Giving, Taking, and Punishment in a Public Goods Environment

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In this paper, we introduce the concept of taking into a public goods environment to better understand 1) if having the option to take influences one's contribution to the public good and 2) whether or not taking transitions into punishment when subjects are given knowledge about the contributions of others. Our results reveal that subjects both give and take; and that providing additional information has no effect on the decision to take. One possible explanation is that decisions such as these rely on exogenous social norms rather than relevant information endogenously determined as the result of game play.

INTRODUCTION

A common result found in public good (PG) and dictator game (DG) experiments is that subjects do not follow the dominant wealth-maximizing strategy and choose instead to give some of their endowment to the other player(s).[1] Looking more closely at this result for DGs, List (2007), Bardsley (2008) and Kench and Niman (2010) introduce taking into the DG framework. The results observed in these experiments have called into question the traditional explanations of altruism or pro-social behavior to explain non-maximizing choices.

To see if creating a taking option affects the widely observed results found in PG experiments, we create an environment that allows subjects to give and take. Our experiment differs from Cox et al. (2013) and that no subject is more powerful than any other subject.[2] What we observe is that on balance, subjects both give and take with the amount they take exceeding what is given. To see if we could frame subjects into taking more as a form of punishment, we ran a second treatment where the contributions of others to the PG is revealed before the decision-maker must decide how much to take from other members of the group.[3] What we observe in this extended treatment is that the amount of giving and taking is not statistically different from the first treatment where decisions were made without knowledge about the actions of others.

While it would be interesting to speculate why a subject would both give to a public good and then take from other members in a group, the focus here is more narrowly directed toward the observed result that an increase in the amount of information available does not appear to change behavior. In other words, knowledge about the actions of others did not appreciably affect either the decision to give or take. This suggests that the criteria used to make decisions may be determined by something other than the amount of information provided to the decision-maker. This result is not consistent with the recent work of Lopez-Perez (2009) and Krupka and Weber (2009) suggesting that additional information will have an effect on subject behavior. However, following along similar lines, we concur that social norms may provide an important piece of the puzzle in order to develop a better understanding of subject behavior in an experimental environment.

EXPERIMENTAL DESIGN AND TESTABLE HYPOTHESIS

Our experiment was conducted online.[4] The experimental design uses two treatments: a normal form treatment (see Appendix 1 for complete instructions) and an extensive form treatment (see Appendix 2 for complete instructions). Each subject participated in one of the treatments. Each treatment was a one-shot game. In both treatments subjects earned 18 tokens by answering 25 questions. Our motivation for having subjects complete the survey was to have all subjects complete a task in an effort to avoid the endowment effect demonstrated by List (2007).

During the experiment, all subjects made two decisions: 1) a PG decision and 2) a taking decision.

Treatments

The PG Decision

Each subject was given the option to allocate 9 tokens (one-half of their earnings) between a private account and / or a public account. Each token contributed to the public account earned E$0.40 for every member of the group, whereas each token contributed to the private account earned E$1 for the individual who made the contribution and nothing for the other group members. Each group was made up of four students from the University of New Hampshire and The University of Tampa. Subjects were told the size of their group and that group members had the same decisions to make. Subjects were not told which university their group members were from or that only two universities were involved in the experiment.

The Taking Decision

Subjects were told that their remaining 9 tokens had been placed in a savings account. Each token in the savings account was worth E$1. A subject could not move funds from their savings account to their public or private accounts. However, each subject was allowed to increase the number of tokens in their savings account by decreasing the savings accounts of other group members. Each subject was allowed to decrease each of the other three group members' savings accounts by up to three tokens. Thus, each subject could take a *maximum* of 9 tokens. Each token moved from a group member's savings account to their own savings account decreased the other member's payoff by E$1 and increased the subject's payoff by E$1. Relative to Fehr and Gachter (2000a), we have lowered the marginal cost of taking from fellow subjects from a positive integer to zero. Further, each subject was informed that not until all group members had made their decisions, would they know the net number of tokens in their savings account.

In the normal form treatment, both the PG decision and the taking decision are made simultaneously on the same decision screen. In the extensive form treatment, the PG decision is made first. After all group members have made their PG decision, subjects return to the experiment. On the same decision page: 1) the public account contribution amounts by group members are revealed from highest to lowest; and 2) the subjects are given the opportunity to take tokens from their fellow group members' savings accounts.

Hypotheses

The first hypothesis claims that subjects used the wealth-maximizing Nash-strategy to make their decisions. In both treatments, the Nash-strategy is to contribute 9 tokens to the private account (thus, zero tokens to the public account) and take a total of 9 tokens from their group members' savings accounts. If all subjects behaved in this way, each subject would earn E$18.

Some utility theories (Palfrey and Prisbrey, 1997) have sought to explain giving as something other than altruism. Sometimes the pro-social behavior is labeled as "warm-glow" because the giver receives a non-monetary benefit from giving. This effect, along with altruism, is now used to explain giving in PG experiments.

The second hypothesis, therefore, claims that subjects make decisions that achieve a Pareto efficient outcome (be it because of altruism or warm-glow). In both treatments, the Pareto efficient decision is to contribute 9 tokens to the public account. So long as a subject contributes 9 tokens to the public account, they may also take from the public account and the outcome will be Pareto efficient—this is because taking is zero-sum.

List (2007) and Kench and Niman (2010) have found that by only offering a decision to be made in the positive contribution space (for example, contributing 0 to 9 tokens to the public account), the experimenter unknowingly frames a direction for which the subject shall move. However, when the experimenter opens up the decision set into a taking space, giving behavior ebbs and taking behavior begins. Our third hypothesis claims that having the option of taking generates negative net value creation. Net value includes the value created by contributing to the public account and the value lost though the act of taking tokens from other group members. Net value equals subject *i*'s public account contribution x E$1.20 minus the number of tokens subject *i* took from other subjects x $E1 or,

$$\text{Net Value}_i = PG_i * \$1.20 - T_i * \$1 \qquad (1)$$

In the extensive form treatment, after making the PG decision, subjects are provided information about what each group member contributed to the public account. After observing this data, subjects make their taking decision. Because subjects understand that other group members can observe their PG decision and will be able to take tokens from their savings account, there might be an incentive to contribute more to the public account. Similarly, because of the additional information about contributions to the public account, subjects might have an incentive to take more tokens from subjects that contribute less to the public account. Thus, hypothesis four claims that contributions to the public account and taking from others are subject to a treatment effect.

RESULTS OF THE EXPERIMENT

Subjects

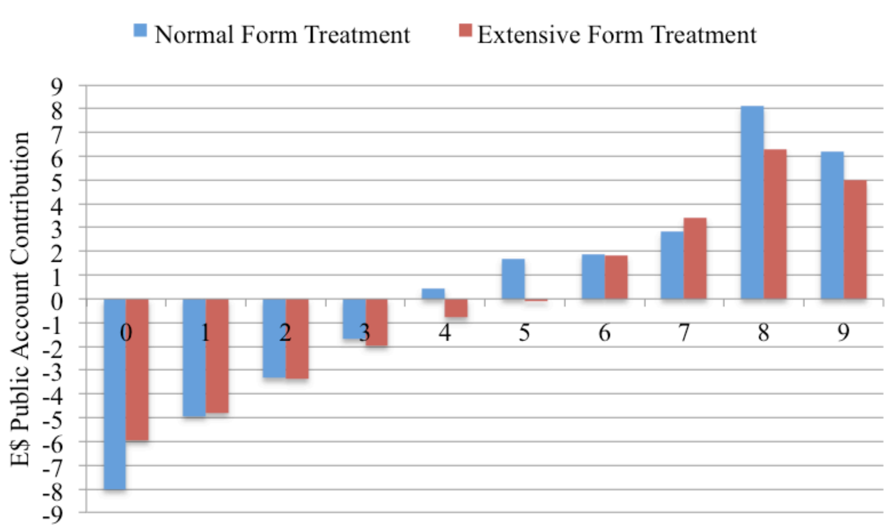
212 students from the University of New Hampshire and The University of Tampa participated in an online single-play public goods experiment with the option to take from other subjects. Students that responded to our email solicitation were told by e-mail from The University of Tampa the start date of the experiment and their unique user identification code (which they needed to access the online experiment). Subjects were not paid a show-up fee and had up to 48 hours to complete a task, from any location with an internet connection, or they were dropped from the study. The exchange rate was E$2 = $1. Subjects earned, on average, $9.63. At the end of the experiment, each subject's earnings were posted online, and the subject was told where to go to receive a cash payment.[6] Table 1 contains summary statistics for the experiment.

TABLE 1
SUMMARY STATISTICS

		Normal Form Treatment		Extensive Form Treatment	
		Mean (s.e.)	Median	Mean (s.e.)	Median
Value of public account contribution		4.59 (3.57)	4.20	5.02 (3.56)	4.80
Amount taken from other group members savings account		5.55 (3.32)	6.00	5.68 (3.14)	6.00
Net value created		-.97 (5.65)	-.90	-.66 (4.85)	-.70
Amount others took from subject *i*		5.55 (2.05)	6.00	5.68 (1.78)	6.00
Number of subjects contributing to the public account by contribution amount	0	23		15	
	1	7		5	
	2	11		13	
	3	15		7	
	4	13		22	
	5	10		10	
	6	9		5	
	7	7		3	
	8	4		3	
	9	13		17	
N		112		100	

Hypothesis1: Subjects Used the Wealth-Maximizing Nash-Strategy

FIGURE 1
AVERAGE NET VALUE CREATED BY NUMBER OF TOKENS CONTRIBUTED TO THE PUBLIC ACCOUNT AND BY TREATMENT



The wealth-maximizing Nash-strategy decision of contributing zero tokens to the public account and taking a total of nine tokens from the three other group members would create -$E9 in net value. This decision was selected 15 percent (17 of 112) of the time by subjects in the normal form treatment and 4 percent (4 of 100) of the time by subjects in the extensive form treatment. In addition, Figure 1 shows average net value created by the number of tokens contributed to the public account and by treatment. On average, subjects that contributed zero tokens to the public account generated –E$8 ($N$=23, s.e. = 2.13) in the normal form treatment and –E$5.93 ($N$=15, s.e. = 3.08) in the extensive form treatment.

When focusing exclusively on taking behavior, we find that 37.5 percent (42 of 112) of subjects took 9 tokens in the normal form treatment and 31 percent (31 of 100) of subjects took 9 tokens in the extensive form treatment. We fail to reject the null hypothesis because there is marginal evidence of wealth-maximizing Nash-strategy decision-making in the overall experiment and more significant evidence of Nash behavior in the taking portion of the experiment.

Hypothesis 2: Subjects Make Pareto Efficient Decisions

The decision to contribute nine tokens to the public account while taking zero to nine tokens from the savings account of other group members is Pareto efficient in this experiment. Taking behavior is zero-sum because the act of taking a token from another subject does not alter total wealth. Taking another subject's tokens simply reallocates wealth. In the normal form treatment 11.6 percent (13 of 112) of subjects made the Pareto efficient decision, while 17 percent (17 of 100) did so in the extensive form treatment. We reject the null hypothesis because a significant fraction of subjects made the Pareto efficient decision.

Hypothesis 3: The Option to Take Generates Negative Net Value Creation

Net value created was –E$0.97 (s.e. = 5.65), on average, in the normal form treatment and –E$0.66 (s.e. = 4.85) in the extensive form treatment. Figure 1 breaks the data down by tokens contributed to the public account, revealing that simply introducing the option to take does *not* affect the behavior of all subjects. However, on average, our normal form results do not reaffirm Andreoni et al. (2007) and Andreoni (1988), which conclude: the results of PG experiments are that *average* giving is significantly above zero, no matter whether the play is with the same group of partners or with randomly changing groups of strangers. Altogether then, we fail to reject the null hypothesis because, in the current study, *average* net value creation was negative in both treatments.

Hypothesis 4: Contributions to the Public Account and Taking from Others Are Subject to a Treatment Effect

The results of a censored regression model with the number of tokens subject i contributed to the public account as the dependent variable are reported in Table 2. In both treatments, the number of tokens that a subject i took from others is negatively correlated with the number of tokens the subject i contributed to the public account (p-value = .002). However, there is no statistical difference between the treatments (p-value = .220).

TABLE 2
CENSORED REGRESSION OF NUMBER OF TOKENS SUBJECT *I* CONTRIBUTED TO THE PUBLIC ACCOUNT

Parameter	Estimate	Error	*z*	*p* > |*z*|
(Constant)	5.010	.666	7.521	<.000
Tokens subject *i* took from others	-.285	.091	-3.133	.002
The University of Tampa	0			
University of New Hampshire	.271	.596	.455	.649
Normal form treatment	0			
Extensive form treatment	.715	.584	1.226	.220
Log-likelihood = -479.338; Left censored obs. = 38; Right censored obs. = 30; *N* = 212				

The average number of tokens taken from the other group members' savings account by subject *i* was 5.55 (se. = 3.318) in the normal form treatment and 5.68 (se. = 3.143) in the extensive form treatment; these averages are not statistically different.

The results of a censored regression model with the number of tokens subject *i* took from other group members as the dependent variable is reported in Table 3. These results reveal that subject *i*'s decision to take from other subjects is negatively correlated with their contribution to the public account (*p*-value = .002). However, there is no stastatical difference between the treatments (*p*-value = .794).

TABLE 3
CENSORED REGRESSION OF TOKENS SUBJECT *I* TOOK FROM OTHER GROUP MEMBERS

Parameter	Estimate	Error	*z*	*p* > |*z*|
(Constant)	7.397	.863	8.573	<.000
Subject *i*'s public contribution	-.430	.139	-3.103	.002
The University of Tampa	0			
The University of New Hampshire	1.775	.830	2.138	.033
Normal form treatment	0			
Extensive form treatment	.213	.812	.262	.794
Log-likelihood = -437.989; Left censored obs. = 28; Right censored obs. = 73; *N* = 212				

Table 4 reports a censored regression model with the number of tokens others took from subject *i* as the dependent variable and subject *i*'s public contribution, university, and treatment on the r.h.s., the result informed us that the treatments where not statistically different (*p*-value = .794). Thus, we fail to reject the null hypothesis.

TABLE 4
CENSORED REGRESSION OF NUMBER OF TOKENS OTHER SUBJECTS TOOK FROM SUBJECT *I*

Parameter	Estimate	Error	*z*	*p* > |*z*|
(Constant)	6.100	.262	23.311	<.000
Subject *i*'s public account contribution	-.055	.055	-1.006	.314
Subject *i*'s public account contribution*NF treatment	0			
Subject *i*'s public account contribution*EF treatment	-.016	.057	-.289	.772
University of X	0			
University of Y	-.445	.286	-1.557	.119
Log-likelihood = -438.401; Left censored obs. = 1; Right censored obs. = 13; *N* = 212				

DISCUSSION AND CONCLUSION

Our PG design has an option to decrease other subject's savings by choosing to take tokens from another subject. With this option, we observe a subject's net value creation is negative, on average, in both a normal form treatment and an extensive form treatment. At the individual subject level, there is evidence that some subjects used the wealth-maximizing Nash-strategy in their decision making, while others used the Pareto efficient strategy. More often, however, subjects both contributed to the public account and took tokens from other subjects' savings.

Most interesting however was the discovery of no statistically significant difference between our normal form treatment, where all decisions were made simultaneously, and our extensive form treatment, where the taking decision was made after we revealed the public account contributions of group members. This reveals that subjects were not taking from other subjects in an effort to punish for undesirable behavior.

When our results are compared with those of a long series of traditional PG experiments, we find average net value created changes from being significantly positive in traditional PG experiments to negative in our experiment. Indeed, 70 percent (148 of 212) of our subjects both gave to the public account and took from other subjects (67 percent in the normal form treatment and 73 percent in the extensive form treatment). This seems to indicate that something other than altruism is at play. The interesting question that emerges is: what stops subjects from taking all or giving nothing? There is no recrimination, punishment or other explicit consequences for giving less or taking more. Yet what the experimental results reveal is that there appears to be a self-imposed limit to what some are willing to give or take.

In an effort to explain why some subjects contribute to the PG and others do not, Ostrom (2000) sets forth the argument that subject pools are generally comprised of two different types of individuals. These two types are characterized as "conditional cooperators" and "willing punishers". "Conditional cooperators are individuals who are willing to initiate cooperative action when they estimate others will reciprocate and to repeat these actions as long as a sufficient proportion of the others involved reciprocate," while willing punishers are players who are "willing, if given an opportunity, to punish presumed free riders through verbal rebukes or to use costly material payoffs when available (Ostrom 2000, p. 142)."

Ostrom appeals to evolutionary psychology in order to explain why both types of individuals might exist simultaneously in the same population. Citing (Barkow *et al.*, 1992), she carries forward the argument that survival not only depends on individual fitness, but also the ability to work effectively with others to solve collective action problems that also has the potential to increase the probability for survival.[7] Citing other developments in evolutionary theory and empirical research, she contends that strong support exists for the contention that human beings have a propensity to learn social norms that in turn shape our understanding about actions that are obligatory, permitted, or forbidden (Crawford and Ostrom, 1995). Which norms are actually incorporated in an individual's daily behavior depends on culture, education, family dynamics and a wide variety of socio-economic factors. Failing to adhere to an accepted social norm, whether it is something as simple as telling the truth or keeping a promise, can lead to guilt or shame (if known by others) (Posner and Rasmusen, 1999).

The important point to be made is that when our PG environment is extended to allow a subject to view the decisions of others prior to making their own decision, our findings show that the additional information does not have a statistically significant impact on the subsequent decision process. This would suggest that in a one-shot game, rather than using all of the available information to fully form a decision within a rational choice-based framework, subjects instead rely on some type of heuristic to facilitate the decision making process.

One possible explanation is that this heuristic is based on the existence of social norms. Subjects bring with them conceptions of how much they *should* contribute to the PG or how much they can take from other players without feeling guilty. These social norms established prior to the experiment effectively set the parameters for the subsequent choices that are made within the experimental environment. This supports the work by Cain (1998) where subjects playing a prisoner's dilemma game were told prior to making their decision whether the other player was "stingy" or "nice." Those who were characterized as stingy were unlikely to cooperate while those who were nice had a greater propensity to play well with others. Despite learning that their opposite number was stingy and hence not likely to cooperate, 39 percent chose to cooperate anyway. This finding is similar to our result where learning whether others contributed a great deal or very little to the PG had little impact on the subsequent decisions that were made when compared with the group who made the same decision without knowledge of the actions of others.

Thus one might conclude that if the existence of norms creates alternate behavioral patterns for different individuals as the result of evolutionary forces that have influenced the development of a specific culture over multiple generations, then such norms must also play an important role in the decision-making that takes place in a PG environment. In a one-shot game where such norms do not have an opportunity to change as the result of repeated play, it seems logical to conclude that prior norms formulated outside the game environment could influence the decision-making that takes place within that same environment. If experimental subjects are indeed rational and therefore take advantage of all of the information that is available, the relevant information set would include previous life experiences along with current information about the existing game environment. If additional information about other players does not have a demonstrable effect on individual decision-making, it seems reasonable to conclude that some other decision rules based on suitable social and psychological foundations must be at play if one is to reconcile the concept of rationality with observed behavior.

ENDNOTES

1. See for example Andreoni et al., 2007, Isaac and Walker, 1988, Isaac et al., 1994, and Andreoni, 1988.
2. The Cox et al. (2013) "boss" and "king" experiments are asymmetric in that one subject is more powerful relative to the subjects in a group setting.
3. Fehr and Gachter (2000a, 2000b, 2002) have revealed that individuals are willing to punish others who fail to contribute adequately to the provision of a PG. Such punishment of free-riders in a PG experiment is considered altruistic because imposing punishment reduces the punisher's earnings, yet the punisher accrues absolutely no monetary benefit from punishing another subject. The results of Fehr and Gachter (2000a, 2000b, 2002) are used as empirical support of behavior that is common in industrial disputes, where striking workers ostracize strikebreakers, and in team production settings where violators of production quotas are punished by those who stick to the norm (Fehr and Gachter 2000a, p. 980).
4. An open question is whether online experiments differ from experiments conducted in a more controlled laboratory. In a DG environment, Kench and Niman (2010) demonstrate that subject perceptions of an "online" experiment are identical to subject perceptions of a "laboratory" experiment. Although observed

behavior might very well be different in the two environments, how intensely a subject believes what the experimenter is telling *not* different.

5. It is important to note that in our experimental design we phrased the decision as an option to "decrease member x's savings account" rather than the using the word "punish" to describe the task at hand.
6. Payments were delayed for all subjects in our experiment. An open question is what effect delayed payments have on subject behavior in an environment such as ours. In a standard dictator game environment, Kovarik (2009) finds that dictators are more self-interested when the time gap between decision and payment is large.
7. This concept can be traced back to the work of Marshall where in his Principles of Economics, Marshall (1961, p. 243) writes: "Thus the struggle for existence causes in the long run those races of men to survive in which the individual is most willing to sacrifice himself for the benefit of those around him; and which are consequently the best adapted collectively to make use of their environment."

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APPENDIX 1: NORMAL FORM TREATMENT

Welcome to the experiment!

This experiment has been designed to study economic decision-making. The instructions are simple. If you follow them carefully and make good decisions, you may earn a considerable amount of money. The money will be paid to you after the experiment has concluded. You will receive an email with information about where and when to pick up your earnings.

Payment for Completing the Online Survey

You have earned 18 tokens by completing the online survey.

The Experiment

In this experiment you will make two decisions. You will be assigned to a group of 4 people. What you earn from your decision will depend on what you and the other 3 people in your group decide.

Your first task will be to choose how to divide 9 of your tokens between two investment opportunities: the RED investment and the BLUE investment.

We have placed your remaining 9 tokens in a SAVINGS account. Your second task is to decide whether or not to increase your SAVINGS account by decreasing another person's SAVINGS account.

The Red Investment

Each token you invest in the RED investment will earn you a return of E$1.

- Example: Suppose you invest 4 tokens in the RED investment, then you would earn E$4 from this investment.
- Example: Suppose you invest 9 tokens in the RED investment, then you would earn E$9 from this investment.
- Example: Suppose you invest 0 tokens in the RED investment, then you would earn nothing from this investment.

The Blue Investment

What you earn from the BLUE investment will depend on the total number of tokens that you and the other three members of your group invest in the BLUE investment. The more the group invests in the BLUE investment, the more each member of the group earns. The process is best explained by a number of examples.

- Example: Suppose that you decided to invest no tokens in the BLUE investment but that the 3 other members invest a total of 27 tokens. Then your earnings from the BLUE investment would be E$10.80. Everyone else in your group would also earn E$10.80.
- Example: Suppose that you decided to invest 5 tokens in the BLUE investment but that the 3 other members invest a total of 27 tokens. Then your earnings from the BLUE investment would be E$12.80. Everyone else in your group would also earn E$12.80.
- Example: Suppose that you decided to invest 9 tokens in the BLUE investment but that the 3 other members invest nothing. Then your earnings from the BLUE investment would be E $3.60. Everyone else in your group would also earn E$3.60.

As you might have figured out, every token invested in the BLUE investment will earn E$0.40 for every member of the group, not just the person who invests it there. It does not matter who invests tokens in the BLUE investment. Everyone will get E$0.40 from every token placed in the BLUE investment - whether they invest tokens in the BLUE investment or not.

Decision 1

Your task is to decide how many of your 9 tokens to invest in the RED investment and how many to invest in the BLUE investment. You are free to decide how many of your 9 tokens to invest in the RED investment and / or the BLUE investment.

You will make your decision on a screen similar to the one below.

Choose 1	RED INVESTMENT	BLUE INVESTMENT
O	9 tokens	0 tokens
O	8 tokens	1 token
O	7 tokens	2 tokens
O	6 tokens	3 tokens
O	5 tokens	4 tokens
O	4 tokens	5 tokens
O	3 tokens	6 tokens
O	2 tokens	7 tokens
O	1 token	8 tokens
O	0 tokens	9 tokens

Decision 2

We have placed your other 9 tokens in a SAVINGS account. Each token in the SAVINGS account is worth E$1.

You cannot move tokens from your SAVINGS account to the BLUE or RED investment. However, you can increase the number of tokens in your SAVINGS account by decreasing the SAVINGS accounts other group members.

You may decrease each of the other three group members' SAVINGS accounts by up to 3 tokens. Each token moved from a group member's SAVINGS account to your SAVINGS account decreases their payoff by E$1 and increases you payoff by E$1.

Each group member is able to take up to 3 tokens from each of the other 3 group member's SAVINGS accounts.

Not until all group members have made their investment decisions, will you know the total number of tokens in your SAVINGS account.

You will make your decision #2 on a screen similar to the one below by selecting one of the options for each of the 3 group members.

Group Member 2			Group Member 3			Group Member 4		
Choose 1	Increase your savings by	Decrease Member 2’s savings account by	Choose 1	Increase your savings by	Decrease Member 3’s savings account by	Choose 1	Increase your savings by	Decrease Member 4’s savings account by
O	0 tokens	0 tokens	O	0 tokens	0 tokens	O	0 tokens	0 tokens
O	1 token	1 token	O	1 token	1 token	O	1 token	1 token
O	2 tokens	2 tokens	O	2 tokens	2 tokens	O	2 tokens	2 tokens
O	3 tokens	3 tokens	O	3 tokens	3 tokens	O	3 tokens	3 tokens

Earnings Statement

Once you and the other three members of your group have made your decisions, your earnings will be posted online. After reentering your user I.D., your earnings will be revealed in a form similar to the following:

INVESTMENT DECISION 1				
Your tokens in the RED investment				3 tokens
Your tokens in the BLUE investment				6 tokens
Total tokens in the BLUE investment				24 tokens
INVESTMENT DECISION 2				
(a) Initial tokens in your SAVINGS account				9 tokens
(b) Other members decreased your SAVINGS by				2 tokens
(c) You increased your SAVINGS account by				2 tokens
Net number of tokens in your SAVINGS account = (a) – (b) + (c)				9 tokens
A	B	C	D	E
Tokens in your RED investment	Tokens in your SAVINGS account	Tokens in your BLUE investment	Total group tokens in BLUE investment	Total investment earnings = A*$1+B*$1+D*$0.4
3	9	6	24	E$21.60

Your Cash Payoff

Each experimental dollar (E$) is worth 50 cents. After viewing your earnings statement, we will let you know where and when to pick up your earnings. This is the end of the instructions. Good Luck!

Decision page viewed by each subject

Your task is to decide how many of your 9 tokens to invest in the RED investment and how many to invest in the BLUE investment. You are free to decide how many of your 9 tokens to invest in the RED investment and / or the BLUE investment.

Remember: 1) Each token you invest in the RED investment will earn you a return of E$1 and, 2) every token invested in the BLUE investment will earn E$0.40 for every member of the group, not just the person who invests it there.

Choose 1	RED INVESTMENT	BLUE INVESTMENT
O	9 tokens	0 tokens
O	8 tokens	1 token
O	7 tokens	2 tokens
O	6 tokens	3 tokens
O	5 tokens	4 tokens
O	4 tokens	5 tokens
O	3 tokens	6 tokens
O	2 tokens	7 tokens
O	1 token	8 tokens
O	0 tokens	9 tokens

We have placed your other 9 tokens in a SAVINGS account. Each token in the SAVINGS account is worth E$1.

You cannot move tokens from your SAVINGS account to the BLUE or RED investment. However, you can increase the number of tokens in your SAVINGS account by decreasing the SAVINGS accounts other group members.

You may decrease each of the other three group members' SAVINGS accounts by up to 3 tokens. Each token moved from a group member's SAVINGS account to your SAVINGS account decreases their payoff by E$1 and increases you payoff by E$1.

Not until all group members have made their investment decisions, will you know the total number of tokens in your SAVINGS account.

Before making Decision 2, it is important for you to know that you are: GROUP MEMBER 1

Decision 2

Group Member 2			Group Member 3			Group Member 4		
Choose 1	Increase your savings by	Decrease Member 2's savings account by	Choose 1	Increase your savings by	Decrease Member 3's savings account by	Choose 1	Increase your savings by	Decrease Member 4's savings account by
O	0 tokens	0 tokens	O	0 tokens	0 tokens	O	0 tokens	0 tokens
O	1 token	1 token	O	1 token	1 token	O	1 token	1 token
O	2 tokens	2 tokens	O	2 tokens	2 tokens	O	2 tokens	2 tokens
O	3 tokens	3 tokens	O	3 tokens	3 tokens	O	3 tokens	3 tokens

Submit

APPENDIX 2: EXTENSIVE FORM TREATMENT

Welcome to the experiment!

This experiment has been designed to study economic decision-making. The instructions are simple. If you follow them carefully and make good decisions, you may earn a considerable amount of money. The money will be paid to you after the experiment has concluded. You will receive an email with information about where and when to pick up your earnings.

Payment for Completing the Online Survey

You have earned 18 tokens by completing the online survey.

The Experiment

In this experiment you will make two decisions. You will be assigned to a group of 4 people. What you earn from your decision will depend on what you and the other 3 people in your group decide.

Your first task will be to choose how to divide 9 of your tokens between two investment opportunities: the RED investment and the BLUE investment.

We have placed your remaining 9 tokens in a SAVINGS account. Your second task is to decide whether or not to increase your SAVINGS account by decreasing another person's SAVINGS account.

The Red Investment

Each token you invest in the RED investment will earn you a return of E$1.

- Example: Suppose you invest 4 tokens in the RED investment, then you would earn E$4 from this investment.
- Example: Suppose you invest 9 tokens in the RED investment, then you would earn E$9 from this investment.
- Example: Suppose you invest 0 tokens in the RED investment, then you would earn nothing from this investment.

The Blue Investment

What you earn from the BLUE investment will depend on the total number of tokens that you and the other three members of your group invest in the BLUE investment. The more the group invests in the

BLUE investment, the more each member of the group earns. The process is best explained by a number of examples.

- Example: Suppose that you decided to invest no tokens in the BLUE investment but that the 3 other members invest a total of 27 tokens. Then your earnings from the BLUE investment would be E$10.80. Everyone else in your group would also earn E$10.80.
- Example: Suppose that you decided to invest 5 tokens in the BLUE investment but that the 3 other members invest a total of 27 tokens. Then your earnings from the BLUE investment would be E$12.80. Everyone else in your group would also earn E$12.80.
- Example: Suppose that you decided to invest 9 tokens in the BLUE investment but that the 3 other members invest nothing. Then your earnings from the BLUE investment would be E $3.60. Everyone else in your group would also earn E$3.60.

As you might have figured out, every token invested in the BLUE investment will earn E$0.40 for every member of the group, not just the person who invests it there. It does not matter who invests tokens in the BLUE investment. Everyone will get E$0.40 from every token placed in the BLUE investment - whether they invest tokens in the BLUE investment or not.

<u>Decision 1</u>

Your task is to decide how many of your 9 tokens to invest in the RED investment and how many to invest in the BLUE investment. You are free to decide how many of your 9 tokens to invest in the RED investment and / or the BLUE investment.

You will make your decision on a screen similar to the one below.

Choose 1	RED INVESTMENT	BLUE INVESTMENT
O	9 tokens	0 tokens
O	8 tokens	1 token
O	7 tokens	2 tokens
O	6 tokens	3 tokens
O	5 tokens	4 tokens
O	4 tokens	5 tokens
O	3 tokens	6 tokens
O	2 tokens	7 tokens
O	1 token	8 tokens
O	0 tokens	9 tokens

After everyone has had a chance to complete Decision 1, you will return to make Decision 2. Before making Decision 2, you will find out how many tokens the other members of your group have contributed to the BLUE investment in a table like the one below:

Member Contributions	
Member	*# of BLUE tokens*
Member 1	5
Member 2	5
Member 3	5
Member 4	5

Recall that in Decision 1 you decided how many of your 9 tokens to invest in the RED investment and how many to invest in the BLUE investment. Every token invested in the BLUE investment will earn E$0.40 for every member of the group. Each token you invested in your RED investment will earn you a return of E$1.

Decision 2

Don't forget that you earned 18 tokens by completing the online survey. We have placed the remaining 9 tokens in a SAVINGS account. Each token in the SAVINGS account is worth E$1.

You cannot move tokens from your SAVINGS account to the BLUE or RED investment. However, you can increase the number of tokens in your SAVINGS account by decreasing the SAVINGS accounts other group members.

You may decrease each of the other three group members' SAVINGS accounts by up to 3 tokens. Each token moved from a group member's SAVINGS account to your SAVINGS account decreases their payoff by E$1 and increases you payoff by E$1.

Each group member is able to take up to 3 tokens from each of the other 3 group member's SAVINGS accounts.

Not until all group members have made their investment decisions, will you know the total number of tokens in your SAVINGS account.

You will make your decision #2 on a screen similar to the one below by selecting one of the options for each of the 3 group members.

Group Member 2			Group Member 3			Group Member 4		
Choose 1	Increase your savings by	Decrease Member 2's savings account by	Choose 1	Increase your savings by	Decrease Member 3's savings account by	Choose 1	Increase your savings by	Decrease Member 4's savings account by
O	0 tokens	0 tokens	O	0 tokens	0 tokens	O	0 tokens	0 tokens
O	1 token	1 token	O	1 token	1 token	O	1 token	1 token
O	2 tokens	2 tokens	O	2 tokens	2 tokens	O	2 tokens	2 tokens
O	3 tokens	3 tokens	O	3 tokens	3 tokens	O	3 tokens	3 tokens

Earnings Statement

Once you and the other three members of your group have made your decisions, your earnings will be posted online. After reentering your user I.D., your earnings will be revealed in a form similar to the following:

INVESTMENT DECISION 1				
Your tokens in the RED investment				3 tokens
Your tokens in the BLUE investment				6 tokens
Total tokens in the BLUE investment				24 tokens
INVESTMENT DECISION 2				
(a) Initial tokens in your SAVINGS account				9 tokens
(b) Other members decreased your SAVINGS by				2 tokens
(c) You increased your SAVINGS account by				2 tokens
Net number of tokens in your SAVINGS account = (a) – (b) + (c)				9 tokens
A	B	C	D	E
Tokens in your RED investment	Tokens in your SAVINGS account	Tokens in your BLUE investment	Total group tokens in BLUE investment	Total investment earnings = A*$1+B*$1+D*$0.4
3	9	6	24	E$21.60

Your Cash Payoff
Each experimental dollar (E$) is worth 50 cents. After viewing your earnings statement, we will let you know where and when to pick up your earnings. This is the end of the instructions. Good Luck!

Decision page viewed by each subject

Your First Decision

Your task is to decide how many of your 9 tokens to invest in the RED investment and how many to invest in the BLUE investment. You are free to decide how many of your 9 tokens to invest in the RED investment and / or the BLUE investment.

Remember: 1) Each token you invest in the RED investment will earn you a return of E$1 and, 2) every token invested in the BLUE investment will earn E$0.40 for every member of the group, not just the person who invests it there.

Choose 1	RED INVESTMENT	BLUE INVESTMENT
O	9 tokens	0 tokens
O	8 tokens	1 token
O	7 tokens	2 tokens
O	6 tokens	3 tokens
O	5 tokens	4 tokens
O	4 tokens	5 tokens
O	3 tokens	6 tokens
O	2 tokens	7 tokens
O	1 token	8 tokens
O	0 tokens	9 tokens

<u>Submit</u>

In order to understand your relationship to other members of the group, it is important for you to know that you are: GROUP MEMBER 1

Here is the table showing each members contribution to the BLUE investment:

Member Contributions	
Member	*# of BLUE tokens*
Member 1	8
Member 2	8
Member 3	2
Member 4	2

Recall that in Decision 1 you decided how many of your 9 tokens to invest in the RED investment and how many to invest in the BLUE investment. Every token invested in the BLUE investment will earn E$0.40 for every member of the group. Each token you invested in your RED investment will earn you a return of E$1.

Now you are ready to make the second decision.

Don't forget that you earned 18 tokens by completing the online survey. We have placed the remaining 9 tokens in a SAVINGS account. Each token in the SAVINGS account is worth E$1.

You cannot move tokens from your SAVINGS account to the BLUE or RED investment. However, you can increase the number of tokens in your SAVINGS account by decreasing the SAVINGS accounts other group members.

You may decrease each of the other three group members' SAVINGS accounts by up to 3 tokens. Each token moved from a group member's SAVINGS account to your SAVINGS account decreases their payoff by E$1 and increases you payoff by E$1.

Decision 2

Group Member 2			Group Member 3			Group Member 4		
Choose 1	Increase your savings by	Decrease Member 2's savings account by	Choose 1	Increase your savings by	Decrease Member 3's savings account by	Choose 1	Increase your savings by	Decrease Member 4's savings account by
O	0 tokens	0 tokens	O	0 tokens	0 tokens	O	0 tokens	0 tokens
O	1 token	1 token	O	1 token	1 token	O	1 token	1 token
O	2 tokens	2 tokens	O	2 tokens	2 tokens	O	2 tokens	2 tokens
O	3 tokens	3 tokens	O	3 tokens	3 tokens	O	3 tokens	3 tokens

Submit