can cause a big difference in a person's response. While this decreases confidence in my estimates, the interaction terms are all positive, indicating that, if anything, we should probably be more confident that we are seeing a significant treatment effect in each case.

Another way to address order effects is to observe how players act in Round 6, compared to in previous rounds. Recall that in the sixth round, everyone repeats a randomly selected round, so that we may investigate learning effects by observing a player confronted with the same situation twice. When we include observations, a dummy, and a set of interaction terms for the sixth round in (3), our estimated treatment effects have approximately the same significance as before, and the estimates on the sixth-round effects are not statistically significant, which is reassuring. In (4), we combine the two sets of controls, and our results are qualitatively similar to (2).

We might also be interested in controlling for session effects. When we run our standard regression with SessionXTreatment interaction terms in (2) of Table 8, we lose all significance and also see the signs reversed for nearly all estimates. I would argue that this is probably because of the smaller degrees of freedom driving standard errors up in my relatively small sample.

4.3.2 Demographics effects

I was also curious to see how making use of demographic information affects our results.

First, in (2) of Table 9 we can see that by substituting fixed effects with certain demographic controls[3] we get the same answer as before (because of the fact that every person experienced every treatment), although standard errors are understandably larger. The Bx dummies represent income brackets (B1 for the poorest and B6 for the wealthiest) and the EDx ones represent different levels of education with ED1-ED4 representing years 1-4 of College (the language for "freshmen" through "seniors" was also included in the survey) and ED5 representing "other," which here should consist of Language Assistants.

Next, in (3) I use interaction terms for demographic dummies such as gender and race. The coefficients lose their logical appeal, and the standard errors become larger, but arguably this is again a function of small sample size more than anything else. By including more interaction terms in (4), we get even less useful results. Although one of the coefficients (for T4) is significant at the

[3]I omitted a few statistically insignificant controls (namely, B2, B4, and ED 3) to save space

Table 7: Order Effects

Control	(1)	(2)	(3)	(4)
T1	0.702**	0.400	0.702**	0.212
	(0.333)	(0.422)	(0.336)	(0.456)
T2	0.553*	0.367	0.553*	0.323
	(0.277)	(0.380)	(0.280)	(0.364)
T3	1.149***	0.500	1.149***	0.555
	(0.395)	(0.452)	(0.398)	(0.457)
T4	0.681*	0.167	0.681*	0.155
	(0.339)	(0.388)	(0.342)	(0.369)
O2XT1		0.835		1.355*
		(0.678)		(0.775)
O2XT2		0.516		0.637
		(0.532)		(0.523)
O2XT3		1.794**		1.643**
		(0.810)		(0.780)
O2XT4		1.422**		1.454**
		(0.704)		(0.641)
sixth			0.084	0.055
			(0.801)	(0.766)
sixthXT1			-2.126	-2.120
			(1.723)	(1.736)
sixthXT2			-0.020	-0.014
			(0.965)	(0.940)
sixthXT3			-0.616	-0.517
			(1.393)	(1.375)
sixthXT4			-0.481	-0.440
			(0.949)	(0.906)
_cons	4.085***	4.085***	4.121***	4.124***
	(0.219)	(0.211)	(0.236)	(0.226)
N	235	235	276	276
Person FE	Y	Y	Y	Y
Order effects	N	Y	N	Y
Sixth-round effects	N	N	Y	Y

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Session Effects

Control	(1)	(2)
T1	0.702**	-0.000
	(0.333)	(0.762)
T2	0.553*	-0.167
	(0.277)	(0.779)
T3	1.149***	0.833
	(0.395)	(0.779)
T4	0.681*	-0.667
	(0.339)	(0.789)
N	235	235
Person FE	Y	Y
Session effects	N	Y

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5% level, the coefficient of -21.646 doesn't mean much given all the interaction terms and is hard to interpret. For example, because of the age interaction term, a 20-year old would have a point estimate of essentially 0 for the effect of T4.

4.3.3 Personality types

After completing the game and demographics section, I asked participants to answer 60 questions used in the Big Five Personality test (Soto and John 2017). The questions asked participants to report their level of agreement with simple statements describing themselves such as "Is sometimes rude to others," or "Is complex, a deep thinker." 15 groups of 4 questions each can then be mapped into the personality facets, such as Sociability, Compassion, Trust, Curiosity, and Imagination. Finally, each of the Big Five (BF) personality traits (Extraversion, Agreeableness, Conscientiousness, Negative Emotionality, and Open-Mindedness) were observed from 3 of these facets. It is worth considering to what degree this information can explain observed behavior, or change our results.

In Table 10, (1) gives our main results from before, (2) replaces person-level FE with the BF traits as controls. Estimates change a bit, and lose significance, but overall, they look pretty similar to those from (1). In (3) I re-introduce person-level FE and include BF-Treatment interaction terms. Arguably because of the loss of statistical power, my results become completely different and generally statistically insignificant. However, it is worth noting that negative emotionality (interestingly) and agreeableness seem to have positive interaction effects that are statistically and economically significant for most treatments.

Table 9: Demographic Effects

Control	(1)	(2)	(3)	(4)
T1	0.702**	0.702	-0.438	-2.735
	(0.333)	(0.792)	(0.499)	(12.337)
T2	0.553*	0.553	-0.438	-15.790
	(0.277)	(0.781)	(0.499)	(10.128)
T3	1.149***	1.149	-0.438	1.087
	(0.395)	(0.814)	(0.499)	(13.593)
T4	0.681*	0.681	1.124	-21.646**
	(0.339)	(0.817)	(0.999)	(9.146)
female		-2.996***		
		(0.786)		
white		-14.192***		
		(1.129)		
black		-13.568***		
		(1.740)		
asian		-15.261***		
		(0.984)		
age		-1.139***		
		(0.362)		
B3		3.769***		
		(0.929)		
B5		3.095**		
		(1.287)		
B6		-2.169***		
		(0.682)		
ED2		1.597*		
		(0.909)		
ED4		5.363***		
		(1.282)		
ED5		8.055***		
		(1.914)		
arts		3.686***		
		(1.072)		
science		3.861***		
		(1.127)		
social		3.531***		
		(1.027)		
inter		5.826***		
		(1.218)		
_cons	4.085***	35.782***	4.085***	4.085***
	(0.219)	(7.046)	(0.222)	(0.221)
N	235	235	235	235
Person FE	Y	N	Y	Y
Race and gender interaction effects	N	N	Y	Y
Other demographic interaction effects	N	N	N	Y

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Personality Effects

Control	(1)	(2)	(3)
	0.702**	0.717	-4.937
	(0.333)	(0.964)	(3.620)
T2	0.553*	0.587	-0.605
	(0.277)	(0.959)	(2.243)
T3	1.149***	1.152	-6.712*
	(0.395)	(0.983)	(3.515)
T4	0.681*	0.696	-3.884
	(0.339)	(1.021)	(2.999)
agreeableXT1			0.972**
			(0.366)
agreeableXT2			0.525
			(0.337)
agreeableXT3			1.611***
			(0.444)
agreeableXT4			0.901*
			(0.480)
negativeXT1			0.615*
			(0.364)
negativeXT2			0.648**
			(0.252)
negativeXT3			1.273***
			(0.412)
negativeXT4			0.629*
			(0.374)
_cons	4.085***	-6.144***	4.152***
	(0.219)	(2.299)	(0.212)
N	235	230	230
Person FE	Y	N	Y
Big Five Personality	N	Y	Y
Big Five Personality Interaction Effects	N	N	Y

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5 Conclusion

Overall, my results indicate that both sacrifice and benefit play a significant role in determining reciprocity. While some statistical approaches do not yield significant results, I think that this is more than anything else a factor of my relatively small experimental sample size. Considering that my observations consisted of only 47 people, it is not surprising that adding certain controls made it difficult to observe accurate treatment effects. The controls that stood out as most clearly significant were the order effects, but these indicated that we may be underestimating the effects. Thus, my experiment provides moderately strong evidence that benefit and sacrifice matter in determining reciprocity.

Another issue that I think may have decreased our ability to observe an effect is the fact that, based on anecdotal evidence, not everyone understood the rules. For example, some people didn't understand that their gift back to P1 wouldn't get multiplied, and some didn't know they would be assigned different partners in each round. While it is not clear how these beliefs would affect treatment effects, I think at the least they added more noise and thus made treatment effects harder to detect. Future experiments on this topic should spend more time finding the best way to clarify the rules than I was able to.

While my results provide a first pass at answering the question of how sacrifice and benefit affect reciprocity, more research is needed. For one, the study should be scaled up to provide more statistical power and external validity to the researcher. Secondly, the anecdotally high number of people who didn't understand various aspects of the rules indicates that the experimental design, particularly in terms of delivery, could be improved. While a few misunderstandings might have negligible effects on our measurements, eliminating them would significantly improve confidence in the results.

6 Acknowledgements

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7 Appendix

7.1 Instructions from Experiment

7.1.1 Instructions

This is an experiment about individual decision-making. Thank you for agreeing to take part. You will be paid for your participation, and the amount of money that you earn will depend on your decisions and the decisions of other participants.

The entire session will take place through the computer. Your decisions will be confidential, and your name will not be associated with any of your actions. You are not allowed to talk to or communicate with other participants in any other way during the session. You should have all your mobile phones, smart phones, mp3 players, and any other such devices turned off. If they are not, please turn them off immediately. These devices must remain switched off throughout the session. Be sure to place them somewhere where they won't distract you (on the floor if necessary).

You are asked to abide by these rules throughout the session. Should you fail to do so, I will have to exclude you from this (and future) session(s) and you will not receive any compensation for this session.

We will start with a brief instruction period. Please read these instructions carefully. They are identical for all participants with whom you will interact. If you have any questions about these instructions now or at any other time during the experiment, please raise your hand. The experimenter will come to answer your questions.

7.1.2 Compensation

In addition to the $7 participation fee, you will earn money based on your decisions and the decisions of other participants. In the instructions and all decision tasks that follow, payoffs are reported in points. At the end of the experiment, the amount you have earned will be converted into dollars using the following conversion rate:

1 point = $0.40

The payment takes place in cash at the end of the experiment. Your decisions in the experiment will remain confidential.

You will play multiple rounds in the experiment; at the end, one round from the game will be chosen at random. Everyone's monetary earnings will be based on the number of points they earned in this round. You will also be asked several survey questions after the game.

7.1.3 Experiment

For this experiment, you will play multiple rounds of a decision-making game. In each round, you will be randomly assigned a partner. Your identity and the identity of your partner will remain confidential.

There are two different roles in this game: Player 1 and Player 2. At the beginning of the experimental session, you will be randomly assigned to one of these two roles. While your partner will be randomly assigned in each round, your assigned role (Player 1 or Player 2) will remain the same throughout the experiment.

Step-by-step process of the game:

- Each player will start a round with a certain number of points. This is called the endowment
- Player 1 may send any (whole) number of points, up to their endowment, to Player 2. This will be taken from their endowment
- Player 2 will receive this amount multiplied by a multiplication factor, and it will be combined with their endowment
- Player 2 may send back between 0 and the total number of points they now possess
- After both players have had the chance to act, your payoffs for the round are revealed
- Repeat above steps for each of 6 rounds (note that the endowments and multiplication factors may change between rounds)
- Complete the survey component as completely and honestly as possible
- Final payoffs will be based on the points you received for one randomly selected round

7.1.4 Player 2's Choice

Instead of responding to Player 1 (P1)'s choice directly, Player 2 (P2) is asked to respond to the set of all possible P1 choices. Then, after decisions are made, the appropriate response will be selected to determine payoffs. In the example below, the multiplication factor is 2, P1's endowment is 3 and P2's endowment is 5. The example illustrates how P2 would make their choices in the game, where the letters a, b, c, and d represent numbers chosen by P2:

Please specify how you much you would send back in each case:

P1 sends you 0. You have 5 $\rightarrow$ a

P1 sends you 1. You have 7 $\rightarrow$ b

P1 sends you 2. You have 9 $\rightarrow$ c

P1 sends you 3. You have 11 $\rightarrow$ d

After P2 makes their decisions, the computer matches P1's actual choice to P2's decisions. In the example above, if P1 sent 2 points (multiplied to 4 points), P2 would end up transferring the quantity c back to P1. If P1 instead sent 3 points, P2 would send back d to P1, and so on.

7.2 Interior solution of r

I will show that $\frac{\partial D(\pi_1,\pi_2)}{\partial \pi_1} - \frac{\partial D(\pi_1,\pi_2)}{\partial \pi_2} + \frac{\partial g(s,b,r)}{\partial r} + \frac{\partial d(w_1,w_2,r)}{\partial r}$ is decreasing with respect to r. That is

$$\frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1 \partial r} - \frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_2 \partial r} + \frac{\partial^2 g(s,b,r)}{\partial r^2} + \frac{\partial^2 d(w_1,w_2,r)}{\partial r^2} < 0.$$

Note that this is complicated by the fact that an increase in r simultaneously implies an increase in $\pi_1$and a decrease in π_2. Thus, we must have

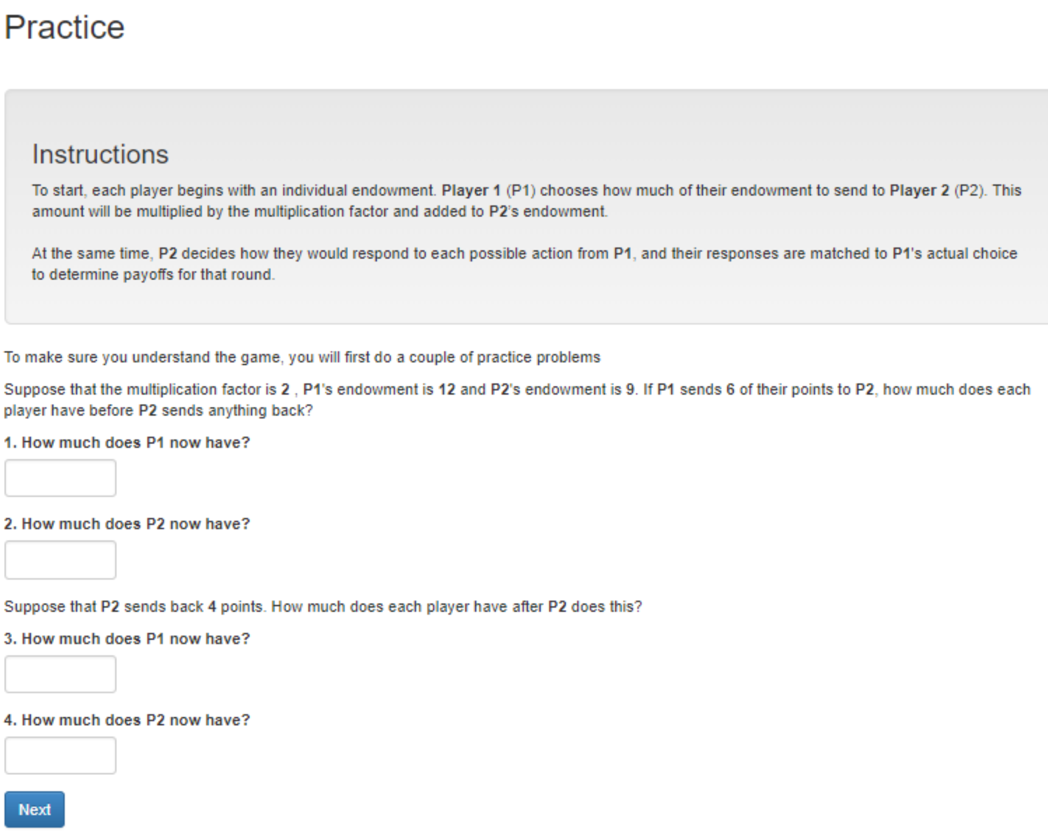
$$\frac{\partial^2 D(\pi_1,\pi_2)}{\partial {\pi_1}^2} - \frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1 \partial \pi_2} + \frac{\partial^2 D(\pi_1,\pi_2)}{\partial {\pi_2}^2} - \frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1 \partial \pi_2} + \frac{\partial^2 g(s,b,r)}{\partial r^2} + \frac{\partial^2 d(w_1,w_2,r)}{\partial r^2} < 0.$$

But since we have shown earlier that

$$\frac{\partial^2 D(\pi_1,\pi_2)}{\partial {\pi_1}^2}, \frac{\partial^2 D(\pi_1,\pi_2)}{\partial {\pi_2}^2}, \frac{\partial^2 g(s,b,r)}{\partial r^2} + \frac{\partial^2 d(w_1,w_2,r)}{\partial r^2} < 0 < \frac{\partial^2 D(\pi_1,\pi_2)}{\partial \pi_1 \partial \pi_2},$$

this must be true.

7.3 Screenshots from the game



Practice

Instructions

To start, each player begins with an individual endowment. **Player 1** (P1) chooses how much of their endowment to send to **Player 2** (P2). This amount will be multiplied by the multiplication factor and added to **P2**'s endowment.

At the same time, **P2** decides how they would respond to each possible action from **P1**, and their responses are matched to **P1**'s actual choice to determine payoffs for that round.

To make sure you understand the game, you will first do a couple of practice problems

Suppose that the multiplication factor is **2** , **P1**'s endowment is **12** and **P2**'s endowment is **9**. If **P1** sends **6** of their points to **P2**, how much does each player have before **P2** sends anything back?

1. How much does P1 now have?

2. How much does P2 now have?

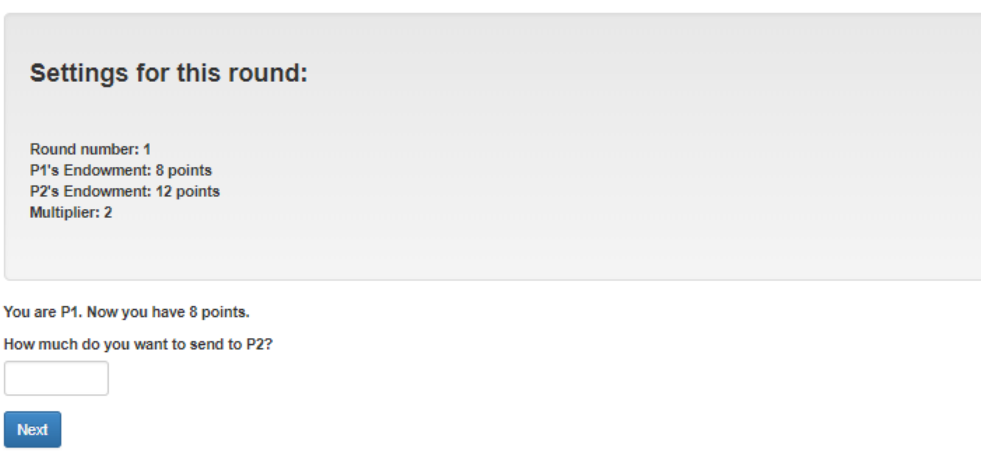
Suppose that **P2** sends back **4** points. How much does each player have after **P2** does this?

3. How much does P1 now have?

4. How much does P2 now have?

Next

Figure 2: Practice Page



Settings for this round:

Round number: 1
P1's Endowment: 8 points
P2's Endowment: 12 points
Multiplier: 2

You are P1. Now you have 8 points.

How much do you want to send to P2?

Next

Figure 3: Send Page (P1)

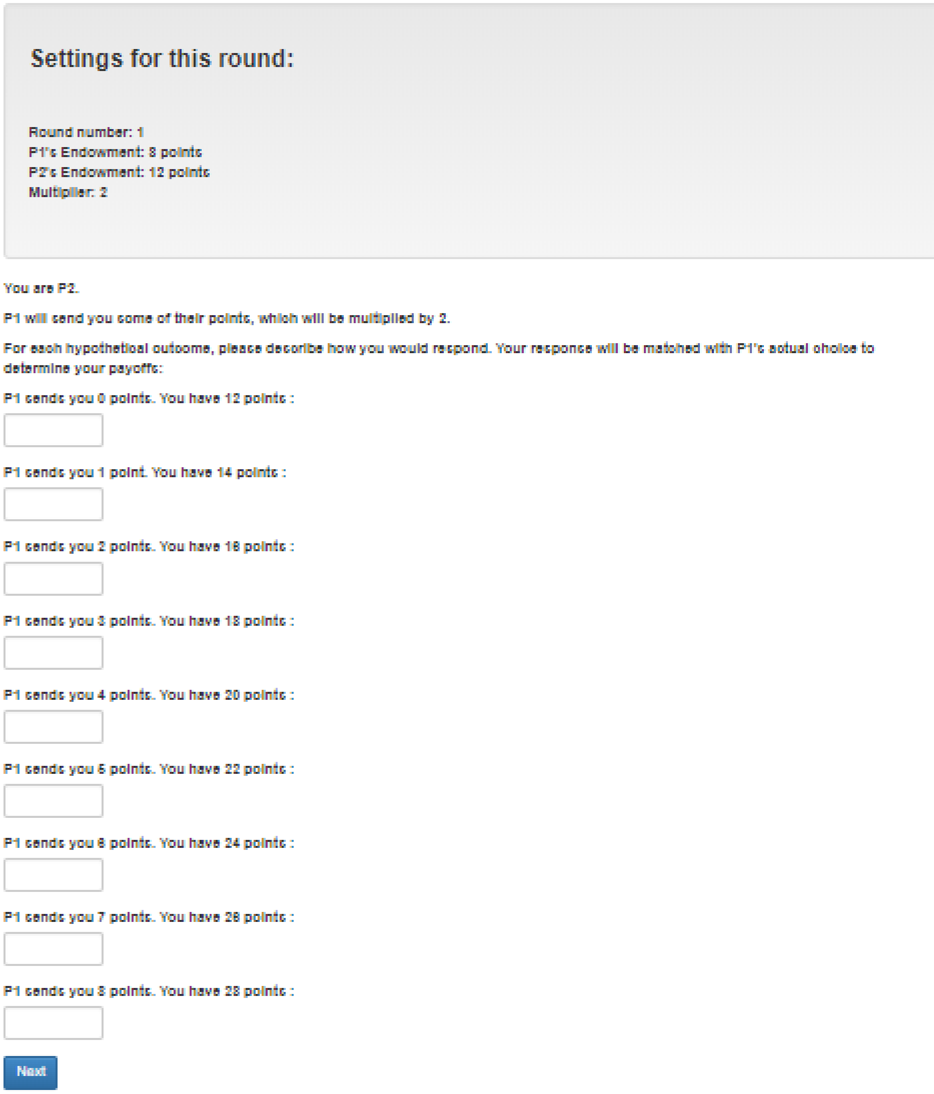


Figure 4: Send Back Page (P2)

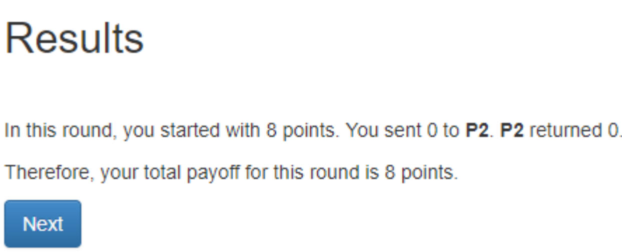


Figure 5: Results (P1)

If "Not listed or Multiracial," please specify :

What is your level of education? If not in College, pick "other" and please report your level of education below :

- College first year/Freshman
- College second year/Sophomore
- College third year/Junior
- College fourth year/Senior
- Other
- Prefer not to answer

If "Other," please specify :

Please estimate your gross family income :

- $0 to $59,999
- $60,000 to $79,999
- $80,000 to $99,999
- $100,000 to $119,999
- $120,000 to $159,999
- $160,000 or more
- Prefer not to answer

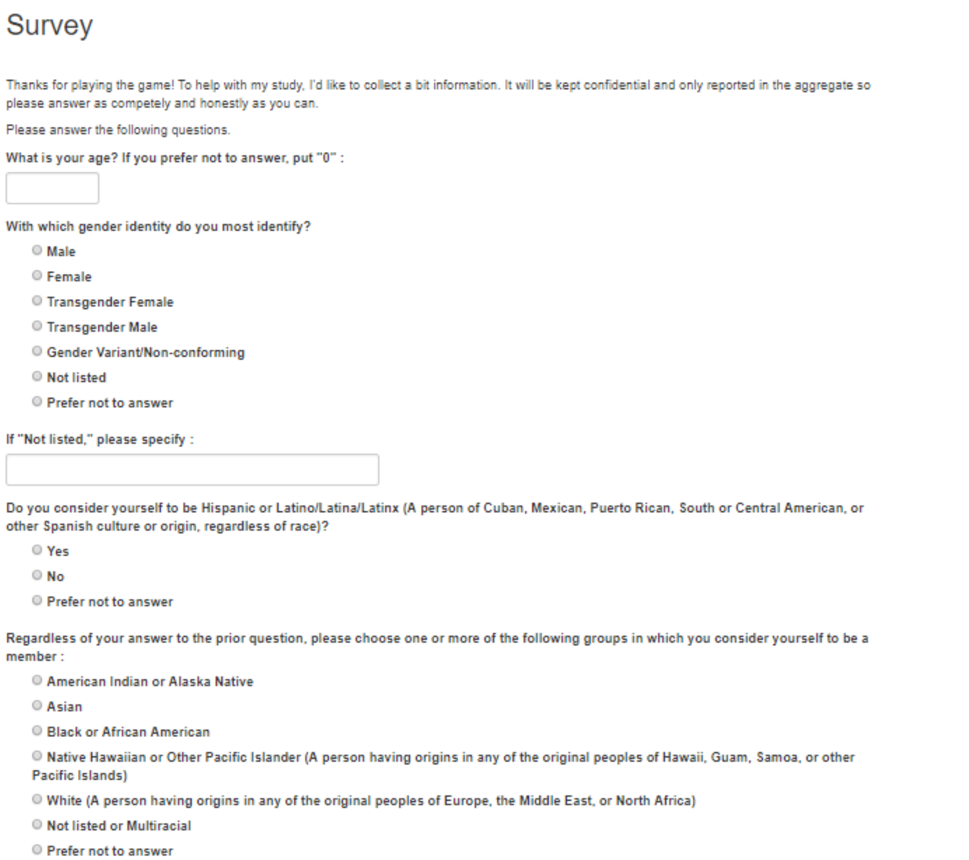
Select the area of your major. If you double major in two different areas, select the one you feel closest to :

- Arts & Humanities
- Social Sciences
- Natural Sciences & Engineering
- Interdisciplinary Studies
- Other
- Prefer not to answer
- Not applicable

If "Other," please specify :

Next

Figure 6: Survey Page 1 (1/3)



Survey

Thanks for playing the game! To help with my study, I'd like to collect a bit information. It will be kept confidential and only reported in the aggregate so please answer as competely and honestly as you can.

Please answer the following questions.

What is your age? If you prefer not to answer, put "0" :

With which gender identity do you most identify?

- ○ Male
- ○ Female
- ○ Transgender Female
- ○ Transgender Male
- ○ Gender Variant/Non-conforming
- ○ Not listed
- ○ Prefer not to answer

If "Not listed," please specify :

Do you consider yourself to be Hispanic or Latino/Latina/Latinx (A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race)?

- ○ Yes
- ○ No
- ○ Prefer not to answer

Regardless of your answer to the prior question, please choose one or more of the following groups in which you consider yourself to be a member :

- ○ American Indian or Alaska Native
- ○ Asian
- ○ Black or African American
- ○ Native Hawaiian or Other Pacific Islander (A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands)
- ○ White (A person having origins in any of the original peoples of Europe, the Middle East, or North Africa)
- ○ Not listed or Multiracial
- ○ Prefer not to answer

Figure 7: Survey Page 1 (2/3)

If "Not listed or Multiracial," please specify :

What is your level of education? If not in College, pick "other" and please report your level of education below :

- College first year/Freshman
- College second year/Sophomore
- College third year/Junior
- College fourth year/Senior
- Other
- Prefer not to answer

If "Other," please specify :

Please estimate your gross family income :

- $0 to $59,999
- $60,000 to $79,999
- $80,000 to $99,999
- $100,000 to $119,999
- $120,000 to $159,999
- $160,000 or more
- Prefer not to answer

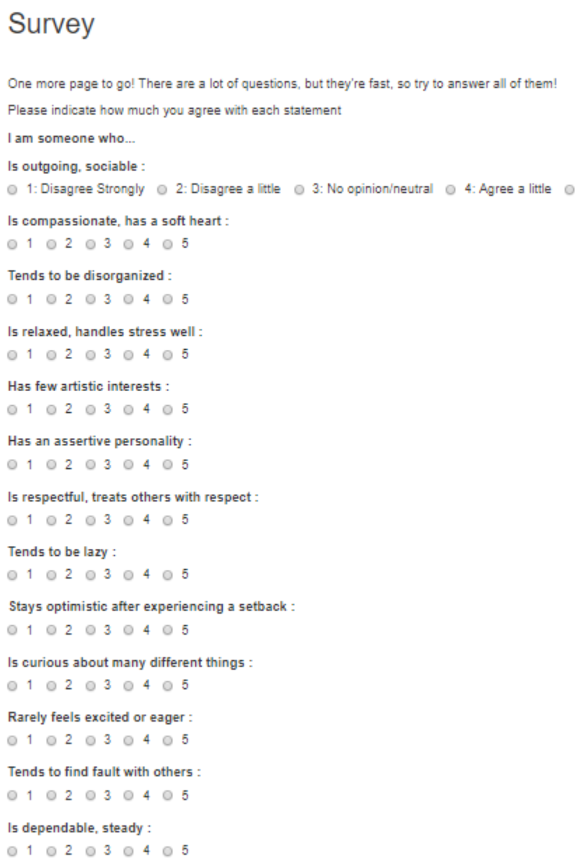
Select the area of your major. If you double major in two different areas, select the one you feel closest to :

- Arts & Humanities
- Social Sciences
- Natural Sciences & Engineering
- Interdisciplinary Studies
- Other
- Prefer not to answer
- Not applicable

If "Other," please specify :

Next

Figure 8: Survey Page 1 (3/3)



Survey

One more page to go! There are a lot of questions, but they're fast, so try to answer all of them!

Please indicate how much you agree with each statement

I am someone who...

Is outgoing, sociable :

1: Disagree Strongly 2: Disagree a little 3: No opinion/neutral 4: Agree a little

Is compassionate, has a soft heart :

1 2 3 4 5

Tends to be disorganized :

1 2 3 4 5

Is relaxed, handles stress well :

1 2 3 4 5

Has few artistic interests :

1 2 3 4 5

Has an assertive personality :

1 2 3 4 5

Is respectful, treats others with respect :

1 2 3 4 5

Tends to be lazy :

1 2 3 4 5

Stays optimistic after experiencing a setback :

1 2 3 4 5

Is curious about many different things :

1 2 3 4 5

Rarely feels excited or eager :

1 2 3 4 5

Tends to find fault with others :

1 2 3 4 5

Is dependable, steady :

1 2 3 4 5

Figure 9: Sample of Survey Page 2 (1/2)

Is talkative :

1 2 3 4 5

Can be cold and uncaring :

1 2 3 4 5

Leaves a mess, doesn't clean up :

1 2 3 4 5

Rarely feels anxious or afraid :

1 2 3 4 5

Thinks poetry and plays are boring :

1 2 3 4 5

Prefers to have others take charge :

1 2 3 4 5

Is polite, courteous to others :

1 2 3 4 5

Is persistent, works until the task is finished :

1 2 3 4 5

Tends to feel depressed, blue :

1 2 3 4 5

Has little interest in abstract ideas :

1 2 3 4 5

Shows a lot of enthusiasm :

1 2 3 4 5

Assumes the best about people :

1 2 3 4 5

Sometimes behaves irresponsibly :

1 2 3 4 5

Is temperamental, gets emotional easily :

1 2 3 4 5

Is original, comes up with new ideas :

1 2 3 4 5

Next

Figure 10: Sample of Survey Page 2 (2/2)

Results

Your payoff from the randomly selected round was 12 points ($6.00). When combined with the show-up fee of $7.00, you get **$13.00**.

Please wait for your number to be called to receive your prize.

Thank you for participating in my experiment! The goal of the experiment was to see how people make decisions in social interactions. If you have any questions, ask me! Also, if you're interested, come to my CLAS presentation!

Figure 11: Payment Results Page

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