When Charities Compete: A Laboratory Experiment with Simultaneous Public Goods

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Abstract

What happens when charities compete? We begin to answer this question through a laboratory experiment in which subjects play two public goods games simultaneously. We systematically vary the incentives for contributing in one of the games – investigating the effects of recognition, a bonus conditional on contributing, and non-monetary sanctions - and measure the effect on contributions in both games. Monetary incentives in the form of conditional bonuses increase contributions, even when two games are played simultaneously. However, non-monetary incentives such as recognition and sanctions are less effective than in related literature on games played in isolation. Moreover, we find mixed evidence of the spillover effect of treatment on the un-treated games – bonuses increase contributions initially, recognition decreases contributions, and sanctions have no effect.

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1. Introduction

Charitable organizations spend billions on fundraising activities annually in an effort to compete for donor attention (Kelly, 1997); and nearly 50% of U.S. households contribute to more than one charitable organization annually (List, 2011). The use of costly fund raising tactics has been criticized as inefficient as it may lead to a shift in contributions between charities instead of raising "new" contributions, yet no consensus exists in the literature about the actual effect of such competition (Rose-Ackerman, 1982). One reason for a lack of consensus is the difficulty in obtaining naturally occurring data from both the supply side and the demand sides of the charitable market. However, recent research has opened the door to investigating the impact of simultaneous game-play using laboratory experiments (Cason et al., 2012; Bednar et al., 2012; Savikhin and Sheremeta; 2012; McCarter et al., 2013). Just as potential donors are exposed to many different 'asks' in the real world, subjects in our laboratory experiment play two public goods games simultaneously.

Our contribution is a laboratory experiment in which subjects participate in two public goods games at the same time. We systematically vary the incentives for contributing in one of the public goods games, while keeping incentives in the other public good game constant. We separately consider the effect of providing a monetary bonus for contributing, implementing recognition, and changing the level of within-group communication through sanctions. These incentive mechanisms were chosen for a few reasons. First, these mechanisms have great effectiveness in improving cooperation when implemented on a single public good in the laboratory (e.g., see Andreoni and Petrie, 2004; and Samek and Sheremeta, 2014 for effects of recognition; see Fehr and Gachter, 2000; Andreoni et al., 2003; Masclet et al., 2003; Sefton et al., 2007 for effects of sanctions; and Palfrey and Prisbrey, 1997; Goeree et al., 2002 for changing the cost of contributing; for a survey of the literature see Chaudhuri, 2011). Second, similar strategies are implemented with success in the field. For example, the bonus is similar to a conditional gift, which has shown success in the field (Landry et al., 2010). Recognition has also been widely used as a means to encourage contributions in the field, and very few contributions are actually done anonymously.

We find that monetary incentives in the form of conditional bonuses increase contributions, even when two games are played simultaneously. However, non-monetary incentives such as recognition and sanctions are less effective than in related literature on games played in isolation. One possible reason for these findings is that social incentives such as sanctions and recognitions are less effective when an alternative opportunity to be pro-social is present (i.e., the un-treated game). We find mixed evidence of treatment spillovers on the un-treated games – bonuses increase contributions initially, recognition decreases contributions, and sanctions have no net effect. Our findings add to knowledge in the field about the effects of different incentive schemes when games are played in isolation versus in ensemble. In addition, our findings have practical relevance for fundraisers.

2. Experimental Environment, Design and Procedures

The experiment was conducted at the Vernon Smith Experimental Economics Laboratory (VSEEL) at Purdue University. Subjects were recruited via email from a subject pool of undergraduate students using ORSEE (Greiner, 2004). A total of 192 subjects participated in 12 sessions, with 16 subjects participating in each session. The computerized experimental sessions used z-Tree (Fischbacher, 2007) to record subject decisions. Instructions were read out loud by the experimenter at the beginning of each session (see Appendix A for instructions).

While the link between the public goods game in the laboratory and social organizations in the field is imperfect, public goods games have been studied extensively to answer questions about charitable giving and contributions to social communities (e.g., Ledyard, 1995; Andreoni and Petrie, 2004; Landry et al., 2006; Chen et al., 2010). In the simple linear public goods game we employ (Groves and Ledyard, 1977), n identical risk-neutral individuals choose a portion of their endowments e to contribute to a public good. Individual i's contribution c_i to the public good is multiplied by m and given to each of n individuals in the group, where $0 < m < 1$ and $m \times n > 1$. The payoff of each individual i is $\pi_i = e - (1-m)c_i + m\sum_{j \neq i} c_j$. The Nash equilibrium prediction of the linear public goods game is to contribute nothing (free-ride), i.e. $c^* = 0$. However, behaviorally

motivated theories of social preferences suggest possible reasons for the contributions of $c>0$ that are observed in the empirical literature.

Since our goal was to investigate the potential spillover effects when individuals make decisions about contributions to more than one charity, we used a two-neighborhood design similar to that used in related laboratory experiments on simultaneous game-play (Falk et al., 2010; McCarter et al., 2013). Within each session, each participant was randomly assigned to a group of $n=4$ players for one game and to a different group of $n=4$ players for the other game, such that no participant played one game with any of their group members from the other game. Group composition remained fixed for all 20 periods of the experiment. The treatment was conducted on exactly one of the games in the set played by the individual – we call this the 'treated' game. We call the other game played simultaneously the 'standard' game.[1] The two games were also economically independent, as subjects received a separate endowment to use in the standard game and a separate endowment to use in the treated game.

The standard linear public goods game proceeded in the following way. At the beginning of each period, each individual received an endowment of $e=80$ experimental francs and was asked to choose his or her contribution c to the public good. Each individual's contribution to the public good was multiplied by $m=0.4$ and the total of all contributions given to each of the 4 individuals in the group. Each individual kept the remainder of the 80-franc endowment that he or she did not allocate to the public good. Individuals did not know others' decisions before making their own decisions. In addition, in each round, we also elicited individuals' beliefs about the sum of all other contributions in each group.[2]

In addition to the standard public goods game, all individuals also participated in a treated public goods game. This game was displayed side by side with the standard

[1] Assignment was done by first randomly assigning each subject to a computer station. To complete the group assignment, suppose computer stations are arranged in a 4x4 grid in consecutive order. Each computer station's row position indicates the assignment to the 'standard' game group and each computer's column position indicates the assignment to the 'treated' game group.

[2] We used an incentive-compatible belief elicitation. Subjects received 25 francs if they were within 10 francs of the correct group contribution, 20 francs if they were within 20 francs, 15 francs if their guess was within 30 francs, 5 francs if their guess was within 40 francs, and 0 francs otherwise. The decision space was 0 to 80*3 = 0 to 240.

game on the same screen.[3] Again, each individual received an endowment of e=80 and could choose how much to contribute to the public good. For the treated game, we conducted four variations of the standard game as summarized in Table 1: A Baseline treatment, in which the treated game was exactly like the standard game; a Bonus treatment, in which subjects received 0.2 of an experimental franc for each 1 franc contributed to the public good; a Recognition treatment, in which subjects' names and photos were linked to their contribution in each round[4]; and a Sanctions treatment, in which subjects could send costless approval or disapproval signals to fellow group members. While the payoff functions in Baseline, Recognition and Sanctions remains the same as in the un-treated standard game, the payoff function is changed in the Bonus treated game to $\pi_i = e - (1-m+0.2)c_i + m\sum_{j\neq i}c_j$.

After all individuals made their contributions in both games, the computer displayed the total contribution to the group account and the individual contributions of all 4 group members. In the Recognition treatment, the individual contribution amount was additionally linked to a photo of the subject who made the contribution (as in Samek and Sheremeta, 2014). In the Sanctions treatment, after observing the contributions made by others in the group, each individual had the opportunity to costlessly assign up to 5 approval or up to 5 disapproval points to each member. Approval/disapproval points did not affect the earnings of the subject receiving them. After all subjects made decisions in this part, the total number of approval and disapproval points assigned to each subject (but not who assigned them) were displayed to the entire group.

Table 1: Summary of Treatments

Treatment	Standard Game	Treated Game	Number of Subjects	Number of Groups	Number of Sessions
Baseline	Standard	Standard	48	12 / 12	3
Bonus	Standard	Get 0.2 francs for each 1 franc	48	12 / 12	3
Recognition	Standard	Subjects identified with photos	48	12 / 12	3
Sanctions	Standard	Can send costless +/- points	48	12 / 12	3

[3] In half of the sessions, the standard game appeared on the left and the treated game on the right; in the other half we reversed the order. Also, so as not to alert subjects to the treated game, we used neutral titles for the games. As in Savikhin and Sheremeta (2014), one of the games was called GREEN and the other BLUE.

[4] At the beginning of each session of the Recognition treatment, subjects have their photo taken. This digital photo is displayed on the outcome screen above each subject's contribution in the treated game only.

3. Hypothesis Development

3.1 Bonus, Recognition and Sanctions

The Nash equilibrium outcome remains at $c^*=0$ in the standard and treated games. However, most experimental studies find that individuals tend to contribute significant amounts, even in games such as the standard game (see Ledyard, 1995; Fehr and Gachter, 2000). An explanation for this finding is that, in addition to monetary incentives, individuals have intrinsic motivations for giving. Common intrinsic motivations for contributing a positive amount include social preferences over final allocations such as altruism and inequality aversion (Andreoni, 1989; 1990; Fehr and Schmidt, 1999). Individuals may also be motivated by warm glow, and receive utility from the act of giving (Andreoni, 1989; 1990). More recently, social pressure and moral cost from not giving have been suggested as an alternate explanation that may play a role (List, 2007; DellaVigna et al., 2012).

To investigate effects of charity 'competition' on the standard game, we first selected several mechanisms that we predicted would have a positive effect of increasing contributions in the treated game. Because individuals have a separate budget constraint for each game, there is no theoretical reason why treatment effects should differ when games are played in ensemble as opposed to when games are played in isolation. Related work has found that the treatments we tested have significant and positive effects on contributions to the public good, though these treatments have not been tested on games played in ensemble.

In the treated game of the Bonus treatment, subjects receive 0.2 francs back for each 1 franc contributed. This is payoff-equivalent to decreasing the cost of giving (since subjects need only to donate 0.8 francs for 1 franc to be donated to the public good). In models with elements of altruism, the bonus decreases the price of contributing and this in turn increases the contribution (Andreoni and Miller, 2002). The Bonus treatment models a real-world conditional gift (since subjects receive 0.2 francs back conditional on donating 1 franc) and also is payoff-equivalent to a matching gift (since subjects need only to donate 0.8 francs for 1 franc to be donated to the public good). Both of these

mechanisms increase charitable giving in the field (e.g. Karlan and List, 2007; Landry et al., 2010). This brings us to our first conjecture:

Conjecture 1: The Bonus treatment will increase contributions in the treated game through decreasing the cost of giving.

Revealing individual identities, as in the treated game of the Recognition treatment, provides an additional non-monetary incentive for individuals contribute to the public good. Several studies find that recognizing contributors by revealing their identities increases contributions to public goods (Andreoni and Petrie, 2004; Rege and Telle, 2004; Soetevent, 2005; Samek and Sheremeta, 2014). This is usually attributed to the theory that individuals are concerned about their social image one reason why most charitable gifts are not anonymous (Andreoni and Bernheim, 2009; Ariely et al., 2009). Benabou and Tirole (2006) have postulated a theory in which the care for social image drives higher giving under recognition. Recent work has also attributed the observed increased contributions to avoiding shame from being viewed as a low contributor (Samek and Sheremeta, 2014). This brings us to our second conjecture:

Conjecture 2: The Recognition treatment will increase contributions in the treated game because individuals care about their social image.

In the Sanctions treated game, subjects can send up to 5 costless Approval or Disapproval points to any fellow group member. While standard theory would predict no role for sanctioning (no utilization of sanctions and no effect of sanctions), there could be many behavioral reasons for sanctions. The sanction points are a non-monetary sanctioning system since they have no effect on the receiver's payoffs, and therefore could serve as a communication mechanism. In the charitable giving environment, monetary sanctions make little sense, but informal sanctioning systems such as peer pressure are more likely to be used. In fact, Masclet et al. (2003) finds that non-monetary sanctions are an effective way to increase contributions to the public good. Non-monetary sanctions may increase contributions because they are a basic form of communication and facilitate the establishment of social norms. Chat based communication has been found to increase contributions in traditional public goods games as well (Bochet et al., 2006). Sanctions could be used by high contributors in order to encourage low contributors to give more. As postulated by Noussair and Tucker (2005), non-monetary

sanctions work to increase contributions of individuals who are swayed by communication and social pressure. This brings us to our next conjecture:

Conjecture 3: The Sanctions treatment will increase contributions in the treated game by increasing contributions through a social pressure / communication channel.

While behavior in games played in ensemble should not differ from games played in isolation, behavioral spillovers may emerge when games are played in ensemble (Bednar et al., 2012; Cason et al., 2012). Behavioral spillovers occur when behavior – either individually or collectively in a group – differs when a game is played in isolation when compared to when it is played together with other games. Generally, the predicted direction for behavioral spillover is for subjects to use decision-making from the game with lower strategic uncertainty in the game with higher strategic uncertainty. In our design, it is unclear a priori which of the two games played simultaneously have the higher strategic uncertainty. We refer to spillovers that increase contributions in the standard game as 'positive spillovers' and spillovers that decrease contributions in the standard game as 'negative spillovers.' If conjectures 1-3 are not supported by the data, one possible reason would be behavioral spillovers.

3.2 Effects on the Standard Game

By having two separate budget constraints, we set up our games to decrease the likelihood of the treated game affecting the standard game. However, treatment could still affect contributions, through several different channels, including behavioral spillover. We propose three alternative conjectures, and discuss the reasoning for them below:

Conjecture 4A: Treatment (Bonus, Recognition, or Sanctions) will increase the contribution in the treated game, but have no effect in the standard game.

Conjecture 4B: Treatment (Bonus, Recognition, or Sanctions) will increase the contribution in the treated game, but decrease contributions in the standard game.

Conjecture 4C: Treatment (Bonus, Recognition, or Sanctions) will increase the contribution in the treated game, and increase contributions in the standard game.

Conjecture 4A posits that there is no effect from treatment on the standard game, even if there is an effect from treatment on the treated game. That is, since the games are economically independent, individuals will make decisions in each game as if the two

games were separate. On the other hand, Conjecture 4B predicts that treatment will increase contributions to the treated game, but decrease contributions to the standard game in the following way. In line with a mental accounting framework, individuals may pre-select how much to donate to the public good, and then allocate their contribution between the two public goods available, favoring the treated game and thereby shifting contributions away from the standard game. Contributions to the standard game would thus be decreased by any amount up to the increase in the treated game. Due to the presence of self-interested motivations for giving, such as warm glow, contributions may not be crowded out one to one. Another way that standard game contributions could be decreased is if the subject perceived that the mechanism designer (in this case the experimenter) used the treatment as a signal that he/she preferred subjects to contribute more in the treated game and less in the standard game (experimenter demand effect). Conjecture 4A and alternate Conjecture 4B represent the prevailing beliefs about the effects of costly competition among fundraisers.

Finally, Conjecture 4C predicts that treatment will increase contributions in the treated game and in the standard game. The most obvious channel for the increase would be through behavioral spillovers from the treated game to the standard game. In particular, the increase in contributions caused by treatment may 'spill over,' also increasing contribution behavior in the standard game. Spillovers may occur after receiving feedback in the game, but could also occur in Period 1 if subjects use the instructions to infer information about how to proceed in both games. Another way through which we may observe increased contributions in the standard game is in the Bonus treatment. If individuals do not view the two games as economically independent, they may contribute more in the Bonus treated game and in the standard game since contributing to one of those games generates a rebate.

If we find support for Conjecture 4A or 4C, we can conclude that at least in this environment, innovation in fundraising by one charity causes a net social gain through an increase in the charitable pie. However, support for Conjecture 4B, depending on the levels, may signify that costly fundraising techniques have little to no net effect on the charitable pie. In this case, we could think of costly fundraising techniques as costly rent-seeking that, when reduced, may lead to higher societal gains. Also note that the effects

on the standard game operate through increases in contributions to the treated game. Thus, if we do not see an increase in contributions for the treated game, we may not observe a change in contributions in the standard game.

4. Results and Discussion

4.1 Main Treatment Effects

Table 1 provides a summary of contributions (as a percentage of endowment) to both the treated and standard games, averaged across all 20 periods and separately for period 1. Figure 1 provides data on contributions over 20 rounds in the treated game. We use both Period 1 and overall contributions since at Period 1, each individual provides an independent observation, and no feedback information from either game is available in Period 1.

Table 2: Summary of Contributions

Treatment	Treated – Period 1	Standard – Period 1	Treated - Average	Standard - Average	N
Baseline	37.45% (31.91)*	36.43% (31.07)	28.34% (23.12)*	29.18% (21.08)	48
Bonus	59.79% (28.86)	49.11% (30.78)	51.26% (26.06)	31.02% (21.93)	48
Recognition	43.31% (30.36)	40.91% (28.50)	34.73% (28.63)	23.10% (19.67)	48
Sanctions	44.17% (27.81)	41.04% (28.30)	33.10% (23.47)	28.31% (25.42)	48

*Note: This table provides contributions, as a percentage of endowment, to the standard and treated games. Number in parentheses represents standard deviation. *The treated game in Baseline is exactly the same as the Standard game.*

Overall, our results in the standard game in the Baseline treatment are similar to that found in a related paper that uses two simultaneous public goods with the same payoff function – contributions start at 36-37% of the endowment and decrease over the 20 rounds (McCarter et al., 2013). Over all periods, contributions in Baseline are at 28-29% of endowment. By comparison, the Bonus treatment shows the highest increases in contributions, with contributions at 60% of endowment in Period 1 and 51% of endowment overall, significantly higher than contributions in Baseline (Wilcoxon Mann-Whitney test at period 1 p-value < 0.01; averaged all periods by subject p-value <0.01; averaged over all periods by group p-value = 0.013). In the Bonus treatment, subjects receive 20% of their contribution back in the form of a bonus. The total contribution, net of bonus, is thus 48% in Period 1 and 41% overall – still a significant increase above the Baseline (Wilcoxon Mann-Whitney test at period 1 p-value = 0.04; averaged all periods

by subject p-value<0.01, averaged over all periods by group p-value =0.15). This brings us to our first result, which is in support of Conjecture 1:

Result 1: The Bonus treatment significantly increases contributions to the treated game relative to the Baseline treatment.

By comparison, Recognition and Sanctions result in contributions at 43-44% of endowment in Period 1 and 33-35% of endowment on average, respectively. The treatments increase contributions, but the effect is not significant (p-values > 0.10 for Wilcoxon Mann-Whitney tests comparing Recognition to Baseline and Sanctions to Baseline, both Period 1 alone and averaged). The only significant increase occurs in Recognition in the later part of the game (periods 10 and later). Averaging contributions made after period 10, we observe a significant increase for the treated game in Recognition - 32% of endowment - versus the Baseline - 21% of endowment (Wilcoxon Mann-Whitney p-value = 0.03 averaged by subject, p-value = 0.42 averaged by group). These mixed findings stand at odds with related work. For example, both Andreoni and Petrie (2004) and Samek and Sheremeta (2014) find that recognition results in significant increases to contributions to the public good when it is played on its own. In particular, the data in Samek and Sheremeta (2014) was gathered in the same lab using a similar interface and setup, yet recognition increased contributions to the public good from 29% of endowment to 55% of endowment.[5] This brings us to our second result, which provides only weak support for Conjectures 2-3:

Result 2: Recognition and Sanctions treatments increase contributions in the treated public good but not significantly.

One major difference when comparing the Bonus treatment to the Recognition and Sanctions treatments is that while the Bonus provides a monetary reward for contributing, Recognition and Sanctions rely on concerns for social image and a regard for social pressures, respectively. While there could be many underlying reasons for the large effect of Bonus and the minor effect of Recognition and Sanctions in the two-game setting, we provide one plausible explanation. Samek and Sheremeta (2014) find that the positive effect of recognition is driven primarily by shame from being a low donor, and

[5] In fact, the only difference in Samek and Sheremeta (2013), besides the one-game environment, is that participants play in groups of 5 rather than 4.

propose that an ability to 'exit' may render recognition less effective. Since shame from being a low donor could also be generated through non-monetary punishment points, we would argue that the ability to 'exit' may also render sanctions less effective. In our two-game setting, individuals have, in a sense, an ability to 'exit' because they might believe that their fellow group members will assume that they are more active in the un-treated game. Anecdotally, charities encounter many such excuses when conducting door-to-door fund drives – potential donors will respond that they already donate to another charity, and therefore choose not to donate at that time. On the other hand, the Bonus, which does not operate through social pressure/social image channels, does not have a diminished effect when 'exit' is available. As shown in the histogram of contributions in Figure 3, recognition did not significantly reduce the incidence of low contributors as it did in Samek and Sheremeta (2014) – sanctions performed even worse than recognition at reducing low contributors.

4.2 Effects of Treatment on the Standard Game

We now investigate the contributions to the standard game in each treatment. As evidenced by Figure 2, standard game contributions also start out at a little under half of endowment, and decrease over time. Conjecture 4A as well as alternate Conjectures 4B and 4C indicate that we would expect treatment to have an effect on the standard game in instances where treatment had a significant increase on contributions in the treated game. This occurs in the Bonus treatment over all rounds, in the Recognition treatment in the second half of the experiment, but not in the Sanctions treatment. In the below, we provide analysis both across all periods in all treatments, as well as concentrated on these specific treatments/periods.

The Bonus treatment has a positive effect on contributions to the standard game, especially in early periods of the experiment. In the first period, the Bonus treatment increases contributions to the standard game, raising contributions from 36% to 49% of endowment (Wilcoxon Mann-Whitney p-value = 0.04). In addition, we find significantly higher contributions in the standard game of Bonus as compared to Baseline when averaging the first 5 periods (p-value = 0.03). However, when contributions over all 20 rounds are averaged, we no longer see an effect on Bonus, with contribution rates at 31%

of endowment in Bonus relative to 29% of endowment in the Baseline (p-value > 0.10 for both individual and group contributions). This brings us to the next result:

Result 3: Relative to Baseline, Bonus had a positive and significant effect on contributions to the standard game in early periods, but the effect did not hold in the long run.

Result 3 provides some support for Conjecture 4C, since we find that the monetary incentive to contribute in the treated game in Bonus had a positive effect for some periods of the standard game in Bonus. This suggests evidence for the presence of behavioral spillovers, or to the possibility that individuals use mental accounting and contribute more in both games when contributions to one game become cheaper (despite not having a shared budget constraint).

Contributions of 43% of endowment in Period 1 of the Recognition standard game are slightly, but not significantly higher than contributions of 36% to the standard game in the same period (p-value > 0.10). Note that Recognition significantly increased contributions in the treated game only in the second half (periods 11-20) but not in the first half (periods 1-10) of the session. While we find no significant difference in contributions in standard game between Recognition and Baseline treatments overall (p-value > 0.10), we do see a decrease in contributions to the standard game in the second half (periods 11-20) of the experiment, with contributions at 15.63% of endowment in Recognition versus 22% of endowment in Baseline, significant at the 10% level (p-value = 0.08). Thus, it appears that increased contributions due to Recognition in the treated game are correlated with decreases in contributions in the standard game. This brings us to the next result:

Result 4: In periods where Recognition had a positive and significant effect on contributions in the treated game, Recognition also had a negative and significant effect on contributions in the standard game.

Unlike Result 2, which suggests support for Conjecture 4C, Result 4 is in support of Conjecture 4B, since contributions to the standard game declined with increased contributions to the treated game. This finding suggests that to some extent, increased contributions to one game due to recognition crowd out the desire to contribute to the public good where one is not recognized.

Since Sanctions had no effect on the treated game, we do not expect to find an effect on the standard game. While contributions in the first period of the standard game of Sanctions are higher than contributions in Baseline (about 41% versus 36%), the effect is not significant (p-values >0.10). In addition, contributions averaged over all periods in the standard game of Sanctions are at 28%, almost the same as Baseline contributions of 29% (p-value > 0.10).

The question remains: does competition between charities lead to higher, or lower, overall contributions? Table 3 provides a summary of total contributions to the public good, by treatment. Since the Bonus treatment also increases contributions to the standard good in some periods, we should observe a higher level of total contributions in that treatment. This is exactly what we find – the Bonus treatment has total contributions of 41% of endowment (averaged) versus 29% of endowment in the Baseline treatment (p-value < 0.01). By comparison, in the Recognition treatment we see that contributions to the treated game rise while contributions to the standard game fall in some periods. Thus, we may expect either an increase, decrease, or no change in total contributions. In fact, while contributions in the Recognition treatment (at 30%) are higher than Baseline, the difference is not significant (p-value > 0.10).

Table 3: Sum of Contributions to Both Public Goods

Treatment	Sum of Contributions – Period 1	Sum as Percent of Endowment – Period 1	Sum of Contributions -- Averaged	Sum as Percent of Endowment - Averaged	N
Baseline	59.10 (50.12)	36.94% (31.32)	46.02 (32.02)	28.76% (20.01)	48
Bonus	87.13 (45.84)	54.45% (28.65)	65.82 (34.21)	41.11% (21.38)	48
Recognition	67.38 (45.63)	42.11% (28.52)	46.27 (34.79)	29.92% (21.74)	48
Sanctions	68.17 (43.87)	42.60% (27.42)	49.13 (34.52)	30.71% (21.58)	48

How can the disparate findings in support of Conjecture 4B in the case of Bonuses, but Conjecture 4C in the case of Recognition, be explained? One possible explanation is that the type of treatment matters for whether a positive or negative spillover effect will be observed. This also suggests that multiple behavioral channels may play a role in determining the effect – e.g., spillovers, mental accounting, etc. While socially motivated reasons like concern for social image may cause individuals to shift

contributions to the game in which he/she is recognized, monetary incentives like Bonuses do not cause the shift.

4.3 Sanctions

We now turn to see whether Sanctions are utilized. Recall that individuals could assign up to 5 disapproval or up to 5 approval points to each group member after the outcome of the period was revealed. In all instances, every subject received at least one approval or disapproval point – subjects received only disapproval point(s) 30% of the time, approval point(s) 31% of the time and both types of points 39% of the time. The points were also used in the way anticipated – subjects receiving only approval points contributed an average of 67.5% of endowment to the public good, subjects receiving only disapproval points contributed an average of just 5% of endowment, and subjects receiving both types of points contributed 27.5% of endowment. Figure 5 displays the average approval or disapproval points received by each subject over all periods (sum of all points from all 3 group members). As contributions declined over time, disapproval points increased and approval points decreased.

Most subjects utilized both approval and disapproval points actively – both types of points were utilized 48% of the time. 22% of the time subjects sent only disapproval points, and 27% of the time subjects sent only disapproval points. Only 3% of the time were points not utilized. Thus, despite its relatively low impact, sanctioning was actively being used in the Sanctions treatment, in the way it was intended.

5. Conclusion

We conducted a laboratory experiment using simultaneous public goods to search for the answer to the question – what happens when charities compete? In the experiment, subjects play two public goods games simultaneously with different group members in each game. Across 4 different treatments, we vary the incentives to contribute in one of the games, using proven methods of bonuses, recognition, and non-monetary sanctions. We find that monetary incentives in the form of conditional bonuses increase contributions, even when two games are played simultaneously. However, non-monetary incentives that rely on social pressure or communication, such as recognition

and sanctions, are less effective than in related literature on games played in isolation. We also find mixed evidence of treatment on the un-treated games – bonuses increase contributions initially, recognition decreases contributions, and sanctions have no net effect.

Our findings point to the importance of considering the effect of different mechanisms when games are played simultaneously, versus in isolation, since outside of the laboratory individuals receive numerous requests for their time and money. More work is needed to learn about how different incentives to contribute operate when multiple games are available. However, if our conjecture that socially motivated incentives are less effective than monetary in multiple game play holds up in the field, fundraisers who are expecting to compete with others for charitable dollars (such as during the holiday season) may do better to use monetary incentives than social incentives.

In addition, our findings have relevance for social questions. Does competition between charities expand the charitable pie, or are contributions simply shifted from one charity to the other? Our laboratory experiment suggests that the answer to this question depends on the environment. In our context, when bonuses are used, we see an initial boost in overall contributions. On the other hand, recognition causes a re-allocation of contributions from the un-treated game to the treated game, resulting in no net effect. More work is needed to investigate the channels through which these transfers, or spillovers, happen.

Future work should investigate the effects on contributions when games are played sequentially, rather than in isolation. In particular, sequential game-play was found to result in greater spillovers than simultaneous game-play in coordination games (Cason et al., 2012), but little is known about the effects of sequential game-play in our environment. While naturally occurring data tells us little about both the supply and demand sides of the market, conducting field experiments by varying the asks for different charities and observing the outcome would also be a good next step.

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Figure 1: Contributions in the Treated Game

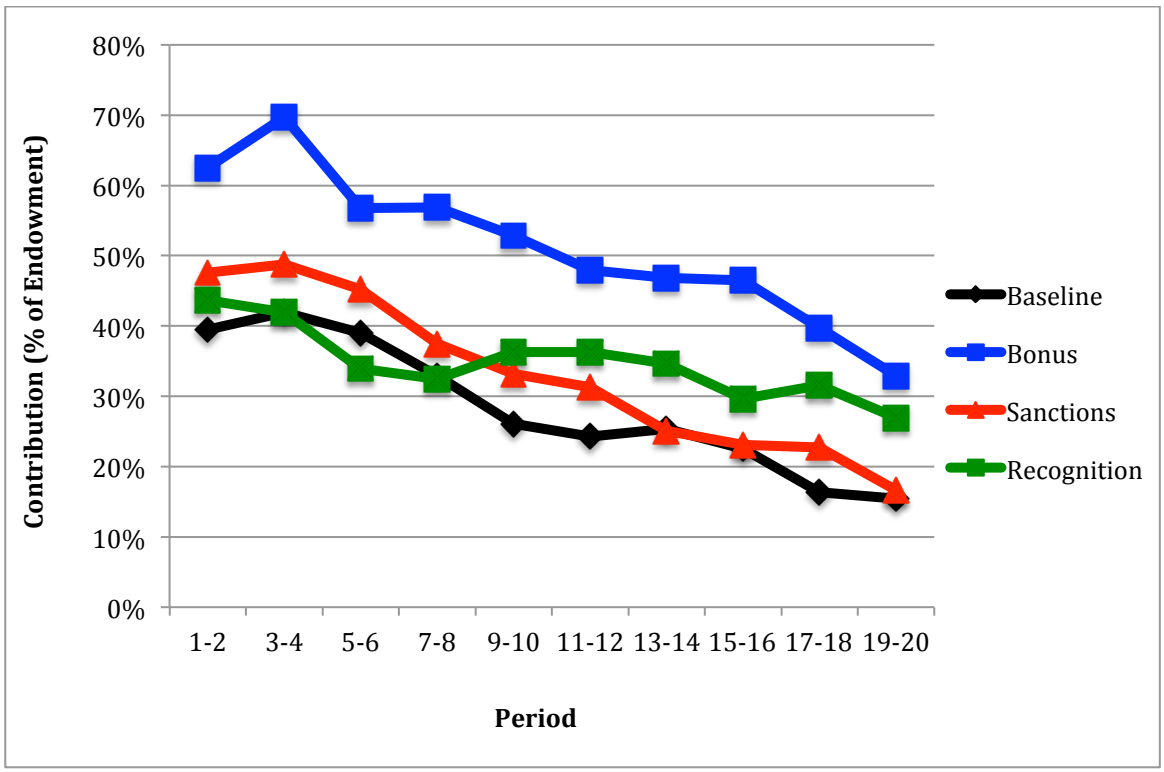


Figure 2: Contributions in the Standard Game

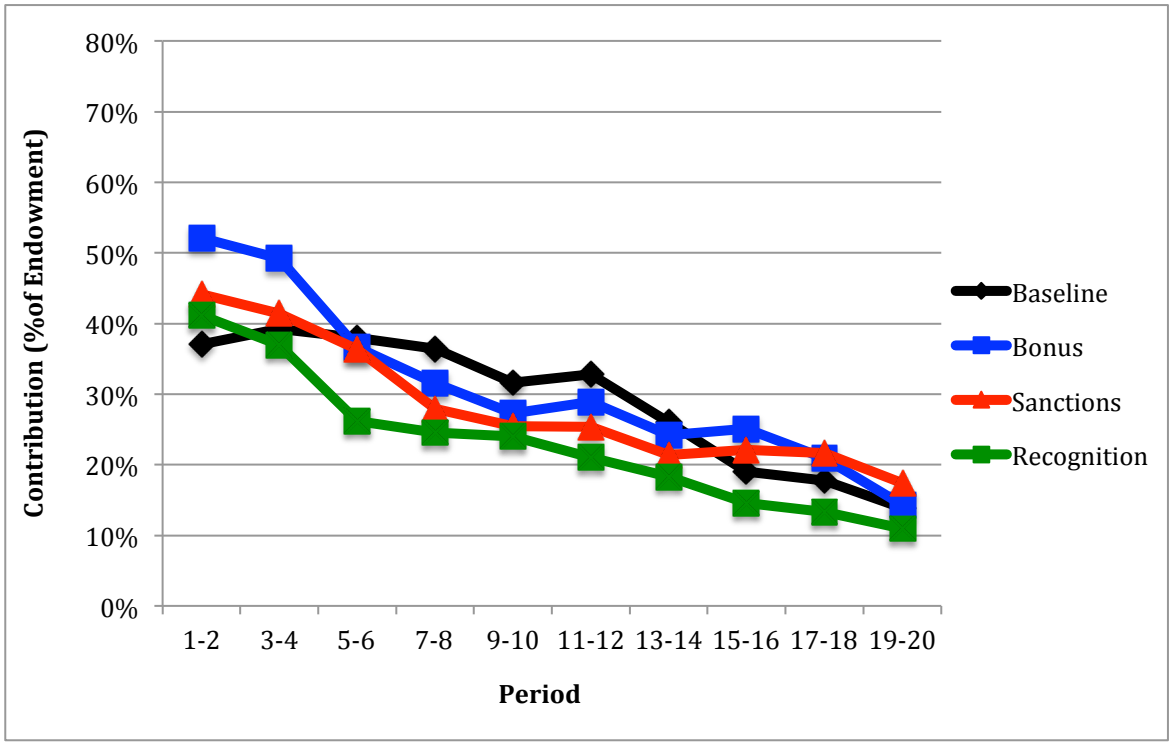


Figure 3: Histogram of Contributions in Treated Game

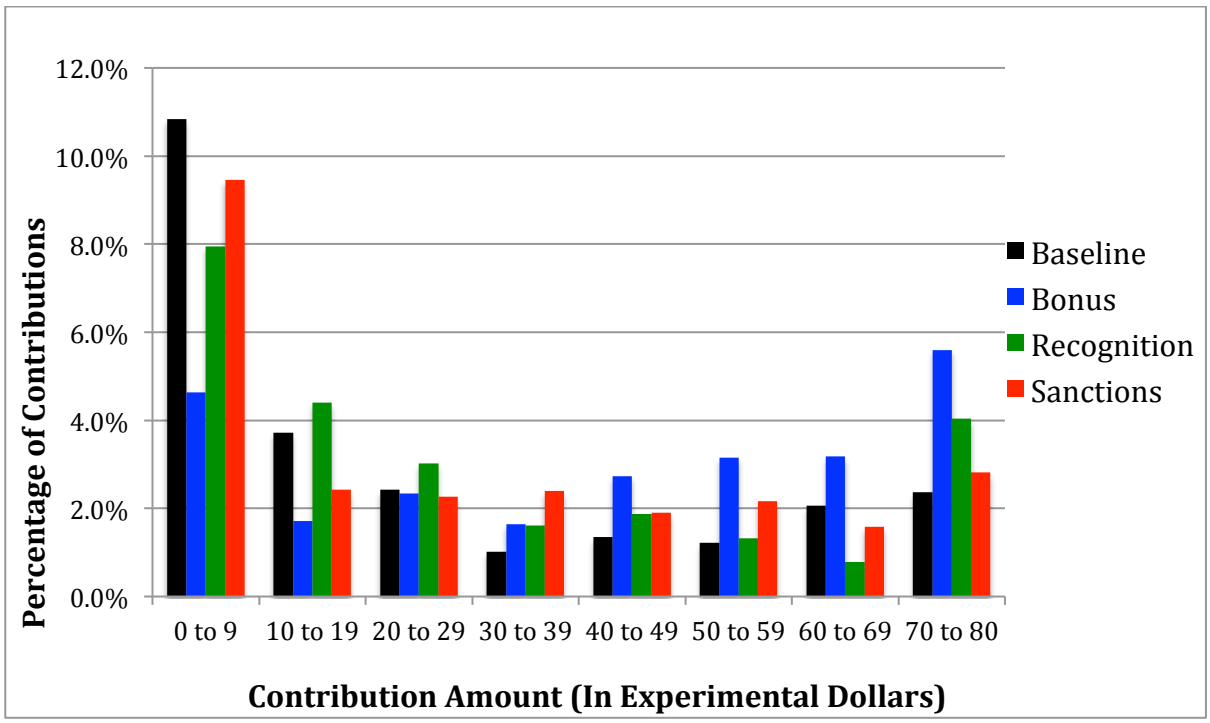


Figure 4: Histogram of Contributions in Standard Game

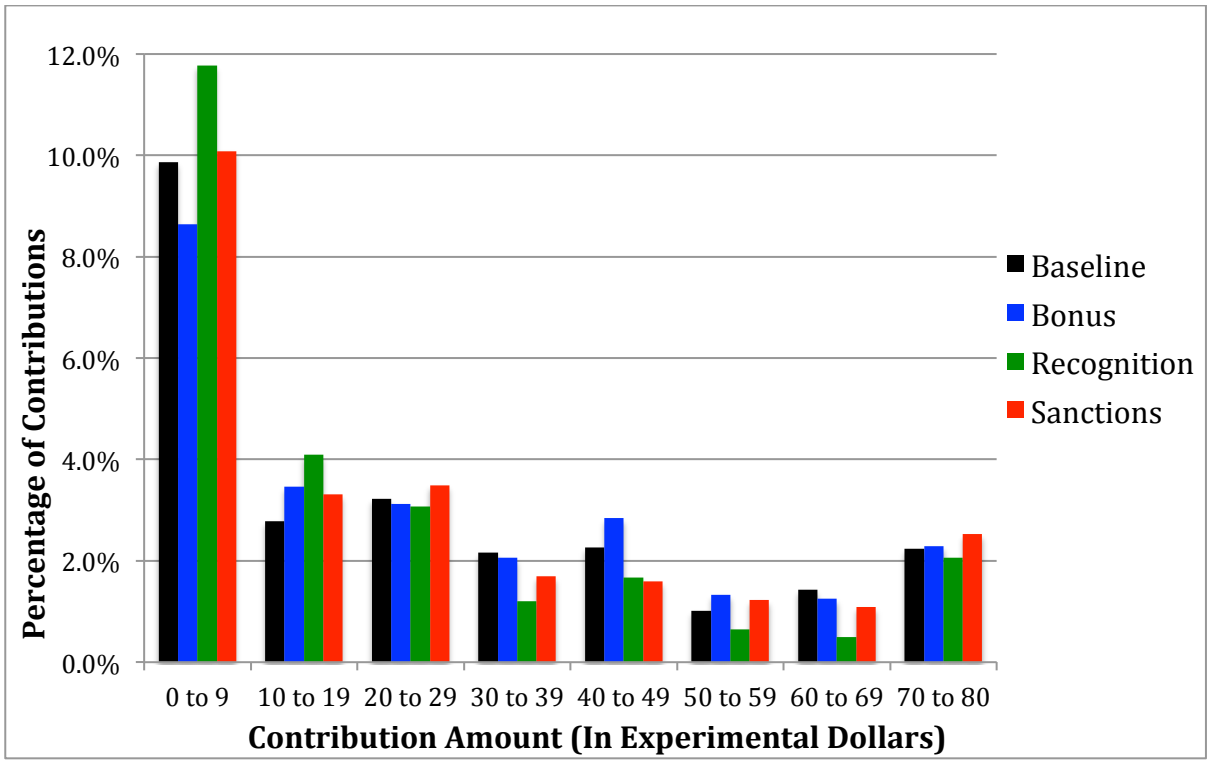
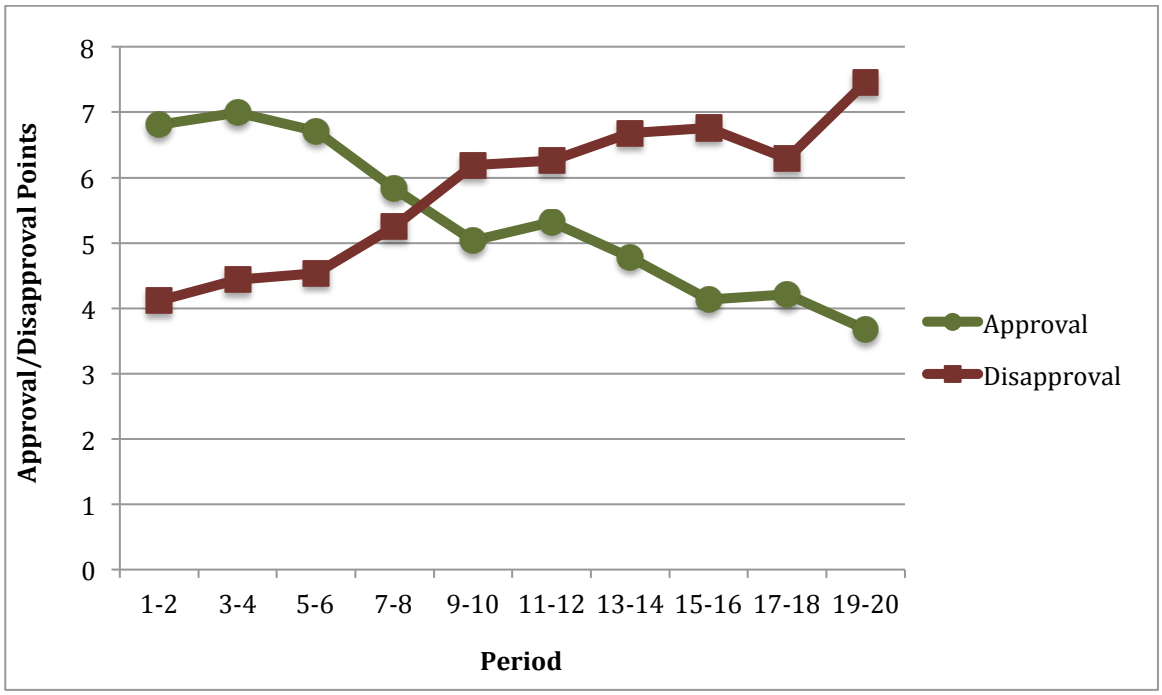


Figure 5: Approval/Disapproval Points Received (Average for each Subject)



Appendix A: Instructions

A.1. INSTRUCTIONS: BASELINE

In this experiment you will participate in two games. Each of the two games will have four participants, including you. You will not know the identity of the participants you are grouped with. The experiment will consist of **20 rounds**. You will participate in a **BLUE GAME** and a **GREEN GAME** at the same time. The BLUE GAME and GREEN GAME have exactly the same rules – **the only difference between the two games is the three participants you are matched with.**

In each of the 20 rounds, you will participate in the BLUE GAME with the **same three participants.** In each of the 20 rounds, you will participate in the GREEN GAME with the **same three participants.** However, the **three** participants you are matched with for the GREEN GAME are **completely different** from the **three** participants you are matched with for the BLUE GAME**.** The GREEN GAME will appear on the left side of the screen and the BLUE GAME will appear on the right side of the screen at the same time in all 20 rounds.

At the end of the experiment **2 out of 20** rounds will be randomly selected for payment for each game. After you have completed all rounds two tokens will be randomly drawn out of a bingo cage containing tokens numbered from **1 to 20**. The token numbers determine which two rounds are going to be paid for each game.

At the beginning of each round you will be given **80 francs** for the GREEN GAME and **80 francs** for the BLUE GAME. Francs will be converted to U.S. dollars at the end of the experiment at the rate of **25 francs = $1.** In each round, you will select an allocation for the GREEN GAME and an allocation for the BLUE GAME. When you are ready to make your decision, click on the "input boxes" below "How much would you like to allocate to the Group Account?" and the program will allow you to enter your choices. When you are finished making your choices, click "Submit".

After submitting your choices you will be asked to give your "best guess" about the allocation choices of the others in each game. After each group member has submitted their allocation choice and "best guess" in the GREEN GAME and BLUE GAME, total earnings for the round are computed and displayed. This completes the round, this process is repeated for each of the **20** rounds.

GREEN (BLUE) GAME

Below, we will read instructions for the GREEN GAME. However, the rules for the GREEN GAME and the BLUE GAME are **exactly the same**.

Each round you will decide how many of your **80 francs** you want to allocate to a **Group Account**, this amount is called **YOUR GREEN Group Allocation.** You may allocate any integer number of francs between **0** and **80**. At the same time you select your group allocation the 3 other group members in the GREEN GAME must select their group allocation. The sum of the 3 others' group allocations is the **Others' Total GREEN Group Allocation**.

Your earnings from the GREEN Group Account depends on the total number of francs allocated to the Group Account by all 4 group members (including you). In particular, your earnings from the GREEN Group Account are **40 percent** of the **Total GREEN Group Allocation**. This is seen below,

Earnings from GREEN Group Account = 0.40 x (Total GREEN Group Allocation)
= 0.40 x (YOUR GREEN Group Allocation + Others' Total GREEN Group Allocation)

Therefore, for every franc you allocate to the GREEN Group Account, you increase the **Total GREEN Group Allocation** by 1 franc and your **Earnings from GREEN Group Account** rise by 0.4×1=0.4 francs. Every franc you allocate to the GREEN Group Account also raises the **Earnings from GREEN Group Account** of the 3 other group members by 0.4 francs *each*. So the total earnings of the group rise by 1.6 francs for each franc you allocate to the GREEN Group Account.

Example: Suppose that you allocate 40 francs to the GREEN Group Account and the other 3 group members allocated a total of 120 francs to the GREEN Group Account. The Total GREEN Group Allocation = 40 + 120 = 160 francs and each group member in the GREEN GAME receives **Earnings from GREEN Group Account =** 0.4 × 160 = 64 francs.

In each game, you keep the francs that are not allocated to the Group Account. The amount you keep, your **Individual Allocation = 80 – YOUR Group Allocation**, is allocated to your **Individual Account.** In the GREEN GAME your earnings from the GREEN Individual Account are equal your **Individual Allocation** and do not depend on the decisions of others. Therefore, for **every franc** you keep earns you **1 franc** and earns **0 francs** for each of the others in the group. That is,

Earnings from GREEN Individual Account = 1 x (GREEN Individual Allocation)

= 1 x (80 – YOUR GREEN Group Allocation)

Remember, the GREEN GAME and the BLUE GAME have the exact same rules. Specifically,

Earnings from BLUE Group Account = 0.40 x (Total BLUE Group Allocation)

Earnings from BLUE Individual Account = 1 x (BLUE Individual Allocation)

After you choose how much to allocate to the Group Account in the GREEN GAME and how much to allocate to the Group Account in the BLUE GAME, you will be asked to give your "best guess" about what others in each game will allocate to the Group Account (a "best guess" of the Others' Total Group Allocation). Specifically, your "best guess" of Others' Total Group Allocation is a guess of **THE TOTAL AMOUNT** that **the other three group members will allocate to the Group Account** in that round.

You can earn additional francs from your "best guess" and the amount you earn depends on how close your "best guess" is to the **actual** amount allocated. You earn 24 francs if your guess is equal to the actual amount the others allocate to the Group Account, 23.9 francs if your guess is 1 franc away from the actual amount, 23.8 francs if you are 2 francs away…23 francs if you are 10 francs away, … all the way to 0 francs if your "best guess" is 240 francs away from the actual amount. Stated differently, for every **10 francs** your *guess* of Others' Total GREEN Group Allocation is from the *actual* Others' Total GREEN Group Allocation your **Earnings from GREEN Guess** decline by **1franc**. In each game, your guess earnings are calculated,

Earnings from GREEN Guess = 24 - | (GREEN Guess – Actual GREEN Amount) / 10 |
Earnings from BLUE Guess = 24 - | (BLUE Guess – Actual BLUE Amount) / 10 |

TOTAL EARNINGS

In each round your **TOTAL EARNINGS** are the sum of your individual, group and guess earnings. That is,

TOTAL EARNINGS from GREEN GAME
= Earnings from GREEN Individual Account + Earnings from GREEN Group Account
+ Earnings from GREEN Guess

TOTAL EARNINGS from BLUE GAME
= Earnings from BLUE Individual Account + Earnings from BLUE Group Account
+ Earnings from BLUE Guess

For each game, if a given round is randomly chosen for payment then the **TOTAL EARNINGS** for that round will be converted to cash and paid at the end of the experiment.

OUTCOME SCREEN – GREEN GAME

At the end of each round, Your GREEN Group Allocation, Total GREEN Group Allocations and the individual GREEN Group Allocation of each group member are reported on the Outcome Screen. The computer will also display each part of your earnings and the **TOTAL EARNINGS from GREEN GAME** for the round.

OUTCOME SCREEN – BLUE GAME

At the end of each round, Your BLUE Group Allocation, Total BLUE Group Allocations and the individual BLUE Group Allocation of each group member are reported on the Outcome Screen. The computer will also display each part of your earnings and the **TOTAL EARNINGS from BLUE GAME** for the round.

RECORD SHEET & PAYMENT

Once the outcome screen is displayed you should record the results for the round on your **Personal Record Sheets** under the appropriate heading.

At the end of the experiment **2 out of 20** rounds will be randomly selected for payment. Your earnings for the two rounds selected for the GREEN GAME and BLUE GAME will be added up and converted to U.S. dollars at the end of the experiment at the rate of **25 francs = $1.**

A.2: INSTRUCTIONS: BONUS TREATMENT

In this experiment you will participate in two games. Each of the two games will have four participants, including you. You will not know the identity of the participants you are grouped with. The experiment will consist of **20 rounds**. You will participate in a **BLUE GAME** and a **GREEN GAME** at the same time. The BLUE GAME and GREEN GAME have similar rules – **the only differences between the two games are the three participants you are matched with and in the BLUE GAME you may earn a bonus payment.**

In each of the 20 rounds, you will participate in the BLUE GAME with the **same three participants.** In each of the 20 rounds, you will participate in the GREEN GAME with the **same three participants.** However, the **three** participants you are matched with for the GREEN GAME are **completely different** from the **three** participants you are matched with for the BLUE GAME**.** The BLUE GAME will appear on the left side of the screen and the GREEN GAME will appear on the right side of the screen at the same time in all 20 rounds.

At the end of the experiment **2 out of 20** rounds will be randomly selected for payment for each game. After you have completed all rounds two tokens will be randomly drawn out of a bingo cage containing tokens numbered from **1 to 20**. The token numbers determine which two rounds are going to be paid for each game.

At the beginning of each round you will be given **80 francs** for the GREEN GAME and **80 francs** for the BLUE GAME. Francs will be converted to U.S. dollars at the end of the experiment at the rate of **25 francs = $1.** In each round, you will select an allocation for the GREEN GAME and an allocation for the BLUE GAME. When you are ready to make your decision, click on the "input boxes" below "How much would you like to allocate to the Group Account?" and the program will allow you to enter your choices. When you are finished making your choices, click "Submit".

After submitting your choices you will be asked to give your "best guess" about the allocation choices of the others in each game. After each group member has submitted their allocation choice and "best guess" in the GREEN GAME and BLUE GAME, total earnings for the round are computed and displayed. This completes the round, this process is repeated for each of the **20** rounds.

GREEN (BLUE) GAME

Below, we will read instructions for the GREEN GAME. However, the rules for the GREEN GAME and the BLUE GAME are very similar. In the BLUE GAME you may earn a bonus payment which will be explained.

In each round you decide how many of your **80 francs** you want to allocate to a **Group Account**, this amount is called **YOUR GREEN Group Allocation.** You may allocate any integer number of francs between **0** and **80**. At the same time you select your group allocation, the other 3 group members will select their group allocations. The sum of the others' group allocations is the **Others' Total GREEN Group Allocation**.

Your earnings from the GREEN Group Account depend on the total number of francs allocated to the Group Account by all 4 group members. In particular, your earnings from the GREEN Group Account are **40 percent** of the **Total GREEN Group Allocation**. This is seen below,

Earnings from GREEN Group Account = 0.40 x (Total GREEN Group Allocation)
= 0.40 x (YOUR GREEN Group Allocation + Others' Total GREEN Group Allocation)

Therefore, every franc you allocate to the GREEN Group Account increases the **Total GREEN Group Allocation** by 1 franc and as a result your **Earnings from GREEN Group Account** rise by 0.4×1=0.40 francs. Every franc you allocate to the GREEN Group Account also raises the **Earnings from GREEN Group Account** of the others in the group by 0.40 francs *each*. So every franc you allocate to the GREEN Group Account increases the total earnings of the group 1.6 francs.

Example: Suppose you allocate 40 francs to the GREEN Group Account and the other 3 group members allocated a total of 120 francs to the GREEN Group Account. Total GREEN Group Allocation = 40 + 120 = 160 francs and each group member would receive **Earnings from GREEN Group Account =** 0.4 × 160 = 64 francs.

In each game, you keep the francs that are not allocated to the Group Account. The amount you keep, your **Individual Allocation**, is allocated to your **Individual Account.** In the GREEN GAME, your earnings from the GREEN Individual Account are equal to your **Individual Allocation** and do not depend on the choices of others. Therefore, **every franc** you keep earns you **1 franc** and earns **0 francs** for each of the others in the group. That is,

Earnings from GREEN Individual Account = 1 x (GREEN Individual Allocation)
= 1 x (80 – YOUR GREEN Group Allocation)

Remember, the GREEN GAME and the BLUE GAME have similar rules. Specifically,

Earnings from BLUE Group Account = 0.40 x (Total BLUE Group Allocation)

Earnings from BLUE Individual Account = 1 x (BLUE Individual Allocation)

In the BLUE game you may earn a BONUS Payment. For each franc **you** allocate to the BLUE Group Account **you** receive a bonus of 0.20 francs. The amount of this BONUS Payment does not depend on the choices.

BONUS Payment = 0.20 x (YOUR BLUE Group Allocation)

*There is **NO** BONUS Payment in the GREEN GAME.

Example: Suppose that you allocate 40 francs to the BLUE Group Account and the other 3 group members allocated a total of 120 francs to the BLUE Group Account. Then Total BLUE Group Allocation = 40 + 120 = 160 francs and each group member receives **Earnings from BLUE Group Account =** 0.4 × 160 = 64 francs. Additionally, the 40 francs you allocated to the BLUE Group Account would earn you **BONUS Payment =** 0.20 x (40) = **8 francs**.

After you choose how much to allocate to the Group Account in the GREEN GAME and how much to allocate to the Group Account in the BLUE GAME, you will be asked to give your "best guess" about the amount the others in each game will allocate to the Group Account. Specifically, you are asked to give your "best guess" of Others' Total Group Allocation, which is a guess of **THE TOTAL AMOUNT** that **the other three group members will allocate to the Group Account** in that round.

You can earn additional francs from the "best guess" and the amount you earn depends on how close your "best guess" is to the **actual** amount allocated. You earn 24 francs if your guess is equal to the **actual** amount the others allocate to the Group Account, 23.9 francs if your guess is 1 franc away from the actual amount, 23.8 francs if you are 2 francs away…23 francs if you are 10 francs away, … all the way to 0 francs if your "best guess" is 240 francs away from the actual amount. Stated differently, for every **10 francs** your *guess* of Others' Total GREEN Group Allocation is from the *actual* Others' Total GREEN Group Allocation your **Earnings from GREEN Guess** will decline by **1franc**. In each game, your guess earnings are calculated,

Earnings from GREEN Guess = 24 - | (GREEN Guess – Actual GREEN Amount) / 10 |
Earnings from BLUE Guess = 24 - | (BLUE Guess – Actual BLUE Amount) / 10 |

TOTAL EARNINGS

In each round your **TOTAL EARNINGS** are the sum of your individual, group and guess earnings and possibly a bonus payment. That is,

TOTAL EARNINGS from GREEN GAME
= Earnings from GREEN Individual Account + Earnings from GREEN Group Account
+ Earnings from GREEN Guess

TOTAL EARNINGS from BLUE GAME
= Earnings from BLUE Individual Account + Earnings from BLUE Group Account
+ Earnings from BLUE Guess + BONUS Payment

For each game, if a given round is randomly chosen for payment then the **TOTAL EARNINGS** for that round will be converted to cash and paid at the end of the experiment.

OUTCOME SCREEN – GREEN GAME

At the end of each round, Your GREEN Group Allocation, Total GREEN Group Allocations and the individual GREEN Group Allocation of each group member is displayed reported on the Outcome Screen. The computer will also display each part of your earnings and the **TOTAL EARNINGS from GREEN GAME** for the round.

OUTCOME SCREEN – BLUE GAME

At the end of each round, Your BLUE Group Allocation, your Bonus Payment, Total BLUE Group Allocations and the individual BLUE Group Allocation and Bonus Payment for each group member is displayed on the Outcome Screen. The computer will also display each part of your earnings and the **TOTAL EARNINGS from BLUE GAME** for the round.

RECORD SHEET & PAYMENT

Once the outcome screen is displayed you should record the results for the round on your **Personal Record Sheets** under the appropriate heading.

At the end of the experiment **2 out of 20** rounds will be randomly selected for payment. Your earnings for the two rounds selected for the GREEN GAME and BLUE GAME will be added up and converted to U.S. dollars at the end of the experiment at the rate of **25 francs = $1.**

A. 3: INSTRUCTIONS: SANCTIONS TREATMENT

In this experiment you will participate in two games. Each of the two games will have four participants, including you. You will not know the identity of the participants you are grouped with. The experiment will consist of **20 rounds**. You will participate in a **BLUE GAME** and a **GREEN GAME** at the same time. The BLUE GAME and GREEN GAME have very similar rules – **the only differences between the two games are the three participants you are matched with and in the BLUE GAME you may register your APPROVAL or DISAPPROVAL for choices made by others in the group.**

In each of the 20 rounds, you will participate in the BLUE GAME with the **same three participants.** In each of the 20 rounds, you will participate in the GREEN GAME with the **same three participants.** However, the **three participants** you are matched with for the GREEN GAME are **completely different** from the **three participants** you are matched with for the BLUE GAME**.** The BLUE GAME will appear on the left side of the screen and the GREEN GAME will appear on the right side of the screen at the same time in all rounds.

At the end of the experiment **2 out of 20** rounds will be randomly selected for payment for each game. After you have completed all rounds two tokens will be randomly drawn out of a bingo cage containing tokens numbered from **1 to 20**. The token numbers determine which two rounds are going to be paid for each game.

At the beginning of each round you will be given **80 francs** for the GREEN GAME and **80 francs** for the BLUE GAME. Francs will be converted to U.S. dollars at the end of the experiment at the rate of **25 francs = $1.** In each round, you will select an allocation for the GREEN GAME and an allocation for the BLUE GAME. When you are ready to make your decision, click on the "input boxes" below "How much would you like to allocate to the Group Account?" and the program will allow you to enter your choices. When you are finished making your choices, click "Submit".

After submitting your allocation choices you will be asked to give your "best guess" about the allocation choices of the others in each game. Once your "best guess" is submitted the computer will display the individual allocation choices for each group member in the BLUE GAME and GREEN GAME. In the BLUE GAME you will then have the opportunity to register your **APPROVAL** or **DISAPPROVAL** for the allocation decisions of the others by assigning points to each group member in the BLUE GAME. This completes the round and this process is repeated for each of the **20** rounds.

GREEN (BLUE) GAME

Below, we will read the instructions for the GREEN GAME. However, the rules for the GREEN GAME and the BLUE GAME are very similar except that it the BLUE GAME you may register your APPROVAL or DISAPPROVAL for others allocation decisions by assigning points.

In each round you will decide how many of your **80 francs** to allocate to a **Group Account**, this amount is called **YOUR GREEN Group Allocation.** You may allocate any integer number of francs between **0** and **80**. At the same time you select your group allocation the 3 other group members in the GREEN GAME must select their group allocation. The sum of the 3 others' group allocations is the **Others' Total GREEN Group Allocation**.

Your earnings from the GREEN Group Account depends on the total number of francs allocated to the Group Account by all 4 group members (including you). In particular, your earnings from the GREEN Group Account are **40 percent** of the **Total GREEN Group Allocation**. This is seen below,

Earnings from GREEN Group Account = 0.40 x (Total GREEN Group Allocation)
= 0.40 x (YOUR GREEN Group Allocation + Others' Total GREEN Group Allocation)

Therefore, for every franc you allocate to the GREEN Group Account, you increase the **Total GREEN Group Allocation** by 1 franc and your **Earnings from GREEN Group Account** rise by 0.4×1=0.4 francs. Every franc you allocate to the GREEN Group Account also raises the **Earnings from GREEN Group Account** of the 3 other group members by 0.4 francs *each*. So the total earnings of the group rise by 1.6 francs for each franc you allocate to the GREEN Group Account.

***Example**:* Suppose you allocate 40 francs to the GREEN Group Account and the other 3 group members allocate a total of 120 francs to the GREEN Group Account. The Total GREEN Group Allocation = 40 + 120 = 160 francs and each group member in the GREEN GAME receives **Earnings from GREEN Group Account =** 0.4 × 160 = 64 francs.

In each game, you keep the francs that are not allocated to the Group Account. The amount you keep, your **Individual Allocation = 80 – YOUR Group Allocation** and is allocated to your **Individual Account.** In the GREEN GAME your earnings from the GREEN Individual Account are equal your **Individual Allocation** and do not depend on the decisions of others. Therefore, **every franc** you keep earns you **1 franc** and earns **0 francs** for each of the others in the group. That is,

Earnings from GREEN Individual Account = 1 x (GREEN Individual Allocation)
= 1 x (80 – YOUR GREEN Group Allocation)

Remember, the GREEN GAME and the BLUE GAME have the exact same rules. Specifically,

Earnings from BLUE Group Account = 0.40 x (Total BLUE Group Allocation)

Earnings from BLUE Individual Account = 1 x (BLUE Individual Allocation)

After you choose how much to allocate to the Group Account in the GREEN GAME and how much to allocate to the Group Account in the BLUE GAME, you will be asked to give your "best guess" about what others in each game will allocate to the Group Account (a "best guess" of the Others' Total Group

Allocation). Specifically, your "best guess" of Others' Total Group Allocation is a guess of **THE TOTAL AMOUNT** that **the other three group members will allocate to the Group Account** in that round.
You can earn additional francs from your "best guess" and the amount you earn depends on how close your "best guess" is to the **actual** amount allocated. You earn 24 francs if your guess is equal to the actual amount the others allocate to the Group Account, 23.9 francs if your guess is 1 franc away from the actual amount, 23.8 francs if you are 2 francs away…23 francs if you are 10 francs away, … all the way to 0 francs if your "best guess" is 240 francs away from the actual amount. Stated differently, for every **10 francs** your *guess* of Others' Total GREEN Group Allocation is from the *actual* Others' Total GREEN Group Allocation your **Earnings from GREEN Guess** decline by **1franc**. In each game, your guess earnings are calculated,

Earnings from GREEN Guess = 24 - | (GREEN Guess – Actual GREEN Amount) / 10 |
Earnings from BLUE Guess = 24 - | (BLUE Guess – Actual BLUE Amount) / 10 |

DIFFERENCE BETWEEN GAMES

In the BLUE GAME you will have the opportunity to register your **APPROVAL** or **DISAPPROVAL** for the BLUE Group Allocation of each of the other 3 group members by assigning points, you may assign any number of points between **0** and **5**. These points are costless to assign and do not affect the earnings of you or the group members that are assigned points.

The computer will display the BLUE Group Allocation for each group member. Under each allocation you must indicate whether you would like to assign APPROVAL Points or DISAPPROVAL Points. After indicating the **type** of points you would like to assign you are asked to register the **level** of your APPROVAL or DISAPPROVAL by assigning some number of points between 0 and 5. Assigning more points registers a higher level of APPROVAL or DISAPPROVAL. For APPROVAL Points assigning ***5*** APPROVAL Points indicates your ***highest*** level of APPROVAL and ***0*** APPROVAL Points indicates your ***lowest*** level of APPROVAL. For DISAPPROVAL Points assigning ***5*** DISAPPROVAL Points indicates your ***highest*** level of DISAPPROVAL and ***0*** DISAPPROVAL Points indicates your ***lowest*** level of DISAPPROVAL.

Once all group members have assigned points the computer will sum the assigned APPROVAL Points and DISAPPROVAL Points for each group member. These sums are displayed on the OUTCOME SCREEN and are displayed to all group members in the BLUE GAME as seen in Figure 2.

TOTAL EARNINGS

In each round your **TOTAL EARNINGS** are the sum of your individual, group and guess earnings. That is,

TOTAL EARNINGS from GREEN GAME
= Earnings from GREEN Individual Account + Earnings from GREEN Group Account
+ Earnings from GREEN Guess

TOTAL EARNINGS from BLUE GAME
= Earnings from BLUE Individual Account + Earnings from BLUE Group Account
+ Earnings from BLUE Guess

For each game, if a given round is randomly chosen for payment then the **TOTAL EARNINGS** for that round will be converted to cash and paid at the end of the experiment.

OUTCOME SCREEN – GREEN GAME

At the end of each round, Your GREEN Group Allocation, Total GREEN Group Allocations and the individual GREEN Group Allocation of each group member are reported on the Outcome Screen. The computer will also display each part of your earnings and the **TOTAL EARNINGS from GREEN GAME** for the round.

OUTCOME SCREEN – BLUE GAME

At the end of each round, Your BLUE Group Allocation, Total BLUE Group Allocations, the individual BLUE Group Allocation of each group member and the sum of APPROVAL Points and

DISAPPROVAL Points assigned to each group member are reported on the Outcome Screen. The computer will also display each part of your earnings and the **TOTAL EARNINGS from BLUE GAME** for the round.

RECORD SHEET & PAYMENT

Once the outcome screen is displayed you should record the results for the round on your **Personal Record Sheets** under the appropriate heading.

At the end of the experiment **2 out of 20** rounds will be randomly selected for payment. Your earnings for the two rounds selected for the GREEN GAME and BLUE GAME will be added up and converted to U.S. dollars at the end of the experiment at the rate of **25 francs = $1.**

A. 4: INSTRUCTIONS: RECOGNITION TREATMENT

In this experiment you will participate in two games. Each of the two games will have four participants, including you. You will not know the identity of the participants you are grouped with. The experiment will consist of **20 rounds**. You will participate in a **BLUE GAME** and a **GREEN GAME** at the same time. The BLUE GAME and GREEN GAME have exactly the same rules – **the only difference between the two games is the three participants you are matched with and the way the outcome for each game is displayed.**

In each of the 20 rounds, you will participate in the BLUE GAME with the **same three participants.** In each of the 20 rounds, you will participate in the GREEN GAME with the **same three participants.** However, the **three** participants you are matched with for the GREEN GAME are **completely different** from the **three** participants you are matched with for the BLUE GAME**.** The GREEN GAME will appear on the left side of the screen and the BLUE GAME will appear on the right side of the screen at the same time in all 20 rounds.

At the end of the experiment **2 out of 20** rounds will be randomly selected for payment for each game. After you have completed all rounds two tokens will be randomly drawn out of a bingo cage containing tokens numbered from **1 to 20**. The token numbers determine which two rounds are going to be paid for each game.

At the beginning of each round you will be given **80 francs** for the GREEN GAME and **80 francs** for the BLUE GAME. Francs will be converted to U.S. dollars at the end of the experiment at the rate of **25 francs = $1.** In each round, you will select an allocation for the GREEN GAME and an allocation for the BLUE GAME. When you are ready to make your decision, click on the "input boxes" below "How much would you like to allocate to the Group Account?" and the program will allow you to enter your choices. When you are finished making your choices, click "Submit".

After submitting your choices you will be asked to give your "best guess" about the allocation choices of the others in each game. After each group member has submitted their allocation choice and "best guess" in the GREEN GAME and BLUE GAME, total earnings for the round are computed and displayed. This completes the round, this process is repeated for each of the **20** rounds.

GREEN (BLUE) GAME

Below, we will read instructions for the GREEN GAME. However, the rules for the GREEN GAME and the BLUE GAME are **exactly the same**.

Each round you will decide how many of your **80 francs** you want to allocate to a **Group Account**, this amount is called **YOUR GREEN Group Allocation.** You may allocate any integer number of francs between **0** and **80**. At the same time you select your group allocation the 3 other group members in the GREEN GAME must select their group allocation. The sum of the 3 others' group allocations is the **Others' Total GREEN Group Allocation**.

Your earnings from the GREEN Group Account depends on the total number of francs allocated to the Group Account by all 4 group members (including you). In particular, your earnings from the GREEN Group Account are **40 percent** of the **Total GREEN Group Allocation**. This is seen below,

Earnings from GREEN Group Account = 0.40 x (Total GREEN Group Allocation)
= 0.40 x (YOUR GREEN Group Allocation + Others' Total GREEN Group Allocation)

Therefore, for every franc you allocate to the GREEN Group Account, you increase the **Total GREEN Group Allocation** by 1 franc and your **Earnings from GREEN Group Account** rise by 0.4×1=0.4 francs. Every franc you allocate to the GREEN Group Account also raises the **Earnings from GREEN Group Account** of the 3 other group members by 0.4 francs *each*. So the total earnings of the group rise by 1.6 francs for each franc you allocate to the GREEN Group Account.

***Example**:* Suppose that you allocate 40 francs to the GREEN Group Account and the other 3 group members allocated a total of 120 francs to the GREEN Group Account. The Total GREEN Group Allocation = 40 + 120 = 160 francs and each group member in the GREEN GAME receives **Earnings from GREEN Group Account =** 0.4 × 160 = 64 francs.

In each game, you keep the francs that are not allocated to the Group Account. The amount you keep, your **Individual Allocation = 80 – YOUR Group Allocation**, is allocated to your **Individual Account.** In the GREEN GAME your earnings from the GREEN Individual Account are equal your **Individual Allocation** and do not depend on the decisions of others. Therefore, for **every franc** you keep earns you **1 franc** and earns **0 francs** for each of the others in the group. That is,

Earnings from GREEN Individual Account = 1 x (GREEN Individual Allocation)

= 1 x (80 – YOUR GREEN Group Allocation)

Remember, the GREEN GAME and the BLUE GAME have the exact same rules. Specifically,

Earnings from BLUE Group Account = 0.40 x (Total BLUE Group Allocation)

Earnings from BLUE Individual Account = 1 x (BLUE Individual Allocation)

After you choose how much to allocate to the Group Account in the GREEN GAME and how much to allocate to the Group Account in the BLUE GAME, you will be asked to give your "best guess" about what others in each game will allocate to the Group Account (a "best guess" of the Others' Total Group Allocation). Specifically, your "best guess" of Others' Total Group Allocation is a guess of **THE TOTAL AMOUNT** that **the other three group members will allocate to the Group Account** in that round.

You can earn additional francs from your "best guess" and the amount you earn depends on how close your "best guess" is to the **actual** amount allocated. You earn 24 francs if your guess is equal to the actual amount the others allocate to the Group Account, 23.9 francs if your guess is 1 franc away from the actual amount, 23.8 francs if you are 2 francs away…23 francs if you are 10 francs away, … all the way to 0 francs if your "best guess" is 240 francs away from the actual amount. Stated differently, for every **10 francs** your *guess* of Others' Total GREEN Group Allocation is from the *actual* Others' Total GREEN Group Allocation your **Earnings from GREEN Guess** decline by **1franc**. In each game, your guess earnings are calculated,

Earnings from GREEN Guess = 24 - | (GREEN Guess – Actual GREEN Amount) / 10 |
Earnings from BLUE Guess = 24 - | (BLUE Guess – Actual BLUE Amount) / 10 |

TOTAL EARNINGS

In each round your **TOTAL EARNINGS** are the sum of your individual, group and guess earnings. That is,

TOTAL EARNINGS from GREEN GAME
= Earnings from GREEN Individual Account + Earnings from GREEN Group Account
+ Earnings from GREEN Guess

TOTAL EARNINGS from BLUE GAME
= Earnings from BLUE Individual Account + Earnings from BLUE Group Account
+ Earnings from BLUE Guess

For each game, if a given round is randomly chosen for payment then the **TOTAL EARNINGS** for that round will be converted to cash and paid at the end of the experiment.

OUTCOME SCREEN – GREEN GAME

At the end of each round, Your GREEN Group Allocation, Total GREEN Group Allocations and the individual GREEN Group Allocation of each group member are reported on the Outcome Screen. The computer will also display each part of your earnings and the **TOTAL EARNINGS from GREEN GAME** for the round.

OUTCOME SCREEN – BLUE GAME

At the end of each round, Your BLUE Group Allocation, Total BLUE Group Allocations and the individual BLUE Group Allocation of each group member are reported on the Outcome Screen. The computer will also display each part of your earnings and the **TOTAL EARNINGS from BLUE GAME** for the round. For the BLUE GAME, the photos and names of each member of your group will be displayed on the top of your screen at all times. At the end of each round, the photos and names of all group members in the BLUE GAME will be displayed next to each member's allocation choice.

RECORD SHEET & PAYMENT

Once the outcome screen is displayed you should record the results for the round on your **Personal Record Sheets** under the appropriate heading.

At the end of the experiment **2 out of 20** rounds will be randomly selected for payment. Your earnings for the two rounds selected for the GREEN GAME and BLUE GAME will be added up and converted to U.S. dollars at the end of the experiment at the rate of **25 francs = $1.**