**DEPARTMENT OF ECONOMICS AND FINANCE
COLLEGE OF BUSINESS AND ECONOMICS
UNIVERSITY OF CANTERBURY
CHRISTCHURCH, NEW ZEALAND**

**An Examination of the Effect of Messages on Cooperation
under Double-Blind and Single-Blind Payoff Procedures**

Cary Deck

Maroš Servátka

Steven Tucker

WORKING PAPER

No. 17/2012

**Department of Economics and Finance
College of Business and Economics
University of Canterbury
Private Bag 4800, Christchurch
New Zealand**

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Cary Deck¹, Maroš Servátka², Steven Tucker³

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Abstract: Previous research has suggested that communication and especially promises increase cooperation in laboratory experiments. This has been taken as evidence for internal motivations such as guilt aversion or preference for promise keeping. The goals of this paper are to examine messages under a double-blind payoff procedure to test the alternative explanation that promise keeping is due to external influence and outside-the-lab reputational concerns and to assess how the impact of communication varies with social distance. Employing a 2x2 design, we find no evidence that communication increases the overall level of cooperation in our experiments with double-blind payoff procedures. However, we also find no evidence that communication impacts cooperation in our experiments with single-blind payoff procedures. Further, the payoff procedure does not appear to impact aggregate cooperation.

Keywords: Anonymity, cooperation, experiment, hidden action, lies, messages, partnership, promises, social distance, trust.

JEL Classifications: C70, C91

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¹ Department of Economics, University of Arkansas.

² New Zealand Experimental Economics Laboratory, University of Canterbury.

³ Department of Economics, University of Waikato.

* Corresponding Author: Maroš Servátka. Phone: +64-3-3642825 ext. 6825, Fax: +64-3-3642635.
Email: maros.servatka@canterbury.ac.nz.

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1. INTRODUCTION.

Anecdotal and scientific evidence suggest that promises – verbal commitments to perform a certain action – are a powerful tool in increasing levels of cooperation.¹ What makes people keep their promises and why do their recipients trust them? In a widely cited paper, Charness and Dufwenberg (2006; hereafter CD) argue that promise keeping is driven by guilt aversion which is an internal motivation not reliant on external enforcement. In an experiment employing a trust game with hidden action CD find that promises strengthen expectations about one's cooperation and that these promises are often kept.² However, their experimental design also allows for an alternative explanation. In particular, their experiments were conducted using a standard single-blind (or low social distance) protocol in which the players did not know the identity of their counterpart, but the experimenter *did*. Further, the experimenter *could* observe both the message and the act before paying the participant in person. Therefore, the CD experiments as well as follow up paper by Vanberg (2008) cannot rule out that the observed behaviour is due to external influences acting through shame or outside-the-lab reputational concerns triggered by the experimenter being able to trace subjects' choices to their identities. Previous research with related games has shown that subjects often behave differently when the experimenter *can* identify who took which action (single-blind) as compared to when the experimenter *cannot* (double-blind).³

The distinction between internal and external motivations for behaviour is potentially quite important for extrapolating to behaviour outside the lab. Thus, the goals of the experiments reported in this paper were two-fold: 1. to determine if the impact of messages observed in CD is contingent upon by the experimenter being able to identify whether the

¹ See e.g. Bicchieri and Lev-On (2007), Charness and Dufwenberg (2006), Ellingsen and Johannesson (2004), Kerr and Kaufmann-Gilliland (1994), Ostrom, Walker, and Gardner (1992), and Sally (1995).

² Other explanations such as lie aversion and preference for promise keeping or honesty have been forwarded as well, but these explanations are also based upon internal motivation. See e.g. Braver (1995), Demichelis and Weibull (2008), Dufwenberg, et al. (2012), Ellingsen and Johannesson (2010), Gneezy (2005), Kartik (2009), Miettinen (2008), Sutter (2009), and Vanberg (2008).

³ Cox and Deck (2005) report the results of a binary trust game using both single- and double-blind procedures. With single-blind procedures, they replicate the results of McCabe and Smith (2000) that approximately 75% of second movers are trustworthy. However, under double-blind procedures only 25% of the subjects are trustworthy, pointing out that cooperation might be more difficult to achieve in a condition of complete anonymity. Such a radical change in behaviour clearly demonstrates the impact that observability by the experimenter may have on behaviour where trust is involved.

subject kept his or her word and 2. to assess how social distance affects the effectiveness of communication. In order to tackle these two questions we implemented a 2x2 design varying the social distance (single-blind vs. double-blind) and the opportunity to send hand written messages. Behavioural theories such as guilt aversion, lie aversion, honesty and preference for promise keeping predict no difference in communication effects on cooperation under single-blind and double-blind procedures since they all rely on internal motivation, making the presence of a third party irrelevant. These models would predict that switching to a double-blind payoff procedure will lead to similar change in cooperation with and without messages. It is also possible that promises are able to overcome the cooperation destroying tendencies of double-blind payoff procedures, making the impact of messages even more important. However, if people are mainly motivated by outside-the-lab reputational concerns, aversion to shame and/or other external influences, then observability by a bystander might have profound implications on their behaviour and on communication itself.

We did not observe any impact of messages in our double-blind experiments. However, to our surprise we also did not find any impact of messages in our single-blind experiments. That is, we fail to replicate CD's finding. Further, we do not find any evidence that the payoff procedures affect behaviour with or without messages. Our findings are driven by the fact that we observe a high level of cooperation without messages. In fact the level of cooperation we observe using double-blind procedures is similar to what is reported in CD with messages. Our results demonstrate two important points. The first is topic specific: the effects of decreasing social distance and allowing communication are relative and not absolute. In our case, cooperation was quite high in the absence of these two factors leaving little room for incremental improvement in cooperation. The second point is more general: it is important to conduct widespread replication of experimental results and non-results. Had our study been conducted first, the conclusion that would have been drawn was that cheap talk communication had no impact, consistent with standard economic theory. Such a finding likely would have stunted the growth in this literature. The rest of this paper proceeds as follows. In the next section we describe our experimental procedures. Section 3 presents our results and compares them to other related studies. The final section offers concluding remarks.

2. EXPERIMENTAL DESIGN AND PROCEDURES.

CD introduce a simple one-shot hidden action trust game. In this game Player **A** can choose *Out* yielding both players \$5. Alternatively, **A** can choose *In*, in which case Player **B** determines both players' payoffs. If **B** chooses *Don't Roll* then **A** earns \$0 and **B** earns \$14. If **B** chooses *Roll* then **B** earns \$10 and **A** earns \$0 if a die roll ends up on 1 and earns \$12 otherwise. The payoff structure is shown in Table 1. Critically, both players know that a selfish action by **B** is never

directly revealed to **A**. Thus, **A** cannot determine if a \$0 payoff is due to **B**'s selfish act or bad luck.

Table 1. Hidden Action Trust Game as Shown to Subjects.

	A Receives	B Receives
A chooses OUT	\$5	\$5
A chooses IN, B chooses DON'T ROLL	\$0	\$14
A chooses IN, B chooses ROLL, die = 1	\$0	\$10
A chooses IN, B chooses ROLL, die = 2, 3, 4, 5, or 6	\$12	\$10

We set out to explore whether people keep promises due to external concerns, stemming from the fact that the experimenters themselves observed both the messages that were sent and the actions that were actually taken. In order to thoroughly assess the impact of messages under the two different payoff protocols, we conducted double-blind conditions with and without messages as well as a replication of CD's single-blind ones.⁴

We implement a double-blind payoff procedure similar to that in Hoffman et al. (1994). As subjects entered the lab, they drew slips indicating if they were in the **A** role (player 1) or **B** role (player 2). **Bs** sat in the back half of the lab and **As** sat in the front half of the lab. Each person was seated at individual workstation with privacy dividers. Instructions were then handed out and all questions were answered publicly. Then a large curtain was partially drawn so that everyone could verify the procedures while visually separating the two types. Identical envelopes with coded mailbox keys and coded response forms were placed in a large box and taken around the **B** half of the lab. Subjects drew out a single envelope, but waited to open it until the experimenters had returned to the **A** side. **B** subjects made their decisions, placed the mailbox key in their pocket, and returned the response form into the envelope. After **Bs** finished, they dropped their envelopes back into the large box. The envelopes were then shuffled and opened in the gap between the two areas. Messages were cut off from the **B** forms, and stapled to coded response forms for **As**. The forms were then placed in envelopes along with a coded mailbox key. **As** then selected an envelope from a box and waited for the experimenters to return to the **B** side before opening the envelopes, placing the keys into their pockets, making their decisions, and returning the forms into the envelopes. When everyone

⁴ While CD also elicit subjects' beliefs (in order to test for guilt aversion), we do not include such elicitation in our experiment as our main focus is on internal vs. external enforcement of promises rather than testing guilt aversion under double-blind procedures or discriminating between various models of internal motivation.

was done, the experimenters determined the payoffs for each player⁵, placed the money in plain envelopes, and placed the envelopes in the coded mailboxes in another room in the lab. Subjects privately opened their mailboxes, collected their earnings envelopes, and left the lab.

As argued by Barmettler, et al. (2012), previous comparisons between single-blind and double-blind procedures tend to emphasize the payoff procedures in double-blind, but not single-blind. This asymmetry may create a demand effect for the subjects and encourage people to act more selfishly in double-blind experiments (see Zizzo, 2010 for a discussion of experimenter demand effects). Therefore, we are careful to keep the attention paid to the payoff procedures similar between our single-blind and double-blind experiments (see the instructions in Appendix 1 for details).

A total of 292 undergraduate students participated in this between subjects study at the Behavioural Business Research Laboratories at the University of Arkansas. Participants received a \$5 participation payment in addition to their salient earning from the approximately 20 minute study, which was slightly under \$8.00 on average.

3. BEHAVIOURAL RESULTS.

We present the results in two subsections. The first looks at the primary treatment effects and compares observed behaviour to what has been reported previously in the literature. The second looks at the content of the handwritten notes to distinguish the impact of promises from other types of messages.

3.1 TREATMENT EFFECTS AND COMPARISON TO LITERATURE.

The first two rows of Table 2 compare behaviour between our four conditions. The percentage of **As** who choose *In* is similar in the double-blind conditions (64% in the message condition and 60% in the no message condition, p -value = 0.689, two-sample proportion test). The striking feature is that the percentage of **Bs** who choose *Roll* is also indistinguishable between two double-blind conditions: 68% versus 67% (p -value = 0.877). These results suggest that messages do not impact behaviour with a double-blind protocol.

Based on the data from our experiments presented in the second row of Table 3, we find no evidence that messages affect behaviour using a single-blind procedure for players in either role (p -values = 0.942 and 0.894 for **As** and **Bs**, respectively). That is, we do not replicate the effectiveness of messages reported in CD, which is shown in the third row of Table 2. However, the effectiveness of messages at encouraging cooperation in this type of environment has also been found by Vanberg (2008) and Goeree and Zhang (2012), whose results are presented

⁵ Following CD, the subjects were informed in advance that a die would be rolled for each pair regardless of what actions were actually taken so that one could not infer what actions had been taken from the noise.

in the fourth and fifth rows of Table 2, respectively. The sixth row presents the results from Ellingsen et al. (2010) No Message double-blind experiment.⁶

Table 2. Observed Aggregate Behaviour and Comparison Between Double-Blind and Single-Blind Conditions

Condition/ Study	A's <i>In</i> Rate				B's <i>Roll</i> Rate			
	Message	No Message	z-statistic	p-value	Message	No Message	z-statistic	p-value
Our Double-Blind	29/45 64%	29/48 60%	0.40	0.689	30/44 68%	32/48 67%	0.16	0.877
Our Single-Blind	22/29 76%	18/24 75%	-0.07	0.942	18/28 64%	15/24 63%	-0.13	0.894
CD Single-Blind	31/42 74%	25/45 56%	1.78	0.075	28/42 67%	20/45 44%	2.08	0.037
Vanberg Single-Blind	--	--	--	--	27/32 84%	18/32 56%	2.46	0.01
Goeree and Zhang Single-Blind	25/40 63%	20/42 48%	1.35	0.177	26/40 65%	14/42 33%	2.87	0.004
Ellingsen et al. Double-Blind	--	26/44 59%	--	--	--	27/44 61%	--	--

Note: Test statistics are based upon two-sample proportion test. The reported p-values are based upon two-sided alternative hypotheses. In the double-blind message condition one subject in **B** role did not make a choice to *Roll* or *Don't Roll*.

To determine the impact of the payoff procedures, we compare the data in the first two rows of Table 2. The behaviour observed under the single-blind payoff procedure is similar to that which we observed in the double-blind procedure (p-values = 0.300 for **As** messages, 0.220 for

⁶ Vanberg's baseline treatments (with and without messages) include a mini-dictator game with random dictatorship. The reported tests were performed using the 32 independent first round observations. Experiment III of Ellingsen et al. involves CD's hidden action trust game in which **B** is informed about the belief of his paired **A** player before choosing *Roll* or *Don't Roll*. Similar to us, they also find a relatively high cooperation rate without messages under double-blind payoff procedures.

As without messages, 0.732 for **Bs** with messages, and 0.726 for **Bs** without messages. Based upon these results we do not find any effect of social distance on cooperation whether communication is possible or not.

Why do we draw different conclusions from those of previous studies? The answer can be surmised from casual inspection of the columns in Table 2. Without messages, the rate at which **As** choose *In* is between two-thirds and three-fourths. This, coincidentally, is the same rate at which **Bs** choose *Roll* with messages across all of the studies. Where the results differ is in the No Message conditions. Here we continue to observe high levels of cooperation, but the others studies see a large decline in cooperation. Specifically, the rate at which the other studies observe **As** choosing *In* is approximately fifty percent without messages. The rate at which **Bs** choose *Roll* falls to between a third and a half without messages for the other studies. Combining the data from our treatments and comparing it with combined data from the CD, Vanberg, and Goeree and Zhang studies we find that the behaviour does not differ with messages (p-value = 0.933 for **As** and 0.527 for **Bs**), but does differ without messages (p-value = 0.085 for **As** and 0.004 for **Bs**).

Why are the messages in our experiment ineffective? The explanation that we favor is that the incremental effects on cooperation of things like messages and observability are decreasing in the overall level of cooperation. That is, the level of trustworthiness that we observe in the double-blind No Message condition may already be so high (67%), that there is not much room for messages or single-blind payoff procedures to increase it. Why we observe as much cooperation in our double-blind No Message condition as CD in their single-blind message condition is an open question. One possible explanation is subject pool differences. We have at least some evidence of such differences based upon the messages that are sent; we find relatively fewer subjects actually sending messages in our study.⁷ However, previous experiments conducted using our subject pool have not generated overly cooperative behaviour in the past (see Deck 2009, 2010). Another possibility is that some aspect of our implementation led to more cooperative behaviour (or some aspect of theirs led to less cooperative behaviour). However, as we described in the previous section, we tried to closely follow CD's instructions and procedures.

Replication is never perfect as the lab facility, appearance of the experimenters, time of day, and countless other factors differ between studies. What we as researchers want to know is how robust a phenomenon is to such nuisance variables. Several other papers have found that communication is effective at increasing cooperation (see Beck et al., 2010; Ben-Ner et al., 2011; Bochet and Putterman, 2009; Servátka et al., 2011 to name a few). Our results suggest that the impact of communication may not be as robust as the literature suggests, especially if

⁷ We elaborate on this issue in the next section.

there is a bias against “non-results” being published.⁸ This is not meant to suggest that communication is not effective. Indeed, if one combines all of the data across studies in Table 2, one would still find that messages lead to a greater percentage of **As** choosing *In* (p-value = 0.094) and a greater percentage of **Bs** choosing to *Roll* (p-value = 0.001).⁹ We do however see one of our paper’s contributions as a reminder that human behaviour is less predictable and more nuanced than phenomena studied in chemistry or physics experiments, something that is easy to lose sight of. We also see our paper as a reminder that it is important to replicate both results and non-results. Had CD’s original results looked like ours, there likely would not be the large literature that built upon their work, which would be a shame.

3.2 THE IMPACT OF MESSAGE TYPE ON BEHAVIOUR.

Up to this point, we have focused on the aggregate effect of **B** having the opportunity to send a message to **A**. We now turn to the specific content of the messages, which are shown in Appendix 2 for both our double-blind and single-blind conditions. To evaluate each we employed three coders to rate each message as being a promise, a non-promise message, or blank.¹⁰ The coders received the instructions for our double-blind conditions, instructions on the coding procedure, and a typed transcript of the messages. Coders went through each message individually and were paid \$20 for the task. Our coders also went through the relevant messages from CD. This allows us to make a direct comparison about the effectiveness of messages in the three cases without introducing variation due to the way coders interpret messages. While our coders generally agreed with the evaluations in CD there were some differences, as indicated in Appendix 2. In the remainder of the paper, all references to message types are based upon the opinions of our coders and we restrict attention to cases where our coders had unanimous agreement. Table 3 evaluates behaviour conditional on message type across the three message conditions.

The results in Table 3 reveal several interesting patterns. First, according to the classification by our coders there is no evidence that subjects who make promises are more likely to choose *Roll* as compared to those who send non-promise messages (74% versus 56%, p-value = 0.314) or do not send messages at all (74% versus 75%, p-value = 0.963) in the CD data. Our single-blind replication finds the same pattern, albeit with small sample sizes (57% versus 60%, p-value = 0.921 and 57% versus 50%, p-value = 0.772, respectively). While in the

⁸ In a separate paper Charness and Dufwenberg (2010) themselves report that the effect of messages may not be that robust as they fail to replicate their previous results when only certain predetermined messages are permissible.

⁹ The test was performed including Ellingsen et al. No Message double-blind data. Without their data, the p-values are 0.064 and <0.001 for **As** and **Bs**, respectively.

¹⁰ Houser and Xiao (2011) point out that the researcher coding in CD is potentially problematic and employ a coordination game to evaluate subjects’ messages. While Houser and Xiao’s method has its advantages, previous literature on communication uses third party coders to analyze content (see for example Neuendorf, 2002).

double-blind condition we do find that a promise increases the likelihood that **B** will play cooperatively as compared to a blank message (90% versus 45%, p -value = 0.026), the effect holds for non-promise messages relative to blank messages as well (83% versus 45%, p -value = 0.033) and there is no difference in behaviour based upon whether the message is a promise or not (90% versus 83%, p -value = 0.719).

Table 3. Behaviour Conditional on Message Type.

Message Type	Our Double-Blind			Our Single-Blind			CD Single-Blind		
	Promise	Blank	Other	Promise	Blank	Other	Promise	Blank	Other
Percent of Messages	24%	48%	28%	35%	43%	22%	64%	11%	25%
A In	8	9	9	8	5	4	20	1	6
A Out	2	11	3	0	5	1	3	3	3
Percent of As choosing In	80%	45%	75%	100%	50%	80%	87%	25%	67%
B Roll	8	9	10	4	5	3	17	3	5
B Don't Roll	1	11	2	3	5	2	6	1	4
Percent of Bs choosing Roll	90%	45%	83%	57%	50%	60%	74%	75%	56%

Note: We exclude observations for which the three coders did not agree. Assigning the observed behaviour according to the majority opinion of the message type does not substantially change the results. In subject pairs in which one of the players did not make a move, the player who did act is included in this analysis as long as the message was unambiguous to the coders.

What we do find is that **As** believe that **Bs** will keep their promises. In all three cases the percentage of **As** choosing *In* is greatest after receiving a promise and is statistically different from when no message is received (80% versus 45%, p -value = 0.068 in our double-blind condition; 100% versus 50%, p -value = 0.019 in our single-blind condition; 87% versus 25%, p -value = 0.006 in CD). However, non-promise messages are not viewed differently than promises in any of the three cases (80% versus 75%, p -value = 0.781 in our double-blind condition; 100% versus 80%, p -value = 0.188 in our single-blind condition; 87% versus 67%, p -value = 0.186 in CD).

By and large, our data is similar to CD in that messages lead **As** to trust and **Bs** often respond by being trustworthy. In fact, no pairwise comparison of **A** or **B** behaviour conditional on message type between any two of the three data sets shown in Table 3 is statistically significant.¹¹ However, there appears to be a substantial difference in the types of messages

¹¹ The power of such tests is relatively low given the small number of observations in some categories (e.g. CD only have four cases where no message was sent).

that are sent between our experiments and those of CD. In both our single-blind and our double-blind conditions, the modal message type was blank whereas the modal message type in CD was a promise. A test rejects the null hypothesis that the distribution of message types is the same in the three cases (χ^2 [4 d.f.] = 16.727, p-value = 0.002). Inspection of the messages (see Appendix 2) also suggests that messages tended to be longer in CD than in our study. In fact, the average number of words in CD was 30.4 and in our single-blind replication it was only 8.8 (a statistically significant difference: t-statistic = 4.16, p-value < 0.001). Therefore, it seems that the difference in aggregate behaviour discussed in section 4.2 may be driven in part by differences in the willingness of Bs to send a message.

4. CONCLUSIONS.

The experiments in this paper were designed to test whether the positive impact that messages have on cooperation are driven by internal motivations or whether they are the result of external social forces. To explore this we employed a 2x2 design varying the payoff procedures and the opportunity for communication in the hidden action trust game of Charness and Dufwenberg (2006). We found no effect of communication or payoff procedure on trusting or trustworthy behaviour in aggregate. While we do find that pairs in which messages are sent had greater cooperation, consistent with previous research, we observe relatively few messages being sent.

Our inability to replicate the cooperation-enhancing effect of the opportunity to send handwritten messages suggests that this behaviour may not be as robust as it has been perceived although two other studies have replicated the results. The lack of an effect from the payoff procedures in our data and in Barmettler et al. (2012), when giving both methods comparable emphasis, is counter to received wisdom. Both of our findings suggest that more research is needed to better understand the subtlety of human behaviour. One possible explanation, consistent with previous studies along both dimensions, is that the incremental effect of cooperation-improving mechanism is decreasing in the underlying level of cooperation. That is, if cooperation is already high (due perhaps to experimental procedures or subject pool effects) then communication and single-blind payoff procedures do not have as great of an effect as when the underlying cooperation rate is low. Only more evidence will ultimately distinguish between explanations such as this for variations across studies and type-1 or type-2 statistical errors due to inherent variance among people. By the same token, our findings also demonstrate the need to publish and replicate non-results. Had early work on communication or payoff procedures mirrored what we observed, both streams of literatures would have likely died on the vine, creating a very different picture of cooperative behaviour.

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APPENDIX 1

Subject Instructions.

The base instructions for the double-blind No Message condition. Text in --()—and --[]-- highlight changes made for conditions with messages and single-blind conditions, respectively.

INSTRUCTIONS

Thank you for participating in this session. The purpose of this experiment is to study how people make decisions in a particular situation. Feel free to ask us questions as they arise, by raising your hand. Please do not speak to other participants during the experiment.

You will receive \$5 for participating in this session. You may also receive additional money, depending on the decisions made (as described below). Upon completion of the session, this additional amount will be paid to you (as described below).

During the session, you will be paired with another person. However, no participant will ever know the identity of the person with whom he or she is paired.

Decision Tasks

In each pair, one person will have the role of A, and the other will have the role of B. The amount of money you earn depends on the decisions made in your pair.

On the designated decision sheet, each person A will indicate whether he or she wishes to choose IN or OUT. If A chooses OUT, A and B each receive \$5. We will collect these sheets after the choices have been indicated. Next, each person B will indicate whether he or she wishes to choose ROLL or DON'T ROLL (a die). Note that B will not know whether A has chosen IN or OUT; however, since B's decision will only make a difference when A has chosen IN, we ask B's to presume (for the purpose of making this decision) that A has chosen IN.

If A has chosen IN and B chooses DON'T ROLL, then B receives \$14 and A receives \$0. If B chooses ROLL, B receives \$10 and a six-sided die is rolled to determine A's payoff. If the die comes up 1, A receives \$0; if the die comes up 2–6, A receives \$12. (All of these amounts are in addition to the \$5 show-up fee.) This information is summarized in the chart below:

	A Receives	B Receives
A chooses OUT	\$5	\$5
A chooses IN, B chooses DON'T ROLL	\$0	\$14
A chooses IN, B chooses ROLL, die = 1	\$0	\$10
A chooses IN, B chooses ROLL, die = 2, 3, 4, 5, or 6	\$12	\$10

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A Message

Prior to the decision by A concerning IN or OUT, B has an option to send a message to A. Each B receives a blank sheet, on which a message can be written, if desired. We will allow time as needed for people to write messages, then these will be collected. Please print clearly if you are B and you wish to send a message to A.

In these messages, no one is allowed to identify him or herself by name or number or gender or appearance. (The experimenter will monitor the messages. Violations, as determined by the experimenter, will result in B receiving only the \$5 show-up fee, and the paired A receiving the average amount received by other A's.) Other than these restrictions, B may say anything that he or she wishes in this message. If B does not wish to not send a message, B should simply write an "X" in the space provided.)--

Payoff Procedures

Each of you will receive a "code." The code will be written on your response form. The purpose of this code is --(so that the experimenters can insure that any message sent by B is received by the paired A. The code also allows the experimenters)-- to insure that your payoff is based on your action and the action of the person with whom you are paired while maintaining that no participant will ever know the identity of the person with whom he or she is paired

The code you receive will also be on a "key." After the experiment is completed, you will be able to receive your cash payment in a sealed envelope from a locked mailbox, located in another room here in the lab. The envelopes will be identical on the outside, so that no one, including the experimenter, will ever know the decision --(, message,)-- or payoff of any participant. To protect your anonymity, you should place the coded key in your pocket once you receive it. After you have collected your payoff envelope, there will be a container into which everyone will drop their keys.

--[The code you receive will also be on a "key." After the experiment is completed, each person will be called by name to collect their money. You will be able to receive your cash payment from the experimenter by privately showing your key to the experimenter so the experimenter knows how much money you earned. At this point your earnings will be recorded beside your name on the sign-in sheet you already completed.]--

Response form for subjects in role **A** in all four conditions

You have the role of A

Your code _____

Please circle your choice of (1) IN or (2) OUT and then place this form back in the envelope. You must circle exactly one choice.

(1) IN

A receives \$0 & B receives \$14 if B chooses DON'T ROLL

A receives \$0 & B receives \$10 if B chooses ROLL & die = 1

A receives \$12 & B receives \$10 if B chooses ROLL & die = 2,3,4,5 or 6

or

(2) OUT

A receives \$5 & B receives \$5

Response form for subjects in role **B** in all no message conditions

You have the role of B

Your code _____

Please circle your choice of (1) DON'T ROLL or (2) ROLL and then place this form back in the envelope. You must circle exactly one choice.

(1) DON'T ROLL

A receives \$5 & B receives \$5 if A chooses OUT

A receives \$0 & B receives \$14 if A chooses IN

or

(2) ROLL

A receives \$5 & B receives \$5 if A chooses OUT

A receives \$0 & B receives \$10 if A chooses IN and B chooses ROLL & die = 1

A receives \$12 & B receives \$10 if A chooses IN and B chooses ROLL & die = 2,3,4,5 or 6

Response form for subjects in role **B** in all message conditions

You have the role of B

Your code_____

Please circle your choice of (1) DON'T ROLL or (2) ROLL and then place this form back in the envelope. You must circle exactly one choice.

(1) DON'T ROLL

A receives \$5 & B receives \$5 if A chooses OUT

A receives \$0 & B receives \$14 if A chooses IN

or

(2) ROLL

A receives \$5 & B receives \$5 if A chooses OUT

A receives \$0 & B receives \$10 if A chooses IN and B chooses ROLL & die = 1

A receives \$12 & B receives \$10 if A chooses IN and B chooses ROLL & die = 2,3,4,5 or 6

The experimenter will cut this page along the dashed line and only the bottom portion will be sent to A, if you choose to send a message. Place an "X" in the provided space if you do not wish to send a message to A.

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You may print a message to your paired A below if you wish.

APPENDIX 2

Coder Instructions and Subject Messages

a/b in the Code column denotes that the three coders were split and that two coded the messages as a and 1 coded the message as b. In the table with the messages from Charness and Dufwenberg (2006), an * denotes that a majority of our coders evaluated the message differently than did CD.

Coder Instructions

Purpose: To study how communication affects the play of the game.

Game: Refer to the attached instructions for the experiment.

Coding Rules:

- (1) The unit of observation is a single message.
- (2) If a message contains the relevant category of content, enter the appropriate category code.
 - “0” a blank message
 - “1” a promise or statement of intention of the action the message’s sender will take
(The sender’s actions are limited to Roll and Don’t Roll)
 - “2” a message that is not blank, but does not contain a promise or statement of intention of the action the messenger’s sender will take.
- (3) You should **independently** code all messages. Do not discuss with anyone about which statements should fall into which categories.
- (4) Your job is to capture the content of the message as sent rather than why it was sent or what effect it had. Think of yourself as a “coding machine.”

You will be paid **\$20** for coding all messages. Thank you.

Messages in Our Double-Blind Condition

ID	B action	A action	Code	Message
1	Roll	In	1	I'm Going to choose to roll. You have a one in six chance of making 12. Like me, if you're in this study, you probably need the money. Choose IN, I guess you can't Tell but I'm not trying to deceive you.
2	Roll	Out	0	
3	-	In	1	I will not choose the Don't Roll option so feel free to go with the 5/6 odds for the dice roll.
4	Roll	Out	2	Your move
5	Roll	In	2/1	If you pick "in" every time, and I pick roll every time we will both win the highest amount of money safely. For every 6 rolls if you pick in you have a 1/6 chance of getting \$0 & a 5/6 Chance of getting \$12.00. It's in our best interest to pick "in" and Roll every time.
6	Roll	In	1	Look, we'll both make a lot more money if you go in and I roll every time. I will roll every time, so if you go in we'll both make off pretty good.
7	Roll	Out	2	There is more of a chance for both of us to make more if you always choose in, Odds are in both our Favors if you choose in.
8	Don't Roll	Out	0	
9	Don't Roll	Out	0	
10	Don't Roll	In	1	I'm In it to Roll with it.
11	Roll	In	2	Trust me and choose to roll to be in. It is the best odds for both of us, even if you make more money
12	Don't Roll	In	2	I' am B and I wish to send a message to A. You should Roll choose in
13	Roll	Out	0	
14	Roll	In	2	Stay In
15	Roll	In	0	
16	Don't Roll	Out	0	
17	Roll	In	1	I chose to roll the die. Gives you a 83% chance at \$12 extra dollars if you want to go IN.
18	Roll	In	0	
19	Roll	In	1	I chose to roll
20	Don't Roll	In	0	
21	Roll	In	2	Choose IN - You won't be sorry.
22	Roll	Out	0	
23	Roll	In	1	PLEASE choose "IN" because I am choosing to "ROLL" - this is the best option for both of us together.
24	Roll	In	0	
25	Roll	In	2	INNER
26	Don't Roll	Out	0	
27	Roll	Out	1	If you choose In, I'll choose roll. Gives us both to make more money, which seems fair. Go Team!

28	Roll	In	0	
29	Don't Roll	Out	0	
30	Roll	In	2	Choose In
31	Don't Roll	Out	0	
32	Don't Roll	In	0	
33	Don't Roll	In	0	
34	Roll	In	1/2	Lets Roll 5/6 chance of making more money
35	Roll	In	1	I CHoSE To RoLL.
36	Roll	In	0	
37	Don't Roll	Out	0	
38	Roll	In	2	IN
39	Roll	Out	2	If you choose to go in, we can both walk away with something hopefully!
40	Roll	In	0	
41	Roll	In	1/2	If you are willing to take a 5/6 chance of getting more than 5, I'm in.
42	Roll	In	2	There is no good or evil. Only power, and those too weak to seek it.
43	Don't Roll	Out	0	
44	Roll	Out	1	Hi! Im choose Roll
45	Don't Roll	In	2	Hey buddy, I think should choose IN because

Messages in Our Single-Blind Condition

ID	B action	A action	Code	Message
1	Roll	In	2	THE CHANCES ARE WORTH IT TO BE "IN".
2	Roll	Out	0	
3	Roll	In	2	Choose In the chances are higher to for positive gains than none. 5 5/6 for gain. You've got nothing to lose.
4	Roll	Out	0	
5	Roll	Out	2	IN (**triple underlined**)
6	Don't Roll	In	0	
7	Roll	In	1	You better have chosen IN, because I'm rolling a 6 baby!
8	Don't Roll	In	0	
9	Roll	In	0	
10	Don't Roll	In	1	Choose <u>IN</u> I will choose <u>Roll</u> You have a 5 in 6 chance of getting \$12 dollars. I'm happy with getting \$10.
11	Roll	In	1	I promise to select Roll
12	Don't Roll	Out	0	
13	Don't Roll	In	2	good luck :) let's do it.

14	Roll	In	1	I am going to roll every time. Everything will be ***single unknown scratched out character*** okay.
15	Roll	In	2/1	Choose IN, we'll both win.
16	Don't Roll	In	0	
17	Roll	In	2/1	I want to maximize our shared profit :)
18	Roll	In	1/2	If you choose "IN" and I choose "Roll" the most money will be acquired for the both of us.
19	Roll	In	1	Roll
20	Roll	Out	0	
21	Don't Roll	In	0	
22	Roll	In	1/2	I'm down to pick roll if you want to pick in. Doesn't matter to me. :) <-- helps us both?
23	Don't Roll	In	1	I will roll no matter what you may choose.
24	Roll	In	2/1	I'm not greedy, I'm choosing the option to get the most for both of us.
25	Roll	Out	0	
26	Don't Roll	In	2	Choose <u>IN</u> and we will both have A better chance of making more money. Obviously.
27	Roll	Out	2/1	Go IN, your chances at \$12 is <u>5/6</u> !
28	Don't Roll	In	1	Okay, the best choice for both of us looks like if you choose In. That way you have a 5/6 chance of getting \$12 and I am happy with \$10. If you chose IN I will choose ROLL.
29	-	In	1	Choose IN, Either way I am going to Roll the die thus I will either get 1 or 2,3,4,5,6 The chance of us getting more \$ is greater if we are both in (***subject did not indicate a decision on the form***)

Relevant Messages in Charness and Dufwenberg (2006)

<i>ID</i>	<i>B action</i>	<i>A action</i>	<i>Our Code</i>	<i>Their Code</i>	<i>Message</i>
1	Don't Roll	Out	2	2	Please choose In so we can get paid more.
2	Don't Roll	In	1	1	Choose in, I will roll dice, you are 5/6 likely to get 2,3,4,5, or 6 → \$12. This way both of us will win something.
3	Don't Roll	In	2	2	If you stay in, the chances of the die coming up other than 1 are 5 in 6 – pretty good. Otherwise, we'd both be stuck at \$5. (If you opt out)
4	Roll	Out	2	2	I have to do laundry tonight and I really don't want to do it! But I don't have any clean underwear left and I don't want to go commando tomorrow. We'll see what I decide tonight. This man acts funny doesn't he? But he seems cool, he's quite a character. All this mystery is kinda cool.
5	Roll	In	1	1	If you will choose "In", I will choose to roll. This way, we both have an opportunity to make more than \$5! ☺
6	Roll	Out	0	0	
7	Roll	In	1/2	1	If I roll a 2-6 (you'll know when you receive the \$, you will give \$5.00 to a stranger. [[[then there is a line, under which is written "Sign here if you are so kind]]] Thanks. You'll still be gaining more than if I had chosen Don't roll.
8	Roll	In	1	1	The fairest thing to do is if you opt "IN". Then I will proceed to choose "roll." That way you and I have 5/6 chances to make money for the both of us. That's much better than just making \$5 each. Increases both our chances. Thanks.
9	Don't Roll	In	1	1	Choose In and I will Roll You have my word
10	Roll	In	2	2	Good luck I do not know what I'm going to do, so I have no hints on how to advise you on choosing "in" or "out." Though it would be beneficial for me to pick don't roll and hope you pick "in", I also like to give you a chance to gain some cash. Who knows?
11	Don't Roll	In	2/1	2	What's up? Good luck on your decision. Choose whatever. If you choose "out," you get only \$10 total. If you choose "In," you can get \$17 total instead of only \$10. 7 bucks is a lot of money!
12	Don't Roll	In	1	1	Hey. OK I think that the best way for both of us to make a profit is for you to choose IN and for me to roll. That way we both make some money. There's no point in me not rolling because that would give you and me less profit. So I'm a roller if you're in ☺
13	Roll	In	2	2	take a risk

14	Roll	Out	1*	2	If you choose IN the first round and then I will choose Don't Roll at first. I will get \$14 but then after that I will choose roll each time after the 1st role. Chances are most likely you will get \$12 and I will get only \$10. I will the only take 7 rolls for you to get even with me. That way we both leave with a good amount of money. Hope you have a great evening and that this works out for both of us. ☺
15	Roll	In	1	1	If you choose in I'll roll. Why? If you choose out, we walk out with \$10 each. If you choose IN & I choose IN then both of us coin. So it's a compromise. By agreeing to this I guarantee myself more \$ than risking you choose out. So if you choose out I get \$10 (\$5 diff.) if you choose in I get \$15 vs. \$19 (\$4 diff.). that's why
16	Don't Roll	Out	0	0	
17	Roll	Out	0	0	
18	Roll	In	2/1*	1	Choose "In" so we can both make some \$\$ What are the chances me rolling a 1? I'll try my best.
19	Roll	Out	1	1	I'm going to roll.
20	Roll	In	1	1	I'll choose roll.
21	Don't Roll	In	1	1	I will choose roll.
22	Roll	In	1	1	I'm going to choose roll
23	Roll	In	1	1	choose in, & I'll roll.
24	Roll	In	1	1	You can have the 2 extra dollars. I'll be nice and choose to roll. ☺
25	Roll	In	0	0	
26	Don't Roll	In	1	1	Hey, choose in and I will roll. You have to like your odds that I will roll a 2,3,4,5, or 6. 5/6 odds ain't bad.
27	Roll	In	1	1	If you choose "In", I'll choose Roll and you've got a 5/6 chance of getting \$12.
28	Roll	In	2	2	Stay IN, I really need the money.
29	Don't Roll	Out	2/1	2	If you choose IN, and I roll, the chances of our getting the most \$ are very high. The likelihood of my rolling a 1 is small compared to the chances of rolling a 2-6. So we both get cash.
30	Roll	In	1	1	Hi, well I'm going to Roll so you have at least a shot for more money. I hope it works out.
31	Don't Roll	Out	1/2*	2	Hopefully I'll make a lucky role.
32	Roll	In	1	1	It's much more likely that I'll roll a 2-6 and thus get more money than if we don't roll or choose out. I promise that I won't cheat you and that I'll choose to roll. J
33	Roll	Out	2	2	Tee hee, this is kinda Twilight Zone – ism; Why not "go for it", eh? I hope you have a lovely evening as well.

34	Roll	In	1/2*	2	Hello fair stranger, anonymous partner ... Choose whatever you want. Far be it from me to influence your decision, but I think you should choose "in" and I should choose "roll" and we should take the chance at both earning as much as we can. 5 chances out of 6 say it'll work, and I'm totally broke, looking to rake in stray cash however I can. I feel the luck in the air. I don't really have much else to say. Hope you're doing well, whoever you are. Yes. That's all. Random note from random human
35	Don't Roll	In	2	2	Both of 'us' can earn.
36	Roll	In	1	1	Ok. You're probably thinking, lets chose out, and I'll at least get 5 bucks. But... ..Chose 'IN', and I WILL chose to roll. The probability that I will roll a 2,3,4,5, or 6 is pretty high, and I think worthy of trying for. (I have no way of assuring you that I will roll ... but, its probably worth going for, you'll get \$12 for finding out, where I could get \$10.) x. I WILL ROLL
37	Roll	In	1	1	I <u>will roll</u> , so if you stay in, you've got a 5/6 chance of getting 12. If you don't mind the risk, if you stay in we'll both probably get more than \$5 ... Pretty cool to get money, eh? I'm kinda bored. Hope you've had a great day so far! My country Tis of Thee Sweet Land of Liberty Of Thee I sing. Land where my fathers died Land of the Pilgrim's Pride On every mountainside Let freedom ring. George W. Bush wants you to go in! Bin Laden says "out"! ☺
38	Don't Roll	In	1	1	Lets together get the most \$ out of this that we can. -->you 12 0 0 5 me 10 10 14 5 I promise not to do this one. ^ I promise I will choose to roll. You can have the extra \$2 bucks. It's good karma. Thanks. I will choose ROLL in any case considering I will get the same amount no matter what you choose, as long as you choose IN. please excuse the awful handwriting. I'm trying
39	Roll	In	1	1	I'm choosing ROLL, which gives you a chance to get \$12 instead of \$5, so stay. It's a risk, but you could end up getting a lot more.
40	Roll	In	1	1	If you choose in then I'm going to choose roll. This gives you a 5/6 chance of getting 12 dollars. That is 7 more than if you choose out. Since the money is free anyway – why not believe me. I'm don't lie – I promise I will choose roll.
41	Don't Roll	In	2	2	If you choose IN you have the best opportunity to make the most money. You have a 5/7 chance of making more money! So IN would be your best bet. Cheers. ☺
42	Roll	Out	1	1	Choose IN. I promise I'll ROLL.