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

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Preliminary Version

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 who are ranked first are significantly less likely to give than those who are ranked second. This non-monotonic relationship between earnings and giving behavior disappears if individual earnings are randomly determined or if individuals learn about the second (transfer) stage after they earn their income. These results suggest that the non-monotonic relationship detected may be driven by differences in individuals' expectations about others' behavior in the second stage, which are correlated with their own willingness to give.

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1 Introduction

There exists considerable evidence from field and laboratory studies showing that a large proportion of people are willing to give part of their money to help others (Andreoni, 2006; Camerer, 2003). Despite the large literature on giving, there is still no clear understanding of the relationship between income and giving. Simple intuition suggests that as income increases, people donate more money to help others, at least in absolute terms. This is in accordance with recent theories of social preferences, which have emerged to explain, amongst other things, why people help others at a personal cost.[3] However, both field and laboratory studies raise questions about the relationship between income and giving (Auten et al., 2000; Andreoni and Vesterlund, 2001; Buckley and Croson, 2006).

This paper presents the results from a laboratory experiment investigating the relationship between relative earnings and giving in a new game. The game is divided into two stages. In the first stage, four subjects participate in a real-effort 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, participants are given a chance to transfer part of their earnings to one or more of their group members. To prevent participants from free-riding on the transfers of others, only one of the three suggested transfers is implemented for each recipient. That is, an individual can only receive money from one group member.

Our main result is that when the ranking of the subjects is based purely on relative effort, subjects who rank first (and hence have the highest earnings) are significantly less likely to give to other group members than those ranked second. We

[3] Theories of social preferences assume that individual utility is affected by a variety of factors, such as relative earnings (Bolton, 1991) or inequitable payoffs (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000). See Fehr and Schmidt (2006) for a survey.

also find that the absolute amounts given do not vary with earnings. The observed non-monotonic relationship between earnings and giving behavior goes against the intuition that subjects with higher earnings should be at least as likely to give as subjects with lower earnings.

Evidence suggests that people are more likely to receive support when they have been negatively affected by luck (such as the victims of natural calamities) and that people who are positively affected by luck are more likely to help others (such as lottery winners). That is, individual giving behavior might be different when luck affects earnings (Eckel, Grossman and Milano, 2007). Thus, to test the robustness of our findings, the experiment included a treatment in which rankings and, hence, earnings could also be affected by luck in addition to relative effort. To implement this, a virtual coin is tossed separately for each individual after the first stage is completed. A tails outcome reduces one's output in the first stage by 30 percent and could in some cases cause a switch in rankings between two or more players.

We find that individuals who are negatively affected by luck are as likely to receive a transfer as other subjects when we control for earnings and relative effort.[4] However, conditional on a transfer occurring, unlucky subjects receive greater amounts. Most importantly, we find that, as in the treatment in which luck does not affect outcomes, the highest earners are significantly less likely to give than subjects ranked second, despite the fact that the earnings of the latter are 25 percent lower.

[4] Fong (2007) studies a dictator game with charitable giving to real-life welfare recipients with self-reported levels of effort. Subjects are randomly matched with welfare recipients. They are then assigned the role of donors and are given money. They had to decide how much, if any, of their endowment to give to the welfare recipient. She finds that those who were perceived to be poor due to bad luck received more.

Subjects' responses in a post-experimental questionnaire reveal that the proportion of self-interested individuals is substantially higher among the first-ranked. That is, many more of the subjects that ranked first reported a concern about maximizing their experimental earnings. On the other hand, the majority of second-ranked subjects stated that they gave part of their earnings because they felt sorry for the low earners. Therefore, one possible explanation for the non-monotonic relationship we observe between earnings and likelihood of giving is that self-regarding subjects self-select themselves to the first rank by working harder.

To test this explanation, we conducted a second experiment consisting of two treatments. In the first treatment, subjects were asked to put in a fixed amount of effort in order to participate in the second stage. At the end of the first stage, earnings were randomly allocated. Our aim was to see whether earnings would have a positive impact on likelihood of giving when relative effort did not matter. In the second treatment, subjects again competed in the first stage, but they were not given information about the content of the second stage until the first stage was completed. Hence, if subjects had different expectations about the giving behavior of others, this could not have affected their behavior in the first stage of the second treatment.

The results show that in both treatments of the second experiment, the difference between the giving behavior of the first-ranked and second-ranked subjects disappears. The first-ranked are as likely to give as the second-ranked. Moreover, there exists a positive relation between subjects' earnings and the absolute amount they give. The results from the second treatment suggest that the non-monotonic relation between earnings and the likelihood of giving observed in the first experiment is primarily driven by a self-selection mechanism where self-regarding subjects expect others to be

similarly self-regarding. Hence, they work harder than other-regarding individuals and are more likely to rank first. This type of correlation between one's type and expectations about the types of others is known as the *false consensus effect* (Mullen et al., 1985; Engelmann and Strobel, 2001).

The paper proceeds in the following way. After discussing the related literature in section 2, we outline the design and procedure of the first experiment in section 3. Section 4 discusses the results from the first experiment. In section 5, we discuss the design and results of the second experiment. We conclude in section 6 with a discussion of the implications of our results.

2 Previous Studies

Two closely related experimental papers, which also investigate the relationship between income and giving, are Andreoni and Vesterlund (2001) and Buckley and Croson (2006). In Andreoni and Vesterlund (2001), subjects play a modified Dictator Game. They 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.[5] The authors find that while the *price* of giving has an impact on giving, the subjects' endowment in terms of tokens has no effect on giving.

Buckley and Croson (2006) study how contributions to a public good change with income level in a finitely-repeated voluntary contribution mechanism. In their experiment, individuals are randomly allocated a high or a low endowment (50 and 25

[5] Tokens are worth 1, 2 or 3 points each, and total tokens available are 40, 60, 75 or 100.

tokens, respectively) 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 their 'wealthier' counterparts. The authors conjecture that the result implies that individuals are averse to differences in contributions rather than outcomes.

Our experiment differs from those in Andreoni and Vesterlund (2001) and Buckley and Croson (2006) in two important ways. First, in our experiment subjects earn their income instead of receiving endowments. There exists substantial evidence from laboratory experiments that pro-social behavior is mitigated when participants earn their endowments by answering quiz questions or performing real-effort tasks (e.g., Carpenter et al., 2007; Cherry et al., 2002; Hoffman et al., 1994; Harrison, 2007). Given the fact that in every day life most people earn their income, it is important to understand how behavior changes with earned income.

Second, the differences in earnings are substantially larger in our experiment. The highest ranked receives $60 while the lowest ranked receives $15. Earnings change by $15 between any two successive ranks. In contrast, the largest difference in Andreoni and Vesterlund (2001) is $6 while in Buckley and Croson (2006), one token is worth 1 cent implying that the absolute difference in real money between high and low earners is 25 cents. Therefore, our experiment allows us to analyze the impact of larger differentials on giving behavior.

Amongst the field studies which investigate the relation between income and giving, the most interesting one for our purposes is Auten et al. (2000). The authors use data from the IRS for the period between 1991 and 1995 and find a positive relationship between personal income and the *average* percentage of income

individuals give to charities. However, they also find a negative relationship between income and the *median* percentage of income that individuals donated.[6] This suggests that the majority of high earners do not give to charity, and those who do give a substantial proportion of their income.

3 Experiment 1

3.1 Design

The game is divided into two stages. In the first stage, subjects participate in a novel real-effort task, the Encryption Task, in groups of four. We chose to have a group size of four to be able to compare the behavior of subjects of different ranks. Participants are given a table which assigns a number to each letter of the alphabet in a random order. Each of the four subjects in the group is then presented with words in a predetermined sequence (which is the same for all participants) and is asked to encode them. That is, participants must substitute the letters of the alphabet with numbers. The computer screen subjects use for the encryption task can be seen in Figure 1.

The first stage lasts for twenty minutes. At the beginning of the second stage subjects are ranked. 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 determined depending on relative effort only. Subjects receive one point for each word they encrypt. The group member with the highest number of points receives $60, the

[6] See Andreoni (2006) for a survey on philanthropy. Andreoni emphasizes the fact that not all donors itemize their tax returns. However, other studies (which do not consider the likelihood of giving separate from the amount given) find comparable results. For example, the data from the *Survey of Consumer Finances* shows that in 2001, U.S. households with incomes between $100,000 and $125,000 donated on average 2.3% of their income, the same as households with incomes under $10,000 (Havens et al., 2006). For a detailed discussion of the empirical studies on giving, see also Vesterlund (2006).

second highest receives $45, the third highest receives $30, and the fourth highest receives $15.[7]

Treatment EL (EL for Effort and Luck) is essentially the same as treatment E, with the exception that the number of points (and hence the earnings at the end of the first stage) depends not only on relative 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.[8] The random shock is introduced to capture the impact of luck on earnings and evaluate the robustness of our findings in treatment E.

A decision we had to make when designing the experiment was whether to use a tournament in the first stage or a piece-rate scheme in which players would be rewarded with a fixed amount of money for each word they encrypted. Using a tournament was more desirable for two reasons. First, a tournament allows us to control for income effects more effectively than a piece-rate scheme and ensures comparability across treatments. Second, the existing studies in the literature in which subjects exert real-effort (e.g., Hoffman et al., 1994; Cherry et al., 2002) also have a tournament structure. Therefore, using a tournament allows us to compare our results with those in the previous studies. In section 5, we state briefly how we think our results would extend under a piece-rate payment structure.

[7] If two or more individuals encoded the same number of words, the computer randomly determined the ranking of the tied participants. Each player faced the same probability of being ranked above the other group members with the same number of points. The amounts are in Australian dollars. At the time of the experiments, the exchange rate was approximately AUD$1 = USD$0.85.

[8] A tails outcome will sometimes lead to a change in the rankings, but not always. For example, a participant who is ranked first and receives tails could be displaced from her position by another participant and be ranked second. However, rankings will not be affected by a tails outcome if, for example, all group members receive tails or if the differences in points between the members are too large for the relative rankings to be affected.

The second stage is essentially the same in both treatments. Subjects observe the points of each group member, the ranking, and the individual earnings. They must then decide simultaneously and without communication whether they wish to transfer any part of their earnings to other group members. In addition, in treatment EL, group members also observe the outcome of the coin toss, the initial ranking (i.e., before the coin toss) and the final ranking of the group (i.e., after the coin toss).

The existence of multiple potential "donors" implies that free-riding incentives exist because individuals (even the altruistic ones) would prefer someone else to help the low earners (Andreoni, 1989). Since such free-riding would limit the comparability of our results with those from previous experiments, only one group member's suggested transfer is implemented for each subject. Each member's suggested transfer is equally likely to be selected.

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 the amount of the transfer received (if any) minus the amount transferred (if any). Table 1 summarizes the experimental design.

3.2 Procedure

The experiment was conducted at the Experimental Economics Laboratory of the University of Melbourne using z-Tree (Fischbacher, 2007). Each session lasted approximately 60 minutes, including instruction time. Participants' earnings ranged from AUD$4 to AUD$62, with median earnings of AUD$38.5. All 108 participants were Australian citizens and University of Melbourne students with different academic

backgrounds including economics.[9] None of the subjects had previously participated in a similar experiment.

We chose to restrict our sample to Australian citizens to have a more homogeneous subject pool. This was desirable for two reasons. First, we wanted performance in the encryption task to reflect individual effort and not ability. The arguably simple task of substituting letters with numbers using a table is explained in detail and participants are only required to use a keyboard and a computer mouse. As long as subjects 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 could differ, but these should be less of a concern in our relatively homogeneous subject pool.[10] Second, there could be cultural differences in social preferences relating to giving (Alesina and Angeletos, 2005). Therefore, using a homogeneous subject pool allowed us to control for the impact of culture across treatments and focus on our variable of interest which is relative earnings.

Upon arrival at the laboratory, participants were randomly assigned a computer terminal. Each terminal had large partitions which prevented eye contact between subjects. Once seated, participants were randomly divided into groups of four individuals. Individuals knew that they were randomly matched with three others, but they did not know with whom they were matched. They were then asked to read the experimental instructions and to answer a series of questions that tested their

[9] From economics, only first-year students were used to ensure that they did not have a background in game theory or experimental economics.

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

understanding of the experiment. The experimenter checked the answers individually to ensure that each participant fully understood the instructions. After all answers were checked, the experimenter read out loud a one page summary of the instructions to achieve common knowledge about the experimental procedure.

At the end of the experiment, participants were also asked to fill out a demographic survey with questions regarding their age, gender, field of study, and the number of years they have lived in Australia.[11] They were also asked to explain the motivation behind their decisions to transfer (or not) money to others in the experiment and to respond to a selection of questions taken from the World Values Survey. The instructions and survey questions for treatment EL are in the appendix.

4 Analysis of Experiment 1

4. 1 Results

Experiment 1 focuses on whether relative earnings affect giving. We begin by presenting summary statistics and non-parametric tests regarding giving behavior. We then report results from a multivariate regression analysis.

Figure 2 presents the percentage of subjects in treatments E and EL who gave to at least one of their group members according to their rank. Given that some of the subjects in treatment EL might have been affected by luck, the figure also presents the joint giving behavior for the subjects in treatment E and those in treatment EL who were not affected by luck.

Figure 2 reveals a striking fact. 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%,

[11] An individual can obtain an Australian citizenship after 4 years. However, the majority of our subjects were born in Australia. The average number of years in Australia was 18 with a standard deviation of 4.1 years. The age of the average subject was 19.3 with a standard deviation of 1.9 years.

23%, and 26% in E, EL, and 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%) and more than three times as likely to transfer as the subjects ranked first in EL (77%). The difference is statistically significant in EL using a Fisher exact test (p-value = 0.02), but not in E (p-value = 0.15). The difference between the first-ranked and the second-ranked is also significant when we pool the observations from treatment E with the observations from treatment EL for those subjects who are not affected by luck in EL (p-value < 0.01).

Subjects ranked first do not appear to be more likely to make a transfer than those ranked third despite the fact that their earnings are twice as high and above the average earnings.[12] The likelihood of individuals transferring according to rank does not differ across treatments E and EL (p-value = 0.35, Fisher exact). Figure 3 shows that, as one might have expected, most of the transfers are made to those ranked third and fourth.

Table 2 presents the amounts transferred by the subjects according to their rank. Two things are noteworthy. First, there are no apparent differences across ranks with respect to the amount transferred in treatments E and EL. This implies that subjects ranked third and fourth in Experiment 1 gave a greater proportion of their earnings. This contrasts with models of social preferences which predict that amounts transferred should increase with earnings. However, this finding is consistent with the evidence in Andreoni and Vesterlund (2001) and Buckley and Croson (2006) that individuals with

[12] 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 them stated that they 'wanted to see what will happen.' Given the absence of such transfers in treatment EL, we conjecture that some subjects ranked fourth in treatment E could not understand why they were given the option of making a transfer. In treatment EL, the possibility of a random shock might have provided subjects with a justification for the second stage.

higher endowments do not contribute more in absolute terms towards the provision of public goods.

Non-parametric tests do not take into account factors other than earnings that could affect giving. For example, individuals might be less willing to give to those who encrypted fewer words in the first stage. Hence, we conducted a multivariate regression analysis and the models reported in Table 4 evaluate the potential impact of multiple influences on the transfer choices of subjects. Figure 2 and Table 2 suggest that relative earnings impact differently the likelihood of giving and the amount given. The appropriate econometric technique to capture this behavior 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.[13]

The empirical model allows transfers to depend on the rank of the sender, the rank of the receiver and personal characteristics (gender, field of study and the number of years an individual has been in Australia). In addition, the model controls for the difference in the average number of words for the group and the receiver's number of words (i.e., *Average Word Difference* $= \sum_{i=1}^{4} w_i / 4 - w_j$, where w_j is the number of words encrypted by receiver *j*). The rationale for including *Average Word Difference* is that giving behavior might be affected by the *absolute* number of words an individual encrypted and how that compared with the average in the group. For example, a fourth-ranked subject might be less likely to receive if she did not work hard enough.

[13] 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 (McDowell, 2003). The standard errors in the models are White (1980) robust to account for the correlation of errors terms across observations.

We estimate the model separately for treatments E and EL. In addition, we estimate another model for treatment EL which controls for whether the sender had good luck (i.e., whether the coin toss influenced her ranking positively) and whether the receiver had bad luck (i.e., whether the coin toss influenced her ranking negatively). Finally, regression 4 in Table 4 pools the data from treatments E and EL.

Regression 1 shows that individuals ranked second in treatment E are more likely to give than those ranked first. The likelihood of giving to another group member increases with the receiver's rank. The negative coefficient of average word difference implies that as the difference between individual and group effort increases, the likelihood of receiving a transfer decreases. The amount given seems not to be affected by our regressors. However, given the limited number of cases in which individuals gave part of their earnings in treatment E (29 out of a maximum possible of 168) one must interpret the results of the second part of the hurdle carefully.[14]

The results in treatment EL seem to be very similar to those in treatment E. Regression 2 shows that subjects ranked second (after the coin toss) are more likely to transfer to their group members than subjects ranked first. Similarly, the likelihood of giving to another group member increases with the receiver's rank. Average word difference does not affect the likelihood of giving to another group member, but it has a negative impact on the amount given. We also find that individuals with a higher

[14] The fact that subjects ranked fourth are more likely to give than those ranked first is clearly a surprising outcome. As mentioned earlier, this may be because some of these subjects were confused and transferred to see what would happen. Another possible explanation is that some of the fourth-ranked were trying to show that they do not care about money (and this is why they did not work hard). If we include a dummy for the self-proclaimed confused subjects, the dummy for subjects ranked fourth ceases to be significant.

rank (i.e., third and fourth) receive larger amounts.[15] This is consistent with models of social preferences.

Table 3 presents some initial evidence for the impact of luck on giving. We find that the subjects with good luck are more likely to give while the subjects with bad luck are more likely to receive a transfer from their group members. A lucky subject has a significantly higher probability of sending money than an unlucky or an unaffected subject (*p*-value = 0.042, Fisher exact). An unlucky subject has a significantly higher probability of receiving money than a lucky or an unaffected subject (*p*-value < 0.01, Fisher exact). Of course, there is likely to be a strong correlation between bad (good) luck and low (high) earnings. The regression analysis can help us isolate the impact of luck from that of relative earnings.

Regression 3 includes two dummy variables to account for 'luck' in the experiment. *Sender had Good Luck* takes the value of one if a sender's rank has been positively affected by luck (as compared to what it would have been based on relative effort only) and zero otherwise. Similarly, *Receiver had Bad Luck* takes the value of one if a receiver's rank has been negatively affected by luck and zero otherwise. The results indicate that our findings are robust to the inclusion of the two dummy variables. In addition, we find that while luck does not affect the likelihood of giving, subjects on average compensate unlucky group members by giving them significantly higher amounts.

Figure 4 presents the number of words encrypted by rank per minute in treatments E and EL.[16] Individuals encrypt more words in EL than they do in E (*p*-

[15] Notice that the fact that individuals ranked in the last position 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.

value < 0.01, Mann-Whitney). Given the uncertainty with regards to the final rankings in EL, this suggests that participants worked harder in the first stage in EL to protect themselves from the possible negative shock. This finding is consistent with individuals having von Neumann-Morgenstern utility functions with positive third derivatives (Leland, 1968; Kimball, 1990).

4.2 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 obtain a better understanding of subject behavior, we examined the responses to the post-experimental survey which asked subjects, at the end of the experiment, why they decided (not) to transfer money. We hired a research assistant who did not know the purpose of our study to classify the subjects' answers. Of the 41 subjects who made a transfer in treatments E and EL, 39 responded to the questionnaire. The most popular reason provided for giving across the two treatments was that individuals felt sorry for the low earners (27 out of 39). Table 5 presents the distribution of the 'empathizing' subjects according to rank. It appears that subjects that ranked first were less likely to empathize than those ranked second. In contrast, the most popular reason given for not giving to others was that subjects wanted to maximize their earnings from the experiment. This answer was given by 31 subjects

[16] In a couple of sessions we encountered delays in the beginning due to a slow network. In this cases, the first stage lasted approximately 19 (instead of the intended 20) minutes. This is the reason we present the number of words encrypted per minute.

among the 67 subjects who did not transfer in the experiment (46.3%).[17] Table 5 reveals an interesting fact. The proportion of 'self-regarding' individuals is substantially higher in the first rank even though those ranked first had much higher earnings.

The post-experimental questionnaire also had questions from the World Values Survey. One of these questions 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, we find a strong correlation between believing that the individual should take more responsibility for his/her life and ranking higher in the experiment (p-value < 0.05).

The post-experimental questionnaire suggests that the non-monotonic relation between giving and earnings may be because self-regarding subjects self-select to the first rank by working harder. Two possible channels through which self-selection can work are the following. First, subjects may have different expectations about how others will behave in the second stage. If a person is self-regarding and expects others to be self-regarding, s/he may work harder than someone who expects others to be altruistic. This is at the heart of Buchanan's (1977) Samaritan's Dilemma, who shows that altruism can lead to inefficient outcomes. Hence, if there is a positive correlation

[17] For example, one subject that 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 EL 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. However the transfer was not implemented."

between one's type and his/her expectation about the distribution of types in the group, one would get the results above.

Social psychologists have maintained that a person is likely to believe that others are similar to him. This phenomenon has been termed *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" (Mullen et al., 1985).[18,19]

The second possible channel for self-selection is that there may be a link between how competitive an individual is and how selfish s/he is. That is, more competitive people may also be more self-regarding. All else equal, this would imply that individuals who are more likely to win are also those who are more likely to be self-regarding and hence not give to others with lower earnings. They may find it difficult to empathize with those who achieve a lower rank.

Another possible explanation for the difference we observe between the first-ranked and the second-ranked in Experiment 1 may have to do with status. That is, those ranked first may feel like they worked hard for their position and deserve the

[18] This effect could explain why individuals with the highest rank are less likely to give. To see this, assume X is a self-regarding individual while Y is an altruistic individual. If X and Y suffer from the false consensus effect, X is likely to think others are self-regarding while Y is likely to think that others are altruistic. Self-regarding group members do not give in the second stage and, therefore, X should work as hard as he can. On the other hand, Y can afford to work less as she expects others to help her if she ranks in one of the lower ranks. Therefore, X the self-regarding player will invest more in effort and rank higher than Y.

[19] As Dawes (1989, 1990) points out, the term 'false' is somewhat misleading given that it is rational to use information about one's own preferences in the absence of information about the preferences of others. For this reason, Engelmann and Strobel (2001) conduct an experiment where they distinguish between the false consensus and consensus effects. Their results support the existence of a consensus effect, but not a false consensus effect. In our case, a consensus effect would yield the same behavior as a false consensus effect.

money they earned. Hence, they may not want to share it with others (Cox et al., 2007).[20]

5 Experiment 2

5.1 Design

The results in Experiment 1 may be driven by any subset of the reasons given above. Hence, we conducted a second experiment to understand better the results from the first experiment, which 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 likelihood of giving. Hence, in treatment L (L for Luck), participants' earnings do not depend on their relative effort, but it only depends on luck.

To ensure that behaviour is comparable across treatments, each participant in treatment L is asked to encrypt exactly 50 words in 20 minutes before participating in the second stage. The number of words was chosen based on subjects' performance in the first experiment to ensure that all subjects could encrypt the required amount of words in the given time.[21] 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), but the ranking is determined in a random manner. Hence, the effort spent in the first stage does not affect the amount earned. Due to the random nature of the earnings, neither

[20] Though plausible, this explanation receives little support from the questionnaire responses. 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 the desire to maximise earnings.

[21] 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., Baumeister et al., 1998). Keeping effort levels similar across treatments makes the second-stage decisions more comparable.

the self-selection nor the status explanations given above would apply in this case. In the experimental instructions, we emphasised that earnings were not going to be related to the task performed and that earnings were determined in a random manner.

The second treatment in Experiment 2, treatment NI (NI for No Information), aims to test the first selection explanation discussed above, namely, that subjects have heterogeneous expectations about the distribution of altruistic types in their group and this causes the first-ranked to behave differently from the second-ranked. The earnings are determined in the same way as in treatment E. However, in NI subjects are not informed about what happens in the second stage although they know that there will be a second stage. Since earnings are determined in the same way as they are in treatment E, treatment NI allows us to control for the impact of the competitive types and status in order to isolate the role played by expectations. 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.[22] As a result, if selection in the first experiment is primarily driven by heterogeneous expectations about how others will behave in the second stage, then in NI we should observe that those ranked first are at least as likely to give as those ranked second. If the pattern observed in treatments E and EL in Experiment 1 persists, then this could be taken as evidence for either the second self-selection mechanism (competitive subjects not wanting to help others) or the status effect.

The procedure followed in Experiment 2 was the same as in the first experiment and a similar subject pool was used.

5.2 Analysis of Experiment 2

[22] It may be the case that the differences in the game in treatment E and the game in treatment NL 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.

Figure 5 shows that in treatment L, the percentage of subjects who transferred money among the first-ranked was the same as the percentage of subjects who transferred money among the second-ranked (64%). This implies that either self-selection or status or both were behind the non-monotonic relationship we observed between earnings and the likelihood of giving in Experiment 1. While it is interesting that those ranked first are still not more likely to give than those ranked second, it should be noted that those ranked first tend to give higher amounts. In fact, Table 6 shows that there seems to be a monotonic relation between the absolute amounts given and earnings; this was not the case in Experiment 1. Figure 6 shows that individuals receiving transfers tend to be those ranked 3rd and 4th as one might have expected although some individuals also transfer to those ranked first and second.

Figure 5 also shows the percentage of subjects who gave to other individuals in treatment NI. There is no statistically significant difference between the behavior of the first and second ranked subjects (Fisher's exact, *p*-value=.99) It is interesting to point out that 43% of the subject's ranked first or second transferred money in treatment E. This percentage is extremely similar in treatment NI, namely, 42%. However, what has changed is the distribution of giving subjects in the first and second rank: More first-ranked subjects give in NI relative to E (38% vs. 29%) and less second-ranked subjects give in NI relative to E (57% vs. 46%). Since we would intuitively expect those subjects ranked first and second to give more than others, this supports our explanation. Further, Table 6 shows that there seems to be a monotonic relation between the absolute amount given and earnings in treatment NI which was absent in treatment E.

Table 7 reports the results of a hurdle model of transfers in treatments L and NI. The estimates corroborate the observations made while looking at the summary

statistics. Subjects ranked first are as likely to give to other members in their group as subjects ranked second. These results indicate that to the extent that we can control for the impact of the competitive types and status, the results in Experiment 1 may be primarily driven by a self-selection mechanism, where heterogeneous expectations about how others will behave affect behavior.

In terms of effort, Figure 4 shows that first-ranked individuals in treatment NI seem to work harder than their counterparts in E. Although this is consistent with our self-selection explanation, the difference fails to be significant (p-value < 0.17, Mann-Whitney). There appear to be no differences between subjects ranked in the remaining three places in treatments E and NI (p-value < 0.64, Mann-Whitney).

6 Concluding remarks

This paper presents results from an experiment investigating the relationship between relative earnings and giving. We find that if incomes are determined by participating in a tournament, unlike in the case when they are determined randomly, those ranked first are less likely to give than those ranked second. The evidence suggests that heterogeneous expectations about how others will behave which are based on one's own preferences may be playing an important role in this result. Individuals who expect others to be self-regarding may exert more effort than individuals who expect others to be other-regarding. Hence, in addition to finding support for selection effects, our research indicates that selection works via individuals forming expectations about others' behavior.

Given the large experimental and field evidence on pro-social behavior, it is important to understand when social preferences matter and how context-dependent

they are. Our results imply that in situations where relative effort in a group setting determines earnings, relative performance can have an impact on social preferences. It may be important to pay attention to this in contexts where social preferences matter.

Our findings can have important implications for charitable giving by individuals, which is the single largest source of donations.[23] They are consistent with Auten et al.'s (2000) finding that the majority of high earners do not give to charity. One explanation suggested by our experiment is that higher earners may be more likely to be self-regarding. This is in accordance with the following observations in Andreoni (2006): "Despite the clear tax advantage of giving during life, the rich hold a surprising fraction of giving in their estates…. The preference for delaying giving until death goes against the grain of tax incentives" (p. 1246). Our results also suggest that looking at the *average* amount given by individuals can be misleading and that one should consider the percentage of individuals giving separately.

Although the experimental environment studied here differs substantially from that of charitable giving, our results shed light on a phenomenon which is hard to analyze using field data sets. They imply that in empirical studies, it may be important to consider not just income, but its source also while analyzing the link between income and giving behavior. That is, it may be the case that whether people have inherited their wealth or earned it makes a difference in their giving behavior .

One important methodological implication of our results is that in experiments where subjects earn their money with a real effort task, the first stage may introduce unintentional distortions in the outcomes. That is, those with the highest earnings level may display certain preferences which may interact in undesirable ways with the goals

[23] See Andreoni (2006) for a survey of the theoretical and empirical literature on philanthropy.

of the experiment. Our experiment shows that one should be careful of this effect. Random allocation of endowments may be desirable in such cases.

The results from our experiment may also help us understand the adverse effects of competitive incentive schemes used within firms.[24] For example, if promotions in firms 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 give up some of their time to assist their junior colleagues, which may negatively impact the amount of mentoring received by junior employees. An alternative could be a promotion system based on absolute effort, i.e., expecting individuals to meet certain criteria may be preferable. Understanding how competition may impact cooperative tendencies of group members is useful in organizational structuring and in the design of optimal incentive schemes. Hence, further experimental research exploring such group dynamics would be valuable.[25]

A worthwhile avenue for future research is to see whether similar results hold in an environment where earnings are determined in a piece-rate fashion. Our conjecture is that as long as earnings are made public at the end of the first-stage task (as is the case in our experiment), the effects discussed above would still be present. That is, behavior would still be affected by competition and perceptions of status.

[24] In this regard, our results are consistent with the theoretical literature on personnel economics which shows that competition for promotions affects cooperative behavior in a negative way (Holmstrom and Milgrom, 1991; Lazear, 1991; Prendergast, 1999; Rob and Zemsky, 2002). The intuition for this is that providing private incentives to employees transforms many situations requiring team effort to social dilemmas.

[25] Empirically, Carpenter and Seki (2006) and Drago and Garvey (1998) show in different contexts that on-the-job competition reduces cooperative behavior significantly.

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Table 1 – Experimental design

	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 amount sent in Experiment 1 (conditional on transfer)

	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 squared brackets denote standard deviation. Numbers in standard brackets denote observations. The highest transfer was 10, which was made by a second-ranked subject.

Table 3 – 'Luck' and likelihood of giving

	Good Luck	No Change	Bad Luck
% of subjects giving money	62.5	36.7 (35.3)	30.0
% of subjects receiving money	12.5	37.8 (41.2)	70.0

Good (Bad) Luck refers to a coin toss leading to a higher (lower) ranking compared to the ranking based only on effort. No Change includes observations from both E and EL. The numbers in parentheses are the averages from EL.

Table 4 – Hurdle model of transfers in Experiment 1

	(1)		(2)		(3)		(4)	
	Probability	Amount	Probability	Amount	Probability	Amount	Probability	Amount
Sender's Rank: 2nd	0.78*	-0.61	0.89*	1.61	0.97**	1.57	0.73**	0.41
	(0.44)	(1.22)	(0.48)	(1.08)	(0.47)	(1.09)	(0.33)	(0.85)
Sender's Rank: 3rd	0.13	-0.21	0.29	1.23	0.46	1.30	0.33	1.01
	(0.51)	(1.44)	(0.65)	(1.20)	(0.65)	(1.41)	(0.42)	(0.71)
Sender's Rank: 4th	1.18**	0.26	-0.81	3.67***	-0.51	4.57**	0.53	1.87**
	(0.58)	(1.85)	(0.67)	(1.27)	(0.68)	(1.62)	(0.45)	(0.74)
Receiver's Rank: 2nd	0.99***	-0.81	0.63	1.22	0.52	0.60	0.60***	1.25
	(0.35)	(1.36)	(0.38)	(0.86)	(0.38)	(0.70)	(0.22)	(0.80)
Receiver's Rank: 3rd	2.90***	-3.30	1.23***	1.98**	1.08**	0.73	1.56***	1.83*
	(0.61)	(2.54)	(0.47)	(0.77)	(0.54)	(0.87)	(0.32)	(1.04)
Receiver's Rank: 4th	4.70***	-2.33	2.02***	2.97***	1.87***	1.50	2.55***	3.46***
	(0.96)	(3.60)	(0.47)	(1.02)	(0.52)	(1.15)	(0.41)	(1.17)
Average Word Difference	-0.08***	0.11	-0.01	-0.11***	-0.00	-0.07	-0.03***	-0.07*
	(0.03)	(0.10)	(0.01)	(0.03)	(0.01)	(0.04)	(0.01)	(0.04)
Sender had Good Luck					0.42	-0.03		
					(0.63)	(0.86)		
Receiver had Bad Luck					0.15	1.27**		
					(0.38)	(0.47)		
Constant	-5.62***	-0.12	-2.43	3.97	-2.18	5.49	-3.75***	-0.36
	(1.35)	(2.52)	(2.46)	(4.84)	(2.37)	(5.28)	(1.18)	(2.11)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	156	29	135	29	135	29	291	58
R-squared	0.33	0.64	0.31	0.80	0.32	0.84	0.25	0.43

'Probability of transfer' is a probit regression with robust standard errors, 'Amount transferred' is a truncated-linear regression

with robust standard errors, Standard errors are in parentheses. Individual characteristics include gender, field of study, age, and number of years lived in Australia. *** 1% level, ** 5% level, *10% level. Regressions 1, 2, 3, and 4 use data from treatments E, EL, EL, E and EL, respectively.

Table 5 – Most popular reasons for giving and not giving in treatments E and EL

	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	52%	15%	26%	22%

(Entries are percentages of individuals giving or not giving who filled in the questionnaire.)

Table 6 – Average amount sent in Experiment 2 (conditional on transfer)

	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 squared brackets denote standard deviation. Numbers in standard brackets denote observations. The highest transfer was 22, which was made by a first-ranked subject.

Table 7 – Hurdle model of transfers in Experiment 2

	(1)		(2)	
	Probability	Amount	Probability	Amount
Sender s Rank: 2nd	-0.06	-2.34	0.14	-0.08
	(0.46)	(1.65)	(0.45)	(1.71)
Sender s Rank: 3rd	-0.32	-3.12	0.38	-0.52
	(0.43)	(2.23)	(0.43)	(2.40)
Sender s Rank: 4th	-0.59	-2.23	-0.58	-1.04
	(0.47)	(1.45)	(0.49)	(3.47)
Receiver s Rank: 2nd	0.26	-3.87	0.22	1.07
	(0.40)	(2.95)	(0.43)	(0.91)
Receiver s Rank: 3rd	1.26***	-4.86	0.70	2.05
	(0.30)	(3.06)	(0.49)	(2.80)
Receiver s Rank: 4th	1.82***	-1.89	1.39**	4.04
	(0.35)	(2.72)	(0.59)	(2.84)
Average Word Difference	0.01	0.21	-0.00	-0.02
	(0.04)	(0.16)	(0.01)	(0.03)
Constant	-4.49	4.10	-1.72	8.79
	(3.06)	(11.07)	(3.32)	(10.29)
Individual characteristics	Yes	Yes	Yes	Yes
Observations	168	45	147	27
R-squared	0.28	0.51	0.18	0.41

'Probability of transfer' is a probit regression with White (1980) robust standard errors, 'Amount transferred' is a truncated-linear regression with robust standard errors, Standard errors are in parentheses. Individual characteristics include gender, field of study, age, and number of years lived in Australia. *** 1% level, ** 5% level. Regressions 1 and 2 use data from treatments L, and NI, respectively.

Figure 1 – Screen shot of effort stage

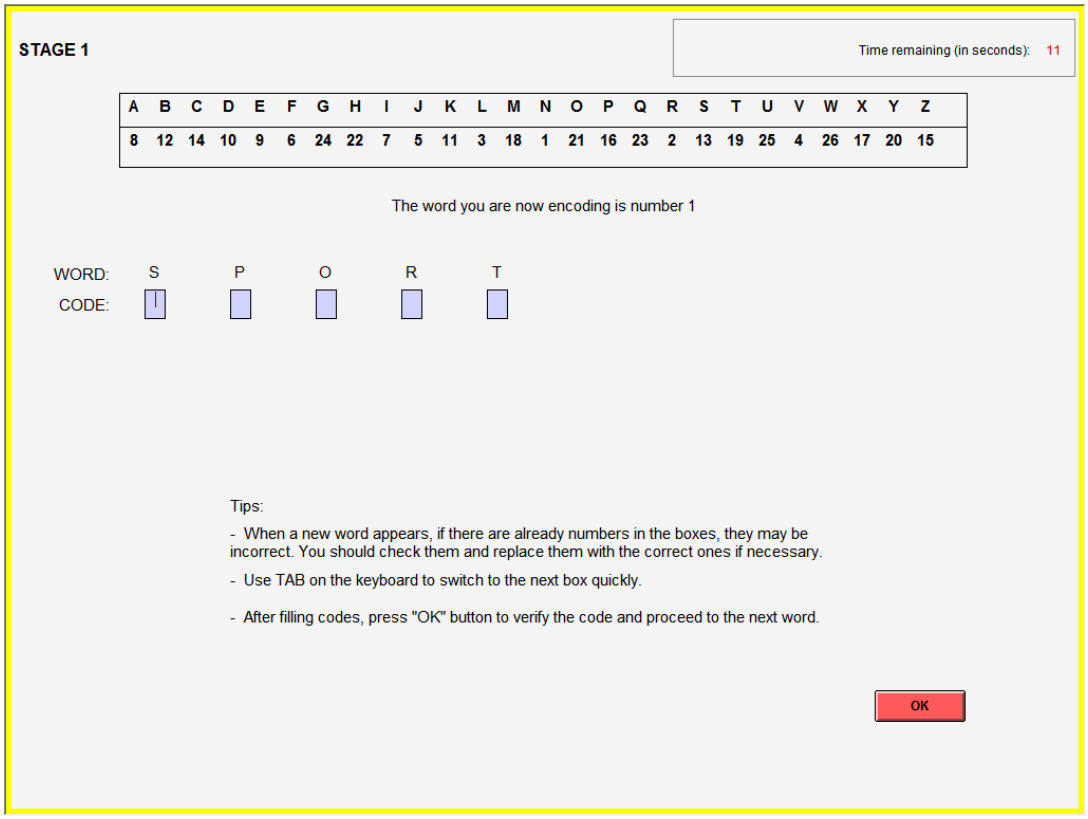

Figure 2 – Percentage of individuals giving by rank in Experiment 1

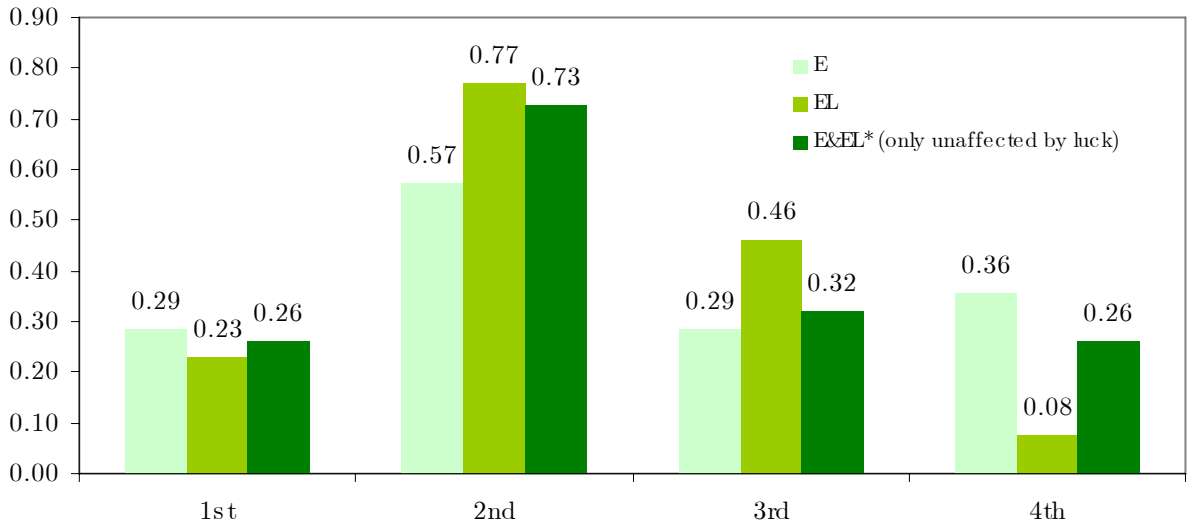

Figure 3 – Percentage of individuals receiving transfers by rank in Experiment 1

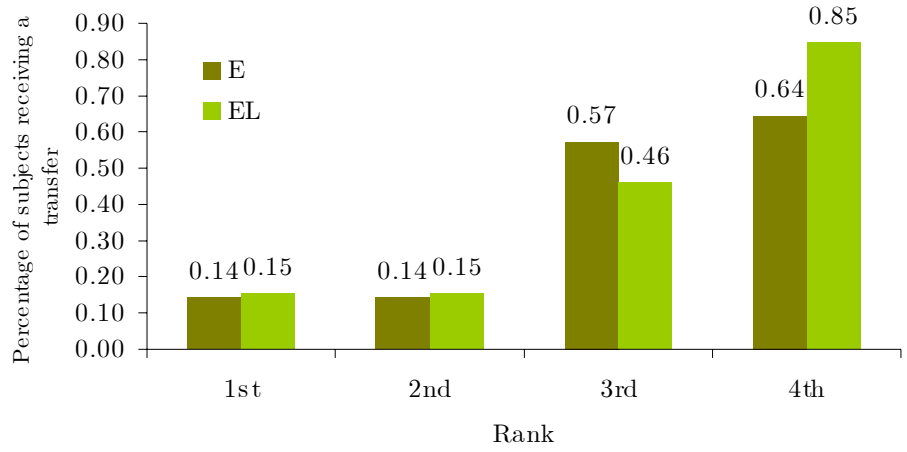

Figure 4 – Number of words encoded per minute

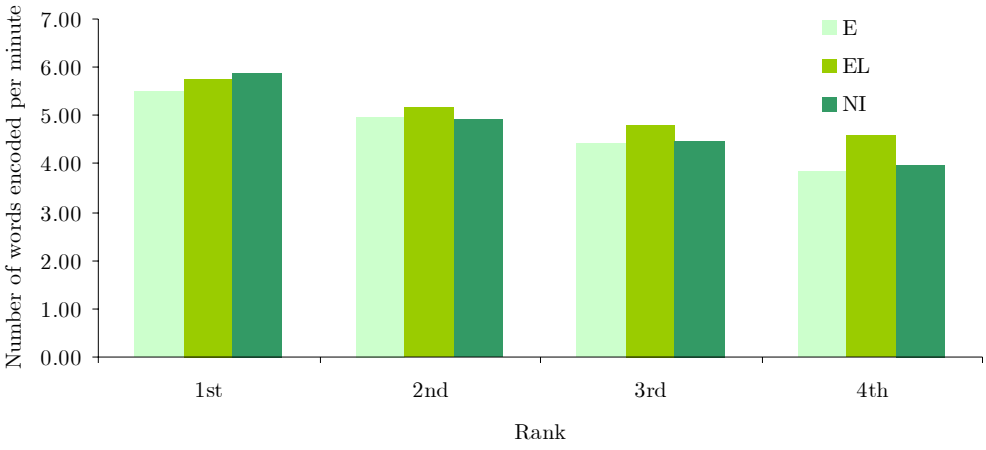

Figure 5 – Percentage of individuals making transfers by rank in Experiment 2

Figure 6 – Percentage of individuals receiving transfers by rank in Experiment 2