Implicit communication in the ultimatum game

Markus Brunner, Andreas Ostermaier

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Markus Brunner* Andreas Ostermaier†

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Abstract
We use modified ultimatum games to examine implicit communication in bargaining. Our results show that responders reject low offers not only because they disapprove them but because they want to demonstrate their disapproval to proposers. If rejection implicitly signals envy, in turn, they refrain from rejecting offers. Proposers anticipate the effect of implicit communication and make higher offers to evade rejection. To manipulate implicit communication, we introduce random noise so that proposers cannot infer responders’ decisions unless we disclose these. Our study contributes to the growing literature on communication in bargaining, which has focused on explicit rather than implicit communication.

Keywords: Implicit communication, laboratory experiment, punishment, ultimatum game.

JEL classification: C91, D03, D83.

* TUM School of Management, Technische Universität München, Arcisstraße 21, 80333 München, Germany, +49 89 289 25803, markus.brunner@tum.de
† TUM School of Management, Technische Universität München, Arcisstraße 21, 80333 München, Germany, +49 89 289 24076, andreas.ostermaier@tum.de
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1 Introduction

Bargaining is an interesting setting to examine the role of communication in economic interactions. A growing body of literature shows that communication can improve cooperation in ultimatum games (Greiner et al., 2014; Xiao and Houser, 2005; Zultan, 2012). Most of this research has examined explicit communication, such as face-to-face talk or on-line chat. It is commonly understood, though, that people communicate through their actions as much as through their words. To illustrate, imagine a negotiator who rejects an offer that he or she disapproves especially to demonstrate this disapproval. Conversely, a negotiator may also reluctantly accept an offer to avoid admitting disapproval and to not appear as a sore loser. We examine such implicit communication in bargaining. Specifically, we explore whether negotiators’ responses to offers are driven by what they want and do not want to communicate with their actions.

In our first study, we conduct experiments to answer two questions: Do responders reject offers to signal—implicitly—their disapproval to proposers? Do proposers anticipate responders’ use of implicit communication? We modify the ultimatum game, which is commonly used to simulate bargaining situations, to manipulate implicit communication. In the standard game, a proposer suggests how to divide some amount of money between him- or herself and the responder, and the responder either accepts or rejects this offer. If the responder accepts the offer, the money is allocated as proposed; otherwise, both get nothing (Güth et al., 1982). Rejection can be driven by a variety of motives, including fairness preferences, anger, or envy (Roth, 1995; Güth and Kocher). As a notable exception, Kriss et al. (2013) studied both implicit and explicit deception in the ultimatum game. However, they consider communication by the proposer, whereas our focus is on the responder’s communication.
2014), and potentially the motive to communicate. In the standard ultimatum game, however, these motives cannot easily be disentangled.

Prior studies enabled communication by adding a communication channel (e.g., chat messages). To explore implicit rather than explicit communication, however, we block communication. Specifically, we introduce noise to prevent the proposer from learning the responder’s decision. In 25% of the games, offers are randomly accepted or rejected, so that the proposer can never know whether some offer has been accepted or rejected by the responder. This experimental setup allows us to manipulate implicit communication by either disclosing or not disclosing the responder’s decision. If their decisions are disclosed, responders can use rejection to communicate to proposers. Otherwise, responders cannot communicate to proposers, no matter whether they accept or reject offers. If responders care about whether proposers learn their decisions, rejection rates presumably differ between the disclosure and no-disclosure conditions.

Related research suggests that negative emotions, such as anger, drive rejection (Sanfey et al., 2003; van ’t Wout et al., 2006), and that people want to communicate their anger. Xiao and Houser (2005) find that rejection rates drop when they enable responders to send written messages along with their decisions. They conclude that (explicit) communication allows responders to vent their anger, which otherwise factors into their decisions. Other studies employ the impunity game, where proposers receive their payoffs regardless of responders’ decisions, instead of the ultimatum game. They find that responders reject offers and thus forgo their own without reducing the proposer’s payoff (Yamagishi et al., 2009; Ma et al., 2012). However, while Ma et al. (2012) see rejection rates significantly increase when proposers are also told about responders’ decisions, Yamagishi et al. (2009) measure no effect of their communication manipulation.

Although none of these experiments considers implicit communication in bargaining, they offer intuitions for potential effects. The decrease in rejection rates that Xiao and Houser (2005) and Ma et al. (2012) see when they enable communication suggests that responders want proposers to know about their disapproval. Xiao and Houser’s outcomes provide indeed indirect evidence for implicit communication. Rejection rates are arguably higher without than with written messages because responders who may not communicate their disapproval in writing use rejection instead. Hence,
provided that rejection is the only way of communicating disapproval, we should observe higher rejection rates when this implicit communication channel is available than when it is blocked. In particular, an increase of rejection rates under disclosure would offer direct evidence for implicit communication in the rejection of proposers’ offers.

We complement our first study on whether responders reject offers to send implicit messages with another experiment to address a related question: Do responders accept offers to avoid sending implicit messages? We run another set of modified ultimatum games. Compared to our first study, we replace proposers’ offers with random offers, but keep the distribution of offers constant. We thus create an identical bargaining setting, except that proposers are passive as they do not make offers. This setup rules out anger about the proposer as a driver of rejection. While responders may still reject offers, they cannot reasonably imply that they are angry about proposers, whether their decision is disclosed or not. Nonetheless, rejection still tells the proposer about the responder’s motive. In particular, the random-offer manipulation spotlights envy as another motive of rejection.

Envy, unlike anger, is condemned by all societies. While anger is potentially justified by someone else’s behavior, envy is a negative feeling toward someone who is better off, which is not in response to others’ actions. Envy is usually repressed, denied, disguised, or relabeled, because people feel embarrassed to admit that they are envious. In particular, responders can normally disguise their envy with anger. In the absence of anger, however, envy remains as a major motive of rejection, and the responder must expect that the proposer interprets rejection to indicate envy. As a result, responders may tend to accept low offers to avoid appearing envious in the random-offers ultimatum game. Hence, while we should see rejection rise under disclosure in response to proposers’ offers, we should see it fall with random offers.
2 Experiment

We recruited students of a large European university using ORSEE (Greiner, 2015) to participate in one of two experimental studies. Each study involved two conditions. Subjects could only participate in one condition of one of the two studies. In both experiments, subjects interacted anonymously through a computer network. The experiment was programmed in z-Tree (Fischbacher, 2007). Subjects were remunerated in cash at the end of their session, earning €2 for each experimental currency unit (ECU).

2.1 Study 1

In Study 1, subjects played the two-player ultimatum game repeatedly over 10 rounds. They were randomly assigned either as proposers or responders and kept their roles throughout the experiment. Upon arriving at the laboratory, subjects drew cards with the number of their computer. They first received general instructions, which applied across roles. They then took a quiz to make sure that they had understood the instructions. Only after passing the quiz, they learned, in private, whether they were a proposer or a responder.

At the beginning of each round, proposers and responders were randomly rematched for repeated one-shot games. The proposer suggested how to divide 10 ECU between the proposer and the responder. The possible offers were 0, 1, 2, . . . , 10 ECU. The responder accepted or rejected this offer. We modified the standard ultimatum game design, however, by adding noise to the responder’s decision. Specifically, in 25% of the games, nature decided about the proposer’s offer after the responder had made a decision. Independently of the responder, nature accepted or rejected the offer with equal probability, overriding the responder’s decision. In 75% of the games, nature did not make a decision. At the end of each round, the proposer learned whether the offer had eventually been accepted or rejected. The proposer could not infer whether the offer had been accepted or rejected by the responder without further information. The probability for nature to accept the offer was not

\[ \text{The instructions, which are reprinted in the appendix, refer to the proposer as “Participant A” and to the responder as “Participant B.”} \]

\[ \text{We are particularly interested in the rejection of low offers. As such offers are rare, we opted for repeated games with stranger matching instead of a one-shot experiment to generate more data.} \]
revealed to subjects to prevent proposers from updating their beliefs about responders’ decisions. If the proposer’s offer was eventually accepted, both players received their payoffs according to the proposer’s offer, and no payoff otherwise.

While the proposer could not infer the responder’s decision from the rejection or acceptance of the offer, we could always disclose this information. We manipulated, between subjects, whether or not the responder’s and nature’s decisions were disclosed to the proposer along with the outcome. In the disclosure condition, the proposer was thus told the responder’s decision; whether nature had taken a decision and, if so, how nature had decided; the outcome that resulted from the responder’s or nature’s decision. In the no-disclosure condition, the proposer was only told the outcome. Responders knew whether proposers would learn their decisions. Hence, depending on the condition, they either could or could not use acceptance and rejection for implicit communication to proposers. While noise is technically not necessary in the disclosure condition, we used it across conditions to keep everything except disclosure constant.

After the last round, subjects took the Mach-IV test to measure Machiavellianism (Cristie and Geis, 1970) and answered demographics questions. Finally, they were paid for one round, which was randomly selected at the end of the experiment. In addition to their payoffs from the ultimatum game, they received an additional fixed amount of 2.5 ECU.

2.2 Study 2

Study 2 differed from Study 1 only in the task of the proposer. Proposers could not decide on offers themselves but had to forward to responders offers that were randomly drawn. Specifically, the offers were drawn from the distribution of offers that resulted from Study 1. To avoid that differences in responders’ rejection decisions between both conditions were potentially driven by different distributions of offers, we pooled offers across the conditions of Study 1. This distribution was then used to determine offers in both conditions of Study 2. Responders were told that offers

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4After ten rounds, we manipulated the treatment also within subjects and changed whether the responder’s and nature’s decisions were disclosed. Subjects were not told about this manipulation at the beginning of their session, but only after the first ten rounds were finished. Comparisons between the first and second ten rounds did not yield any meaningful insights. We thus exclude the data and related tests for brevity.
were not the proposers’ choice, but were adopted from an experiment conducted earlier in the same laboratory.

Again, we manipulated, between subjects, whether or not the responder’s and nature’s decisions were disclosed to the proposer at the end of each round. Like in Study 1, the responder’s acceptance or rejection decision implies communication if it is disclosed. As opposed to Study 1, however, the responder cannot possibly react to the proposer’s decision because the offer is not the proposer’s choice.

3 Results

Either study involved 6 sessions of about one hour, for a total of 12 sessions. In half of these sessions, responders’ decisions were disclosed, in the other half, they were not disclosed. A total of 352 students participated in both studies (188 in Study 1 and 164 in Study 2). Subjects’ age averaged 23.5 years (SD 4.2) and 65.3% were male. The remuneration was about €14 on average.

3.1 Responders’ rejection decisions

We first consider the effect of disclosure on the rejection of offers in either study. Fig. 1 summarizes the responders’ rejection rates. Specifically, a responder’s rejection rate averages, for each offer, the responder’s rejection decisions over the ten rounds of the experiment. The figure reports the means of the individual rejection rates by offer, condition, and study. Fig. 1 highlights the mean rejection rates for offers of 2, 3, and 4 ECU. We pool offers of 0 ECU, which are rare, with offers of 1 ECU. Likewise, we pool the few offers of 6 ECU and more with offers of 5 ECU. Offers of 5 ECU and more are usually accepted. By contrast, rejection rates vary considerably between studies and conditions for offers of 2, 3, and 4 ECU.

For consistency, the role of subjects who had to forward offers but not make offers themselves in Study 2 still as proposers. In the experiment, the roles were again referred to as “Participant A” for the proposer and “Participant B” for the responder.
Unsurprisingly, rejection rates are lower for higher offers across both studies. Contrasting the studies, rejection rates are generally higher in Study 1, where offers are chosen by proposers, than in Study 2, where proposers do not have any choice. The difference in rejection rates between the studies suggests that rejection is, to some extent, driven by whether proposers have the choice over offers. However, rejection rates differ only between offers below 5 ECU. A potential explanation for the rejection of low offers in Study 2 are concerns about distributional fairness. In Study 1, where proposers choose the offers, rejection can in addition reciprocate proposers’ choices, and low offers are indeed more often rejected than in Study 2, which rules out reciprocity as a motive for rejection by design. Rejection rates differ especially when responders’ decisions to accept or reject offers are disclosed. Without disclosure, rejection rates are similar.

Looking at the effect of disclosure, we note that rejection rates increase under disclosure in Study 1. That is, responders are more likely to reject a given (low) offer when they can be sure that proposers learn their decision. While rejection has apparently some value for responders (they forgo money as they reject offers), this value is even higher when their decisions are disclosed. Disclosure enables implicit communication from the responder to the proposer. Responders can let proposers know that they have rejected an offer to punish them, that they are angry about proposers’ greed, or that an offer violates their self-esteem. This said, implicit communication remains necessarily vague, which arguably reduces its value. As rejection does not imply one specific reason, the proposer may or may not interpret rejection as intended by the responder.

Interestingly, we observe the inverse pattern in Study 2, where rejection rates decrease under disclosure. While disclosure makes rejection more valuable when it reciprocates the proposer’s choice in Study 1, it reduces the value of rejection when it is not in response to anything the proposer has done to justify this decision. Specifically, as rejection does not respond to any action of the proposers, it can only reveal the responder’s preferences about the allocation of payoffs. Rejection arguably tells proposers that responders consider an allocation too unfair to be realized or, put differently, that they envy proposers their higher payoff, although the allocation is not their choice. A potential motive for proposers to accept a given offer under disclosure that they would otherwise reject is that they do not want to appear to be driven by envy.
Both the increase in rejection rates in response to the proposers’ choice of the offers and the decrease when proposers do not have a choice are most striking for offers of 2 and 3 ECU. Offers of 4 ECU, which come close to an equal split, and particularly offers of 5 ECU and more, give little reason to reject. Offers of 2 or 3 ECU, in turn, leave responders rather undecided between rejection and acceptance. The additional value of communication (or avoiding communication) tips the scale when the offer is such that the responder is wavering whether to accept or reject it.

Regression results confirm these observations on Fig. 1. Table 1 reports random-effects probit regressions that test the effect of disclosure on rejection in either study for significance. Since rejection obviously depends on the offer, which is reflected in Fig. 1, offer is included as a covariate in the baseline model. The most important finding is that both the increase of the probability for an offer to be rejected in response to disclosure in Study 1 and the decrease in Study 2 are significant. It turns out that disclosure has opposite effects depending on whether offers are made by proposers or random. The significant negative effect of offer is also in keeping with Fig. 1 which shows that rejection rates decrease as offers increase—irrespective of disclosure and of whether offers are the proposers’ choice.

The second and third models, which include the round as a covariate, show that the probability of rejection declines over time. The third model includes a (standardized) measure of the responder’s Machiavellianism. Machiavellianism predicts skillful negotiation tactics, cynical views of others, and disavowal of moral standards (Cristie and Geis, 1970). It is interesting to note that Machiavellianism reinforces the effect of disclosure in Study 1, where rejection reciprocates the proposer’s choice of (low) offers. When rejection is not disclosed, responders who are higher in Machiavellianism are more likely to accept offers. Conversely, when rejection is disclosed, they are more likely to reject offers, and the difference between the effects of Machiavellianism is significant. This observation aligns well with the intuition that Machiavellianists exploit implicit communication as an additional tactic of negotiation that disclosure provides to them.
3.2 Proposers’ offers

The difference in rejection rates between the conditions in either study shows that responders’ rejection decisions are contingent on whether these decisions are disclosed to proposers. In particular, responders reject low offers more often in Study 1 when they can be sure that proposers learn about rejection. Given the effect of disclosure on responders’ behavior, it is interesting to examine whether disclosure also affects proposers’ offers. That is, do proposers anticipate the effect of disclosure on responders, which would lead them to make different offers depending on whether responders’ decisions are disclosed? To answer this question, we consider the data from Study 1, where proposers made offers. Fig. 2 depicts the distribution of offers.

We noted in the previous section that offers of 0 and 1 ECU as well as offers of more than 5 ECU are rare. Fig. 2 therefore pools low and high offers and focuses instead on offers of 2, 3, and 4 ECU, like Fig. 1 in the previous section. Comparing offers between conditions, we see that low offers of 0 through 2 ECU are less frequent with disclosure than without. Offers of 4 ECU, by contrast, are more common under disclosure. The relative frequencies of offers of 5 ECU and more are similar across conditions. Overall, Fig. 2 suggests that proposers react to disclosure by raising their offers, although they do not go so far as to offer equal splits more often.

Table 2 reports mixed-effects regressions of offers on disclosure with random effects on the subject level. The regression results confirm our observations on Fig. 2. The constant term measures the mean offer without disclosure, which is 3.7 ECU. Under disclosure, offers increase significantly by 0.3 ECU. This result suggests that proposers anticipate responders’ increased willingness to reject offers, provided that their decisions are disclosed. Proposers make higher offers to reduce the risk of rejection, which is reflected in the peak of 4-ECU offers, while the relative frequency of offers of less than 3 ECU declines in Fig. 2. The regression with the round as a covariate shows that offers do not increase over time, though. Unlike rejection rates, offers are not influenced by Machiavellianism.
3.3 Responders’ and proposers’ earnings

Taken together, we see two opposite effects of disclosure on responders’ earnings in Study 1. On the one hand, rejection rates rise under disclosure. As responders reject offers more often, their earnings decline on average. On the other hand, however, proposers anticipate that disclosure drives responders’ willingness to reject offers. They therefore make higher offers to avoid rejection, which potentially increases responders’ earnings. We consider the hypothetical earnings that would result from responders’ decisions, rather than their actual earnings, which are distorted by the noise that we used for our manipulation. Comparing these earnings across conditions in Study 1, we find that responders’ payoff averages 3.26 ECU (SE 0.13) with disclosure and 3.20 ECU (SE 0.12) without. While earnings are slightly higher under disclosure, this difference is not significant ($t$-test, $p = 0.736$, two-tailed). Hence, the negative effect of rejection on earnings is fully compensated by higher offers, so that the same earnings result with and without disclosure.

Proposers’ hypothetical earnings, in turn, average 4.24 ECU (SE 0.11) with disclosure and 4.61 ECU (SE 0.16) without. Unlike the difference in responders’ earnings between conditions, the 0.37-ECU decline of proposers’ earnings under disclosure is significant ($t$-test, $p = 0.065$, two-tailed). The decrease in earnings is driven by two effects. On the one hand, as proposers make higher offers to avoid rejection, they earn less provided that an offer is accepted by the responder. On the other hand, rejection rates are generally higher under disclosure despite higher offers.

4 Discussion

The ultimatum game has been widely used to study economic behavior in bargaining. The rejection of unfair offers provides compelling evidence that people’s actions are driven by non-monetary motives, such as concerns about fairness (Fehr and Schmidt 1999; Bolton and Ockenfels 2000), reciprocity (Rabin 1993; Falk and Fischbacher 2006), or reputation, as well as emotions (Xiao and Houser 2005; Ma et al. 2012). While ultimatum game experiments usually reduce interactions to a minimum, recent research has shed light on the role of (explicit) communication, which turns out to facilitate cooperation (Zultan 2012; Greiner et al. 2014). As a contribution to this research, we
examine implicit communication in the ultimatum game. Specifically, our study explores whether people account for what their actions communicate to others about their motives and condition their actions on what they want and do not want to communicate.

To single out the effect of implicit communication, we introduce noise, so that the proposer cannot infer the responder’s decision. We then manipulate implicit communication by either disclosing or not disclosing the responder’s decision. Our results show that behaviors and bargaining outcomes differ depending on disclosure. Specifically, rejection rates are higher under disclosure, which enables responders to use rejection to communicate their anger to proposers. As we rule out anger, in turn, rejection communicates envy rather than anger, which is embarrassing to admit. Consequently, low offers are accepted more often under disclosure. The opposite effects of disclosure depending on whether envy can be masked with anger is noteworthy. It suggests that responders are aware that rejection will be interpreted differently in both cases and that they condition their decisions on what they want to communicate to proposers.

Implicit communication influences responders’ decisions most when they face moderately unfair offers (20–30% of the amount to be divided). In turn, very low offers (10% and less) are mostly rejected and higher offers (40% and more) almost always accepted, both with and without implicit communication. Being one potential driver of rejection, implicit communication tips the scale when people are undecided whether to accept or reject an offer that is quite obviously unfair, but that still earns them a sizable amount of money. This observation should not lead us to underrate the effect of implicit communication, though. It is unsurprising that there is little variation in responders’ decisions when offers are either high or very low. Moderately unfair offers are most interesting and relevant to study in bargaining situations, and we find that implicit communication has a significant effect on responders’ decisions about these offers.

It has often been pointed out that punishment can enhance cooperation (Fehr and Gächter, 2002; Fehr and Fischbacher, 2004). Specifically, cooperation increases as people anticipate that uncooperative behavior will be punished and they therefore cooperate to avoid punishment. This argument assumes, however, that proposers understand that responders will reject unfair offers to punish them. It is interesting to see that proposers anticipate the effect of implicit communication.
Specifically, they make higher offers when responders’ decisions are disclosed, which suggests that they take measures to avoid rejection. This said, proposers cannot compensate the increase in rejection rates. While responders’ earnings remain the same with and without disclosure, proposers’ earnings fall as they make higher offers but rejection rates increase at the same time. Hence, implicit communication costs proposers money.

Implicit communication is inherently vague in content. Rejection, for instance, can be a signal of anger, envy, fairness concerns, and other motives (Güth and Kocher, 2014). The responder must therefore consider, first, that the proposer may misinterpret the signal that he or she wants to send and, second, how much sending the (costly) signal is worth, whether or not the proposer interprets it correctly. Given these uncertainties, it is noteworthy that implicit communication has nonetheless a sizable effect on responders’ decisions, which proposers anticipate. While these outcomes suggest that implicit communication works, further research is needed to understand the underlying mechanisms. Specifically, it would be interesting to analyze, in future research, whether the responder and proposer agree also on the content of the message that the responder sends.
**Experimental instructions**

The following text is taken from the instructions displayed to participants on screen. The full instructions, including screenshots, were submitted as a separate file.

**Welcome**

In this experiment you will make decisions that affect other participants. However, you will remain anonymous. Nobody will learn which decisions you have made. The data will not be attached to you personally but to your workstation.

Please follow the instructions of the experimenter. Look on your own screen and do not speak. Switch off or mute your mobile devices and stow them in the pocket at the partition panel. If you have any questions, raise your hand. The experimenter will come to you and answer your questions quietly.

All necessary information will be displayed on your screen. You will not be deceived. Only the decisions that you will make based on this information will be analyzed after the experiment.

**Compensation**

You can earn money in this experiment. Amounts are in ECU and not in Euro. The conversion rate is as follows:

\[
1 \text{ ECU} = 2.00 \text{ Euro.}
\]

Each participant receives a fixed compensation of 2.50 ECU. You will find information about the variable compensation on the following screens.

The compensation will be paid confidentially and in cash. No participant will learn how much the other participants are paid.

**Overview**

The participants have different tasks. One half of the participants are Participants A, the other half Participants B.

The experiment consists of 20 rounds. In each round, random new couples of one Participant A and one Participant B will be formed. Nobody learns who the other participant is.

Participants are randomly assigned as Participant A or Participant B. However, you will always remain either Participant A or Participant B.

At the end of the experiment, you will answer questions on your computer. Your answers help us understand your decisions.

The compensation is based on 1 round of the 20 rounds. This round will be randomly selected at the end of the experiment.

**Task (Study 1)**

Participant A and Participant B divide 10 ECU between them. Participant A proposes an allocation (allocations are in whole numbers: 0 and 10 ECU; 1 and 9 ECU; 2 and 8 ECU etc.). Participant B either accepts or rejects this offer.
In 75% of the games Participant A’s offer is accepted or rejected as decided by Participant B. In 25% of the games, however, nature decides whether the offer is accepted or rejected. Nature can reach the same decision as Participant B and thus confirm Participant B’s decision. If nature makes a different decision than Participant B, however, the decision of nature prevails.

If the offer is eventually accepted, the 10 ECU are divided as suggested by Participant A. If the offer is rejected, both participants receive zero payoffs.

Whether the offer is accepted or rejected thus depends either on Participant B or on nature. Participant A learns whether the offer is eventually accepted or rejected {and always}D/{but never}ND learns
  • whether Participant B accepted or rejected the offer;
  • whether the offer was eventually accepted or rejected by Participant B or by nature.

Sequence of events (Study 1)
The following figure illustrates the sequence of events in each round.

Whether the offer of Participant A is accepted or rejected as decided by Participant B or whether nature decides: Participant A {always}D/{never}ND learns
  • whether Participant B accepted or rejected the offer;
  • whether the offer was eventually accepted or rejected by Participant B or by nature.

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6The text elements in curly brackets vary between conditions. The text marked with “D” appeared in the disclosure condition, the text marked with “ND” in the no-disclosure condition.
Task (Study 2)

10 ECU are divided among Participant A and Participant B. Participant A receives a proposal for an allocation which he forwards to Participant B (allocations are in whole numbers: 0 and 10 ECU; 1 and 9 ECU; 2 and 8 ECU etc.). Participant B either accepts or rejects this offer.

Participant A does not make an offer himself. The forwarded offer comes from offers made by different Participants A of an earlier experiment in this laboratory. Participant A can neither change nor withhold this offer but must forward it unchanged.

In 75% of the games Participant A’s offer … (continued like Task in Study 1).

Sequence of events (Study 2)

The following figure illustrates the sequence of events in each round.

Whether the offer forwarded by Participant A is accepted or rejected as decided by Participant B or whether nature decides: Participant A \({\text{always}}\}_{D}/\{\text{never}\}_{ND} \text{ learns}

- whether Participant B accepted or rejected the offer;
- whether the offer was eventually accepted or rejected by Participant B or by nature.
References


Table 1
Probit regressions of rejection decisions

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th></th>
<th>Round</th>
<th></th>
<th></th>
<th>Machiavellianism</th>
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<tr>
<td></td>
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<td>−0.866***</td>
<td>−1.272***</td>
<td>−0.918***</td>
<td>−1.271***</td>
<td>−0.925***</td>
<td>(0.212)</td>
<td>(0.091)</td>
<td></td>
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<tr>
<td>Mach.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>−0.213</td>
<td>0.077</td>
<td>(0.188)</td>
<td>(0.053)</td>
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<tr>
<td>Disc. × Mach.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>0.426*</td>
<td>−0.371**</td>
<td>(0.234)</td>
<td>(0.158)</td>
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<td>1.513***</td>
<td>3.313***</td>
<td>2.313***</td>
<td>3.270***</td>
<td>2.325***</td>
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<td>94</td>
<td>82</td>
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<td></td>
</tr>
</tbody>
</table>

Data from responders only. Includes (subject) Study 2 effects; robust standard errors (clustered by matching group) in parentheses. * p < 0.1; ** p < 0.05; *** p < 0.01.
Table 2
Regressions of offers

<table>
<thead>
<tr>
<th></th>
<th>Baseline (1)</th>
<th>Round (2)</th>
<th>Mach. (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disclosure</td>
<td>0.302*</td>
<td>0.302*</td>
<td>0.241*</td>
</tr>
<tr>
<td></td>
<td>(0.169)</td>
<td>(0.169)</td>
<td>(0.126)</td>
</tr>
<tr>
<td>Mach.</td>
<td>-0.225</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.142)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discl. × Mach.</td>
<td>0.266</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.162)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Round</td>
<td>0.010</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.009)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>3.698***</td>
<td>3.644***</td>
<td>3.707***</td>
</tr>
<tr>
<td></td>
<td>(0.117)</td>
<td>(0.120)</td>
<td>(0.064)</td>
</tr>
<tr>
<td>Observations</td>
<td>940</td>
<td>940</td>
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</tr>
<tr>
<td>Subjects</td>
<td>94</td>
<td>94</td>
<td>94</td>
</tr>
</tbody>
</table>

Data from proposers in Study 1 only. Includes (subject) random effects; robust standard errors (clustered by matching group) in parentheses.

* $p < 0.1$; *** $p < 0.01$. 
Fig. 1. Rejection rates by offer, condition, and study.
Fig. 2. Distribution of offers by condition in Study 1.