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Self-Selection into Economics Experiments Is Driven by Monetary Rewards

Johannes Abeler
Daniele Nosenzo

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Johannes Abeler
University of Oxford,
IZA and CESifo

Daniele Nosenzo
University of Nottingham

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

Self-Selection into Economics Experiments Is Driven by Monetary Rewards*

Laboratory experiments have become a wide-spread tool in economic research. Yet, there is still doubt about how well the results from lab experiments generalize to other settings. In this paper, we investigate the self-selection process of potential subjects into the subject pool. We alter the recruitment email sent to first-year students, either mentioning the monetary reward associated with participation in experiments; or appealing to the importance of helping research; or both. We find that the sign-up rate drops by two-thirds if we do not mention monetary rewards. Appealing to subjects' willingness to help research has no effect on sign-up. We then invite the so-recruited subjects to the laboratory to measure a range of preferences in incentivized experiments. We do not find any differences between the three groups. Our results show that student subjects participate in experiments foremost to earn money, and that it is therefore unlikely that this selection leads to an over-estimation of social preferences in the student population.

JEL Classification: C90, D03

Keywords: methodology, selection bias, laboratory experiment, field experiment, other-regarding behavior, social preferences, social approval, experimenter demand

Corresponding author:

Johannes Abeler
University of Oxford
Department of Economics
Manor Road
Oxford OX1 3UQ
United Kingdom
E-mail: johannes.abeler@economics.ox.ac.uk

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1. Introduction

Laboratory experiments have become a wide-spread tool in economic research. They have delivered many new insights about what preferences people hold, how people maximize their preferences, and how people interact. Yet, there is still doubt about how well the behavior in lab experiments generalizes to non-laboratory setups, and how well the behavior of lab subjects generalizes to other groups of decision makers. In this paper, we focus on the second issue and investigate what drives the self-selection process into economics lab experiments. Research on self-selection into psychology experiments (e.g., Rosenthal and Rosnow, 1969; 1975) has often concluded that subjects participate for pro-social reasons, wanting to help the researchers, or because of their need for social approval. This has led some economists to conjecture that lab experiments exaggerate the extent of social preferences: if subjects come to the lab to help researchers, one would expect that these subjects are more pro-social (Levitt and List, 2007). Economics lab experiments, however, differ from most psychology experiments in that participants are paid according to their decisions. It could thus be that the self-selection process into economics lab experiments differs and is at least partly based on the expected monetary payment, changing the composition of the resulting subject pool.

Virtually every setting of economic interest has a selected group of participants (Dohmen and Falk, 2011). Employees, stock market participants, entrepreneurs, to name just few examples, are not randomly drawn from the general population but have chosen (or have been chosen) to participate in this particular economic interaction. If one wants to use lab experiments to investigate these interactions, it is crucial to understand the selection process into lab experiments to be able to tell whether this process is similar to the selection process into the targeted real-world setting (see Falk and Heckman, 2009).

To investigate the selection process into lab experiments, we conduct a field experiment in which we alter the recruitment message sent to first-year university students inviting them to join the experimental subject pool.[1] Subjects could be in one of three treatments: in the *Standard* treatment we sent out the usual invitation email stressing that subjects can earn money *and* that students' participation is very important for the success of the research program and that we rely on their help. To check whether volunteering for lab experiments is

[1] Recruitment into lab experiments is usually a two-step process: first, students sign up for the subject pool. This only documents their interest in receiving invitations for experiments. Invitations to actual experiments, including exact time slots, are then sent to sub-groups of the subject pool and recipients of these invitations can decide whether to participate or not.

about earning money, we dropped any mentioning of money from the email in the second treatment and only focused on the appeal for help (*NoMoney* treatment). To check whether volunteering is about pro-social motivation and need for approval, we changed the recruitment email such that participants were only informed about the monetary payment (*NoAppeal* treatment). We compare the sign-up rates in the three treatment groups to understand the self-selection mechanism into lab experiments: the difference Standard–NoMoney measures the importance of monetary reasons for participating in experiments; the difference Standard–NoAppeal measures the importance of pro-social reasons.

We then invited the so-recruited subjects for a lab experiment to check how the different recruitment mechanisms affect pro-social and approval motivations. In a series of incentivized experiments, we measured subjects' social values, cooperativeness, and sensitivity to experimenter demand. If one is concerned about the external validity of lab experiments, our test of experimenter demand should be especially of interest: subjects who attend lab experiments to help the researchers will also alter their behavior during the experiment in light of what they expect helps the researchers most. We also measure subjects' risk preferences and elicit non-incentivized measures of social approval need and a range of socio-demographic variables. If volunteering is about pro-social motivation and approval need we would expect to observe more pro-social behavior and approval seeking in Standard (where the appeal playing on these motives was included in the recruitment email) than in NoAppeal (where the appeal was dropped from the email).

We find that the sign-up rate drops by about two-thirds if we do not mention monetary rewards. Appealing to subjects' willingness to help research has no effect on sign-up. In the Standard and NoAppeal treatments, 13.8 and 14.6 percent of contacted students sign up respectively. These two rates are not statistically significantly different from each other. In the NoMoney treatment, only 5.0 percent sign up, significantly less than in either of the other treatments. These results suggest that the expected monetary payments are the main driver of selection into economics lab experiments. At the same time, we do not find any differences in elicited preferences across treatments. Adding an appeal to help research does not only leave the sign-up rate unchanged, it also does not affect the level of social preferences and approval seeking in the so-recruited population.

Since we find that selection into lab experiments is mostly driven by the desire to earn money, we would predict that results from lab experiments may generalize particularly well to settings into which people are also likely to select to earn money, e.g., employment

relations or stock-market investment. Additionally, our results suggest that it is unlikely that the self-selection of participants into experiments leads to an over-estimation of social preferences.

Our paper also addresses a second concern that has not been as prominent in the literature: Assume that selection into lab experiments is indeed driven by pro-social motives. Then self-selected participants should have higher measures of social preferences. If studies find no such difference between subjects and non-subjects (as it is the case, for example, for Cleave et al., forthcoming and Falk et al., forthcoming), then the conclusion must be that lab measurements of social preferences are poorly correlated with true pro-social motives. Viewed this way, if selection is driven by pro-social motives, the use of lab experiments to gauge the importance of social preferences is never a good idea: either they exaggerate the prevalence of social preferences (because of the selection) or they are not able to predict pro-social behavior outside the lab. The jury is still out on how well lab-experimental measures of social preferences predict behavior outside the lab (compare, for example, Rustagi et al., 2010 with Stoop et al., 2012; see Camerer, 2011 and Coppock and Green, 2013 for overviews); our results, however, suggest that a simple story of self-selection via social preferences cannot be used to argue against these lab-experimental measures.

We contribute to the fast-growing literature that examines the generalizability of lab experimental results, part of which focuses on the effect of selection. Most of these studies take the selection process as given and examine whether the selected sample differs from the total population (e.g., Slonim et al., 2013; Cleave et al. forthcoming; Falk et al., forthcoming), from other non-selected samples (e.g., Eckel and Grossman, 2000; Gaudecker et al., 2012; Anderson et al. forthcoming), or from other selected samples (e.g., Burks et al., 2009; Belot et al., 2010; Anderson et al. forthcoming). In contrast, our paper tries to influence the selection process directly to understand what brings subjects to the lab. The paper most closely related to ours is Krawczyk (2011), who also changes the invitation to lab experiments and observes, like we do, that subjects enter the pool more often when monetary rewards are prominent.[2] However, our study extends Krawczyk's design in several important dimensions: i) Since Krawczyk compares only two treatments (emphasizing either the monetary or non-monetary rewards of participation), he can only state that the monetary motive is more important than non-monetary motivations. With our three treatments, we can

[2] Relatedly, Cubitt et al. (2011) report that monetary incentives increase rates of survey participation. They also find that the different participation incentives do not affect responses in the survey.

separately identify the effect of monetary and non-monetary motives. ii) The NoMoney and NoAppeal treatments suppress all information about monetary or non-monetary rewards respectively, while Krawczyk only changes the emphasis and always mentions money. We also made sure that no information about monetary payments for experiments at our university was available on the web while we sent out the recruitment emails. This strengthens our finding that even under our treatment variation subjects' behavior does not differ across treatments. iii) Finally, and most importantly, we run a whole battery of incentivized preference elicitation experiments with our differently-recruited subjects to test different nuances of pro-social and approval seeking behavior. Krawczyk focuses instead on subjects' willingness to participate in an unpaid survey and an un-incentivized altruism measure derived from the survey as outcome variables.

The paper is structured as follows. In the next two sections we present the design of field and lab experiment and discuss our hypotheses. Section 4 contains the results of the experiments. Section 5 concludes.

2. The Field Experiment

In October 2010 we sent an email to 5725 first-year undergraduate students at the University of Nottingham inviting them to volunteer for research studies involving laboratory and internet experiments conducted at the School of Economics Centre for Decision Research and Experimental Economics (CeDEx). Students had only recently arrived at the university and were thus not accustomed to economics lab experiments. Students were randomly assigned to one of three treatments, which differed in the content of the recruitment email message (reproduced in Appendix A).

In all treatments the email contained a brief description of what an economics experiment is, and included a link to a website where students could complete the registration. The treatments differed in whether or not the email contained several sentences informing students that 1) participation in experiments is usually rewarded with a cash payment; and 2) students' participation is of crucial importance for the success of scientific research at the University and is thus highly valued and appreciated by researchers.

This information is typically provided in invitation letters used to recruit students to volunteer for experimental research. In our *Standard* treatment the email message used contained both the information about cash payments (e.g., "*You will typically receive some reward (usually cash) in return for your participation*") and the appeal about the importance

of volunteering (e.g., "*Your participation is crucial to the success of our research, and we will highly appreciate your contribution and be really grateful for your collaboration*"). In the *NoAppeal* treatment we used the same email as in Standard but deleted all sentences emphasizing the value of participation. Finally, in the *NoMoney* treatment students received the same email as in Standard but without references to the existence of financial incentives.[3]

Students were randomly assigned to treatments depending on the last digit of their student ID number. With this procedure we assigned 1722 students to Standard, 1734 students to NoAppeal and 2269 students to NoMoney.[4] The emails were sent out on October 7th 2010. We focus on responses to the invitation emails between October 7th and October 24th. On October 24th, in fact, all subjects who had by then agreed to volunteer were sent a recruitment email inviting them to a laboratory experiment, described in detail in the next section.

2.1 Hypotheses

As highlighted by Levitt and List (2007) and List (2007), a long tradition of research in social psychology has focused on the characteristics of subjects volunteering for psychological experiments. This research suggests that the decision to participate in an experiment may be driven by pro-social motives, such as altruism or cooperativeness towards the experimenter, and by a desire to seek social approval.[5] The recruitment email used in Standard (and NoMoney) appealed to these motives. Students were told that their participation was of great value for academic research, and that researchers would highly appreciate students' contribution and be grateful for their collaboration. The appeal plays on students' pro-social motives in two ways. First, by emphasizing the value of participation for academic research, we aim to increase students' subjective valuation of the volunteering activity, and thus crowd-in participation. Second, the explicit reference to the researchers as beneficiaries of the volunteering activity aims to reduce the psychological distance between the donor (the subject) and the donee (the researchers), and thus trigger a stronger empathic

[3] Students completed the registration via a website (http://www.nottingham.ac.uk/~lezorsee/orsee/public/) hosting the web-based online recruitment system ORSEE (Greiner, 2004). The website also contains additional details about the Research Centre, and a statement about our privacy policy and a description of the rules and practices that participants must agree to abide by. Students can also use the website to browse through a list of frequently asked questions. During the whole period of the experiment (October 7th 2010 to November 15th 2010) we temporarily disabled any feature of the website (and of any University webpage linking to it) that could void our treatment manipulations (e.g., we temporarily removed the FAQ: "Do you pay me for participating in experiments? How much?").

[4] Since each student ID number can end with 1 of 10 possible digits and there are only 3 treatments, we had to assign 4 possible end-digits to one treatment.

[5] For a comprehensive review of this literature see Rosenthal and Rosnow (1975).

response from the subject.[6] Moreover, the emails appealed to students' approval need by highlighting the potential rewards (in terms of approval and appreciation) of participating.

On the other hand, the email received by students in the NoAppeal treatment did not contain any references to the value of volunteering. We can thus assess the strength of the pro-social and approval need motives for volunteering by comparing the recruitment response rates in Standard and NoAppeal:

> **H.1.FIELD** - *If pro-social and approval need motives are important determinants of the decision to volunteer, Standard will yield a higher response rate than NoAppeal.*

As already noted by Kagel et al. (1979), an important difference between psychology and economics experiments is that in the latter participants typically receive nontrivial financial incentives for participation. The decision to volunteer for economics experiments could thus be predominantly driven by the prospects of financial reward, and this may reduce the role of the pro-social and approval need motives relative to psychological experiments.

To examine the role of financial incentives in the decision to volunteer for experiments we compare recruitment response rates in Standard and NoMoney. In both treatments students received the same information about the value of volunteering for experimental research. Students in Standard were also informed about the existence of financial incentives for participating in experiments, whereas students in NoMoney did not receive this information. This leads to our second hypothesis:

> **H.2.FIELD** - *If the decision to volunteer for experimental research is driven by financial incentives, Standard will yield a higher response rate than NoMoney.*

3. The Lab Experiment

We subsequently conducted a laboratory experiment with the pool of volunteers who had registered to our database by October 24th 2010. The main purpose of the lab experiment was to obtain laboratory measurements of the importance of pro-social and approval need

[6] Being able to identify the beneficiary of a pro-social act increases pro-social behavior (the "identifiable victim effect"), see, e.g., Jenni and Loewenstein (1997); Small and Loewenstein (2003). More generally, there is evidence that reducing social distance increases pro-social behavior (Hoffman et al., 1996; Bohnet and Frey, 1999; Charness and Gneezy, 2008).

motives for the volunteers recruited across our three treatments, although we also collected measurements on subjects' risk preferences and cognitive skills.

Subjects were invited to participate on October 24th, and the experiment took place between October 29th and November 9th. All students received the same invitation email, regardless of the treatment they were assigned to in the field experiment. The email listed the available sessions and explained how students could sign up for a session of their choice.

A total of 174 subjects participated in the lab experiment, 67 recruited via Standard, 78 via NoAppeal, and 29 via NoMoney. We conducted 11 sessions in total with 12, 16 or 20 participants per session.[7] In all sessions, subjects from the three treatments simultaneously participated in the laboratory.

Each session consisted of 6 parts. Subjects were informed at the beginning of the experiment of the existence of the 6 different parts, but detailed instructions about each part were only given upon completion of the previous one (all instructions are reproduced in Appendix B). Any information about earnings from any part of the experiment was only given at the end of part 6. Subjects were paid according to the sum of the earnings they made in each (paid) part of the experiment. Earnings were computed in points during the experiment and converted into British Pounds at a rate of £0.10 per point. Table 1 shows the timeline of a session and details the tasks subjects faced in each part of the experiment.

[7] The recruitment for the first 9 sessions was designed such that subjects in each treatment had 60 slots available in total. However, the lower response rate in NoMoney forced us to run two additional sessions where we tried to over-recruit subjects from this treatment. In 2 sessions we had to recruit a graduate student to be able to run the sessions with 16 participants. We do not use the data from the two graduate students in the analysis of Section 4.

TABLE 1
Timeline of the lab experiment

	Task(s)	Measurement
Preliminary instructions	-	-
Part 1	Decomposed Game	Social value orientation
Part 2	Public Goods Game	Cooperativeness
Part 3	Lottery choice	Risk attitudes
Part 4	SDS-17 Scale; Gudjonsson's Compliance Scale	Social approval need
Part 5	Tsutsui and Zizzo's (2010) experimenter demand test	Social approval need
Part 6	Cognitive Reflection Test; Financial Literacy ELSA Test	Cognitive skills
Earnings from Parts 1-6 revealed	-	-
Questionnaire	Various unincentivized questionnaires	Socio-demographic characteristics; risk attitudes; trust attitudes; personality traits
Payment; end of session	-	-

In the first two parts of the experiment we collected measurements of subjects' pro-social motivation using the Decomposed Game Technique (part 1) and a Public Goods Game (part 2). The Decomposed Game Technique elicits subjects' '*social value orientation*', i.e. the goal that individuals pursue in social interactions involving trade-offs between own and others' material well-being (see, e.g., Liebrand, 1984; Offerman et al., 1996; Sonnemans et al., 1998; Van Lange, 1999; Park, 2000; Buckley et al., 2001; Brosig, 2002; Levati et al., 2011). Subjects were randomly paired with another participant and made a series of 24 choices between two allocations, each specifying different amounts of money for the decision-maker and the opponent.[8] Subjects' payoffs in a choice situation depended on the choices they and their opponent made in that situation. The total earnings from part 1 were determined by the sum of the earnings made in the 24 choice situations. Social psychologists have developed a technique to classify subjects depending on the predominant patterns of their 24 choices.[9] Subjects are classified as: i) '*aggressive*', if they make choices that minimize the opponent's payoff; ii) '*competitive*', if they maximize the difference between

[8] Subjects were (truthfully) told that they would not be matched again with the same person after part 1. We used the same 24 decision problems used by Park (2000), see Appendix C. Subjects made choices simultaneously, with no feedback on previous choices made by the opponent.
[9] See, e.g., Liebrand (1984). Brosig (2002) provides a detailed explanation of the classification procedure.

their payoff and the opponent's payoff; iii) '*individualistic*', if they maximize their own payoff; iv) '*cooperative*', if they maximize aggregate payoffs; and v) '*altruistic*', if they maximize their opponent's payoff.

In part 2, we measured subjects' cooperativeness using the one-shot Public Goods Game introduced by Fischbacher et al. (2001).[10] Subjects were matched in groups of 4 and endowed with 20 tokens each, which they could keep or contribute to a public good.[11] The marginal per capita return from contributing a number of tokens c_i to the public good was 0.4. Earnings were computed as:

$$\pi_i = 20 - c_i + 0.4 \cdot \left(c_i + \sum_{j=1}^{3} c_{j \neq i} \right) \qquad (1)$$

Following Fischbacher et al. (2001) we elicited two types of contribution decisions. First, subjects submitted an unconditional contribution c_i to the public good. Subjects were then asked to fill a 'conditional contributions table': they had to specific a contribution c_i for each of the possible 21 (rounded) average contributions (from 0 to 20) of the three other players in their group. The two types of decisions were elicited in an incentive compatible way: at the end of the experiment, a random mechanism selected for each group one group member for whom the 'conditional contributions table' was relevant and three group members for whom the unconditional contributions were relevant. The (rounded) average of the three unconditional contributions determined which of the 21 decisions in the selected conditional contributions table was relevant. The sum of the three unconditional contributions and of the relevant conditional contribution determined the total amount contributed by the group to the public good. Earnings for each group member were then computed according to equation (1) above.

In part 3 of the experiment we elicited subjects' risk attitudes using the lottery choice task also used by Cleave et al. (forthcoming). Subjects were presented with the 6 lotteries shown in Table 2, and had to choose one to be played out at the end of the experiment. Each lottery had two possible outcomes, each occurring with a 50 percent chance. Moving from Lottery 1 to 6, the risk associated with each lottery decreases. The expected payoffs of lotteries 2 to 6 also decrease by 2 points (=£0.20 in the experiment) with each lottery. Thus, more risk-averse subjects should choose lotteries further down the table.

[10] Different versions of the game have been used since Fischbacher et al. (2001). See e.g. Burlando and Guala (2005); Kocher et al. (2008); Muller et al. (2008); Herrmann and Thöni (2009); Fischbacher and Gächter (2010).
[11] As in part 1, subjects knew that they would have not been matched again with these participants after part 2.

TABLE 2
Part 3 – Lottery Task*

	Outcome A (Probability 50%)	Outcome B (Probability 50%)	*Expected Value*	*Standard Deviation*
Lottery 1	60	0	*30*	*30*
Lottery 2	54	6	*30*	*24*
Lottery 3	46	10	*28*	*18*
Lottery 4	38	14	*26*	*12*
Lottery 5	30	18	*24*	*6*
Lottery 6	22	22	*22*	*0*

* Subjects were not shown the columns reporting expected values and standard deviations.

In parts 4 and 5 we elicited subjects' social approval need using both unincentivized and incentivized tasks. In part 4 subjects completed two unincentivized questionnaires, the Social Desirability Scale (SDS-17; Stöber, 2001), and Gudjonsson's Compliance Scale (GCS; Gudjonsson, 1989).[12] The SDS-17 is a 16-item scale measuring the extent to which subjects over-report socially desirable behaviors and attitudes (e.g., "*I always eat a healthy diet*") and under-report social undesirable ones (e.g., "*I occasionally speak badly of others behind their back*"). Answers were recorded using a true/false scale. The GCS is a 20-item scale that measures subjects' propensity to comply with requests made by others, especially if in a position of authority. Subjects used a true/false scale to indicate their agreement with statements such as "*I find it very difficult to tell people when I disagree with them*", or "*I believe in avoiding rather than facing demanding and frightening situations*".[13]

In part 5 we measured subjects' approval need using the task proposed by Tsutsui and Zizzo (2010) to assess subjects' sensitivity to experimenter demand (Zizzo, 2010). Subjects were presented with six pairs of lotteries (shown in Table 3), and for each pair they had to select one lottery, A or B. Each lottery offered the prospect to win a larger or a smaller amount, each with 50 percent probability. Lottery A and B were identical in the first row. In subsequent rows, A became more attractive and B less attractive. At the end of the experiment, a random mechanism selected one pair for each subject and played the lottery from the pair that was chosen by the subject. Subjects were 'nudged' to select the (weakly) dominated lottery B: a smiley face was placed in the column corresponding to lottery B (see Table 3), and a sentence in the instructions read "*It would be nice if at least some of you were*

[12] Both questionnaires are reproduced in Appendix D.
[13] To check whether the order in which subjects took the questionnaires affected their responses, we had half of the subjects in a session complete the SDS-17 scale first, while the other half completed the GCS scale first. We do not find significant differences between the two orderings ($p \geq 0.174$ using Wilcoxon rank-sum tests), and we thus pool the data from the two sub-groups.

to choose B at least some of the time". We take the number of times a subject selects lottery B over lottery A as a measure of their sensitivity to experimenter demand.

TABLE 3
Part 5 – Tsutsui and Zizzo's Task

	Lottery A (50% - 50%)	Lottery B ☺ (50% - 50%)
Pair 1	10 – 30	10 – 30
Pair 2	11 – 31	9 – 29
Pair 3	12 – 32	8 – 28
Pair 4	13 – 33	7 – 27
Pair 5	14 – 34	6 – 26
Pair 6	15 – 35	5 – 25

In part 6 of the experiment, subjects completed two cognitive skills tests: the 3-question Cognitive Reflection Test (CRT; Frederick, 2005) and the 5-question financial literacy test developed for the English Longitudinal Study of Ageing (ELSA, see, e.g., Banks and Oldfield, 2007).[14] For each correct answer subjects received £0.20.

Upon completion of part 6, subjects received feedback about the earnings accumulated through the 6 parts of the experiment. A short (unincentivized) questionnaire followed, collecting basic socio-demographic information (gender, field of study, etc.), risk attitudes (using the SOEP general risk question, e.g., Dohmen et al., 2011), trust attitudes (using the General Social Survey trust question, e.g., Glaeser et al., 2000), and personality traits using the 15-item SOEP version of the Big-Five test (e.g., Dohmen and Falk, 2010). Once subjects had finished the questionnaire they were paid their earnings for the session and left the laboratory. Sessions lasted about 90 minutes, and average earnings (inclusive of a £1.50 show-up fee) were £12.50 (s.d. £2.40). The experiment was programmed in zTree (Fischbacher, 2007).

3.1 Hypotheses

The main focus was on obtaining measurements of the pro-social motivation and approval need from subjects recruited via Standard, NoAppeal and NoMoney. As discussed in section 2.1, if the decision to volunteer for experimental research is significantly driven by pro-social considerations and approval need we would expect to have attracted more pro-socially motivated and/or approval seeking subjects in Standard than in NoAppeal. As long as lab measurements of such motives are correlated with behavior outside the lab, we would

[14] The questions used in the two tests are reproduced in Appendix E.

expect Standard subjects to show more pro-social and approval seeking behavior in our lab experiment than NoAppeal subjects. Finding evidence of the importance of pro-social and approval motives in the field experiment but no evidence of differences in pro-social and approval seeking lab behavior between Standard and NoAppeal would raise questions about the external validity of lab measurements of such motives. On the other hand, if findings from our field experiment suggest that the pro-social and approval motives play only a small role in the decision to volunteer, we would expect to observe no significant differences between subjects' behavior in these two treatments. To summarize:

> **H.1.LAB** - *If we observe a higher response rate in Standard than in NoAppeal in the field experiment, we would expect to observe more pro-social and approval seeking behavior in Standard than in NoAppeal in the lab experiment. If we do not find differences between Standard and NoAppeal in the field experiment, we would also expect to observe no treatment differences in subjects' pro-social and approval seeking behavior in the lab experiment.*

We do not have a strong prior about the relation between the recruitment message in NoMoney and subjects' pro-social and approval seeking motivations. However, if the field experiment results reveal that the financial motivation is an important determinant of the volunteering activity, a comparison of the pro-social and approval seeking behavior of subjects in NoMoney and Standard will reveal whether (and if so how) these motives are correlated with the financial motive.

4. Results

4.1 What Drives Volunteers to Take Part in Economics Experiments?

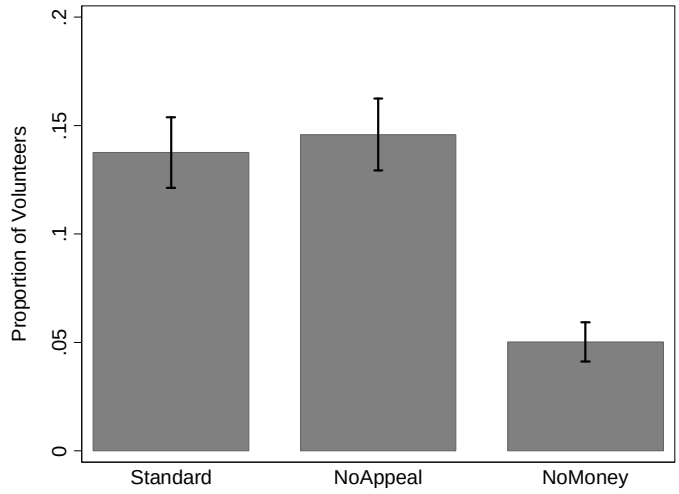
In this sub-section we examine volunteering behavior in the field experiment. We focus mainly on the comparisons of Standard to NoAppeal and Standard to NoMoney as these comparisons involve only one treatment manipulation each. We summarize our main findings in the following results:

> **RESULT.1.FIELD** – *Including an appeal to subjects' pro-social and approval motives in the invitation email does not affect response behavior.*

RESULT.2.FIELD – *Not informing subjects of the existence of financial incentives for participating in experiments reduces the response rate significantly.*

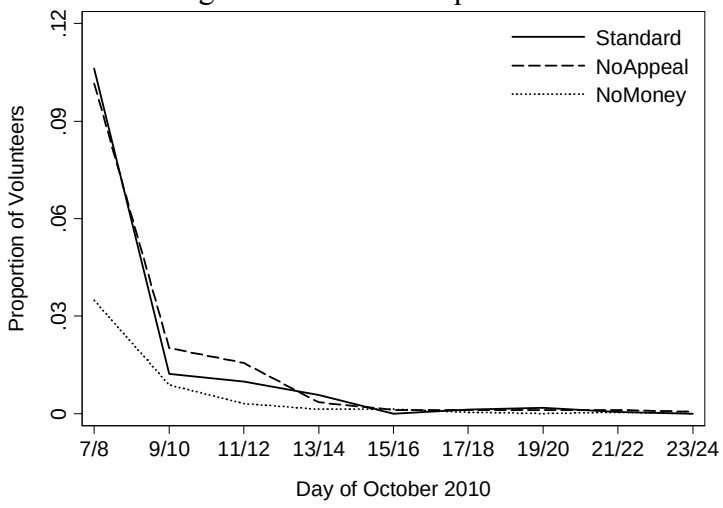
We document these treatment effects in Figures 1 and 2. Figure 1 shows the proportions of invited students who registered to our database of volunteers for experiments in the three treatments. Figure 2 shows how registration rates developed over time.

FIGURE 1
Volunteering for Economics Experiments*



* Lines represent 95% confidence intervals.

FIGURE 2
Volunteering for Economics Experiments over Time



13.8 percent of the invited students completed the registration process in Standard. The proportion of registered students in the NoAppeal treatment is 14.6 percent, whereas only 5.0 percent of the students in NoMoney registered to our database. As shown by Figure 2, these

treatment differences are almost entirely attributable to differences in response behavior in the first forty-eight hours of the field experiment. Overall, we do not find a statistically significant difference in registration rates between Standard and NoAppeal ($\chi^2(1) = 0.49$, $p = 0.486$). The difference in registration rates between NoMoney and Standard is instead highly significant ($\chi^2(1) = 93.21$, $p < 0.001$).[15]

We further explore these treatment effects using regression analysis that allows us to control for observable differences across students assigned to the different conditions.[16] We use a logit regression model where the dependent variable assumes value 1 if a student registered to our database during the treatment period and value 0 otherwise. We use two treatment dummies as regressors (NoAppeal and NoMoney), with students in Standard representing the benchmark category. We include in the regression a dummy for gender (1 if the student is female), a dummy indicating whether a student is classified as overseas for fees purposes, and field of study dummies (we include a separate dummy for students majoring in Economics and we use as benchmark category the Faculty of Sciences, which had the largest number of first-year undergraduate students in 2010). Finally, we also include a set of dummies for students taking courses at Schools whose teaching facilities are (partially) based at campuses located at different distances from the main campus where the experiments are normally run (used as benchmark category). The regression results are reported in Table 4.

[15] The difference between NoMoney and NoAppeal is also highly significant ($\chi^2(1) = 108.01$, $p < 0.001$).
[16] For each first-year undergraduate student we contacted via email we have information on gender, field of study and fee status (Home/EU or Overseas).

TABLE 4
Volunteering for Economics Experiments – Logit Regression

NoAppeal	8.1 (.099)
NoMoney	- 67.1*** (.120)
Female	4.0 (.093)
Overseas	-2.7 (.144)
Arts	-15.9 (.134)
Social Sciences (excl. Economics)	2.9 (.137)
Economics	237.3*** (.176)
Engineering	-22.2 (.170)
Medicine	11.1 (.253)
Campus #2 (approx. 0.8 miles from main campus)	-28.8 (.209)
Campus #3 (approx. 1.3 miles from main campus)	-31.3** (.163)
Campus #4 (more than 10 miles from main campus)	-55.6*** (.269)
N.	*5725*
Pseudo R^2	*0.06*

The dependent variable takes value 1 if a subject registered to our database of volunteers between October 7th and October 24th. Results are shown as percentage changes in the odds of registering to the database. Robust standard errors in parentheses. Benchmark category: in Standard, male, classified as Home/EU for fees purposes, studying a course in the Faculty of Science, whose School is based at the main campus. The category 'Overseas' includes 9 students who for fees purposes would be classified as 'Channel Island' students. The dummy Campus #4 includes 317 students whose School is based at a campus at about 11 miles from the main campus, and 29 students from a campus located at approximately 16 miles from the main campus. Significance levels: * 10%; ** 5%; *** 1%.

The regression shows that being in the NoMoney treatment reduces the odds of volunteering for economics experiments by 67 percent, *ceteris paribus*. The effect is significant at the 1 percent level. Being in the NoAppeal treatment has instead a positive effect on the odds of volunteering. However, the percent change in the odds of registering is small (8 percent) and statistically insignificant (p = 0.434).

Among the controls, we find a strong positive effect of majoring in economics. This result compares with that by Krawczyk (2011), who also report that economics students are significantly more likely to volunteer for experimental economics research. This effect could

be explained by the fact that economics students may have greater interest and familiarity with experimental economics relative to students from other disciplines. We also find that taking a course at Schools which are not located at the main campus (where the experiments are conducted) decreases the odds of volunteering. The size of this negative effects increases with the distance from the main campus. This seems reasonable, as students registered at Schools not located at the main campus may face higher costs of participation, e.g., transportation costs. This sensitivity to distance to the lab could also partly explain why economics students are more likely to register since the lab is located in the same building as the School of Economics (the campus dummies in Table 4 do not control for intra-campus distance and the familiarity with different parts of the campus).

Overall, these results suggest that financial incentives play an important role in the decision to volunteer for economics experiments. Removing any reference to financial incentives from the invitation email reduces the registration rate by about two-thirds. In contrast, removing the appeal to subjects' pro-social and approval motives has a small and insignificant effect on registrations, suggesting that these motives play a minor role in the decision to volunteer. An implication of these findings is that in the follow-up lab experiment we would expect to observe few differences in pro-social and approval seeking behavior between the Standard and NoAppeal subjects. The next section shows that this is indeed the case.

4.2 Lab Measurements of Pro-social Motivation and Social Approval Need

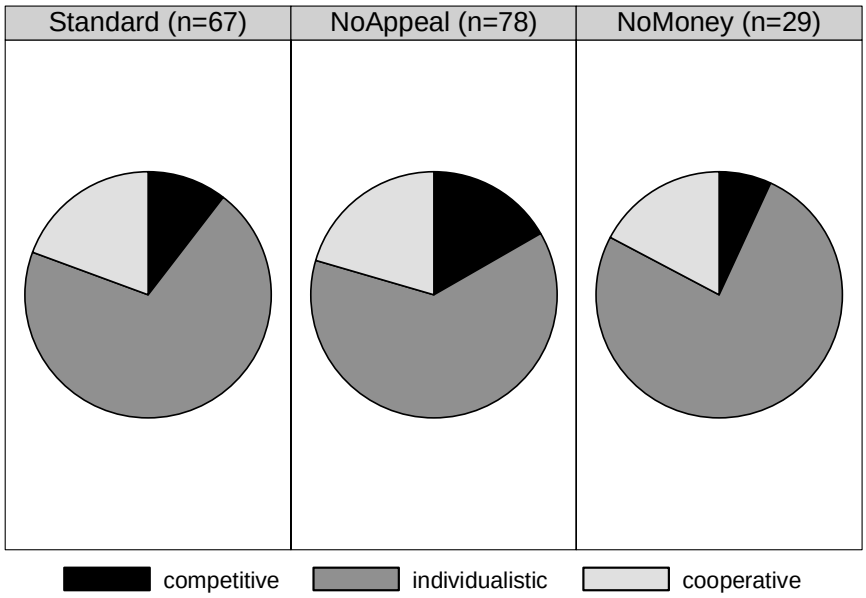
In this sub-section we examine subjects' behavior in the tasks of the lab experiment aimed at measuring their pro-social and approval need motives. We summarize our main findings in the following result:

> **RESULT.1.LAB** – *We do not find any significant treatment differences in subjects' pro-social and approval seeking behavior between Standard and NoAppeal. We also do not find any significant differences between Standard and NoMoney, and NoAppeal and NoMoney.*

We corroborate these results by analyzing subjects' behavior in the Decomposed Game, the public goods game and our three measures of social approval need (the SDS-17 scale, the GCS scales and the experimenter demand task of Tsutsui and Zizzo). Starting with the Decomposed Game, we use behavior in the game to classify 118 subjects (68 percent) as

'individualistic' (i.e. they made own payoff-maximizing choices in the game), 34 subjects (19 percent) as 'cooperative' (they maximized joint payoffs), and 22 subjects (13 percent) as 'competitive' (they maximized the difference between their own payoff and the other player's payoff).[17] We do not find subjects that can be classified as 'aggressive' or 'altruistic' in our experiment. The overall distribution of types is in line with previous experiments, although we find somewhat more 'competitive' subjects and fewer 'cooperative' subjects than in other studies.[18] Figure 2 shows the distribution of types across our three treatments.

FIGURE 2
Social Value Orientations in the Decomposed Game



The proportion of 'cooperative' subjects is fairly stable across treatments (ranging from 17 percent in NoMoney to 21 percent in NoAppeal). The proportions of 'competitive' and 'individualistic' subjects seem to vary somewhat more across treatments, with the most notable difference being that more subjects are classified as 'competitive' and fewer as 'individualistic' in NoAppeal than in NoMoney. However, we fail to detect statistically significant differences in the overall distribution of types across the three treatments (Fisher's

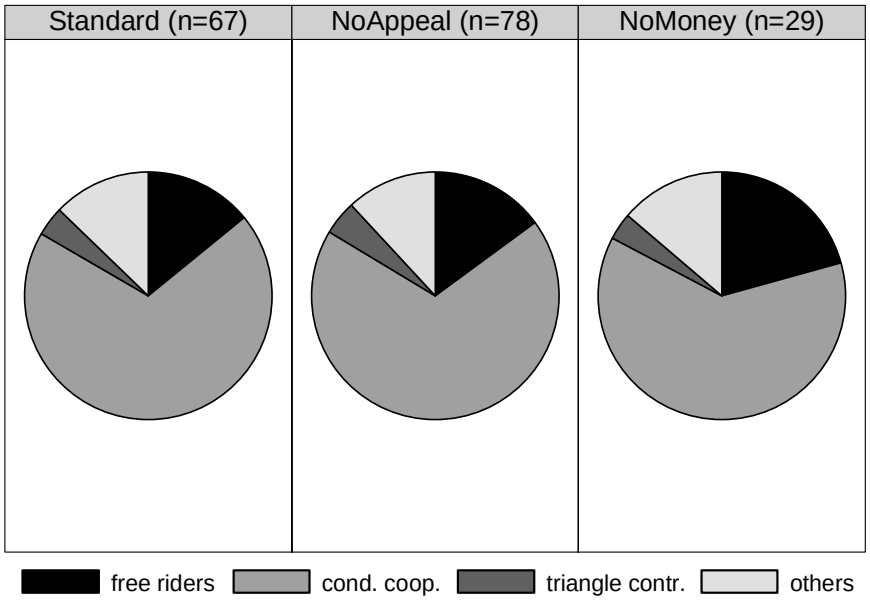
[17] Subjects' choices across the 24 decision problems can also be used to determine their 'degree of consistency', i.e. how often subjects make choices that are consistent with the assigned 'type' (see, e.g., Offerman et al., 1996). Following Offerman et al. (1996) subjects are 'not consistent' if their degree of consistency is less than 33 percent. Accordingly, only 1 subject is 'not consistent' in our experiment. Results are not sensitive to the inclusion of this person into the analysis.

[18] For example, Offerman et al. (1996) classify 65 percent of their subjects as 'individualistic', 27 percent as 'cooperative' 4 percent as 'competitive' and 1 percent as 'aggressive'. Park (2000) finds that 65.5 percent subjects are 'individualistic', 32 percent are 'cooperative' and only one subject is 'competitive'. Brosig (2002) classifies 59.9 percent of subjects as 'individualistic', 37.3 percent as 'cooperative' 1.4 percent as 'competitive' and 1.4 percent as 'altruistic'.

exact test: p = 0.662). Bilateral comparisons between the Standard treatment and the NoAppeal and NoMoney treatments also reveal insignificant differences in the distribution of types (Standard vs. NoAppeal, p = 0.544; Standard vs. NoMoney, p = 0.937).

Turning to the public goods game, we follow Fischbacher et al. (2001) and use the conditional contributions tables elicited in part 2 of the experiment to classify subjects in four different 'cooperation categories': 'free riders', 'conditional cooperators', 'triangle contributors' and 'others'.[19] In our experiment we find that 15 percent of our subjects are 'free riders', 68 percent are 'conditional cooperators', 4 percent are 'triangle contributors' and 13 percent fall in the category 'others'.[20] Figure 3 shows the distribution of cooperation types across the three treatments.

FIGURE 3
Cooperativeness in the Public Goods Game



Overall, cooperation types are similarly distributed across treatments. Conditional cooperators are somewhat less frequent in NoMoney (62 percent) than NoAppeal or Standard

[19] We classify as 'free riders' those subjects who contribute 0 tokens regardless of the average contribution of their group members. 'Conditional cooperators' have a contribution schedule which increases monotonically in others' average contribution or is positively correlated with others' contribution with a Spearman rank correlation significant at the 1percent level. Subjects whose contributions are positively related to others' contribution up to some level and significantly decrease thereafter, again according to a Spearman rank correlation test at the 1 percent level, are labeled 'triangle contributors'. Finally, we classify as 'others' all subjects who cannot be classified in any of the three categories above.

[20] The distribution of types in our sample is somewhat different from that found in the original study by Fischbacher et al (2001), who had 30 percent free riders, 50 percent conditional cooperators, 14 percent triangle contributors and 6 percent of the subjects classified as 'others'. Our distribution of types is more similar to that reported by Kocher et al (2008), who in a US sample find 8 percent free riders, 81 percent conditional cooperators, 0 percent triangle contributor and 11 percent others.

(69 percent in each), whereas the proportion of free riders is larger in NoMoney (21 percent) than in the other two treatment (15 percent in NoAppeal, 14 percent in Standard). However, we cannot reject the null hypothesis of equal distribution of types across the three treatments (Fisher's exact test: p = 0.985), or in the bilateral comparisons (Standard vs. NoAppeal, p = 1.000; Standard vs. NoMoney, p = 0.887).[21]

We now turn to our measures of social approval need. Table 5 shows, disaggregated by treatment, the descriptive statistics of the SDS-17 and GCS scales as well as the number of times subjects selected the weakly-dominated lottery in the experimenter demand task of Tsutsui and Zizzo (2010). In all cases, higher values are indicative of higher need of social approval.

TABLE 5
Social Approval Need

		Standard (n = 67)	NoAppeal (n = 78)	NoMoney (n = 29)
SDS-17	Mean	8.18	8.5	8.41
	Std. Dev.	3.18	3.14	3.37
	Median	9	9	9
	Min-Max	0-14	1-16	2-13
GCS	Mean	8.97	8.65	9.90
	Std. Dev.	3.01	3.44	3.88
	Median	9	8.5	10
	Min-Max	3-17	2-19	2-18
Tsutsui & Zizzo's task	Mean	1	1.28	1.28
	Std. Dev.	0.92	1.02	1.29
	Median	1	1	1
	Min-Max	0-4	0-4	0-6

We do not find marked differences across treatments in any of our measurements, and in each case we fail to reject the hypothesis that the samples have been drawn from the same distribution using Kruskal-Wallis tests (SDS-17, p = 0.845; GCS, p = 0.233; Tsutsui and Zizzo's task, p = 0.217). Bilateral comparisons using Mann-Whitney tests reveal no difference between Standard and the other two treatments in the SDS-17 (Standard vs. NoAppeal, p = 0.588; Standard vs. NoMoney, p = 0.686) or GCS measurement (Standard vs. NoAppeal, p = 0.465; Standard vs. NoMoney, p = 0.217). We do find a marginally significant

[21] We also do not find significant differences in subjects' unconditional contributions (Kruskal-Wallis test, p = 0.672; Mann-Whitney tests: Standard vs. NoAppeal, p = 0.989; Standard vs. NoMoney, p = 0.383). We also looked at treatment differences in subjects' self-reported trust attitudes as measured by the GSS trust question included in the post-experimental questionnaire. Overall, we find that 53 percent of subjects believe that "most people can be trusted", and this proportion does not vary significantly across treatments (Fisher's exact tests: all treatments, p = 0.232; Standard vs. NoAppeal, p = 0.407; Standard vs. NoMoney, p = 0.119).

difference between Standard and NoAppeal in the choice of weakly-dominated lotteries in the Tsutsui and Zizzo (2010) task (Mann-Whitney test p = 0.083), but this result should be interpreted with caution due to the multiple tests performed and the outcome of the Kruskal-Wallis test. We do not find significant differences in the Tsutsui and Zizzo (2010) task between Standard and NoMoney (Mann-Whitney test p = 0.368).

Overall, we do not find evidence of systematic differences in our measurements of pro-social motivation and social approval need across volunteers attracted by different recruitment messages in Standard, NoAppeal and NoMoney. This is not surprising given our finding from the field experiment suggesting that the pro-social and approval need motives play a small role in the decision to take part in economics experiments.

4.3 Lab Measurements of Risk Preferences and Cognitive Skills

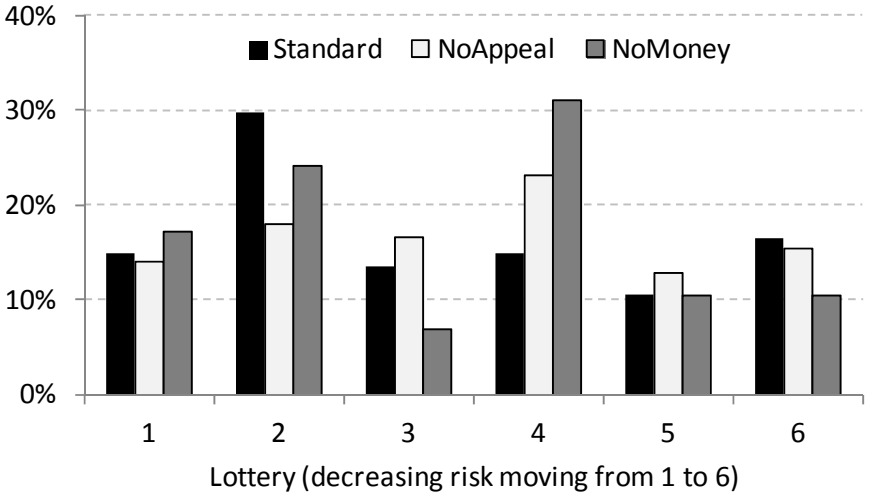
Although the main focus of our lab experiment was on collecting measurements of pro-social and approval motives, we also included experimental tasks to measure subjects' risk preferences (part 3) and cognitive skills (part 6). Our main finding is summarized as follows:

> **RESULT.2.LAB** – *We do not find any treatment differences in subjects' risk attitudes and cognitive skills across any of our three treatments.*

Figure 4 shows the distribution of lottery choices in part 3 of the experiment. The risk associated with each lottery decreases from lottery 1 to 6. The Figure shows that subjects in NoAppeal and NoMoney tend to choose safer lotteries somewhat more often than subjects in Standard. However, a clear pattern does not seem to emerge. In fact, we fail to reject the hypothesis that the distributions of lottery choices are different across treatments (Fisher's exact tests: all treatments, p = 0.719; Standard vs. NoAppeal, p = 0.574; Standard vs. NoMoney, p = 0.562).[22]

[22] We reach a similar conclusion using the the SOEP general risk question included in the post-experimental questionnaire. The question elicits risk attitudes using a scale from 0 to 10, where 0 means "very risk averse" and 10 "fully prepared to take risks". The average value in our sample is 6.18 (s.d. 2.20). We do not find significant differences in the measurement across treatments (Kruskal-Wallis test, p = 0.623; Mann-Whitney tests: Standard vs. NoAppeal, p = 0.353; Standard vs. NoMoney, p = 0.524).

FIGURE 4
Distributions of Lottery Choices



Turning to our measurements of subjects' cognitive skills, Table 6 reports the average number of correct answers in the Cognitive Reflection and Financial Literacy tests in our three treatments. Again, we see only small and statistically insignificant differences across treatments in these measurements.[23]

TABLE 6
Cognitive Skills Tests – Number of Correct Answers

		Standard (n = 67)	NoAppeal (n = 78)	NoMoney (n = 29)
Cognitive Reflection Test	Mean	1.75	1.79	1.96
	Std. Dev.	1.11	1.07	0.94
	Median	2	2	2
	Min-Max	0-3	0-3	0-3
Financial Literacy Test	Mean	4.73	4.55	4.83
	Std. Dev.	0.66	0.89	0.38
	Median	5	5	5
	Min-Max	2-5	1-5	4-5

5. Conclusions

In this paper, we have studied the self-selection process of subjects into laboratory experiments. We sent differently-worded emails to first-year university students inviting them to sign up for the subject pool. In three treatments, we either mentioned the monetary payments that go along with the participation in experiment; or appealed to subjects'

[23] Cognitive Reflection test: Kruskal-Wallis tests: p = 0.724; Mann-Whitney tests: Standard vs. NoAppeal, p = 0.813; Standard vs. NoMoney, p = 0.420. Financial Literacy test: Kruskal-Wallis tests: p = 0.285; Mann-Whitney tests: Standard vs. NoAppeal, p = 0.185; Standard vs. NoMoney, p = 0.843.

willingness to help research and stressed the importance of volunteering; or both. We find that the sign-up rate drops by about two-thirds if we do not mention monetary rewards. Appealing to subjects' willingness to help research does not have a statistically discernible effect on sign-up.

In a second step, we invited the so-recruited subjects to the lab to test whether they differ in their social values, cooperativeness, risk attitudes, social approval need or sensitivity to experimenter demand. We do not find any significant differences across the three treatments. While we would have wished for bigger sample sizes in the NoMoney treatment, the point estimates do not differ systematically between treatments; we thus do not expect larger sample sizes to alter our conclusion.

We conclude that the main reason for students to self-select into becoming lab-experimental subjects is to earn money. This is in line with the observation that many subjects repeatedly participate in lab experiments, often more than a dozen times, treating participation almost like a small side job. Given that money is the driver of selection, it is unlikely that the selection aspect of lab experiments leads to over-estimation of social preferences in the population from which participants are sampled.[24]

Usual lab experimental subjects differ in two ways from the general population. We examined the self-selection process from the group of all students into the subject pool. We cannot say anything about the second margin of selection: students will differ from non-students by, for example, being younger, smarter, and by having a better socioeconomic background and higher lifetime earnings. Anderson et al. (forthcoming) and Falk et al. (forthcoming), among many others, study this margin of selection and usually find only small differences; if anything, students seem to be less pro-social than non-students.

[24] Of course, other factors could lead to an overestimation of social preferences in lab experiments, e.g., the fact that in a lab experiment participants are aware that they are being scrutinized (see Levitt and List, 2007, Falk and Heckman, 2009, and Camerer, 2011 for discussions).

References

Anderson, J., S.V. Burks, J. Carpenter, L. Götte, K. Maurer, D. Nosenzo, R. Potter, K. Rocha, and A. Rustichini. forthcoming. Self-selection and variations in the laboratory measurement of other-regarding preferences across subject pools: Evidence from one college student and two adult samples. *Experimental Economics*

Banks, J., and Z. Oldfield. 2007. Understanding Pensions: Cognitive Function, Numerical Ability and Retirement Saving. *Fiscal Studies* 28(2), 143–170.

Belot, M., R. Duch, and L. Miller. 2010. Who should be called to the lab? A comprehensive comparison of students and non-students in classic experimental games. University of Oxford, Nuffield College Discussion Papers (2010-001).

Bohnet, I., and B.S. Frey. 1999. Social distance and other-regarding behavior in dictator games: Comment. *American Economic Review* 89(1), 335–339.

Brosig, J. 2002. Identifying cooperative behavior: Some experimental results in a prisoner's dilemma game. *Journal of Economic Behavior & Organization* 47(3), 275–290.

Buckley, N., K.S. Chan, J. Chowhan, S. Mestelman, and M. Shehata. 2001. Value Orientations, Income and Displacement Effects, and Voluntary Contributions. *Experimental Economics* 4(2), 183–195–195.

Burks, S., J. Carpenter, and L. Götte. 2009. Performance pay and worker cooperation: Evidence from an artefactual field experiment. *Journal of Economic Behavior & Organization* 70(3), 458–469.

Burlando, R.M., and F. Guala. 2005. Heterogeneous agents in public goods experiments. *Experimental Economics* 8(1), 35–54.

Camerer, C. 2011. The Promise and Success of Lab-Field Generalizability in Experimental Economics: A Critical Reply to Levitt and List. SSRN Working Paper.

Charness, G., and U. Gneezy. 2008. What's in a name? Anonymity and social distance in dictator and ultimatum games. *Journal of Economic Behavior & Organization* 68(1), 29–35.

Cleave, B.L., N. Nikiforakis, and R. Slonim. forthcoming. Is There Selection Bias in Laboratory Experiments? The Case of Social and Risk Preferences. *Experimental Economics*

Coppock, A., and D.P. Green. 2013. Assessing the Correspondence between Experimental Results Obtained in the Lab and Field: A Review of Recent Social Science. Mimeo, Columbia University.

Cubitt, R.P., M. Drouvelis, S. Gächter, and R. Kabalin. 2011. Moral judgments in social dilemmas: How bad is free riding? *Journal of Public Economics* 95(3-4), 253–264.

Dohmen, T.J., and A. Falk. 2010. You Get What You Pay For: Incentives and Selection in the Education System. *The Economic Journal* 120(546), F256–F271.

Dohmen, T.J., and A. Falk. 2011. Performance Pay and Multidimensional Sorting: Productivity, Preferences, and Gender. *American Economic Review* 101(2), 556–590.

Dohmen, T.J., A. Falk, D. Huffman, U. Sunde, J. Schupp, and G.G. Wagner. 2011. Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences. *Journal of the European Economic Association* 9(3), 522–550.

Eckel, C.C., and P.J. Grossman. 2000. Volunteers and Pseudo-Volunteers: The Effect of Recruitment Method in Dictator Experiments. *Experimental Economics* 3(2), 107–120.

Falk, A., and J.J. Heckman. 2009. Lab Experiments Are a Major Source of Knowledge in the Social Sciences. *Science* 326(5952), 535–538.

Falk, A., S. Meier, and C. Zehnder. forthcoming. Do Lab Experiments Misrepresent Social Preferences? The case of self-selected student samples. *Journal of the European Economic Association*

Fischbacher, U. 2007. z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics* 10(2), 171–178.

Fischbacher, U., and S. Gächter. 2010. Social preferences, beliefs, and the dynamics of free riding in public good experiments. *American Economic Review* 100(1), 541–556.

Fischbacher, U., S. Gächter, and E. Fehr. 2001. Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters* 71(3), 397–404.

Frederick, S. 2005. Cognitive Reflection and Decision Making. *Journal of Economic Perspectives* 19(4), 25–42.

Gaudecker, H.-M. von, A. van Soest, and E. Wengström. 2012. Experts in experiments. *Journal of Risk and Uncertainty* 45(2), 159–190.

Glaeser, E.L., D.I. Laibson, J.A. Scheinkman, and C.L. Soutter. 2000. Measuring trust. *Quarterly Journal of Economics* 115(3), 811–846.

Greiner, B. 2004. An Online Recruitment System for Economic Experiments. In *Forschung und wissenschaftliches Rechnen. GWDG Bericht 63*, ed by. K. Kremer and V. Macho, 79–93. Göttingen: Ges. für Wiss. Datenverarbeitung.

Gudjonsson, G.H. 1989. Compliance in an interrogative situation: A new scale. *Personality and Individual Differences* 10(5), 535–540.

Herrmann, B., and C. Thöni. 2009. Measuring conditional cooperation: A replication study in Russia. *Experimental Economics* 12(1), 87–92.

Hoffman, E., K. McCabe, and V.L. Smith. 1996. Social Distance and Other-Regarding Behavior in Dictator Games. *American Economic Review* 86(3), 653–60.

Jenni, K.E., and G. Loewenstein. 1997. Explaining the identifiable victim effect. *Journal of Risk and Uncertainty* 14(3), 235–257.

Kagel, J.H., R.C. Battalio, and J.M. Walker. 1979. Volunteer Artifacts in Experiments in Economics: Specification of the Problem and Some Initial Data from a Small-Scale Field Experiment. In *Research in Experimental Economics*, ed by. Vernon L. Smith, 1:169–197. Greenwich, CT: JAI Press.

Kocher, M.G., T. Cherry, S. Kroll, R.J. Netzer, and M. Sutter. 2008. Conditional cooperation on three continents. *Economics Letters* 101, 175–178.

Krawczyk, M. 2011. What brings your subjects to the lab? A field experiment. *Experimental Economics* 14(4), 482–489.

Levati, M.V., M. Ploner, and S. Traub. 2011. Are conditional cooperators willing to forgo efficiency gains? Evidence from a public goods experiment. *New Zealand Economic Papers* 45(1), 47–57.

Levitt, S.D., and J.A. List. 2007. What do laboratory experiments measuring social preferences reveal about the real world? *Journal of Economic Perspectives* 21(2), 153–174.

Liebrand, W.B.G. 1984. The effect of social motives, communication and group size on behaviour in an N-person multi-stage mixed-motive game. *European Journal of Social Psychology* 14(3), 239–264.

List, J.A. 2007. Field Experiments: A Bridge between Lab and Naturally Occurring Data. *The B.E. Journal of Economic Analysis & Policy* 6(2).

Müller, L., M. Sefton, R. Steinberg, and L. Vesterlund. 2008. Strategic behavior and learning in repeated voluntary-contribution experiments. *Journal of Economic Behavior & Organization* 67, 782–793.

Offerman, T., J. Sonnemans, and A. Schram. 1996. Value Orientations, Expectations and Voluntary Contributions in Public Goods. *Economic Journal* 106, 817–845.

Park, E.-S. 2000. Warm-glow versus cold-prickle: a further experimental study of framing effects on free-riding. *Journal of Economic Behavior and Organization* 43, 405–421.

Rosenthal, R., and R.L. Rosnow. 1969. The Volunteer Subject. In *Artifact in Behavioral Research*, ed by. Robert Rosenthal and Ralph L. Rosnow, 61–118. New York and London: Academic Press.

Rosenthal, R., and R.L. Rosnow. 1975. *The Volunteer Subject*. Wiley Series of Personality Processes. New York: Wiley.

Rustagi, D., S. Engel, and M. Kosfeld. 2010. Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management. *Science* 330(6006), 961–65.

Slonim, R., C. Wang, E. Garbarino, and D. Merrett. 2013. Opting-In: Participation Biases in the Lab. *Journal of Economic Behavior & Organization* 90, 43–70.

Small, D.A., and G. Loewenstein. 2003. Helping a victim or helping the victim: Altruism and identifiability. *Journal of Risk and Uncertainty* 26(1), 5–16.

Sonnemans, J., A. Schram, and T. Offerman. 1998. Public good provision and public bad prevention: The effect of framing. *Journal of Economic Behavior & Organization* 34(1), 143–161.

Stöber, J. 2001. The Social Desirability Scale-17 (SDS-17): Convergent Validity, Discriminant Validity, and Relationship with Age. *European Journal of Psychological Assessment* 17(3), 222–232.

Stoop, J., C.N. Noussair, and D. van Soest. 2012. From the lab to the field: Cooperation among fishermen. *Journal of Political Economy* 120(6), 1027–1056.

Tsutsui, K., and D.J. Zizzo. 2010. Group Status, Minorities and Trust. University of East Anglia CBESS Working Paper 10-10.

Van Lange, P.A.M. 1999. The pursuit of joint outcomes and equality in outcomes: An integrative model of social value orientation. *Journal of Personality and Social Psychology* 77(2), 337–349.

Zizzo, D.J. 2010. Experimenter demand effects in economic experiments. *Experimental Economics* 13(1), 75–98.

Appendix A – Recruitment Messages

Standard recruitment message. The sentences deleted in the NoAppeal treatment message are underlined and within square brackets. The sentences deleted in the NoMoney treatment message are in italics and within parentheses.

Dear #name#,
We are a group of researchers based at the School of Economics, and we would like to invite you to participate in our studies. [Participation is fun and your collaboration will be of immense value to our scientific investigations.] *(You will typically receive some reward (usually cash) in return for your participation.)* To participate in our studies you need to register with us at: http://www.nottingham.ac.uk/economics/cedex/register/

Once you register you will be eligible to receive invitations for individual studies. The invitations will tell you the dates and times and any other necessary information. Note that registering with us does not commit you to anything. You are always free to accept or ignore a particular invitation. You can also deregister at any time.

[Our research investigates how people make decisions and for that we require the participation of volunteers: your participation is crucial to the success of our research, and we will highly appreciate your contribution and be really grateful for your collaboration.] If you have never taken part in our studies the best way to describe them is as a game in which you will act as a trader or other type of decision maker. Any interaction with other participants is typically via a computer network. There is no chance of your losing anything – at worst you will win nothing – and no special skills are required. Participating in a study usually does not take longer than an hour and normally takes place at the School of Economics (invitations for individual studies will give you more precise details about duration and location). *(We pay you when you take part in our studies. We do not wish to create expectations about the payments, but we can tell you that most participants in previous experiments have been pleased with their cash rewards.)* Your participation is strictly confidential: we never reveal your identity to other participants or anyone else.

We have been conducting these studies for nine years now. We had several thousands of students take part in many studies over the years. If you register, your registration will remain valid, and you will remain eligible to receive invitations, until the end of your studies (unless you choose to deregister in the meantime). Once again, if you wish to register, you can do it at: http://www.nottingham.ac.uk/economics/cedex/register/

Appendix B – Lab Experiment Instructions

PRELIMINARY INSTRUCTIONS

Welcome! You are about to take part in a decision-making experiment. This experiment is run by the "Centre for Decision Research and Experimental Economics" and has been financed by various research foundations.

There are other people in this room, who are also participating in this experiment. All participants are reading the same instructions and have been recruited in the same way. Likewise, everyone is participating in this experiment for the first time. It is important that you do not talk to any of the other participants during the experiment. If you have a question at any time, raise your hand and a monitor will come to your desk to answer it.

This experiment consists of six different parts.

In each part you will be asked to make one or more decisions. Decisions made in one part of the experiment will bear no consequences for the other parts of the experiment.

During the experiment you will have a chance to earn money. The total amount you will earn from the experiment will be the sum of the earnings you make in the different parts of the experiment. During the experiment your earnings will be calculated in points. These point earnings will be converted into cash at a rate of 10p per point. In addition to the money you will earn during the experiment, we will pay you £1.50 for showing up today. Your cash earnings will be paid to you in private at the end of the experiment.

You will be informed of any outcome (including your earnings) from the six parts of the experiment only at the end of the session. Therefore, in any given part of the experiment everyone will make their decisions without knowing any outcome from the previous parts.

You find on your desk instructions for PART 1 of the experiment. You will receive instructions for the other parts of the experiment gradually, as the experiment progresses.

If you have a question now, please raise your hand and a monitor will come to your desk.

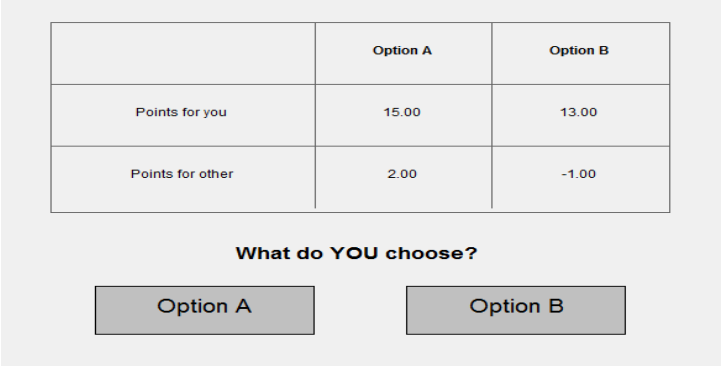
PART 1

At the beginning of PART 1 the computer will randomly pair you with another person in this room. You will remain paired with this person for the whole duration of PART 1. At the end of PART 1 the pair will be dissolved, and you will not be matched with this other person again during today's experiment. You will not learn the identity of the person you are paired with in PART 1, neither during, nor after, today's session.

In PART 1 of the experiment you and the person you are paired with will be asked to make choices in a series of 24 situations. You and the other person will make choices independently and will not learn each other choices at any point during the experiment.

For each situation you will have to choose between two options: Option A or Option B. Each option specifies a number of points that you will receive or pay ("Points for you"), and a number of points that the other person will receive or pay ("Points for other").

For example, a possible situation may look as follows:



	Option A	Option B
Points for you	15.00	13.00
Points for other	2.00	-1.00

What do YOU choose?

Option A Option B

In this example situation, if you choose Option A you receive 15 points and the other person receives 2 points. If you choose Option B, you receive 13 points and the other person has to pay 1 point. Likewise, if the person you are paired with faces this situation and chooses Option A, he or she receives 15 points and you receive 2 points. If the person you are paired with chooses Option B, he or she receives 13 points and you have to pay 1 point.

Thus, in each situation your earnings depend on the number of points that you assign to yourself, and on the number of points that the other person assigns to you. For example, suppose that in the example situation above you choose Option A and the other person chooses Option B. Your total earnings for the situation will be 14 points: 15 points that you assign to yourself minus 1 point that the other person makes you pay. The earnings of the other person will be equal to 15 points: 13 points that he or she assigns to him or herself plus 2 points that you assign to him or her.

Your total earnings from PART 1 of the experiment will be the sum of the earnings you make in the 24 situations. You will learn your earnings from PART 1 at the end of today's session. You will be paid in private and in cash at the end of the experiment.

Please raise your hand if you have any questions.

To make sure everyone understands the instructions, please complete the questions about PART 1 below. In a couple of minutes someone will come to your desk to check the answers. (The decisions and earnings used for the questions below are simply for illustrative purposes. In the experiment the decisions and earnings will depend on the actual choices of the participants.).

Questions about PART 1:

1. How many choices will you make in total in PART 1? _____

2. Suppose that in the example situation above you choose Option B and the person you are paired with also chooses Option B. How much would you earn? _____ How much would the other person earn? _____

3. Is the following statement true: you will not learn the choices made by the other person, nor will he or she learn your choices during today's experiment _____

4. Is the following statement true: your total earnings from PART 1 will be determined by adding the earnings you make in each of the 24 situations _____

PART 2

At the beginning of PART 2 the computer will randomly match you with three other participants in this room to form a group of four people. You will remain in this group for the whole duration of PART 2. At the end of PART 2 the group will be dissolved, and you will not be matched with these three participants again during this experiment. You will not learn the identity of these participants neither during, nor after today's session.

The Basic Decision Situation

The basic decision situation is simple. Each group member is given an endowment of 20 points, and has to decide how many of these points to place into a **private account** and how many to contribute to a **group project**.

- Each point a group member places into his or her **private account** earns 1 point to that person. For example, if you place 20 points into your private account (and therefore do not contribute to the group project) your earnings from your private account will be 20 points. If you place 6 points into your private account, your earnings from your private account will be 6 points. No one except you earns points from your private account.
- Each point contributed to the **group project** generates 1.6 points to be shared equally among the group members. For example, if the sum of all contributions to the project in your group is 60 points, then the project generates $60 \times 1.6 = 96$ points. These will be shared equally among you and the three other members of your group, so each of you will receive $96 \div 4 = 24$ points. As another example, if you and the three other group members contribute a total of 10 points to the project, each of you will receive: $(10 \times 1.6) \div 4 = 4$ points.

Your total earnings from the decision situation are given by the sum of your earnings from your private account and your earnings from the group project.

To make sure everyone understands the instructions so far, please complete the questions on the next page. If you want to, you can use an electronic calculator while you answer the questions. To use the electronic calculator, click the CALCULATOR icon on the bottom-right corner of your computer screen. In a couple of minutes someone will come to your desk to check your answers. (The decisions and earnings used for the questions below are simply for illustrative purposes. In the experiment decisions and earnings will depend on the actual choices of the participants.).

Questions about PART 2:

1. Each group member has 20 points. Assume that none of the four group members (including you) contributes anything to the project.

What are *your* total earnings? _____

What are the earnings of *each other member* of your group? _____

2. Each group member has 20 points. You contribute 20 points to the project. Each of the three other members of your group also contributes 20 points to the project.

What are *your* total earnings? _____

What are the earnings of *each other member* of your group? _____

3. Each group member has 20 points. Suppose that the other three members of your group contribute a total of 30 points to the project.

a. What are *your* total earnings if – in addition to these 30 points - you contribute 0 points to the group project? _____

b. What are *your* total earnings if – in addition to these 30 points - you contribute 15 points to the group project? _____

4. Each group member has 20 points. Suppose that you contribute 8 points to the project.

a. What are *your* total earnings if – in addition to your 8 points – the other group members contribute a total of 7 points to the group project? _____

b. What are *your* total earnings if – in addition to your 8 points - the other group members contribute a total of 22 points to the group project? _____

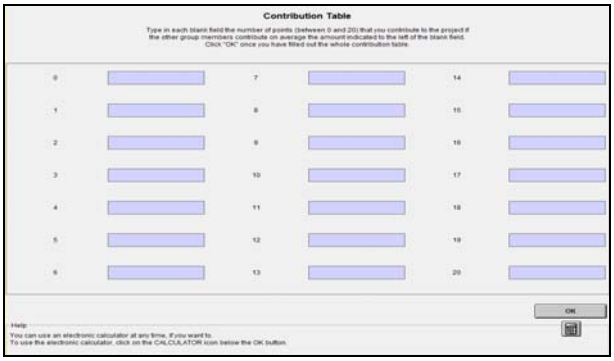
How You Make Decisions

PART 2 of the experiment is based on the decision situation just described above. As you know you will have an endowment of 20 points. You will have to decide how many of these points to contribute to the group project. Any point that you do *not* contribute to the project will be automatically placed into your private account.

In this experiment we ask you to make **two types of decisions**. We will refer to these two decision types as "the unconditional contribution decision" and "the contribution table". You will make these decisions on the computer by completing two screens. Note that you will complete these screens only once, there is no repetition.

On the first screen, you have to make your **unconditional contribution decision** by typing in the number of points (between 0 and 20) you contribute to the group project. This is how the screen where you indicate your unconditional contribution will look like:

On the second screen, you have to fill out a **contribution table** where you indicate how many points you contribute to the project for **each possible average contribution of the other group members** (rounded to the closest whole number). Thus, with the contribution table you can condition your contribution decision on what the other group members contribute on average. This is how the screen containing the contribution table will look like:



The numbers displayed to the left of each blank field are the possible (rounded) average contributions of the three other group members. We want to know how many points you contribute to the project for any possible average contribution of the other group members. Thus, you have to make a contribution decision for every possible average contribution of the other group members. In each blank field you must indicate the number of points (between 0 and 20) that you contribute to the project **if the other group members contribute on average the amount indicated to the left of the blank field**.

How Your Earnings Are Determined

In PART 2 of the experiment we ask you to make an unconditional contribution decision and to fill out a contribution table. However, only one type of decision will be used for determining your earnings in PART 2. Which type of decision will be used to compute earnings will be determined at random *after* you have made both types of decisions. Thus, at the time you make these decisions you do not know which one will be relevant for the computation of earnings. Therefore, you will have to think carefully about both types of decisions because both can become relevant for you.

After all group members have made their decisions, the computer will randomly select one group member. For the selected group member the contribution table will be used for the computation of earnings. For the other three group members who are not selected the unconditional contribution decision will be used. Thus,

If you are selected at random by the computer: then, we will compute earnings using your contribution table and the three unconditional contribution decisions of the other members of your group. We will average the unconditional contributions of the three other members of your group and round it to the closest whole number. We will then look at your contribution

table to find out the number of points that you decided to contribute when the other group members make that average contribution.

If you are not selected at random by the computer: then, we will compute earnings using your unconditional contribution decision, the unconditional contribution decisions of the two other members of your group who have not been selected, and the contribution table of the member of your group who has been selected. We will compute the average of your unconditional contribution and the unconditional contributions of the two other non-selected members of your group, and round it to the closest whole number. We will then look at the contribution table of the selected group member to find out the number of points that he or she contributes when the other group members make that average contribution.

You will learn your earnings from PART 2 at end of today's session. You will be paid in private and in cash at the end of the experiment.

Please raise your hand if you have any questions.

As before, to make sure everyone understands the instructions about PART 2, please complete the questions below. In a couple of minutes someone will come to your desk to check your answers. (The decisions and earnings used for the questions below are simply for illustrative purposes. In the experiment decisions and earnings will depend on the actual choices of the participants.).

Questions about PART 2:

1. How many types of decisions will you make in PART 2?

2. How many times will you make each type of decision?

3. Is the following statement true: in the contribution table you have to enter 21 contribution decisions, one for each possible (rounded) average contribution of the other group members.

4. Suppose that you are selected at random by the computer – so earnings are computed using your contribution table and the three unconditional contribution decisions of the other group members. Suppose that the three other members of your group contribute 0, 2 and 4 points. Their average contribution is therefore 2 points. Suppose that you decided to contribute 2 points when the other group members contribute on average 2 points. What are your total earnings?

PART 3 to PART 6

For the remaining four parts of the experiment you will not be matched with any of the other participants in this room. Thus, the decision situations in the next four parts of the experiment will not involve any interaction with the other participants in today's experiment, and your earnings will be independent from their decisions.

You will receive the instructions for each of the four remaining parts of the experiment directly on your computer screen. Shortly, you will be shown instructions for PART 3. Once everyone in the room has completed PART 3, you will be shown the instructions for PART 4, and so on.

The instructions for each part of the experiment will explain whether and how you can earn points in that part. So, it is important that you read the instructions carefully.

If you have a question at any time during the rest of the experiment, raise your hand and a monitor will come to your desk to answer it.

Please raise your hand if you have any questions now.

Appendix C – Decision Problems in the Decomposed Game

	Option A	Option B
1.	0, 15	3.9, 14.5
2.	3.9, 14.5	7.5, 13
3.	7.5, 13	10.6, 10.6
4.	10.6, 10.6	13, 7.5
5.	13, 7.5	14.5, 3.9
6.	14.5, 3.9	15, 0
7.	15, 0	14.5, −3.9
8.	14.5, −3.9	13, −7.5
9.	13, −7.5	10.6, −10.6
10.	10.6, −10.6	7.5, −13
11.	7.5, −13	3.9, −14.5
12.	3.9, −14.5	0, −15
13.	0, −15	−3.9, −14.5
14.	−3.9, −14.5	−7.5, −13
15.	−7.5, −13	−10.6, −10.6
16.	−10.6, −10.6	−13, −7.5
17.	−13, −7.5	−14.5, −3.9
18.	−14.5, −3.9	−15, 0
19.	−15, 0	−14.5, 3.9
20.	−14.5, 3.9	−13, 7.5
21.	−13, 7.5	−10.6, 10.6
22.	−10.6, 10.6	−7.5, 13
23.	−7.5, 13	−3.9, 14.5
24.	−3.9, 14.5	0, 15

(The first number is own payoff, the second number is the payoff for the matched subject.)

Appendix D – SDS-17 and GCS items

SDS-17 items

1. I sometimes litter.
2. I always admit my mistakes openly and face the potential negative consequences.
3. In traffic I am always polite and considerate of others.
4. I always accept others' opinions, even when they don't agree with my own.
5. I take out my bad moods on others now and then.
6. There has been an occasion when I took advantage of someone else.
7. In conversations I always listen attentively and let others finish their sentences.
8. I never hesitate to help someone in case of emergency.
9. When I have made a promise, I keep it – no ifs, ands or buts.
10. I occasionally speak badly of others behind their back.
11. I would never live off other people.
12. I always stay friendly and courteous with other people, even when I am stressed out.
13. During arguments I always stay objective and matter-of-fact.
14. There has been at least one occasion when I failed to return an item that I borrowed.
15. I always eat a healthy diet.
16. Sometimes I only help because I expect something in return.

GCS items

1. As a child, I always did as my parents told me.
2. I give in easily when I am pressured.
3. I am not too concerned what people think of me.
4. I tend to become easily alarmed and frightened when in the company of people in authority.
5. When I was a child I sometimes took the blame for things I had not done.
6. When I am uncertain about things I tend to accept what people tell me.
7. I tend to go along with what people tell me even when I know that they are wrong.
8. I would describe myself as a very obedient person.
9. I would never go along with what people tell me in order to please them.
10. I find it very difficult to tell people when I disagree with them.
11. I tend to give in to people who insist that they are right.
12. I try very hard not to offend people in authority.
13. I strongly resist being pressured to do things I don't want to.
14. I generally tend to avoid confrontation with people.
15. I try to please others.
16. People in authority make me feel uncomfortable and uneasy.
17. I try hard to do what is expected of me.
18. Disagreeing with people often takes more time than it is worth.
19. I generally believe in doing as I am told.
20. I believe in avoiding rather than facing demanding situations.

Appendix E – CRT and Financial Literacy test questions

CRT Q.1 - A bat and a ball cost £1.10 in total. The bat costs £1.00 more than the ball. How much does the ball cost (in pence)?

CRT Q.2 - If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets (in minutes)?

CRT Q.3 - In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake (in days)?

Financial Literacy Q.1- In a sale, a shop is selling all items at half price. Before the sale, a sofa costs £300. How much will it cost in the sale?

Financial Literacy Q.2 - If the chance of getting a disease is 10 per cent, how many people out of 1,000 would be expected to get the disease?

Financial Literacy Q.3 - A second hand car dealer is selling a car for £6,000. This is two-thirds of what it cost new. How much did the car cost new?

Financial Literacy Q.4 - If 5 people all have the winning numbers in the lottery and the prize is £2 million, how much will each of them get?

Financial Literacy Q.5 - Let's say you have £200 in a savings account. The account earns ten per cent interest per year. How much will you have in the account at the end of two years?