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Relative Earnings and Giving in a Real-Effort Experiment[1]

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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 they wish to transfer part of their earnings 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 individual earnings are randomly determined or if individuals learn about the second (transfer) stage after they earn their income.

Keywords: Earned income; Other-regarding Preferences; Real effort; Self-selection; Luck
JEL Classification: C91; D3; D64; I3

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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 (James Andreoni, 2006; Colin F. Camerer, 2003). 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. This is in accordance with recent theories of other-regarding preferences.[1] However, both field and laboratory studies raise questions about whether this is the case in practice. Some studies find a positive relationship between income and giving (Catherine Eckel, Philip Grossman and Angela Milano, 2007), some a U-shaped relationship (Gerald E. Auten, Charles T. Clotfelter and Richard L. Schmalbeck, 2000), and others find no relationship between the two (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

[1] Theories of other-regarding preferences, which have emerged to explain, amongst other things, why people help others at a personal cost, assume that individual utility is affected by a variety of factors, such as relative earnings (Gary Bolton, 1991), unequal payoffs (Ernst Fehr and Klaus Schmidt, 1999; Bolton and Axel Ockenfels, 2000), and the joy of giving (Andreoni, 1990). See Fehr and Schmidt (2006) for a survey. While other-regarding preferences can explain phenomena such as peer punishment, we use the term in this paper to refer to individuals' willingness to help others.

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 results is that self-regarding subjects select themselves to the first rank by working harder than other-regarding subjects. 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, subjects' ranking is based on their relative effort as in Experiment 1. However, they 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 the first-ranked are as likely to give as the second-ranked. These results suggest 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.

The paper proceeds in the following way. In Sections I and II, we discuss the experimental design, procedures, and results of Experiments 1 and 2, respectively. In Section III, we review the previous studies which analyze the relationship between income and giving using laboratory and field data, and compare our results to the findings in these studies. We conclude in Section IV by discussing the implications of our results for understanding other-regarding behavior in the laboratory and in the field.

I. Experiment 1

A. Design

Experiment 1 consists of two treatments and utilizes 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 determines individual earnings. We chose to employ a tournament for this purpose due to three reasons. First, tournaments 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).[2] 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 the procedure used to rank the subjects. 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.[3] 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.

In treatment EL (EL for Effort and Luck), the number of points (and hence earnings and ranks) depends not only on effort, but also on a random shock. A virtual coin is tossed separately for each group member. If the outcome is tails, the points obtained in the encryption task are reduced by 30 percent. Otherwise the number of points remains unaffected and equals the number of words encrypted.[4]

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

[2] Tournaments are also commonly used in the experimental literature. See, for example, Elizabeth Hoffman and Matthew L. Spitzer (1985) and Hoffman et al., (1994).

[3] At the time of the experiment, the minimum hourly wage in Australia was \$13.60 and the exchange rate was approximately 1 Australian Dollar = 0.85 U.S. Dollars. As the experimental sessions lasted one hour on average, the earnings of those ranked first were almost four and a half times the minimum wage.

[4] A tails outcome will sometimes lead to a change in the rankings, but not always. We chose to have the coin toss affect the number of words encrypted rather than earnings to control for income effects across the different treatments.

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).

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 (Harold M. Hochman and James D. Rodgers, 1969). 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 AUD$4 to AUD$62, with median earnings being AUD$38.5.

All 108 participants were Australian citizens and University of Melbourne students with different academic backgrounds including economics. None of the subjects had previously participated in a similar experiment. Restricting our sample to

Australian citizens was desirable for two reasons.[5] 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.[6] 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. Once seated, participants were randomly divided into groups of four. Individuals knew that they were matched with three others, but not the identity of their group members. Participants were then asked to read the instructions and to answer a series of questions that tested their understanding of the experiment. The experimenter checked in private the answers of each participant to ensure that all participants fully understood the instructions. After all answers were checked, the experimenter read out loud a one-page summary to ensure that 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.[7] An open-ended question in the survey also asked them to explain their transfer decisions.

C. Results

We start our discussion of the results by presenting some descriptive statistics before turning to a formal statistical 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.

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[5] Subjects were not informed that only Australian citizens would be asked to participate in the experiment. Moreover, from economics, only first-year students were used to ensure that they did not have a background in game theory or experimental economics.

[6] The University of Melbourne has one of the highest entry scores in Australia (and the highest in the State of Victoria). Students are known for their strong academic background.

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

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*).

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.[8]

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 amount 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, consistent with the evidence in previous experiments (Andreoni and Vesterlund, 2001; Buckley and Croson, 2006).

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. We next explore this issue and, more generally, the relationship between relative earnings and giving using multivariate regression analysis.

Since Figure 1 and Table 2 suggest that relative earnings impact the likelihood of giving and the amount given differently, 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

[8] 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.

processes. The hurdle is crossed if an individual decides to give.[9] 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 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.[10]

The regression results are reported in Table 3. The regressions reported in the first two columns pool the data from both treatments while the rest of the columns present results from the two treatments separately. In the last two columns, we include the variables relating to luck.

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, 14% more likely in E, and 25% to 28% more likely in EL. Moreover, the amounts given seem to decrease

[9] 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).

[10] 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 above.

with earnings.[11] 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.

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 interpret the results of the second part of the hurdle carefully. Finally, Table 3 also reveals that there is a gender effect. While men appear to be significantly less likely to give in treatment E, they give significantly higher amounts in treatment EL.

D. Discussion

The results from the first experiment show that there is a non-monotonic relation between earnings and the likelihood of giving. Given the relative homogeneity of the subject pool and the pronounced differences in earnings, this result seems 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?

To help us answer this question, 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 in their own words why they decided to transfer or not to transfer money. 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 most popular explanation for making a transfer, given by 27 subjects out of 39 (69%), was that subjects felt sorry for the low earners. Table 4 presents the

[11] 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. This can be seen in Table 2.

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 subjects out of 67 (46%), was that subjects wanted to maximize their earnings from the experiment.[12] 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%).[13]

Based on the subjects' responses, we conjecture that the non-monotonic relation observed between the likelihood of giving and earnings may be due to one of three reasons: (i) self-selection based on other-regarding preferences, (ii) self-selection based on competitiveness, and (iii) status effect.

To understand how self-selection based on other-regarding preferences may be driving the results, consider a framework with two types of individuals, selfish and other-regarding. The utility of both types is increasing in own material payoff. In addition, 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.[14] In the second stage of the game, one would expect the other-regarding individuals to give part of their earnings in order to reduce the disutility they suffer from the unequal monetary payoffs. 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

[12] 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." Another first-ranked subject wrote: "I did not decide to transfer any money because I am rather selfish and in need of money for myself. In addition, I do not know any of these people and I do not see any reason to give money to strangers." 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 …." Similarly, another second-ranked subject in EL wrote: "I chose to transfer $5 to the team member who only received $15. I did this because I felt sorry for them ..."

[13] 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 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).

[14] 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.

factors. First, other-regarding individuals will transfer a higher amount if they are ranked first than if they are ranked, for example, second. Second, they will expect a higher reduction in inequality if they are the one ranked first since they know with certainty that they will suggest positive transfers. Therefore, both factors increase with earnings and other-regarding individuals will have less incentive to rank first in the first stage of the game, if the expected reduction in inequality is smaller than the increase in income loss due to giving.[15]

If individuals dislike unequal outcomes, giving is a public good because each individual would prefer others to give to reduce inequality. However, many individuals derive utility from the act of giving (Andreoni, 1990; David C. Ribar and Mark O. Wilhelm, 2002). Giving in this case, at least partly, is a private good, which implies that the marginal utility of effort for an other-regarding individual does not necessarily have to be lower than the marginal utility of effort for a selfish individual. However, selection of the kind we observe may still take place if subjects have heterogeneous expectations about the transfers they expect to receive from others. Evidence suggests that it is not uncommon for individuals to form expectations about others' behavior based on their own preferences. That is, they assign a higher probability on others being like them.[16] In such cases, other-regarding individuals may work less because, all else equal, they expect larger transfers in the states of the world where their earnings are low. Since self-regarding individuals expect smaller transfers (if any), they face steeper incentives to work.

As mentioned above, the second possible explanation of the results from Experiment 1 is self-selection based on competitiveness. That is, those people who derive utility from winning may also be more self-regarding. All else equal, this would

[15] We thank a referee for pointing out this interpretation of our results. Note that according to this explanation of the results, one may expect the propensity to transfer to increase as earnings decrease. However, this may not be the case because the 3rd and 4th ranked have less 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.

[16] This phenomenon is known as the false consensus effect. The false consensus effect has been defined as "an egocentric bias that occurs when people estimate consensus for their own behaviors. Specifically, the false consensus hypothesis holds that people who engage in a given behavior will estimate that behavior to be more common than it is estimated to be by people who engage in alternative behaviors" (Brian Mullen et al., 1985). See Dirk Engelmann and Martin Strobel (2000) and Jeffrey Butler, Paola Giuliano and Luigi Guiso (2009) for evidence on the false consensus effect.

imply that individuals who are more likely to win are also those who are less likely to give to others.

The third possible explanation for our results is status. That is, those ranked first may feel like they worked hard for their position and deserve the money they earned. Hence, they may not want to share it with others (James C. Cox, Daniel Friedman and Steven Gjerstad, 2007). Though plausible, this explanation receives less support from the responses to the open-ended question. Only 5 subjects who were ranked first stated this to be their reason for not giving, whereas 14 of the first ranked subjects said that they did not give due to a desire to maximize earnings.

II. Experiment 2

A. Design

The main result observed in Experiment 1, that the second-ranked subjects are significantly more likely to give than the first-ranked, may be driven by any subset of the reasons given above. To gain more insight into this result, we conducted a second experiment consisting 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.[17] The distribution of earnings is the same as in the first experiment (i.e., the group members are randomly assigned \$60, \$45, \$30 or \$15). Due to the random nature of the earnings, neither the self-selection nor the status explanations given above can explain behaviour in this treatment.

The second treatment in Experiment 2, treatment NI (NI for No Information), aims to test self-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. However, subjects are not informed about the content of

[17] The number of words was chosen based on subjects' performance in Experiment 1 to ensure that all participants could encrypt the required amount of words in the given time. Apart from controlling for the opportunity cost of subjects across treatments, making subjects exert effort for 20 minutes also has the benefit of controlling for 'ego depletion.' The idea behind ego depletion is that cognition is a limited resource. Hence, one act of cognition can have a detrimental impact on subsequent choices (e.g., Roy F. Baumeister, et al., 1998). Keeping the duration of the first stage the same across the different treatments makes the second-stage decisions more comparable.

the second stage until the first stage is over.[18] Since earnings are determined in the same way as they are in treatment E, treatment NI allows us to control for the impact of self-selection based on competitiveness and status. One would expect the competitive types to behave as they do in treatment E and status to play a similar role as in treatment E.[19] As a result, if the main result in Experiment 1 is primarily driven by self-selection based on other-regarding preferences, then in NI we should observe subjects opting to encrypt a larger number of words and those ranked first giving at least as frequently as those ranked second. If the pattern observed in treatments E and EL in Experiment 1 persists, this could be taken as evidence for either self-selection based on competitiveness or the status effect.

In total, 108 individuals participated in Experiment 2. Subjects were again Australian citizens and students at the University of Melbourne. The procedure followed in Experiment 2 was 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 self-selection or status or both were behind the difference we observed between the behaviors of the first- and second-ranked in Experiment 1. In treatment NI, the percentage of second-ranked subjects making a transfer is similar to the percentage of first-ranked subjects. This result suggests that the differences observed in Experiment 1 between the first- and second-ranked are driven by self-selection based on other-regarding preferences. In line with this explanation, the average 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 the distribution of these subjects across the two ranks is quite different in the two treatments. Specifically,

[18] Subjects are informed about their ranking at the beginning of the second stage, that is, 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.

[19] It may be the case that the differences in the game in treatment E and the game in treatment NI affect the role played by the competitive types and the role played by status. Hence, these two factors, if they are present, may manifest themselves differently in the two treatments. Although we do not think this is likely, we cannot rule out this possibility.

more first-ranked subjects made a transfer in NI relative to E (38% vs. 29%) and less second-ranked subjects made a transfer in NI relative to E (46% vs. 57%).

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 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. The only exception is that since all subjects were asked to encrypt the same number of words in treatment L, '*Negative Word Difference'* and *'Positive Word Difference'* are excluded from the regression analysis of the data from this treatment.

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 impacts of the competitive types and status, the results in Experiment 1 may be primarily driven by self-selection by other-regarding types. The dummy for treatment NI in the first regression presented in Table 6 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. Moreover, giving behavior of men and women is the same in both treatments.

Before we conclude this section, we compare the number of words encrypted in treatments E, EL (Experiment 1) and NI (Experiment 2). The average number of words encoded per minute is 4.68 in treatment E (93.6 in total).[20] The presence of luck in treatment EL makes subjects work harder on average (4.94 words per minute and 98.8 words in total). This suggests that participants work harder in EL to protect themselves

[20] In a couple of sessions, we encountered delays at the beginning of the experiment due to a slow network. While all subjects were given the same amount of time to encrypt words, the first stage lasted approximately 19 (instead of the intended 20) minutes. For this reason, we present the number of words encrypted per minute.

against the possibility of a negative income shock. Subjects also appear to work harder in NI than they do in E (4.82 words per minute and 96.4 words in total). 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 in NI work harder than those in E. Although this is consistent with our conjecture that self-selection based on other-regarding preferences is driving our results in Experiment 1, the difference is marginally insignificant at the 10% level (p-value = 0.13).

III. Previous Studies

As mentioned in the introduction, field and laboratory evidence have raised questions about the existence of a positive relationship between income and giving. In this section, we briefly review the relevant studies and compare our results with those in these studies.

A. Laboratory studies

Three studies have previously investigated the relationship between earnings and other-regarding behavior using laboratory experiments. Andreoni and Vesterlund (2001) present the results from a modified Dictator Game. Subjects are given a fixed number of tokens which they must allocate between themselves and an anonymous person. Subjects face eight different allocation problems. The allocation problems differ in terms of the number of tokens to be divided and the number of points a token is worth to each subject. The authors find that while the price of giving has an impact on giving, the subjects' endowments in terms of tokens have no effect on giving.

Eckel, Grossman and Milano (2007) conduct classroom experiments to investigate (amongst other things) how giving behavior is affected by different endowments in a modified Dictator Game. Recipients in the experiment are charities. The authors find that as the endowment increases from $10 to $20 and $50, giving increases in absolute terms, but decreases as a percentage of one's endowment.

Buckley and Croson (2006) study how contributions to a public good change with the level of the endowment in a finitely-repeated voluntary contribution mechanism. In their experiment, individuals are randomly allocated a high or a low endowment, and are asked to contribute an amount to a public account that yields the

same return to all subjects. They find that subjects with low endowments contribute the same absolute amounts as the 'wealthier' subjects.

There are two important differences between these three studies and ours that can explain the differences in the results. First, in our experiment, subjects have to earn their income by competing in groups and, therefore, can select themselves to positions with higher earnings.[21] As our two experiments show, this has a significant impact on behavior. Given the fact that in everyday life most people earn their income, we believe that it is important to understand how giving behavior is affected by earned income. Second, the differences in earnings across ranks are considerably larger in our framework and that of Eckel, Grossman and Milano (2007) than they are in Andreoni and Vesterlund (2001) and Buckley and Croson (2006).

B. Field studies

A large number of studies have used field data to evaluate the relationship between income and giving to charities. There are numerous differences across these studies such as the source of the data used (survey responses versus Internal Revenue Service data), the time horizon investigated (cross-sectional versus panel data), and the method of estimation used to evaluate the sign of the relationship between income and giving. Perhaps not surprisingly, the findings are mixed.[22]

Most studies find 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). They use data from the Internal Revenue Service for the period 1991-1995 and find that the U-shaped pattern is sensitive to the measure of central tendency used. Specifically, 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 the majority of high earners in their sample do not give to

[21] Previous experiments have shown that other-regarding behavior is mitigated when participants earn their endowments by answering quiz questions or performing real-effort tasks (e.g., Jeffrey P. Carpenter, Allison Liati and Brian Vickery, forthcoming; Todd L. Cherry, Peter Frykblom and Jason F. Shogren, 2002; Hoffman et al., 1994). The predominant explanation given for this result is that higher effort establishes property rights over the division of a surplus. Our results suggest that the reduction in pro-social behavior might be at least partly due to self-selection. See also Bradley J. Ruffle (1998) for how effort exerted by recipients may affect the decisions of allocators in a dictator game.

[22] Detailed discussions of the literature can be found in Andreoni (2006) and Vesterlund (2006), who also discuss some of the econometric difficulties involved in using field data to evaluate the link between income and giving.

charity, but those who do, give a substantial proportion of their 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.

Another common finding in the literature is that the income elasticity of giving is positive (Robert McClelland and Arthur C. Brooks, 2004). Although there is a large variation in the estimates, most estimates of income elasticity are between 0.7 and 0.8 (Andreoni, 2006). Given the non-monotonic relationship between earnings and the likelihood of giving, it would be interesting to see whether earnings elasticity is positive in our experiment also. Table 8 shows that this is indeed the case. There is a positive relationship between earnings and the average 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.[23]

IV. Concluding remarks

[23] The method for estimating income elasticity varies considerably across studies. 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. The 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 of earnings elasticity can be found in an online appendix available at www.economics.unimelb.edu.au/nnikiforakis/research.htm.

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 less likely to give than those ranked second. This difference disappears if earnings are randomly determined or if individuals are not informed about the opportunity to give/receive money before exerting their effort. This evidence suggests that the highest earners may be less likely to give because there is a higher proportion of selfish individuals amongst them.

One always needs to be careful when generalizing from the results of a particular study. For example, giving in a laboratory environment differs in a number of ways from giving in the field. In the field, individuals seldom have information about the determinants of others' incomes when they are making their donation decisions. In the laboratory, students are unlikely to 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 implications for studying other-regarding behavior both in the field and the laboratory.[24, 25]

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 also 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, they might be less willing to sacrifice some of their time to assist their junior colleagues, which may negatively impact the amount of mentoring received by junior employees.[26]

[24] This is supported by the similarities between our results and those of the field studies. See Steven D. Levitt and John A. List (2008) for a discussion of the complementary aspects of laboratory and field experiments.

[25] 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.

[26] 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

Third, our findings can also help understand the differences in redistributive policies that exist across countries.[27] This topic has been the subject of extensive research in recent years and several explanations have been offered for the observed differences in the redistributive policies (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.

Peter Zemsky (2002). In these models, providing private incentives to employees transforms many situations requiring team effort to social dilemmas. Carpenter and Erika Seki (2006) and Robert Drago and Gerald T. Garvey (1998) show in different contexts that on-the-job competition reduces cooperative behavior significantly.

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

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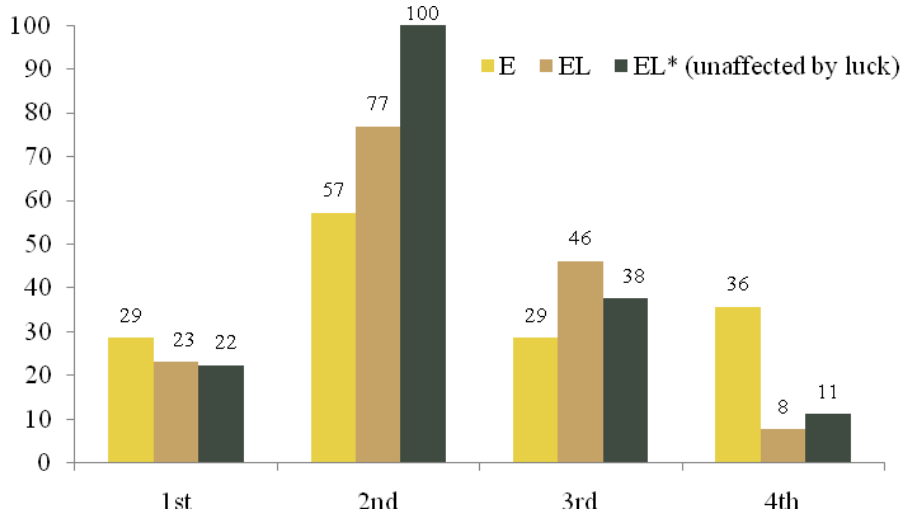
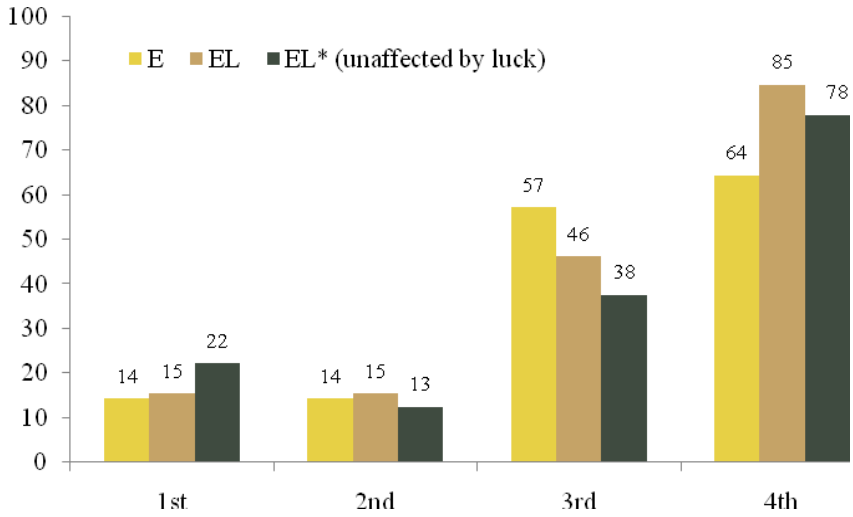
Figure 1 – Percentage of individuals making transfers by rank in Experiment 1



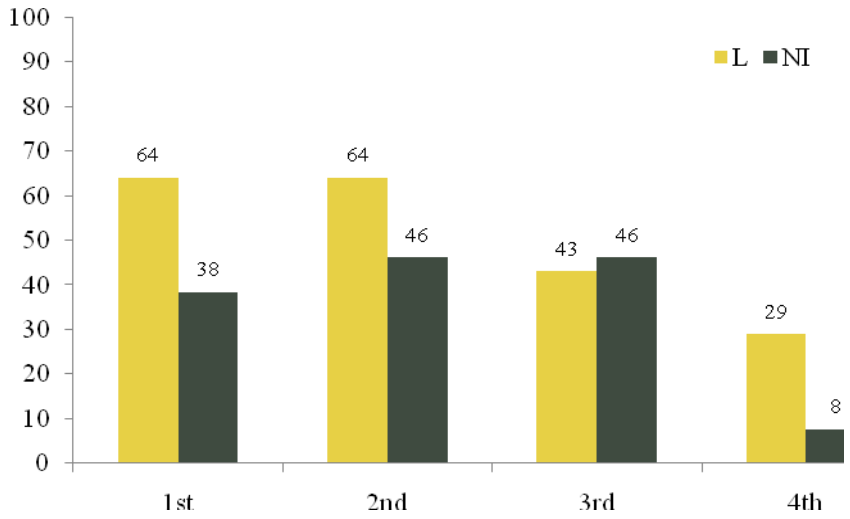
Note: The figure shows the percentage of individuals who suggested at least one positive transfer. EL* represents observations from individuals unaffected by luck. Of the 13 individuals in each rank in EL, 9 of the ones ranked 1st and 4th, and 8 of the ones ranked 2nd and 3rd were unaffected by luck.

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



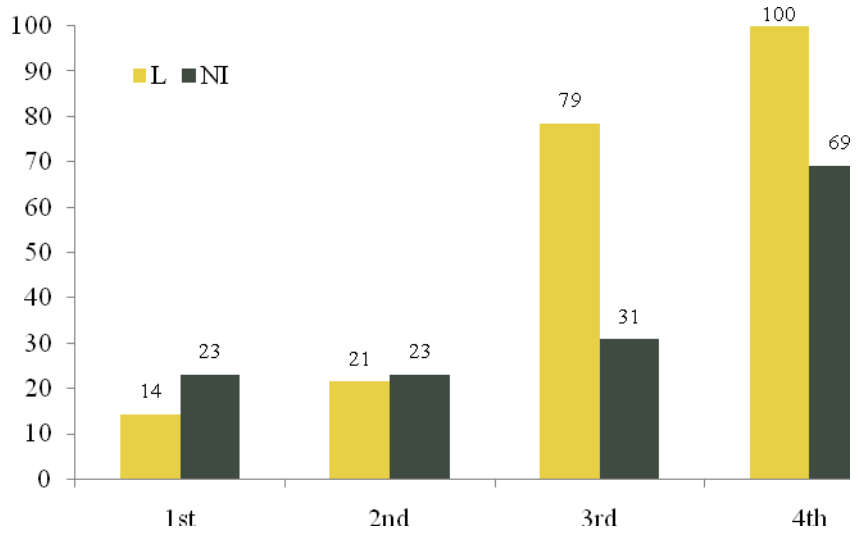
Note: The calculations are based on suggested transfers. EL* represents observations from individuals unaffected by luck. Of the 13 individuals in each rank in EL, 9 of the ones ranked 1st and 4th, and 8 of the ones ranked 2nd and 3rd were unaffected by luck.

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, which was made by a second-ranked subject. 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	
	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)
Male	-0.07	2.04***	-0.08*	1.44	-0.12	2.51***	-0.07	2.91***
	(0.06)	(0.65)	(0.05)	(1.16)	(0.11)	(0.39)	(0.12)	(0.49)
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 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 (17) [5.98]	4.00 (15) [2.10]	3.63 (8) [1.92]	3.00 (5) [1.87]
NI	4.14 (7) [3.19]	3.67 (9) [1.32]	2.9 (10) [2.33]	2 (1) [.]

Numbers in parentheses denote observations of positive suggested transfers. Numbers in squared brackets denote standard deviation. The highest transfer was 22, which was 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	
	Probability	Amount	Probability	Amount	Probability	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)
Male	-0.04	1.48	-0.03	1.85	-0.07	1.94
	(0.05)	(1.00)	(0.03)	(1.39)	(0.05)	(1.74)
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 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)
Male	0.25**
	(0.10)
Constant	5.22***
	(0.95)
Individual Characteristics	Yes
Observations	215
R-squared	0.66

Individual characteristics include 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)
Male	-0.95	-2.05	-1.78	-1.33***	-1.33
	(0.81)	(1.44)	(2.21)	(0.47)	(1.41)
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 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[28,29]

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.

[28] This section is not meant for publication.
[29] These are the instructions for treatment EL. Instructions for the other treatments were appropriately adjusted and are available from the authors upon request.

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 1st, 2nd, 3^{d}, and 4th, 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? .....%