Relative Earnings and Giving in a Real-Effort Experiment*

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Abstract

This paper investigates the relationship between relative earnings and giving in a two-stage, real-effort experiment. In the first stage, four players compete in a tournament that determines their earnings. In the second stage, they decide whether to make a transfer to one or more of their group members. Our main finding is that those ranked first are significantly less likely to give than those ranked second. This difference disappears if individuals learn about the second stage after earning their income or if earnings are randomly determined. This suggests that our main finding is driven by selection based on other-regarding preferences.

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Many field and laboratory studies have shown that a large proportion of people are willing to give part of their money to help others (Colin F. Camerer, 2003; James Andreoni, 2006). Despite the large literature on giving, there is still no clear understanding of the relationship between income and giving. Understanding this relationship is important for various reasons. For example, without this information, it is not possible to evaluate the impact of different tax policies on charitable giving (Andreoni, 1990).

Intuition suggests that as income increases, people would give more money to help others, at least in absolute terms. However, both field and laboratory studies raise questions about whether this is the case in practice. Some studies find a positive relationship (Catherine Eckel, Philip Grossman and Angela Milano, 2007), some find a U-shaped relationship (e.g., Gerald E. Auten, Charles T. Clotfelter and Richard L. Schmalbeck, 2000), and some find no relationship between income and giving (Andreoni and Lise Vesterlund, 2001; Edward Buckley and Rachel Croson, 2006).

This paper presents the results from a laboratory experiment that investigates the relationship between earnings and giving in a new two-stage game. An important feature of our experiment is that participants earn their income. In the first stage of the game, four subjects participate in a real-effort task, the Encryption Task. Subjects' earnings depend on their relative performance in the task and the ones ranked first, second, third and fourth receive $60, $45, $30 and $15, respectively. In the second stage, the subjects are given a chance to transfer part of their earnings to one or more of their group members.

Our main result is that subjects who rank first are less likely to give to their group members than those ranked second. The difference is statistically and economically significant. This is despite the fact that the earnings of those ranked second are 25 percent lower. Participants who are ranked third are as likely to give to others as those ranked first. The observed non-monotonic relationship between earnings and the likelihood of giving continues to hold if earnings are determined by luck in addition to relative effort.

Subjects' responses in a post-experiment questionnaire suggest that the proportion of self-interested individuals is substantially higher among the first-ranked. Therefore, one possible explanation for our main result is that self-regarding subjects select themselves to the first rank by working harder than other-regarding subjects.[1] To test this explanation, we conducted a second experiment consisting of two treatments. In the first treatment, all subjects are asked to put in a fixed amount of effort and earnings are randomly allocated. In the second treatment, ranks are based on relative effort as in Experiment 1. However, subjects are not given information about the content of the second stage until the first stage is completed. Hence, in both treatments, participants' preferences for helping others in the second stage cannot affect their decisions about how much effort to exert in the first stage.

In both treatments of the second experiment, we find that there is no significant difference between the first- and second-ranked subjects' likelihood of giving. This suggests that the non-monotonic relationship between earnings and the likelihood of giving observed in Experiment 1 is primarily driven by self-selection based on other-regarding preferences. That is, other-regarding individuals tend to exert less effort and thus have lower earnings than self-regarding individuals

The paper proceeds in the following way. In Sections I and II, we present the experimental design, procedures, and results of Experiments 1 and 2, respectively. In Section III, we compare our findings with those from field studies. We conclude in Section IV by considering the implications of our results for understanding giving behavior in the laboratory and in the field.

I. Experiment 1

A. Design

Experiment 1 consists of two treatments. Both treatments use a two-stage game. In the first stage, subjects participate in a novel real-effort task, the Encryption Task, for 20 minutes. Subjects are divided into groups of four and are given an encryption table which assigns a number to each letter of the alphabet in a random order. Each subject is then presented with words in a predetermined sequence (which is the same for all participants) and is asked to encrypt them by substituting the letters with numbers using the encryption table.

The effort expended in the first stage of the game determines individual earnings. We chose to employ a tournament for this purpose for three reasons. First, tournaments

[1] In this paper, we will say that individuals are other-regarding if they are willing to help others at a personal cost without anticipating monetary benefits. We will say that individuals are self-regarding if their utility depends solely on their monetary payoff.

are commonly used in naturally-occurring situations to determine individual earnings (Robert H. Frank and Philip J. Cook, 1995). For example, firms hire employees based on their relative credentials (such as grades and letters of reference) and reward them based on their relative performance (such as sales achieved or patents produced). Second, a tournament allows us to control for income effects more effectively and ensures the comparability of behavior across treatments. Third, a tournament allows us to separate econometrically the effect of effort from that of earnings. This is important in order to investigate the relationship between earnings and giving.

The two treatments in this experiment differ in terms of how earnings are determined. In treatment E (E for Effort), earnings are solely determined by subjects' relative effort. In particular, subjects receive one point for each word they encrypt. The group member with the highest number of points receives \$60, the second highest receives \$45, the third highest receives \$30, and the fourth highest receives \$15. If two or more individuals encrypt the same number of words, the computer randomly determines their ranking. Each player faces the same probability of being ranked above the other group members with the same number of points.

Treatment EL is designed to evaluate the robustness of our findings from treatment E by introducing an element of luck. In real life, earnings are determined not only by effort, but also by luck. Evidence suggests that giving behavior might be different when luck affects earnings and that people are more likely to receive support when they have been negatively affected by luck (Christina M. Fong, 2007). In treatment EL (EL for Effort and Luck), therefore, earnings depend not only on effort, but also on a random shock. A virtual coin is tossed separately for each group member at the end of the first stage. If the outcome is tails, the points obtained in the encryption task are reduced by 30 percent, which can result in a change in the rankings. Otherwise the number of points remains unaffected and equals the number of words encrypted.

The second stage is the same in both treatments. Subjects are given information about the points, ranking, and earnings of their group members. In addition, in treatment EL, they are able to observe the outcome of the coin toss, the initial ranking (i.e., before the coin toss) and the final ranking (i.e., after the coin toss) within the group. Based on this information, subjects are asked to decide simultaneously and without communication whether they wish to transfer any part of their earnings to their group members.

The existence of multiple potential “donors” implies that free-riding incentives exist because even other-regarding individuals may prefer someone else to help low earners. Free-riding incentives could be a problem when studying the relationship between earnings and giving, especially if the incentives differ across ranks. For example, second-ranked individuals might expect those ranked first to help the low earners and, hence, not give themselves. To avoid such free-riding, only one group member’s suggested transfer is implemented for each subject. Each member’s suggested transfer is equally likely to be selected, even if the suggested transfer is zero.

The game is played only once. At the end of the game, subjects are informed about the amount of money transferred to them (but not about the identity of the donor), whether any of their suggested transfers was implemented, and their final earnings. Earnings at the end of the experiment equal the earnings after the encryption task plus any transfers received minus any transfers made (if any). Table 1 summarizes the experimental design.

B. Subject pool and experimental procedures

The experiment was conducted at the Experimental Economics Laboratory of the University of Melbourne using z-Tree (Urs Fischbacher, 2007). Each session lasted approximately 60 minutes, including instruction time. Participants’ earnings ranged from $4 to $62, in Australian dollars, with median earnings being $38.50. At the time of the experiment, the exchange rate was approximately 1 Australian Dollar = 0.85 U.S. Dollars and the minimum hourly wage in Australia was $13.60. Hence, the earnings of those ranked first were almost four and a half times the minimum wage.

All 108 participants were Australian citizens and University of Melbourne students with different academic backgrounds. From economics, only first-year students were invited to ensure that they did not have a background in game theory or experimental economics. None of the subjects had previously participated in a similar experiment or were informed that we were restricting our sample to Australian citizens. This restriction was desirable for two reasons. First, we wanted performance in the encryption task to reflect individual effort and not ability. For subjects who are equally familiar with the English language, performance in the encryption task does not depend on knowledge acquired prior to the experiment as numbers were randomly assigned to the letters of the alphabet. Of course, subjects’ ability to absorb new information or use a computer can differ, but these should be less of a concern in our relatively homogeneous subject pool. Second, there could be cultural differences influencing other-regarding behavior (Alberto Alesina and George-Marios Angeletos, 2005). Therefore, using a homogeneous subject pool allows us to control for the impact of culture on giving and focus on our variable of interest, which is relative earnings.

At least 12 individuals took part in each session. Participants were randomly divided into groups of four and did not know the identity of their group members. They read the instructions and answered a series of questions that tested their understanding of the experiment. After checking in private the answers of each participant, the experimenter read out loud a one-page summary to ensure that the instructions were common knowledge. At the end of the experiment, participants filled out a demographic survey with questions on age, gender, field of study, and the number of years they have lived in Australia.[2] An open-ended question in the survey also asked them to explain their transfer decisions.

C. Insights from previous studies

According to recent theories of other-regarding preferences, giving in the second stage of the experiment may be motivated by a variety of factors, such as relative earnings (Gary Bolton, 1991), inequality aversion (Ernst Fehr and Klaus Schmidt, 1999; Bolton and Axel Ockenfels, 2000; Alesina and Angeletos, 2005; Andreoni, Marco Castillo, and Ragan Petrie, 2005), or warm glow (Andreoni, 1990). In general, these models predict that individuals are more likely to give part of their income to others as their income increases. This may be because an increase in the income of an inequality averse individual increases overall inequality and hence his/her willingness to give. Alternatively, if individuals get utility from the act of giving (as in a warm glow model), they may be more willing to give more as their income increases because giving is a normal good. Eckel, Grossman and Milano (2007) present evidence from the laboratory in support of these predictions. They find that as subjects' endowments increase, giving increases in absolute terms.[3]

[2] The majority of our subjects were born in Australia. The average age of the subjects was 19.3 with a standard deviation of 1.9 years. The average number of years spent in Australia was 18 with a standard deviation of 4.1 years.

[3] Eckel, Grossman and Milano (2007) find that the average donation of experimental subjects to a set of charities increases as endowments increase from $10 to $20 and $50. In contrast, Andreoni and Vesterlund (2001), and Buckley and Croson (2006) find that endowments have no significant impact on the absolute

The relationship between earnings and giving in our experiment, however, may also be affected by the existence of the effort stage. Laboratory studies have shown that other-regarding behavior is mitigated when participants earn their endowments, as is the case in our experiment (see, e.g., Elizabeth Hoffman and Matthew L. Spitzer, 1985; Hoffman et al., 1994; Bradley J. Ruffle, 1998; Todd L. Cherry, Peter Frykblom and Jason F. Shogren, 2002; Jeffrey P. Carpenter, Allison Liati and Brian Vickery, 2010). James C. Cox, Daniel Friedman and Steven Gjerstad (2007) present a model showing that this evidence is consistent with individuals caring about their relative status. In their framework, an individual's relative status increases with his/her relative performance (i.e., rank) and affects negatively the extent to which the individual cares about the well-being of others. It has also been argued in the literature that individuals may derive utility from relative status *per se* (see, e.g., Frank, 1985; Arthur J. Robson, 1992). In our experiment, one would expect, all else equal, such status-seeking individuals to exert more effort in the first stage than the subjects who have no regard for relative status. As a result, the status-seeking individuals would rank higher and obtain higher earnings. These individuals would give less in the second stage if they think that their relative status entitles them to keep a larger fraction of their earnings. This, therefore, suggests that the relationship between earnings and giving in our experiment may not be positive if some individuals are concerned about their relative status.

D. Results

We start our discussion of the results by presenting some descriptive statistics before turning to a multivariate regression analysis of the subjects' transfer decisions. In all our uses of the term 'transfer', we will be referring to participants' suggested transfers rather than the actual transfer amounts that were implemented. The discussion of how effort varies across treatments is postponed until the end of Section II.B.

Figure 1 presents the percentage of subjects in each rank who transfer to at least one of their group members in treatments E and EL. Given that some of the subjects in treatment EL might have been affected by luck, the figure also presents the giving behavior for the subjects in EL who were not affected by luck (denoted by EL*).

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amounts given. The reason for their different results may be the substantially larger differences in the endowment levels in Eckel, Grossman and Milano (2007).

Figure 1 reveals a striking fact. In both treatments, those ranked first are not the ones most likely to make a transfer. Less than a third of the subjects ranked first make a transfer (29% and 23% in E and EL, respectively). Subjects ranked second are by far the most likely to transfer. In fact, they are almost twice as likely to transfer as the subjects ranked first in E (57% vs. 29%) and more than three times as likely to transfer as the subjects ranked first in EL (77% vs. 23%). Subjects ranked first do not appear to be more likely to make a transfer than those ranked third either, despite the fact that their earnings are twice as high as the earnings of those ranked third.[4]

Figure 2 shows that, as one would expect, most of the transfers are made to those ranked third and fourth in both treatments. Table 2 presents the average transfer amount by rank. There are no apparent differences across ranks with respect to the transfer amounts in treatments E and EL. This implies that subjects ranked third and fourth in Experiment 1 were willing to transfer a greater proportion of their earnings.

Figures 1 and 2 also offer some initial evidence on the impact of luck in our experiment. A comparison of the columns for EL and EL* indicates that, once we control for rank, luck may have no substantial or systematic effect on giving behavior.

Turning to regression analysis, Figure 1 and Table 2 suggest that relative earnings affect the likelihood of giving and the amount given differently. Hence, the appropriate econometric specification to use is a hurdle model. The hurdle model is a generalization of the Tobit model in which the decision to give and the amount given are determined by two separate stochastic processes. The hurdle is crossed if an individual decides to give.[5] Given that each individual makes three transfer decisions, standard errors are clustered at the individual level.

The empirical model allows transfers to depend on the rank of the sender, the rank of the receiver, whether the sender had good luck (i.e., whether the coin toss influenced

[4] In treatment E, 5 of the 14 subjects ranked fourth made a transfer. In an open-ended question at the end of the experiment, three of these subjects stated that they made a transfer because they 'wanted to see what would happen.' Given the absence of such responses in treatment EL, we conjecture that some of the subjects ranked fourth in treatment E were curious about why they were given the option to make a transfer. In treatment EL, the possibility of a random shock might have provided subjects with a justification for the purpose of the second stage.

[5] The likelihood function for the hurdle model is given by the product of two separate likelihoods. First, the likelihood that a subject will transfer a positive amount to the others in the group, captured by a standard Probit model, and second, the conditional likelihood of an individual transferring a certain amount, estimated by using a truncated linear regression. The two parts of the hurdle model are estimated separately (Allen McDowell, 2003).

her ranking positively), whether the receiver had bad luck (i.e., whether the coin toss influenced her ranking negatively), and individual characteristics (gender, age, field of study, and the number of years the individual has lived in Australia). Transfer behavior may also be affected by the absolute number of words an individual encrypts and how this compares with the group average. Since those above the average may be treated differently from those below the average, the empirical model controls for *'Positive Word Difference'* $= \max\left\{0, w_i - \frac{1}{4}\sum_{j=1}^{4} w_j\right\}$ and *'Negative Word Difference'* $= \max\left\{0, \frac{1}{4}\sum_{j=1}^{4} w_j - w_i\right\}$, where w_i is the number of words encrypted by subject *i*. For example, a fourth-ranked subject might be less likely to receive a transfer if he did not work hard enough, but a first ranked may receive a transfer as a reward for her hard work.[6]

The regression results are reported in Table 3. Table 3 shows that subjects ranked second are significantly more likely to give than subjects ranked first in both treatments. In particular, those ranked second are 19% more likely to transfer than those ranked first across E and EL (Column 1), 14% more likely in E (Column 3), and 25% to 28% more likely in EL (Columns 5 and 7). Moreover, the amounts transferred by those ranked first are not significantly different from the amounts transferred by the others.[7] In general, the lower the earnings of an individual, the higher the likelihood of receiving a transfer and the higher the amount of the transfer. Table 3 also shows that, for those subjects who perform worse than the average, as the difference between their individual effort and the group average increases, the likelihood of receiving a transfer decreases in E and the amount received decreases in EL. For those subjects who perform better than the average, increases in the difference between their individual effort and the group average increase neither their likelihood of receiving a transfer nor the amount received.

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[6] We thank a referee for this comment. Note that the group average is only one of the possible standards that subjects may be using to evaluate relative performance. Our results are robust if we use alternative standards in the regression analysis, such as evaluating performance relative to the first ranked or to those ranked one place above. Our results are also qualitatively robust if we do not control for relative performance, individual characteristics, or if we run separate regressions for each receiver's rank, suggesting that the method used to correct the standard errors is not crucial for the results.

[7] Note that the fact that fourth-ranked individuals in treatment EL transfer a higher amount than those ranked first is not informative given that there is only one instance in which a fourth-ranked subject in EL made a transfer, as can be seen in Table 2.

With respect to luck, we find that controlling for rank, luck does not affect the likelihood of giving. Nevertheless, subjects compensate unlucky group members by giving them significantly higher amounts. However, given the limited number of cases in which individuals transferred part of their earnings, one must be careful when drawing inferences from the second part of the hurdle.

E. Discussion

Given the relative homogeneity of the subject pool and the pronounced differences in earnings, the results from the first experiment seem surprising. Why are subjects who are ranked first and earn the highest amount of money less likely to give than the subjects who are ranked second?

As discussed in Section I.C, one possible answer to this question has to do with some individuals having preferences that depend on their relative status. To gain further insight, we asked a research assistant (who knew neither the purpose of our study nor the experimental results) to classify the subjects' responses to the post-experiment, open-ended question about their transfer decisions. This question specifically asked subjects to explain their decisions in their own words. This question was answered by 39 of the 41 subjects who made a transfer in treatments E and EL, and all of the 67 subjects who did not make a transfer.

The survey responses suggest another possible explanation for the results from Experiment 1. In particular, the tournament in the first stage may result in selection based on other-regarding preferences. The most popular explanation for making a transfer, given by 27 out of 39 subjects (69%), was that subjects felt sorry for the low earners. Table 4 presents the distribution of the 'empathizing' subjects by rank and shows that the empathizing subjects were more likely to be ranked second (15 out of 27, 56%). The most popular reason for not making a transfer, given by 31 out of 67 subjects (46%), was that subjects wanted to maximize their earnings from the experiment.[8] Table 4 reveals that the proportion of 'self-regarding' individuals is substantially higher in the first rank even though those ranked first had much higher earnings (14 out of 31, 45%).[9]

[8] For example, a subject who ranked first in treatment E wrote: "I am here to make money, not to be charitable. I do not feel like being nice today." In contrast, one second-ranked subject in E wrote: "I transferred $5 to the person that got $15 from stage one because I just thought he could do with a little more money …."

[9] The post-experiment questionnaire also included a question from the World Values Survey which asked subjects to state whether they think individuals should take responsibility for their life or whether the

If giving is motivated by other-regarding preferences, then the relationship between earnings and giving depends on whether the self-regarding individuals are likely to exert more effort than the other-regarding individuals. Suppose that the utility of both types is increasing in their own material payoff. In addition, suppose that the utility of the other-regarding type is decreasing in the variance of the monetary amounts received by all of the players in the group due to inequality aversion.[10] In the second stage of the game, the other-regarding individuals may give part of their earnings in order to reduce the disutility they suffer from the unequal monetary payoffs (similar to a voluntary income tax). This implies that, in the first stage of the game, whether or not the other-regarding individuals will exert more effort than the selfish individuals depends on two factors. First, other-regarding individuals will suffer a higher income loss from giving if they are ranked first since the amount they will transfer to reduce inequality will be higher. Second, they will expect a higher reduction in inequality (and hence a lower utility loss) if they are ranked first since they know with certainty that they will suggest positive transfers. Therefore, other-regarding individuals will have more incentive to rank first if the second factor dominates the first one.[11,12]

Given the two possible explanations for the behavior observed in Experiment 1, we conducted another experiment which by design allows us to eliminate the impact of other-regarding preferences on effort choices. Hence, if we still observe the same pattern

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government should take more responsibility. All else equal, one would expect self-regarding individuals to be against government intervention. Indeed, using an ordered probit, we find that those subjects who believe that individuals should take more responsibility for his/her life are more likely to be ranked first (p-value < 0.05).

[10] For example, suppose utility is given by $y_i - \frac{\beta}{n}\sum_{j=1}^{n}\left(y_j - \overline{y}\right)^2$, where y_i and y_j stand for post-transfer income levels, $\overline{y}$ stands for the average income level, $\beta \in [0, \infty)$ stands for the degree of inequality aversion, and n stands for the number of players. For the selfish individuals, $\beta = 0$. Alesina and Angeletos (2005) and Andreoni, Castillo and Petrie (2005) consider utility functions which are similar in spirit.

[11] Note that according to this explanation, one may expect the propensity to transfer to increase as earnings decrease. However, this may not be the case because those ranked third and fourth have fewer options in terms of whom they can give to. Moreover, in our experiment, income decreases by a higher percentage as rank goes down. This implies that the individual has to be even more other-regarding at lower ranks to make a transfer. We thank a referee for making this comment.

[12] Selection based on other-regarding preferences may still take place if individuals derive utility from the act of giving (Andreoni, 1990; David C. Ribar and Mark O. Wilhelm, 2002) and have heterogeneous expectations about the transfers they will receive from others. Evidence suggests that individuals often assign a higher probability on others being like them, a phenomenon known as the false consensus effect (see, e.g., Dirk Engelmann and Martin Strobel, 2000; Jeffrey Butler, Paola Giuliano and Luigi Guiso, 2009). In such cases, other-regarding individuals may work less than self-regarding individuals because, all else equal, they expect larger transfers in the states of the world where their earnings are low.

as in Experiment 1, we can conclude that the results in Experiment 1 are more likely to be driven by subjects' regard for relative status.

II. Experiment 2

A. Design

Experiment 2 consists of two treatments. Our goal in the first treatment is to see whether, in an environment where earnings are randomly determined, we can find a non-decreasing relationship between earnings and the likelihood of giving. Hence, in treatment L (L for Luck), participants' ranks and earnings are determined by luck only. Effort does not affect earnings. However, to ensure that behavior is comparable across treatments, each participant is asked to encrypt exactly 50 words in 20 minutes in order to participate in the second stage. The number of words was chosen based on subjects' performance in Experiment 1 to ensure that all participants could encrypt the required number of words in the given time. Keeping the duration of the first stage the same across the different treatments makes the second-stage decisions more comparable. The distribution of earnings is the same as in the first experiment (i.e., group members are randomly assigned $60, $45, $30 or $15). Due to the random nature of the earnings, neither the selection nor the relative status explanations given above can explain the behavior in this treatment.

The second treatment in Experiment 2, treatment NI (NI for No Information), aims to test selection based on other-regarding preferences as a possible explanation of the results from Experiment 1. The earnings in NI are determined in the same way as in treatment E in Experiment 1. However, subjects are not informed about the content of the second stage until the first stage is over.[13] Since earnings are determined in the same way as they are in treatment E, one would expect relative status to play a similar role in treatment NI as in treatment E. As a result, if behavior in Experiment 1 is primarily driven by selection based on other-regarding preferences, then in NI we should observe subjects opting to encrypt a larger number of words on average and those ranked first giving at least as frequently as those ranked second. If the pattern observed in treatments

[13] Subjects are informed about their ranking at the beginning of the second stage, after reading the instructions for the second stage. This ensures that the same amount of time passes between the moment subjects learn about their earnings and the moment they are faced with the option of giving money across the different treatments.

E and EL in Experiment 1 persists, this could be taken as evidence that subjects' concerns about their relative status were the main reason for our result in Experiment 1.

In total, 108 individuals participated in Experiment 2. Subjects were again Australian citizens and students at the University of Melbourne who had not participated in Experiment 1. The procedures followed in Experiment 2 were the same as in Experiment 1.

B. Results

Figure 3 shows that the percentage of first- and second-ranked subjects who transferred money to at least one of their group members is the same in treatment L (64%). This implies that either selection based on other-regarding preferences or relative status or both were responsible for the difference between the behaviors of the first- and second-ranked in Experiment 1.

In treatment NI, the second-ranked subjects are on average 8% more likely to give than the first-ranked subjects. While we find that the second-ranked subjects are still more likely to give than the first-ranked subjects, the difference is substantially less than that in treatment E in Experiment 1 (8% versus 28%). This result suggests that the differences observed in Experiment 1 between the first- and second-ranked are mainly driven by self-selection based on other-regarding preferences. In line with this explanation, the proportion of subjects in the first two ranks who chose to make a transfer is almost the same in treatments E and NI (43% in E as can be seen in Figure 1 and 42% in NI as can be seen in Figure 3), even though more first-ranked subjects made a transfer in NI relative to E.

While it is interesting that those ranked first are still not more likely to give than those ranked second in treatments L and NI, it should be noted that those ranked first tend to give higher amounts. Table 5 shows that, in accordance with the results of Eckel, Grossman and Milano (2007), there is a monotonic relation between the absolute amounts subjects give and their earnings. This was not the case in Experiment 1 (Table 2). Figure 4 shows that, as expected, individuals tend to give to those ranked third and fourth.

Table 6 reports the results of a hurdle model of transfers in treatments L and NI. The independent variables are the same as the ones we used for the analysis of behavior in Experiment 1 with the exception that '*Negative Word Difference*' and '*Positive Word Difference*' are excluded from the regression analysis of treatment L.

The estimates show that, in both treatments, subjects ranked first are as likely to give to other group members as subjects ranked second. This indicates that to the extent that we can control for the impact of relative status, the results in Experiment 1 appear to be primarily driven by selection based on other-regarding preferences. In line with this, it is worth highlighting that once we control for individual characteristics, second-ranked subjects in NI appear to be less likely to give than first-ranked subjects (even though this difference is insignificant). The dummy for treatment NI in Column 1 reveals that overall, subjects are more likely to give in treatment L than in treatment NI (see also Figure 3). This difference may be due to the greater role played by luck in treatment L. Table 6 also shows that once we control for individual characteristics, subjects do not give more in absolute terms as their earnings increase.

Before we conclude this section, we compare the number of words encrypted in treatments E, EL and NI. The average number of words encoded per minute is 4.68 in treatment E, 4.94 in treatment EL and 4.82 in treatment NI. Table 7 presents the results from an ordinary least squares regression analysis which compares the average number of words encrypted per minute in each treatment and allows us to control for individual characteristics, such as gender, which have been shown to be important (e.g., Muriel Niederle and Vesterlund, 2007). We find that subjects work significantly harder in treatment EL than in E. This may be because participants in EL work harder to protect themselves against the possibility of a negative income shock. This finding is consistent with individuals having von Neumann-Morgenstern utility functions with positive third derivatives (Hayne E. Leland, 1968; Miles S. Kimball, 1990). Subjects in treatment NI work harder than those in treatment E, which is consistent with our conjecture that the results in Experiment 1 are mainly driven by selection based on other-regarding preferences. The difference is marginally insignificant at the 10% level (p-value = 0.13).

III. Field studies on income and giving

A large number of studies have used field data to evaluate the relationship between income and giving to charities (Andreoni, 2006; Vesterlund, 2006). Most studies find that the income elasticity of giving is positive on average (Robert McClelland and Arthur C. Brooks, 2004). Given the non-monotonic relationship between earnings and the likelihood of giving in our experiment, it would be interesting to see whether, on average, earnings elasticity is positive. Table 8 shows that this is indeed the case.[14] On average, we find a positive relationship between earnings and the amount given in all treatments. The relationship is significant in treatments L and NI, but not in treatments E (*p*-value = 0.67) and EL (*p*-value = 0.14). Since it is difficult to know how income is determined outside the laboratory, perhaps the most appropriate comparison is with the estimate we obtain from pooling the data from all treatments. The estimated earnings elasticity implies that a 1% increase in earnings will increase the average amount given by 0.85%. This estimate is similar to those reported in most field studies, which are between 0.7 and 0.8 (Andreoni, 2006).

Another common finding in the literature is a U-shaped relationship between income and the average percentage of income given to charity. Amongst these studies, the most interesting one for our purposes is Auten, Clotfelter and Schmalbeck (2000). Using data from the Internal Revenue Service, they find a U-shaped relationship between income and the average percentage of income given to charity, but a negative relationship between income and the median percentage of income given to charity. This suggests that the majority of high earners in their sample either do not give to charity or give small amounts, while a small minority gives a substantial proportion of its income. This is a surprising finding given that tax incentives are such that the price of giving decreases with income.

One could think of different explanations for the behavior of the high-income earners in the sample of Auten, Clotfelter and Schmalbeck (2000). For example, high-income people may be giving sporadically to maximize the impact of their gifts and retain some control over charities (Paul G. Schervish and John J. Havens, 2003). Another explanation suggested by our experiment is that high earners may be more likely to be self-regarding. This explanation is also consistent with the finding in David Joulfaian (2001) that rich individuals hold a large fraction of their wealth in their estate until their death despite opposing tax incentives.

[14] Given that in the majority of cases in our sample individuals do not transfer money to others, we use a Tobit specification to estimate the impact of earnings on average giving. We then use the decomposition suggested by John F. McDonald and Robert A. Moffitt (1980) to estimate the earnings elasticity of giving. This decomposition takes into account the fact that an increase in earnings increases not only the amount given, but also the likelihood that an individual gives. Details about the calculation can be found in an online appendix at www.economics.unimelb.edu.au/nnikiforakis/research.htm.

IV. Concluding remarks

This paper presents results from two experiments investigating the relationship between relative earnings and giving. We find that if earnings are determined by participating in a real-effort tournament, those ranked first are significantly less likely to give than those ranked second. This difference disappears if individuals are not informed about the opportunity to give/receive money before exerting their effort or if earnings are randomly determined. This evidence suggests that the highest earners may be less likely to give because there is a higher proportion of selfish individuals amongst them. It also implies that the reduction in pro-social behavior observed in the previous studies where subjects had to earn their endowments (e.g., Hoffman et al., 1994) may be at least partly due to selection based on other-regarding preferences.

One always needs to be careful when generalizing from the results of a particular study. Giving in a laboratory environment differs in a number of ways from giving in the field. For example, in the field, individuals seldom have information about the determinants of others' incomes when they are making their donation decisions. In the laboratory, students may not be a representative sample of those who give to charities. Nevertheless, one would expect other-regarding preferences to be a significant determinant of giving both in the laboratory and the field. For this reason, we believe that our results have a number of implications for studying other-regarding behavior both in the field and the laboratory, as well as for understanding the impact of tournaments.[15]

First, our findings imply that in empirical studies investigating the relationship between income and charitable giving, it may be important to consider not just income, but also its sources. When individual effort plays less of a role in determining promotions or salary rises (e.g., due to nepotism), giving behavior might be different from when individual effort is a major determinant of income.

Second, our results may help us understand the adverse effects of competitive incentive schemes used within organizations. For example, if promotions in organizations are based on a tournament-type evaluation scheme, selection effects might lead to more self-regarding individuals being promoted. In turn, those promoted to senior roles might

[15] This is supported by the similarities between our results and those of the field studies. Future work can consider whether similar results hold in other environments, such as those where earnings are determined using a piece-rate scheme and where subjects give to an actual charity instead of each other. See Steven D. Levitt and John A. List (2008) for a discussion of the complementary aspects of laboratory and field experiments.

be less willing to sacrifice some of their time to assist their junior colleagues (for example, in their roles as mentors) or take actions that advance the interests of the firm.[16]

Third, our findings can also help understand the differences in redistributive policies that exist across countries.[17] This topic has been the subject of extensive research in recent years and several explanations have been offered for the observed differences (see, e.g., Alesina and Angeletos, 2005; Roland Benabou and Efe A. Ok, 2001; Alesina, Edward Glaeser and Bruce Sacerdote, 2001; Thomas Piketty, 1995). Our results suggest that rich people (especially in countries with social and economic environments which allow for upward mobility) may be more self-regarding. If this is the case, then one would expect to observe greater opposition to redistributive policies in countries where the rich are overrepresented in the political and legal system (see, e.g., Alesina, Glaeser and Sacerdote, 2001).

Finally, one important methodological implication of our results is that in experiments where subjects earn their money, the real-effort task may introduce unintentional distortions in the outcomes. That is, those with the highest earnings may have different preferences due to selection. This may lead to a misinterpretation of the results. For the correct interpretation of the results in such cases, it is important to understand the exact forces determining behavior. Our study takes an important step in this direction.

[16] For formal models showing the adverse effects of competition on cooperation, see Bengt Holmstrom and Paul Milgrom (1991), Edward P. Lazear (1991), Canice Prendergast (1999), and Rafael Rob and Peter Zemsky (2002). In these models, providing private incentives to employees transforms situations requiring team effort to social dilemmas. Carpenter and Erika Seki (2006) and Robert Drago and Gerald T. Garvey (1998) show that on-the-job competition reduces cooperative behavior significantly.

[17] We thank a referee for making this point.

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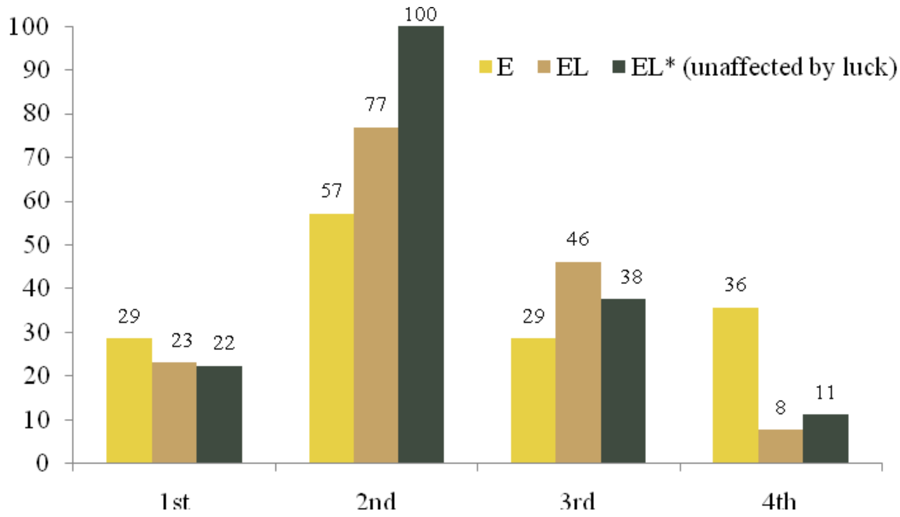
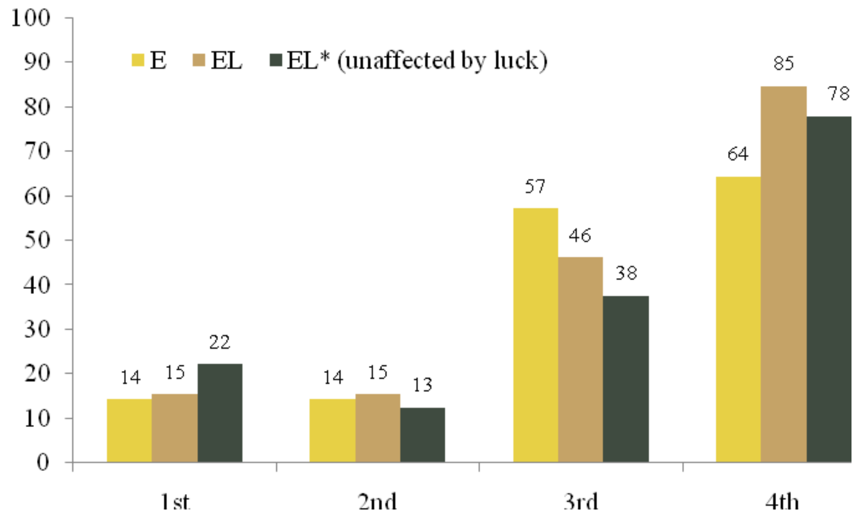
Figure 1 – Percentage of individuals making transfers by rank in Experiment 1



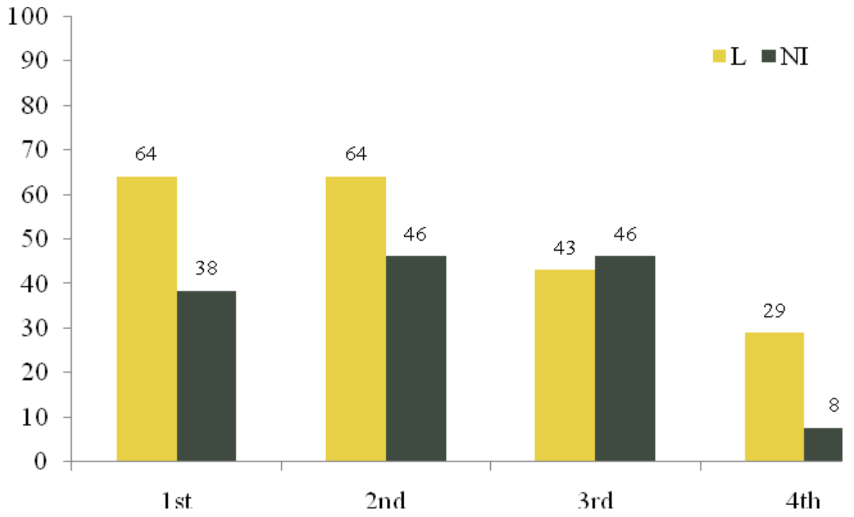
Note: The figure shows the percentage of individuals who suggested at least one positive transfer. EL* represents observations from individuals unaffected by luck. Of the 13 individuals in each rank in EL, 9 of the ones ranked 1st and 4th, and 8 of the ones ranked 2nd and 3rd were unaffected by luck.

Figure 2 – Percentage of individuals receiving transfers by rank in Experiment 1



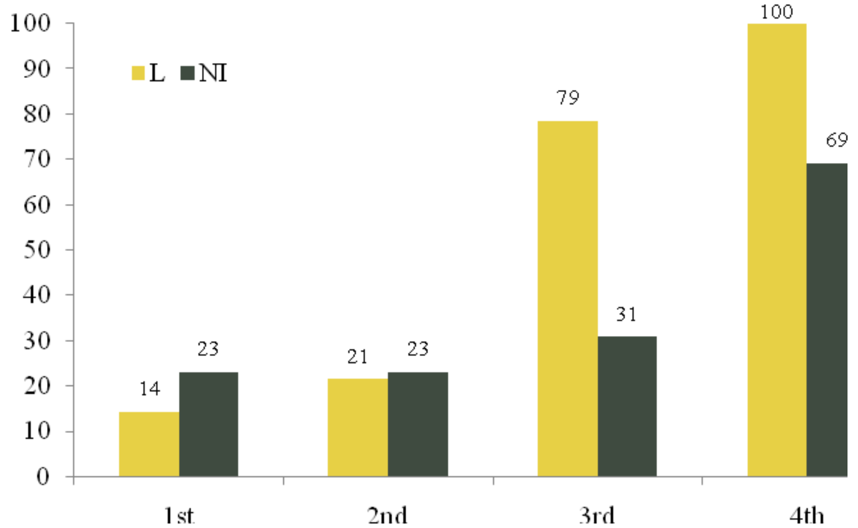
Note: The calculations are based on suggested transfers. EL* represents observations from individuals unaffected by luck. Of the 13 individuals in each rank in EL, 9 of the ones ranked 1st and 4th, and 8 of the ones ranked 2nd and 3rd were unaffected by luck.

Figure 3 – Percentage of individuals making transfers by rank in Experiment 2



Note: The figure shows the percentage of individuals who suggested at least one positive transfer.

Figure 4 – Percentage of individuals receiving transfers by rank in Experiment 2



Note: The calculations are based on suggested transfers.

Table 1 – Experimental design

	Experiment 1		**Experiment 2**	
	Treatment E	**Treatment EL**	**Treatment L**	**Treatment NI**
Do subjects exert effort?	Yes	Yes	Yes	Yes
Does relative effort affect ranking/earnings?	Yes	Yes	No	Yes
Does luck affect ranking/earnings?	No	Yes	Yes	No
Do subjects know the content of the 2nd stage?	Yes	Yes	Yes	No
Number of participants	56	52	56	52

Table 2 – Average positive transfer amount in Experiment 1

	1st	2nd	3rd	4th
E	4.60	3.18	4.00	3.78
	(5)	(11)	(4)	(9)
	[0.89]	[2.64]	[2.00]	[1.64]
EL	3.60	2.94	4.38	5.00
	(5)	(17)	(8)	(1)
	[1.34]	[1.52]	[1.69]	[.]

Numbers in parentheses denote observations of positive suggested transfers. Numbers in squared brackets denote standard deviation. The highest transfer was $10, made by a second-ranked subject in treatment E. In calculating the average for each rank, all observations with positive suggested transfers were given the same weight.

Table 3 – Hurdle model of transfers in Experiment 1

	Treatments E & EL		Treatment E		Treatment EL		Treatment EL	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probability	Amount	Probability	Amount	Probability	Amount	Probability	Amount
Sender's Rank: 2nd	0.19**	0.10	0.14*	-0.56	0.25**	1.61	0.28**	1.57
	(0.09)	(0.76)	(0.10)	(1.28)	(0.16)	(1.15)	(0.16)	(1.19)
Sender's Rank: 3rd	0.08	0.78	0.03	-0.02	0.11	1.30	0.16	1.30
	(0.11)	(0.63)	(0.08)	(1.61)	(0.18)	(1.36)	(0.20)	(1.55)
Sender's Rank: 4th	0.13	0.88	0.22*	0.26	-0.10	3.28**	-0.04	4.37**
	(0.12)	(0.84)	(0.16)	(1.97)	(0.09)	(1.42)	(0.12)	(1.86)
Receiver's Rank: 2nd	0.15**	2.32	0.24*	-1.51	0.15*	0.80	0.12	0.20
	(0.07)	(1.52)	(0.20)	(10.48)	(0.10)	(1.16)	(0.09)	(1.08)
Receiver's Rank: 3rd	0.45***	2.71*	0.81***	-4.35	0.36**	1.64	0.30**	0.35
	(0.10)	(1.53)	(0.19)	(15.16)	(0.15)	(1.16)	(0.17)	(1.38)
Receiver's Rank: 4th	0.74***	4.29***	0.98***	-3.36	0.61***	2.56**	0.56***	1.07
	(0.09)	(1.57)	(0.04)	(14.85)	(0.12)	(0.89)	(0.16)	(0.89)
Positive Word Difference	0.01	0.14	0.01	-0.16	0.00	0.07	0.00	0.02
	(0.00)	(0.10)	(0.01)	(0.69)	(0.00)	(0.10)	(0.00)	(0.09)
Negative Word Difference	-0.01**	-0.05	-0.01**	0.12	-0.00	-0.12*	-0.00	-0.08
	(0.00)	(0.06)	(0.00)	(0.11)	(0.01)	(0.06)	(0.01)	(0.07)
Treatment EL	-0.01	-0.30						
	(0.05)	(0.54)						
Sender had Good Luck							0.12	-0.06
							(0.18)	(0.80)
Receiver had Bad Luck							0.06	1.28**
							(0.11)	(0.56)
Constant		-7.70		-0.72		1.17		7.02
		(6.02)		(16.73)		(18.60)		(18.38)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	291	58	156	29	135	29	135	29
R-squared	0.25	0.49	0.34	0.65	0.33	0.81	0.34	0.84

‘Probability’ reports the marginal effects from a probit regression calculated at the mean; ‘Amount’ is a truncated-linear regression; standard errors are in parentheses and are clustered at the individual level; each suggested transfer constitutes an observation; individual characteristics include gender, field of study, year of study, age, and number of years lived in Australia; ‘Positive Word Difference’ measures how many words more than the group average an individual encrypted; ‘Negative Word Difference’ measures how many words less than the group average an individual encrypted; *** 1% level, ** 5% level, *10% level.

Table 4 – Most popular reasons for giving and not giving in Experiment 1

	1st	2nd	3rd	4th
I gave because I felt sorry for the others	19%	56%	22%	4%
I did not give because I wanted to maximize my earnings	45%	13%	23%	19%

Entries indicate the percentages of respondents across different ranks who gave one of the two responses for giving or not giving. The most popular reason for giving (not giving) was given by 27 (31) individuals. The second most popular reason for giving (not giving) was "I gave because I felt sorry for the unlucky" ("I did not give because I had no incentive to do so"), and it was given by 5 (13) respondents.

Table 5 – Average positive transfer amount in Experiment 2

	1st	2nd	3rd	4th
L	6.47	4.00	3.63	3.00
	(17)	(15)	(8)	(5)
	[5.98]	[2.10]	[1.92]	[1.87]
NI	4.14	3.67	2.9	2
	(7)	(9)	(10)	(1)
	[3.19]	[1.32]	[2.33]	[.]

Numbers in parentheses denote observations of positive suggested transfers. Numbers in squared brackets denote standard deviation. The highest transfer was $22, made by a first-ranked subject in treatment L. In calculating the average for each rank, all observations with positive suggested transfers were given the same weight.

Table 6 – Hurdle model of transfers in Experiment 2

	Treatments L & NI		Treatment L		Treatment NI	
	(1) Probability	(2) Amount	(3) Probability	(4) Amount	(5) Probability	(6) Amount
Sender's Rank: 2nd	-0.01	-0.18	0.04	-1.70	-0.07	1.91
	(0.07)	(1.25)	(0.05)	(1.79)	(0.06)	(2.52)
Sender's Rank: 3rd	0.01	-1.11	-0.01	-2.26	0.07	0.64
	(0.08)	(1.37)	(0.03)	(2.47)	(0.10)	(3.12)
Sender's Rank: 4th	-0.11*	-0.00	-0.01	-1.27	-0.16**	4.07
	(0.06)	(1.55)	(0.03)	(1.98)	(0.05)	(7.03)
Receiver's Rank: 2nd	0.05	-0.18	0.02	-0.96	0.04	0.31
	(0.07)	(0.96)	(0.04)	(1.84)	(0.14)	(1.21)
Receiver's Rank: 3rd	0.29***	-1.09	0.18***	-2.14	0.18	2.01
	(0.08)	(1.36)	(0.08)	(1.62)	(0.20)	(2.33)
Receiver's Rank: 4th	0.47***	1.64*	0.34***	1.03	0.46**	3.82
	(0.08)	(0.94)	(0.12)	(1.00)	(0.26)	(2.48)
Treatment NI	-0.11*	-0.84				
	(0.06)	(1.09)				
Positive Word Difference					0.00	0.00
					(0.01)	(0.02)
Negative Word Difference					-0.00	-0.05
					(0.00)	(0.08)
Constant		-17.45		-10.70		-20.16
		(13.84)		(20.11)		(32.52)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	324	72	168	45	147	27
R-squared	0.23	0.43	0.36	0.50	0.26	0.46

‘Probability’ reports the marginal effects from a probit regression calculated at the mean; ‘Amount’ is a truncated-linear regression; standard errors are in parentheses and are clustered at the individual level; each suggested transfer constitutes an observation; individual characteristics include gender, field of study, year of study, age, and number of years lived in Australia. *** 1% level, ** 5% level, *10% level.

Table 7 – Words Encrypted Per Minute

Dependent Variable: Number of words encrypted per minute	
Treatment EL	0.26*
	(0.14)
Treatment L	-2.06***
	(0.14)
Treatment NI	0.21
	(0.14)
Constant	5.22***
	(0.95)
Individual Characteristics	Yes
Observations	215
R-squared	0.66

Individual characteristics include gender, field of study, year of study, age, and number of years lived in Australia; *** 1% level, ** 5% level, *10% level.

Table 8 – Earnings Elasticity of Giving

	All treatments	Treatment E	Treatment EL	Treatment L	Treatment NI
Earnings	0.08***	0.02	0.09	0.14***	0.10*
	(0.03)	(0.05)	(0.06)	(0.01)	(0.06)
Constant	-18.68***	-25.90***	19.85	-43.78***	15.50
	(6.92)	(9.13)	(21.54)	(0.57)	(24.25)
Income Elasticity	0.85	0.26	1.11	1.20	1.12
Treatment Dummies	Yes	No	No	No	No
Individual Characteristics	Yes	Yes	Yes	Yes	Yes
Observations	645	168	153	168	156
Uncensored Observations	130	29	29	45	27
(Pseudo) R-squared	0.03	0.06	0.06	0.07	.05

Tobit estimates; standard errors are in parentheses and are clustered at the individual level; individual characteristics include gender, field of study, year of study, age, and number of years lived in Australia; earnings elasticity is calculated at the mean following McDonald and Moffitt (1980); *** 1% level, ** 5% level, *10% level.

Instructions[18]

Thank you for agreeing to take part in this study which is funded by the University of Melbourne. Please read the following instructions carefully. A clear understanding of the instructions will help you make better decisions and increase your earnings.

The experiment consists of two stages which are explained in detail below. You will participate in each stage only once.

In the beginning of the experiment the computer will randomly match you with three other people in the room. That is, you will be part of a group of four people.

Stage 1

In Stage 1, all group members will be given a task which will determine their earnings at the end of the stage. The task is the same for all group members. You will be presented with a number of words and your task will be to encode these words by substituting the letters of the alphabet with numbers using Table 2 on p. 4.

Example 1: You are given the word FLAT. The letters in Table 2 show that F=6, L=3, A=8, and T=19.

Once you encode a word correctly, the computer will prompt you with another word which you will be asked to encode. Once you encode that word, you will be given another word and so on. **This process will continue for 20 minutes** (1200 seconds).

All group members will be given the same words to encode in the same sequence. **For each word a participant encodes, s/he will receive 1 point**.

Earnings at the end of stage 1

Your earnings at the end of Stage 1 are determined as follows. At the end of Stage 1 the computer will flip a 'virtual' coin **separately for each individual**. If the outcome is Heads, then the number of points the individual accumulated in Stage 1 will remain unaffected. If the outcome is Tails, the points will be reduced by 30%. In other words, the number of points accumulated in Stage 1 will be multiplied by 0.7.

Your earnings at the end of Stage 1 will depend on the number of points you have after the coin flip and the points your group members have. The person with the highest number of points will receive $60. The players ranked second, third, and fourth will receive $45, $30, and $15, respectively. If two or more individuals have the same number of points, the computer will determine randomly the ranking of the tied players. Each player will have the same probability of being ranked above the other group members with the same number of points.

[18] These are the instructions for treatment EL.

Example 2: *(Note that the numbers are unrealistic on purpose.)* Assume that Players 1 and 2 have 5000 points each while Player 3 has 3000 points and Player 4 has 1000 points. The computer will randomly decide whether Player 1 or Player 2 will be ranked first. Either Player 1 or Player 2 will be ranked first with a 50% probability. Player 3 will be ranked third and Player 4 will be ranked fourth.

Example 3: In the previous example, assume that Player 3 also has 5000 points. The computer will randomly decide the ranking of Players 1, 2, and 3. Each player has a 33.3% chance of being ranked first, 33.3% chance of being ranked second, and 33.3% chance of being ranked third. Player 4 will be ranked fourth.

Stage 2

In the beginning of Stage 2, you will be informed of the number of words each group member encoded, whether the coin landed on Heads or Tails for each group member, the number of points each group member has, and the ranking of each group member. Before actual payments for the performances in Stage 1 are made, players will be given the option to transfer part of their earnings to their group members. You can transfer any amount from $0 to the total amount of your earnings from Stage 1. In particular, you will be prompted with a screen where you can enter the amount you wish to transfer to each participant. If you do not wish to make a transfer to a particular player, you have to enter '0' in the respective field.

Note that while each group member will have to decide how much to transfer to the other individuals in the group, not all transfers will be implemented. **For every player, the computer will randomly choose only one of the suggested transfers**. This process is explained in Example 4.

Table 1

			Recipient			
		Earnings	Player 1	Player 2	Player 3	Player 4
Sender	Player 1	$60	--	$0	$2	$10
	Player 2	$45	$0	--	$5	$0
	Player 3	$30	$0	$10	--	$0
	Player 4	$15	$0	$5	$5	--

Example 4: In Table 1 above, Players 1, 2, 3, and 4 are ranked 1^{st}, 2^{nd}, 3^{d}, and 4^{th}, respectively. Player 1, therefore, has $60, Player 2 has $45, Player 3 has $30, and Player 4 has $15. Suppose that Player 1 wants to send $2 to Player 3, $10 to Player 4 and nothing to any of the other players. Player 2 wishes to make a transfer of $5 to Player 3. Player 3 wants to send $10 to Player 2 and nothing to any of the other players. Finally, Player 4 wants to send $5 to Player 2, $5 to Player 3, and nothing to any of the other players.

Consider for example the case of Player 2. Note that Player 2 will *not* receive $15 in total. The computer will randomly choose among Players 1, 3, and 4, and implement that player’s suggested transfer. Each of the three players has an equal probability of being chosen.

Hence, if Player 1 is chosen, Player 2 will receive \$0. If, however, Player 3 or 4 is chosen, Player 2 will receive \$10 or \$5, respectively. Note that if Player 3 is chosen Player 4 will not have to pay her suggested transfer. Player 3, on the other hand, will have to pay \$10 and, therefore, his income will be \$30 - \$10 = \$20.

At the end of stage 2 you will be notified of whether your suggested transfer(s) were implemented, the amount that was transferred to you (but not who transferred it), and what your final payoff is. You will then be paid your earnings from the experiment.

Note that all decisions will remain anonymous.

If you have any questions, please raise your hand. Otherwise, please proceed to answer the questions on the next page. The purpose of the questions is to make sure that you understand the different elements of the experiment. Any unclear points will be explained by the experimenter. Once you have answered all the questions, please raise your hand and one of the experimenters will come and check your answers.

Table 2

Letters	Numbers
A	8
B	12
C	14
D	10
E	9
F	6
G	24
H	22
I	7
J	5
K	11
L	3
M	18
N	1
O	21
P	16
Q	23
R	2
S	13
T	19
U	25
V	4
W	26
X	17
Y	20
Z	15

Questions

(Note that the numbers in the following questions are unrealistic on purpose. The questions aim to help you understand the experiment in a better way and should not be used as a guide for decision-making in the experiment.)

1. Assume that Player 1 encodes 5000 words, Player 2 encodes 3000 words, Player 3 encodes 11000 words, and Player 4 encodes 20000. What will be the earnings of each individual at the end of Stage 1 if the coin lands on Heads for all of them?

 a. Player 1: $...................
 b. Player 2: $...................
 c. Player 3: $...................
 d. Player 4: $...................

2. Suppose that the players encode the number of words stated in the previous question. However, now assume that the coin lands on Heads for Players 2, 3, and 4, and on Tails for Player 1. Will the ranking change? ....

If yes, what is the new ranking? ..…………………………………………….....................

3. Would your answer to question 2 change if Player 1 had encoded 3500 words instead of 5000 words? ……..

If yes, what is the ranking? …………………………………………….....................

4. Would your answer to question 3 be different if the coin landed on Tails for both Player 1 and Player 2? ....

If yes, what is the ranking? ..…………………………………………….....................

5. Consider Table 1 on page 2.

a. What is the probability that Player 1 will receive a positive transfer from his group members? ....%

b. What is the probability that Player 2 will receive a positive transfer from her group members? ....%

c. What is the probability that Player 3 will receive a positive transfer from her group members? ....%

d. What is the probability that Player 4 will receive a positive transfer from his group members? ....%

6. In Table 1, suppose that for each of the players, the computer implements the suggested transfers of Player 2. (Note that this event has a low probability of happening in the experiment.) What will be the final earnings of each player?

 a. Player 1: $...................
 b. Player 2: $...................
 c. Player 3: $...................
 d. Player 4: $...................

7. If all individuals encode the same number of words, what is Player 1’s chance of being ranked first at the end of the first stage? ....%