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Non-monetary incentives in online experiments☆

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HIGHLIGHTS

- Online experiments with no monetary incentives often provide biased results.
- The bias can be remedied by controlling for subjects' inherent motivation.
- Subsample with high motivation generates results identical to labs.
- Difference between subsamples with high and low motivation cannot be explained by other factors.
- Time spent per question (attention) is a poor predictor of motivation although somewhat similar in effect.

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ABSTRACT

Monetary incentives in online experiments are not always easy to implement. Yet online experiments are advantageous in terms of a natural decision-making environment, less stress on participants and a large number of the latter. Can we obtain plausible results from online experiments by using non-monetary incentives like altruism and curiosity? We investigate the role of non-monetary incentives in a simple Ellsberg-type experiment which can be easily compared to similar lab experiments.

1. Introduction

Comparative advantages of online (Internet) experiments over lab experiments include (1) a large number and variety of participants, (2) natural setting, no pressure of an artificial lab environment, at (3) a relatively low cost. Yet there is an ongoing debate in the literature on whether and which forms of incentives should be used in Internet experiments. Typical incentives schemes range from a cash payment to all participants (frequently used in lab experiments, rare or impossible in Internet experiments due to anonymity concerns), lottery over a large stake (applicable in Internet experiments), performance based payments, or non-monetary incentives like a performance score relative to other participants. Duersch et al. (2009) analyze several of the above and come to a conclusion that without a cash complement the high score incentive alone leads to distorted results and therefore "significant and performance based financial incentives"[1] should be used in online experiments.

We challenge this view by considering non-monetary incentives based on such behavioral patterns as curiosity and altruism rather than on the sense of rivalry and desire to win. Human resource management emphasizes non-monetary factors among incentives, which is especially true for services offered by volunteers.

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[1] Duersch et al. (2009, p. 122).

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Our main idea is that curiosity and altruism (and possibly other behavioral factors not covered in this paper) alone can suffice to provide plausible results from an online experiment with no additional material incentives scheme.

We run online a standard experiment with well known lab treatment results reported in various studies. The only difference is that we do not incentivize participants the way it could be done in a lab but instead control for their inherent incentives to complete the task. Our findings do not reveal significant differences between lab experiments and online results for the group of subjects with high motivation. We obtain that non-monetary incentives are strong enough to generate a significant difference between subjects who take part in the complete experiment (high motivation) and those who quit after fulfilling a part of the task (low motivation).

2. The experiment

This paper draws on Ellsberg's (1961) two-colors experiment. There are two urns, A and B, containing 100 black and red balls each; subjects know that Urn B contains exactly 50 black to 50 red balls and there are *some* red and *some* black balls in Urn A. We ask subjects two questions: from which urn they would draw a ball if they were promised a prize for drawing a black ball, and if they were promised a prize for drawing a red ball. We refer to this experiment as a standard Ellsberg experiment (task). A "task" in our setting is a choice between urn A and urn B given varying information communicated to the participants. Subjects are also asked to perform several additional tasks.[2] They are free to choose whether they continue to answer the questions or quit the experiment at any stage. Responses are registered after they select to proceed to the next screen. The two Ellsberg questions are shown in the first screen (Part A); screen number two contains five additional tasks (Part B); screen number three contains two more tasks (Part C), and finally screen number four contains one question in which subjects are asked to self-assess their proficiency in statistics (Part D). The standard Ellsberg task is used only in Part A and employed in the current study for comparison with similar experiments. The role of additional tasks is explained below.

The study is based on three independent experiments conducted in 2011–12. The first experiment was run in July 2011 on www.surveymonkey.com. The total of 1000 participants was achieved in 20 days. Participants were invited via the Facebook account of a graduate student; in addition (thus suggesting that the majority of the subjects were young people though we did not control how many of them were university students), emails were sent to a group of academics in Europe and USA with an invitation to take part in the experiment and to spread the news. It was made clear that there was no prize for participation in this experiment. The data collected for each case include the start and end dates of the response, the IP address, and the answers to the questionnaire. On average, 76.4% of subjects completed the questionnaire in full (Parts A through D), whereas 21.8% only answered to Part A and did not proceed any further. We refer to this experiment (online, no monetary incentives) as Treatment 1.

We focus on non-monetary factors that made people respond to our invitation by making the following observations. First, each person has an option to ignore the invitation. Second, if curiosity or altruism lead them to open the weblink contained in the invitation they still have an option to quit the experiment after they see the first screen with the questions for part A without answering them. Participants who quit at this stage have the lowest motivation to complete the experiment and are not registered in our data. Participants with a higher motivation answer the questions of Part A, which is required to be able to proceed to the next screen, and register their answers by pressing the button "Next". We interpret this as a higher level of motivation than that of the above group. In a similar fashion, we interpret that motivation of participants who answer parts A and B is higher than that of participants who only answered part A but lower than that of participants who answered parts A, B and C. The highest level of motivation is demonstrated by subjects who complete the experiment in full. We focus on the fact that the majority of respondents have either answered Part A and quit or proceeded to further questions and completed the experiment in full. This leaves us essentially with two levels of motivation: low (only part A completed) and high (all parts completed). As soon as we do not offer any monetary prize, this motivation can only be explained by inherent motives such as curiosity or altruism.

Our main hypothesis is that non-monetary factors like curiosity and altruism provide adequate and non-distortionary incentives. To test this hypothesis we compare the behavior of subjects with low and high motivation in the online experiment with control groups chosen from earlier reported lab-based studies, both with real and hypothetical monetary incentives, and with our results from two additional experiments, described below.

Experiment 2 was conducted in a university classroom in Russia in June 2012, offering the total of 109 subjects an opportunity to win a prize of an equivalent of $100. After subjects have answered the questionnaire, we used real urns to draw black and red balls and identified how many times subjects gave "correct guesses". Each "correct guess" is an equivalent to a lottery ticket for the above prize. Thus subjects with a higher number of "correct guesses" have higher chances to win the prize. The main problem here is to model the ambiguity in Urn B, as in the end it is a real distribution of real balls in a real urn. For our experiment, it is important that this distribution is unknown to all the subjects, and that this is common knowledge (subjects know that nobody knows the distribution, etc.) We have achieved this by publicly selecting the distribution of balls in Urn B *after* all responses to the questionnaires were collected. The selection procedure was as follows: subjects were asked to give a number between 1 and 9, after which the fraction of answers above 5 determined the fraction of red balls in Urn B. In this treatment this fraction was 62%, thus we publicly placed 62 red and 38 black balls in the urn, after which balls were drawn as in the main task. Importantly, at the time of giving responses, subjects did not know the distribution. The completion rate was 100%, not surprising for a lab experiment. As a proxy for non-monetary motivation we used the fact that part of the subjects were our colleagues and friends (aged above 25, about 60% of the sample) and the rest of the subjects were postgraduate students (all aged under 25, about 40%) not related to and never taught by either of us. We expect that the cohort of colleagues and friends have a higher intrinsic motivation. This experiment is referred to as Treatment 2 (lab, with monetary prize).

In their informal feedback many subjects of Treatment 2 revealed that they would have participated in the experiment even without a monetary prize. Thus monetary incentives can affect subjects to different degrees. To control for this, we conducted experiment 3 in August–September 2012 online, mainly following the lines of Treatment 2 in what relates to the prize (£100 awarded by a type of a lottery as in Treatment 2). The distribution in Urn B (ambiguous) was taken 62% as in the previous treatment (not communicated to the subjects, thus preserving ambiguity). The invitations were sent out similarly to Treatment 1, resulting in 568 observations in total.[3] The main difference of this experiment

[2] The complete questionnaire and additional results are reported in the companion paper.

[3] 35% of the sample report themselves as employees, 16% as postgraduate and 30% as undergraduate students.