

Replication of

Participation

by Charness, G./Dufwenberg, M. (2011)

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Replication Authors:

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Charness and Dufwenberg test how communication can help achieve beneficial social outcomes in a hidden-information context depending on whether low-talent agents can participate in a Pareto-improving outcome or not. Communication is effective when low-talent agents can participate but not if they cannot participate.

Hypothesis to bet on:

Communication is effective in a hidden-information game when low-talent agents can participate in a Pareto-improving outcome (a comparison of the “Low B’s Don’t rate” for the messages (M) and no messages (NM) treatments for the (5,7) hidden information game).

Power Analysis

The original p -value is reported as $p < 0.01$, with a one-tailed test and a z -value of 2.56, implying $p = 0.010$ (a test of the difference in proportions, Table 2 ((5,7) treatment) and footnote 9): “Summarizing the results, the only case in which communication led to a significant increase was for low-talent B’s in the (5,7)-game, where the Don’t rate nearly doubles, to 78 percent.”

The original sample size is 162 participants (82 in the M treatment and 80 in the NM treatment). To achieve 90% power the required sample size is 260 participants.

Sample

The sample for replication consists of 264 students (132 participants in each treatment) at the National University of Singapore. There are no exclusion criteria.

Materials

We use the material of the original experiment (paper and pencil). The materials are: index cards with identification numbers, a coin, an opaque bag, blank pieces of paper, decision sheets, pens to write messages and instructions.

Procedure

We follow the procedure of the original article, with only slight but unavoidable deviations as outlined below. The following summary of the experimental procedure is therefore based on the section “II. Experimental Design” (pp. 1215–1217) in the original study.

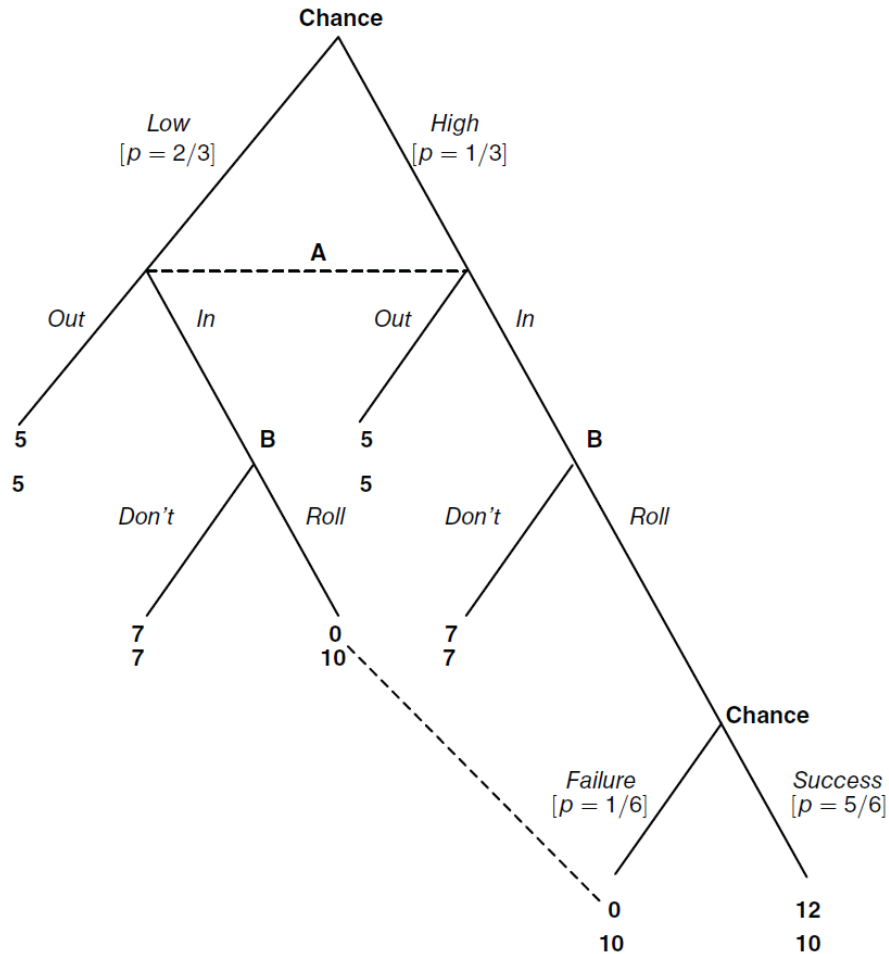
The experiment investigates to what extent communication can achieve beneficial social outcomes in a hidden information game played by anonymous pairs of participants consisting of a principal “A” and an agent “B”. B can either be of high or low talent type, and this information is private. A decides whether to embark on a project with B by choosing “in” or stay out. The final payoffs depend on the Bs type

and the actions of both parties as seen in the figure below.

Given the result that we are going to replicate, we will have a 1×2 design, the first treatment variable indicates that participants will all play the (5,7) game. The second treatment variable refers to whether communication between A and B is allowed (M) or not (NM).

The experiment will be conducted in a large classroom which is divided into two sides by a center aisle, and participants will be seated at spaced intervals. A coin is tossed to determine which side of the room will be for participant who are A and which will host participants who are B. At the beginning of the experiment, each participant draws an index card with an identification number from an opaque bag. The participants are told that the number determines a pair so that each A player is anonymously paired with a B player through

their numbers. Each B learns his or her type by the identification-number on the index card drawn, if the number on the card is evenly divisible by three, then that B has a high talent and otherwise B has a low talent. Each participant receives tables with instructions and a description of the payouts for each scenario, then the experimenter randomly asks participants for the outcome of all possible cases. When it seems clear that everyone has understood the (5,7) game, the session starts. Each participant only plays the (5,7) game once. If participants are in the communication treatment, each B gets the option to send a free-form message to his or her A before A makes the “in” or “out” decision. All messages are screened by the experimenter and messages cannot contain any revealing information about Bs person, violations will end the game.



The size of each session ranged between 20 and 36 subjects in the original study. The session sizes will be in this range also for the replication. Both treatments will be carried out simultaneously in parallel treatments in two different rooms. When subjects arrive they will be randomly allocated to the two different treatments/rooms (in total there will be 132 subjects per treatment and 264 subjects for the entire experiment).

After the (5,7) is played once, participants are paid based on the outcome of the game in addition to the same show-up fee (\$5) as in the original study (average earnings excluding the show-up fee were \$9 per subject in the original study).

Analysis

The analysis will be performed exactly as in the original article. The test used in the original article is the test of the difference of proportions (Glasnapp/Poggio, 1985).

Differences from Original Study

The replication procedure is identical to that of the original study, with some unavoidable deviations. This replication will be performed at the National University of Singapore in Singapore, in 2015, on students from the National University of Singapore, while the original data was gathered at the University of California, Santa Barbara, USA, in 2008, with subjects recruited from the campus community. The experiment will be in English as in the original study.

The original study includes other treatments: for the replication the focus is only on the difference between the messages (M) and no messages (NM) treatments for the (5,7) hidden information game.

Replication Results

In the replication experiment, communication leads to a significant increase in *low-talent B's Don't rate*, from 44.83% in the NM treatment to 80.56% in the M treatment — a dif-

ference that is statistically significant with a p -value of 0.003 (test of the difference of proportions). In addition, communication also leads to a significant increase from 62.12% in the NM treatment to 83.33% in the M treatment in *A's In rate* in the replication study.

As a measure for the effect size we calculate the difference between *low B's Don't rates* in the M and NM treatment. While the effect size equals 35.73 in the replication study, the effect size is 38.26 in the original study. Accordingly, the relative effect size of the replication experiment amounts to 93.39% (35.73/38.26).

Unplanned Protocol Deviations

In the planned protocol, the size of each session of the replication experiments is between 20 and 36 subjects. In the replication experiment, we followed the plan except that for one session of the M treatment only 18 participants showed up. In addition, due to unavailability of two classrooms that are big enough and next to each other, the two treatments were conducted simultaneously in two classrooms located in different levels of the building. For this reason, rather than allocating the participants to different rooms upon arrival, we randomly divided the participants into the two groups of the same size when sending out participation confirmation emails. Apart from that the replication experiment has been conducted exactly the way as outlined above, without further deviations from the protocol.

Discussion

Given the criteria and procedure outlined above, the hypothesis of interest has been replicated at a significance level of $\alpha < 5\%$. The relative effect size equals 93.39% and the p -value of the hypothesis test is 0.003.

References

Glasnapp, D. R. & Poggio, J. P. (1985): “Essentials of Statistical Analysis for the Behavioral Sciences”, Columbus: Charles E. Merrill.

Table 1: Comparison of *Low B's Don't rates*, *A's In rates*, and tests for the effect of communication in both treatments

	<i>Low B's Don't</i>			<i>A's In</i>		
	M	NM	<i>z</i>	M	NM	<i>z</i>
<i>Original Study</i>	18/23 (78.26%)	8/20 (40.00%)	2.559**	33/41 (80.49%)	28/40 (70.00%)	1.095
<i>Replication Study</i>	29/36 (80.56%)	13/29 (44.83%)	2.995***	55/66 (83.33%)	41/66 (62.12%)	2.736***

Note: M/NM refers to the treatments and means that no message/message was feasible. The *z*-statistic reflects the test of proportions across M and NM; one-tailed test.

*** Significant at the 1 percent level

** Significant at the 5 percent level

* Significant at the 10 percent level