

Unilateral face-to-face communication in ultimatum bargaining – A video experiment

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August 19, 2004

Abstract

It is commonly accepted that face-to-face communication induces cooperation. The experiment disentangles communication and social effect (replication of Roth, 1995) and examines the components of the social effect with the help of unilateral communication. Results suggest that separate processes, both of a strategic and of an affective-social nature may induce cooperative outcomes in ultimatum bargaining with pre-play communication, depending on the communication protocol. Unilateral communication is found to have weaker effects than bilateral communication, and affects especially the recipient of the communication.

Keywords: *one way communication, pre-play communication, bargaining*

JEL Code: *C78, C91*

We thank Werner Güth, Yaakov Kareev, Axel Ockenfels, and the participants of the European ESA meeting 2003 in Erfurt for helpful suggestions and comments. The financial support of the Max Planck Society is gratefully acknowledged.

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1. Introduction

Typically experimental economists evaluate economic situations in anonymous experiments. Subjects interact via the computer, where they type in their decisions, and are matched anonymously. Much effort is done in keeping subjects separate and to avoid subject communication. This might be due to the fact that pre-play face-to-face communication is known to influence strategic choice.

It is commonly accepted that face-to-face communication increases cooperation and equity across situations. Frohlich and Oppenheimer (1998) found face-to-face communication to be more effective than written communication in inducing the cooperative efficient outcome in a five players prisoner's dilemma game. In their experiment, each player had a budget of 10 units, and could either keep all 10, or put any proportion of it into a 'bonus fund'. Every unit contributed by a player yielded 0.4 units each to all of the players. The mean contribution increased from 29% to 75.7% when electronic communication between the players was introduced. Face-to-face communication proved even more efficient, invoking a mean contribution of 99.9%.

A comparable game with seven players was studied in a series of experiments conducted by Dawes and his colleagues (Dawes, 1990). Subjects were found to contribute more when given 10 minutes for group discussion before play is carried out. However, this effect was not apparent when subjects believed that their contribution would yield payoff for subjects in a group different from the one they were interacting with. Furthermore, a crucial effect was found for the verbal commitments made by the other subjects during the discussion, although there was no correlation between individual promises to contribute and actual contributions.

Similar results, indicating that face-to-face communication enhances cooperation were obtained in bargaining experiments. When investigating a sealed-bid mechanism with incomplete information, Radner and Schotter (1989) found that face-to-face communication enabled subjects to capture over 99% of the first-best gains from trade, compared to 92% in an equivalent anonymous situation.

To our knowledge no controlled experiment shows an increase in equality when face-to-face communication is introduced in bargaining. However, in a bargaining experiment

with face-to-face communication conducted by Hoffman and Spitzer (1982), 12 out of 12 bargaining pairs agreed to split the pie equally when two bargaining rounds were played, in each of which a ‘controller’ who can unilaterally choose an outcome was randomly chosen just before the negotiation round. When only one round was played, 5 out of 12 pairs settled on equal split.

In another experiment, described by Roth (1995), face-to-face communication proved to induce lower disagreement rates and higher equal-split rates when compared to no communication in ultimatum bargaining. The present experiment was conducted in order to distinguish between two possible hypotheses regarding the effects of face-to-face communication, which Roth (1995) refers to as the uncontrolled social utility hypothesis, and the communication hypothesis.

The uncontrolled social utility hypothesis suggests that in the social environment created by face-to-face communication, preferences become hard to control. For example, people will probably be less likely to take advantage of other people who are similar to themselves, or who are part of their in-group (cf. Dawes, 1990). As in most experiments subjects come from the same population, namely students, this factor may be crucial.

The communication hypothesis, on the other hand, emphasizes the nonverbal channels available in face-to-face communication. Thus, face-to-face communication is not qualitatively different from written communication, but more efficient as it uses multiple channels, which are usually more reliable than the written or verbal channels alone.

In order to distinguish the effects of these two possible hypotheses, the experiment described by Roth (1995) studied pre-play face-to-face communication in ultimatum bargaining, incorporating a restricted, social only communication treatment. In this treatment the subjects have two minutes to converse before actual play is taking place, same as in the standard unrestricted face-to-face communication treatment. However, in the social communication treatment subjects are not allowed to discuss the game. These two treatments were compared to an anonymous no communication treatment in which only written offers and responses were passed between the subjects.

Roth’s results show a significant decrease in rejections (33% in the control treatment, 4% and 6% in the unrestricted and restricted communication treatments, respectively) and

increase in mean offers (\$4.27 out of \$10 in the control treatment, \$4.85 and \$4.70 in the unrestricted and restricted communication treatments respectively). The increase in mean offers corresponds to the higher rates of equal split offers in the unrestricted communication treatment, (75% compared to 31% in the control treatment and 39% in the restricted communication treatment). When offers around the equal split (\$4.50-\$5.50) are examined, high rates are observed in both communication treatments (83% and 82% in the unrestricted and restricted communication treatments respectively, 50% in the control treatment). Based on these findings, Roth (1995) rejected the communication hypothesis, claiming that his restricted communication treatment precludes strategic communication.

Note, however, that the support for this claim is not unequivocal, since the results do not rule out strategic effects. Firstly, one may argue that some relevant nonverbal communication is possible even when communication is restricted. For example, a proposer may learn of a responder's character from her nonverbal behavior, identifying her as someone who would reject a low offer, and therefore makes a relatively high offer. This high offer is, naturally, accepted, hence cooperation is achieved. Alternatively, a proposer who participates in face-to-face communication may become apprehensive of future interactions with the responder, and anticipating reciprocity, makes a relatively high offer. Again, cooperation is achieved due to, in this case, reputation effects, and not alterations in utilities.

Furthermore, it is important to note that the disagreement rates do not capture the responder's behavior, as responders in different treatments are acting on the basis of different offers. Once the proposers play in a cooperative way, making relatively high offers, disagreement rates drop regardless of the responder's implicit acceptance threshold. In the current experiment behavior is studied using the strategy method, thus enabling an unconfounded test of the assumption about responders' communication-induced cooperativeness.

Communicating players are usually simultaneously participating in two roles, as the active communicator and as the passive recipient of the communication. Therefore, the perceived effects of communication on decision making may be attributed to processes, which are particular to but one of the two roles. By using video conference technology,

applying unilateral, or one-way pre-play communication, we are able to disentangle the effects of the two roles. As this is an initial, exploratory attempt to understand the face-to-face communication effects, we have no solid theory to rely upon, but, rather, several hypotheses to interpret possible results in the new unilateral communication treatments introduced here.¹

Hypothesis A: The social effects rely on social interaction. Therefore, no effects will be evident in the unilateral communication treatments.

Hypothesis B: Minimum social exposure or elimination of anonymity is enough to produce the social effect. Hence, the effects will be evident to the same degree in all of the video communication treatments, including the unilateral ones.

Hypothesis C: Empathy and consideration for the other's interests, induced by social exposure to them drive the communication effects. Consequently, effects will be evident for the receiving side of the unilateral communication, and not for the active communicator.

Hypothesis D: The social effects rely on reducing social distance by eliminating anonymity, since a player who is exposed to others perceives the game as a repeated one and is susceptible to reputation effects. Accordingly, effects will be evident only for the active side of the unilateral communication, and not for the passive communicator.

2. Experimental Design and Procedure

In the current experiment subjects participate in an ultimatum game (Güth et. al, 1981) in either play or strategy method (see Appendix A2 for a description of the game). First, the three treatments described by Roth (1995) – no communication, restricted, and unrestricted communication - are replicated using video conferencing. Compared to Roth's experiment, a no-feedback design is used, thus subjects (proposers only in play method) are unaware of the consequences of their decisions until the very end of the session. Furthermore, in the restricted communication treatments, subjects do not know

¹ Unilateral video communication was utilized by Brosig et al. (2003) for different reasons, namely to emulate real world unilateral communications in internet transactions context.

the game they are about to play when they engage in pre-play face-to-face communication in the first round.

Once the social nature of face-to-face communication effects is established, these effects are examined in depth by separating the directions of communication. Thus two new treatments are created. In one the responder sees and hears the proposer via video interface for a two minutes pre-play communication period, whereas in other the proposer sees and hears the responder for a two minutes pre-play communication period. In both treatments the communication is restricted to non-game content.

In all communication treatments, subjects were asked to rate those whom they saw and played with on six scales, based on the semantic differential (Osgood, Suci, and Tennenbaum, 1957). Since a factor analysis based on the ratings given in the four communication treatments produced a single main component, assumed to represent a general impression, the six scales were combined to produce a single variable.

The sessions took place in the video laboratory of the Max Planck Institute in Jena, Germany (Schmidt and Baumann, 2004) in June 2002 for play method and in November 2003 for strategy method. To prevent the influence of possible gender specific communication effects it was decided to use either male or female subjects. In a pilot experiment it turned out that male subjects were self-conscious in the unilateral treatments; therefore, the experiment recruitment was done only from female students of Jena University via email using an online recruitment system (Greiner 2004). About one half of the students were bachelor-level and the rest master-level students. Their field of studies varied, with less than 15% of them studying Business and Economics. For each session, we invited 8 participants (4 proposers and 4 responders) plus two reserve participants to cover no-shows. Altogether 96 subjects participated in 12 sessions² which lasted about 90 minutes each. A pie of 90 ECU (Experimental Currency Unit) has been used in the experiment. The average earnings per play were 41 ECU for the proposer and 33 ECU for the responder, respectively. For pay-off in each session one round was

² For each of the 5 treatments we conducted one session in play and one session in strategy method. Two additional unilateral sessions in play method have been conducted.

randomly determined for pay-off and 10 ECU were converted in 1 Euro. Average total pay-offs were 7.88 € for proposers and 7.06 € for responders including a 4 € show-up fee.

The experimental procedure was as follows:

First, the four proposers plus reserve arrived. They were shown the names of the invited responders and asked whether they knew any of them. A participant that recognized the name of a responder received the show-up fee and was dismissed to allow one of the reserves to take his place. Four proposers were then led into one sound-proof cabin each. Cabins are equipped with a computer, a video camera, a separate video screen and a microphone.

A quarter of an hour later, four responders plus reserve arrived and the same procedure was conducted. Recordings were made of the four proposers and four responders, each player-type on one quadruple screen, for use when players are rating their partners at a later stage.

Participants were given written instructions, which were (announced to be) the same for both proposer and responder roles (see Appendix A for English translation). Instructions were split into general instructions and game specific instructions. In the restricted communication treatments the participants were told that they would play a 2-players game and received general instructions only. In the unrestricted communication treatment the game specific instructions were provided before the communication stage. The instructions stated the assigned roles according to cabin numbers, so that every participant could tell her role by the number on the cabin door. After reading the instructions pertaining to the rules of the game and the communication setup, participants could ask clarifying questions, which were answered individually in each cabin, before answering the control questionnaire. The experiment did not start before all participants had answered all questions correctly.

Once the control questionnaires (in the unrestricted treatments) were filled out correctly, and all of the eight participants indicated that they were ready, the video conference began. In the bilateral treatments each participant could see both herself and the other player onscreen, and hear both on the speaker. In the unilateral treatment only the communicating participant was seen and heard. However, both participants observe the

same picture. Thus, the beginning and ending of the communication stage was indicated for all participants by the screen coming on and off.

After the specified two minutes of pre-play communication were over, all video and audio connections were terminated. In the very first round of the restricted communication treatments it was at this point that the participants received the game instructions and filled out the control questionnaire.

Next, the proposers were asked to indicate their offer, which was restricted to a vector of $x_2 = \{0.5, 1.0, \dots, 8.0, 8.5\}$. Responders were asked either to respond to the proposal in the play method sessions or to fill in a strategy vector, conditioning their response on the possible offers in the strategy method sessions without knowing the actual proposal. For the strategy method the 17 different offers were presented in random order each on a separate screen. Finally, subjects could see an overview of the complete decision vector and make changes. The decisions were computerized using zTree (Fischbacher 1999).

Four rounds, each including a communication stage and a play stage, were played, so that each proposer played with each responder (stranger matching). No feedback was given between rounds.

After four rounds were played, the participants who were recipients of unilateral communication, or a part of bilateral communication received forms on which to rate the four players they have observed using the semantic differential (Osgood et al., 1957). During ratings, the raters were shown the still picture of all four participants they had played with (which was recorded at the beginning of the session).

Once the forms were filled out, the participants received the decisions and results of each round. One round was randomly chosen for the actual payoff. The participants were paid out in cash and left the laboratory. Proposers left immediately, whereas the responders had to wait a quarter of an hour in their cabins. This assured that no two participants who were assigned to the two roles ever met outside the video conference.

3. Results

3.1. Communication effects

Although offers in the control treatment were lower than those observed by Roth (1995, p. 297), the effects observed there for proposers' data are qualitatively replicated: Generally, the average offer is significantly higher in the two communication treatments (see Table 1 for comparisons to the baseline), while average offers between unrestricted and restricted communication do not differ. The percentage of an equal or near-equal split was significantly higher in the unrestricted and restricted communication treatments, and the conflict rate was lower, with significantly more equal split offers in the unrestricted than in the restricted communication treatment ($\chi^2=9.143$, $p<0.01$, one-sided). When looking at responder data, conflict frequency is significantly lower in both communication treatments when compared to the baseline (Table 2). Recall that Roth (1995) interpreted these results as supporting the uncontrolled social utility hypothesis.

However, when we turn to the data obtained using the strategy method, which enables us to examine responders' strategy vector, a different pattern emerges. Even though the offers are qualitatively similar to the offers obtained by Roth (1995, p.297), an evaluation of the acceptance thresholds³ provides evidence for less cooperative responders in the unrestricted communication treatment who reject significantly higher offers compared to the baseline (Table 2). In contrast, acceptance thresholds in the restricted communication treatment are significantly lower than the baseline. This pattern suggests that the significantly higher offers in both distinct bilateral communication treatments are underlined by different processes.

³ Out of 80 strategy vectors obtained over the five treatments, 78 were monotonic (i. e. if an offer x was accepted, then all offers $y>x$ were also accepted). In one case, the lowest and highest offers were rejected (for a discussion of non-monotonic strategy vectors see Güth et al., 2003), and in one case a single high offer was rejected (probably due to a typing error made by the subject in the first round). As all offer vectors were monotonic between the equal split and the minimum offer, we reduce the vector to the acceptance threshold, defined as the lowest offered that would be accepted below the equal split.

Table 1: Proposer behavior

<i>Treatments</i>	<i>Mean offers (share of total pie)</i>	<i>Standard error</i>	<i>Number of observations¹</i>	<i>Frequency of equal splits $x_2=4.50$ €</i>	<i>Frequency of near-equal splits $x_2=4.50\pm 0.50$</i>
No communication	0.345	0.134	32	0.22	0.34
Unrestricted communication	0.467 ^{***}	0.077	32	0.75 ^{xxx}	0.78 ^{xxx}
Restricted communication	0.451 ^{***}	0.073	32	0.37	0.81 ^{xxx}
Proposer talks	0.395 [*]	0.133	48	0.15	0.54 ^x
Responder talks	0.403 ^{**}	0.136	48	0.29	0.58 ^{xx}

¹ Proposer data of play and strategy method sessions have been combined. In the experiment the decision environment for proposers in both methods was equal beside the knowledge of the responder decision method.

* Higher than baseline, $p < 0.1$, Mann-Whitney test, one-sided.

** Higher than baseline, $p < 0.05$, Mann-Whitney test, one-sided.

*** Higher than baseline, $p < 0.01$, Mann-Whitney test, one-sided.

^x Higher than baseline, $p < 0.1$, χ^2 test, one-sided.

^{xx} Higher than baseline, $p < 0.05$, χ^2 test, one-sided.

^{xxx} Higher than baseline, $p < 0.01$, χ^2 test, one-sided.

Table 2: Responder behavior

<i>Treatments</i>	<i>Dis-agreement frequency</i>	<i>Number of observations</i>	<i>Average threshold (share of total pie, strategy method only)</i>	<i>Standard errors</i>	<i>Number of observations</i>
No communication	0.125	32	0.367	0.08	16
Unrestricted communication	0.063	32	0.467 ⁺⁺⁺	0.13	16
Restricted communication	0.029	32	0.244 ^{***}	0.12	16
Proposer talks	0.238	48	0.300	0.15	16
Responder talks	0.271	48	0.400	0.19	16

⁺⁺⁺ Acceptance threshold higher than baseline, $p < 0.01$, Mann-Whitney test, one-sided.

^{***} Acceptance threshold lower than baseline, $p < 0.01$, Mann-Whitney test, one-sided.

When subjects discuss the game, responders make ultimatums of their own, thus equal split offers are driven by a strategic effect. The following translated quote from an unrestricted bilateral session underlines this point:

Responder: Well, make a good offer.

Proposer: You are really so two fisted? You really say 45 and everything else will be refused?

Responder: Yes, of course. Why not?

Proposer: Because you run the risk of getting nothing.

Responder: But so do you. And I don't see why I should give anyone a donation. Why should I?

Conversely, when subjects are prohibited from discussing the game, the higher offers (but not necessarily equal splits) are driven by social effects. This dichotomy was not evident in the play-method data, as the high offers in both treatments had lowered the conflict rates, regardless of responders' strategies.

3.2. Unilateral communication

The average offers in both unilateral treatments were marginally higher than the baseline (see Table 1) and lower than in the bilateral communication treatments ($p < 0.05$ for all four comparisons, one-sided). Although no differences were evident between the average offers made in the two unilateral communication treatments, an examination of the equal split offers reveals that proposers were more likely to offer an equal split when they saw and heard the responder than when they were talking themselves ($\chi^2 = 2.987$, $p < 0.1$, two-sided, see Table 1).

Responders' data are in line with what we observe in the proposer decisions. Responders were less likely to reject offers when they saw and heard the proposer than when they were talking themselves (albeit not reaching significance, see Table 1). This consistent finding, that, seemingly, it is the recipient of the communication who becomes more cooperative, suggests that increased cooperativeness is not driven by reputation effects, which should be evident in the active, and not passive communicator's decisions. It is also in line with the interpretation of Roth's (1995) unrestricted treatment, which seem to reveal the influence of the responder's threats.

3.3. Individual differences

In order to assess whether subjects' decisions were dependant on the characteristics of the other player they saw, the average offers made to each responder and the average acceptance thresholds encountered by each proposer were computed. No significant differences were found between different (active) communicators who played in the same treatments.

Next, the correlation between the general impression rating and the decision (either proposer's offer or responder's acceptance threshold) of the rater was tested. As the ratings were given at the end of each session, it is impossible to determine whether a positive correlation indicates that a positive impression leads to cooperative behavior, or that the decisions influenced the final ratings. Surprisingly, no correlation was found in any of the 8 restricted communication sessions. On the other hand, a strong correlation was found between proposer's offers and their rated impression of the responders in the unrestricted bilateral communication treatment, when using play method (Kendall's $\tau=0.661$, $p<0.01$).⁴ This finding may be driven by the possibility of conflict in the unrestricted treatment, despite the fact that the variance of both offers and ratings was smaller in this treatment than in the other four treatments.

4. Discussion

The results question the previous interpretation of communication effects in ultimatum bargaining. The experiment reported by Roth (1995), applying play method, was not able to uncover responders' strategies, as the observed disagreements rate was driven primarily by the offers made by proposers. Comparison between treatments was meaningless in this respect, as the responders in separate treatments were faced with different decision tasks (due to the systematic differences in the offers they received). In the current study, however, the use of the strategy method made it possible to extract directly the responders' strategies and compare their use in different treatments. Thus, the similar disagreements rate obtained by Roth (1995) for unrestricted and restricted pre-play communication is now shown to result from different processes.

⁴ No ratings were obtained in the unrestricted bilateral communication treatment with strategy method.

Although the effects of restricted social communication may derive from considerations of social utility, which increases cooperative behavior, in the case of unrestricted communication, when the players can discuss the game, the low disagreement frequency does not stem from increased cooperation, as the responders are in fact acting in a less cooperative manner. Rather, the result derives from strategic coordination on the egalitarian outcome, as evidenced in the significant difference between the likelihood of an exact equal split offer with unrestricted and restricted communication.

The effects were not as evident with unilateral pre-play communication as with bilateral communication, giving support to the hypothesis that some effects are specific to social interaction. Nonetheless, significant effects were indeed found even with unilateral communication, particularly for the passive recipient of the communication. Thus, the hypothesis that exposure to relevant others influences social utilities is supported. The evidence supporting the complementing hypothesis, stating that the exposed, active communicator becomes susceptible to reputation effects, hence acting more cooperatively, exists marginally only for the proposers.

To conclude, the results of the reported experiment suggest that pre-play communication effects may be the outcome of both strategic and social-affective processes, depending on the protocol of the communication. Game-relevant communication affects the strategic considerations of the players, whereas social communication may induce cooperative behavior through affective processes. The influence of the protocol may come about by means of inducing different frames for the interaction. When players are making a decision following a bargaining discussion, they become more sensitive to the strategic considerations, and conversely, when the decision making follows a social talk, the players become more sensitive to social cues and norms.

This interpretation is in line with the results obtained with unilateral pre-play communication. As the unilateral communication in the experiment was restricted to social content, its effects can be assumed to be of an affective-social nature, thus evident primarily in the decisions of the receiver of the communication, who is exposed to the other player, hence more readily mentally constructing the situation within a social context than the active communicator.

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Appendix A Translated Instructions⁵

A1. Instructions

Please read the following instructions carefully. Instructions are identical for every participant. The experiment consists of 4 rounds. You are able to earn money during the experiment. The amount you earn depends on your own decisions and the decisions of other participants of the experiment. In addition, for showing up on time you are paid 4 €. Amounts will be displayed in ECU (Experimental currency unit) during the experiment. 10 ECU are converted in 1 €.

There are 8 subjects participating in the experiment. The four participants in cabins 5 – 8 decide as type X. The four participants in cabins 1 – 4 decide as Y. The number of your cabin is printed at the door. In each round a participant of type X interacts with a participant of type Y. During the following 4 rounds you interact with no other participant twice.

At the end of the experiment one round will be determined randomly for payoffs. Your particular payoff in ECU during this round will be converted to Euro and paid out together with the 4 € show-up fee in cash after the experiment. Participants of type X and Y will be paid out separately and will leave the building separately. Since X and Y participants were also invited at different date, participants of different types will not meet each other at any point in time. There are female participants only.

Baseline – no communication

You participate in an experiment without video- and audio communication, which means that neither you will be able to see your partner at any point during the experiment, nor your partner will be able to see you. The audio and video components are deactivated.

You will receive a separate sheet that describes the exact course of events during each round.

Unilateral responder (proposer) talks treatment, restricted communication:

At the beginning of each round participants of type Y(X) can communicate with the assigned participant of type X(Y) via video conference for 2 minutes. Only participant

⁵ Instructions have been translated quite close to the original. Headlines in italics mark paragraphs that are valid for specific treatments only.

X(Y) may hear and see Y(X). Participant Y(X) is able to see her own picture, but is unable to see or hear participant X(Y)! Type Y(X) is not allowed to talk about the content of the experiment. This will be controlled by us. Any attempt to break this rule will result in exclusion from payments. After the initial 2 minutes of communication are over, you will be handed a separate sheet that describes the content of the game.

Bilateral restricted treatment

At the beginning of each round you can communicate with the assigned participant of the other type via video conference for 2 minutes.

Both participants are able to see and hear their assigned partners. You are not allowed to talk about the content of the experiment. This will be controlled by us. Any attempt to break this rule will result in exclusion from payments.

After the initial 2 minutes of communication are over, you will be handed a separate sheet that describes the content of the game.

Unrestricted bilateral

At the beginning of each round you can communicate with the assigned participant of the other type via video conference for 2 minutes.

Both participants are able to see and hear their assigned partners and you are free to decide what you talk about.

Additional instructions for unilateral restricted treatments, active communicators:

In case you see your own picture on your screen please start to talk. When, after 2 minutes of communication, your picture will disappear from the screen, you can stop talking. Type X(Y) is not able to see and hear you anymore. During the two minutes of communication please turn your face towards the camera and not to the screen.

Before the communication phase, please note down a couple of remarks you might want to talk about for 2 minutes. In case you have no idea we present a couple of ideas in alphabetical order below:

- Party
- Sports
- College
- Weather

A2. Game Instructions

After the communication phase the communication via audio and video will be interrupted and the X/Y pairs interact via the computer according to the following rules:

In each round X proposes how to split the available pie of 90 ECU between Y and himself. Therefore X marks down the amount reserved for Y on the screen (that means the rest of the pie is reserved for X).

Instructions for play method

This proposal will be announced to Y, who is able to accept or reject this proposal. In case Y accepts, X and Y receive the distribution specified by X. In case Y rejects, both participants receive nothing.

Instructions for strategy method

This proposal will not be announced to Y. Y will mark for all feasible proposals, that is $X=85$ and $Y=5$, ..., $X=5$ and $Y=85$, whether to accept or reject. The possible distributions will be presented in random order. At the end there is the option to change entries on an overview screen.

The payoff will be determined the following way: the proposal of X will be compared to the corresponding decision of Y. In case Y accepted, X and Y receive the distribution specified by X. In case Y rejects both participants receive nothing. This means each decision of Y may determine the payoff.

Control questionnaire: The following three questions test whether you understand the described rules of the game. Please try to answer the questions the best you can. Before starting the experiment we will check whether you answered the questions correctly.

Imagine a type X participant made a proposal of 15 ECU to Y and Y accepts this proposal: What is the amount X and Y receive:

X receives _____ ECU Y receives _____ ECU

Imagine a type X participant made a proposal of 70 ECU to Y and Y rejects this proposal : What is the amount X and Y receive:

X receives _____ ECU Y receives _____ ECU

Imagine a type X participant made a proposal of 5 ECU to Y and Y accepts this proposal : What is the amount X and Y receive:

Y receives _____ ECU X receives _____ ECU

A3. Instructions Questionnaire

Please mark on the questionnaire the number of the cabin of the subject you are rating. To evaluate your impressions of the different subjects on the video screen we would like to ask you to rate the subjects according to the following scales. We will display on the monitor all four subjects you were interacting with at once. Please fill out the questionnaire for each person separately. Please mark according to the number displayed on the door (behind the subjects) which person you are currently evaluating, and fill in all of the scales.

Following are the instructions on how to use the scales. In case you are not sure how to fill out the questionnaire you can have a look at this instruction again.

In case you find a person to rate very similar to an attribute at the end of the scale, then check one of the following boxes

active x o o o o o o passive

active o o o o o o x passive

In case you find a person to rate quite similar to an attribute at the end of the scale, then check one of the following boxes

active o x o o o o o passive

active o o o o o x o passive

In case you find a person to rate slightly similar to an attribute at the end of the scale, then check one of the following boxes

active o o x o o o o passive

active o o o o x o o passive

Naturally, the horizontal direction of your cross depends on which of the two attributes on the scale describes the person you are rating best.

When the person you are rating can be described as neutral with regard to the two attributes, that is, both attributes apply to the person to the same extent, you should check the box in the middle.

active o o o x o o o passive

Please mark down whether you knew the person you are rating before. Please mark whether you have just seen the person (e.g. at university) but do not know her personally, or whether you know your partner personally.

A4. Computerized Questionnaire

For every partner the following scales had to be rated by the receiver of communication:

active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	passive
welcome	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	displeasing
agile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	calm
beautiful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ugly
strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	weak
influential	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	non influential

Appendix B Data

<i>Session</i>	<i>Treatment</i>	<i>Method</i>	<i>Round</i>	<i>Proposer Cabin</i>	<i>Responder Cabin</i>	<i>Offer in €</i>	<i>Accept</i>	<i>Threshold in €</i>
1	Restricted communication	Play	1	1	5	4.00	1	-
1	Restricted communication	Play	1	2	6	4.50	1	-
1	Restricted communication	Play	1	3	7	4.00	1	-
1	Restricted communication	Play	1	4	8	3.00	1	-
1	Restricted communication	Play	2	1	6	4.50	1	-
1	Restricted communication	Play	2	2	5	4.50	1	-
1	Restricted communication	Play	2	3	8	4.00	1	-
1	Restricted communication	Play	2	4	7	3.00	1	-
1	Restricted communication	Play	3	1	7	4.00	1	-
1	Restricted communication	Play	3	2	8	4.00	1	-
1	Restricted communication	Play	3	3	5	4.00	1	-
1	Restricted communication	Play	3	4	6	3.00	1	-
1	Restricted communication	Play	4	1	8	4.50	1	-
1	Restricted communication	Play	4	2	7	4.50	1	-
1	Restricted communication	Play	4	3	6	4.50	1	-
1	Restricted communication	Play	4	4	5	2.00	0	-
2	Proposer talks, restricted	Play	1	1	5	3.50	1	-
2	Proposer talks, restricted	Play	1	2	6	2.00	0	-
2	Proposer talks, restricted	Play	1	3	7	3.00	0	-
2	Proposer talks, restricted	Play	1	4	8	4.00	1	-
2	Proposer talks, restricted	Play	2	1	6	4.00	1	-
2	Proposer talks, restricted	Play	2	2	5	2.00	1	-
2	Proposer talks, restricted	Play	2	3	8	6.50	1	-
2	Proposer talks, restricted	Play	2	4	7	4.00	1	-
2	Proposer talks, restricted	Play	3	1	7	3.50	1	-
2	Proposer talks, restricted	Play	3	2	8	3.50	1	-
2	Proposer talks, restricted	Play	3	3	5	2.50	1	-
2	Proposer talks, restricted	Play	3	4	6	4.00	1	-
2	Proposer talks, restricted	Play	4	1	8	3.50	1	-
2	Proposer talks, restricted	Play	4	2	7	3.00	0	-
2	Proposer talks, restricted	Play	4	3	6	3.50	1	-
2	Proposer talks, restricted	Play	4	4	5	4.00	1	-
5	Proposer talks, restricted	Play	1	1	5	3.50	1	-
5	Proposer talks, restricted	Play	1	2	6	4.00	1	-
5	Proposer talks, restricted	Play	1	3	7	4.00	0	-
5	Proposer talks, restricted	Play	1	4	8	3.00	1	-
5	Proposer talks, restricted	Play	2	1	6	4.00	1	-
5	Proposer talks, restricted	Play	2	2	5	4.00	1	-
5	Proposer talks, restricted	Play	2	3	8	4.00	1	-
5	Proposer talks, restricted	Play	2	4	7	3.00	0	-
5	Proposer talks, restricted	Play	3	1	7	3.50	0	-
5	Proposer talks, restricted	Play	3	2	8	4.00	1	-
5	Proposer talks, restricted	Play	3	3	5	4.00	1	-
5	Proposer talks, restricted	Play	3	4	6	3.00	1	-
5	Proposer talks, restricted	Play	4	1	8	3.50	1	-
5	Proposer talks, restricted	Play	4	2	7	4.00	1	-
5	Proposer talks, restricted	Play	4	3	6	4.00	1	-
5	Proposer talks, restricted	Play	4	4	5	3.00	0	-

<i>Session</i>	<i>Treatment</i>	<i>Method</i>	<i>Proposer</i>			<i>Responder</i>		<i>Offer</i> <i>in €</i>	<i>Accept</i>	<i>Threshold</i> <i>in €</i>
			<i>Round</i>	<i>Cabin</i>	<i>Cabin</i>	<i>Cabin</i>	<i>Cabin</i>			
4	Unrestricted communication	Play	1	1	5	3.00	1	-		
4	Unrestricted communication	Play	1	2	6	4.50	1	-		
4	Unrestricted communication	Play	1	3	7	4.50	1	-		
4	Unrestricted communication	Play	1	4	8	4.50	1	-		
4	Unrestricted communication	Play	2	1	6	3.00	1	-		
4	Unrestricted communication	Play	2	2	5	4.50	1	-		
4	Unrestricted communication	Play	2	3	8	4.50	1	-		
4	Unrestricted communication	Play	2	4	7	4.50	1	-		
4	Unrestricted communication	Play	3	1	7	3.00	0	-		
4	Unrestricted communication	Play	3	2	8	4.50	1	-		
4	Unrestricted communication	Play	3	3	5	4.50	1	-		
4	Unrestricted communication	Play	3	4	6	4.50	1	-		
4	Unrestricted communication	Play	4	1	8	3.00	1	-		
4	Unrestricted communication	Play	4	2	7	4.50	1	-		
4	Unrestricted communication	Play	4	3	6	4.50	1	-		
4	Unrestricted communication	Play	4	4	5	4.50	1	-		
3	Responder talks, restricted	Play	1	1	5	6.00	1	-		
3	Responder talks, restricted	Play	1	2	6	4.00	1	-		
3	Responder talks, restricted	Play	1	3	7	4.50	1	-		
3	Responder talks, restricted	Play	1	4	8	4.50	1	-		
3	Responder talks, restricted	Play	2	1	6	2.00	1	-		
3	Responder talks, restricted	Play	2	2	5	2.50	1	-		
3	Responder talks, restricted	Play	2	3	8	4.00	1	-		
3	Responder talks, restricted	Play	2	4	7	4.50	1	-		
3	Responder talks, restricted	Play	3	1	7	3.00	1	-		
3	Responder talks, restricted	Play	3	2	8	4.00	1	-		
3	Responder talks, restricted	Play	3	3	5	4.00	1	-		
3	Responder talks, restricted	Play	3	4	6	4.50	1	-		
3	Responder talks, restricted	Play	4	1	8	4.00	1	-		
3	Responder talks, restricted	Play	4	2	7	3.50	1	-		
3	Responder talks, restricted	Play	4	3	6	3.50	1	-		
3	Responder talks, restricted	Play	4	4	5	4.50	1	-		
6	Responder talks, restricted	Play	1	1	5	4.00	1	-		
6	Responder talks, restricted	Play	1	2	6	4.00	1	-		
6	Responder talks, restricted	Play	1	3	7	1.00	0	-		
6	Responder talks, restricted	Play	1	4	8	5.50	1	-		
6	Responder talks, restricted	Play	2	1	6	3.00	1	-		
6	Responder talks, restricted	Play	2	2	5	3.50	1	-		
6	Responder talks, restricted	Play	2	3	8	0.50	0	-		
6	Responder talks, restricted	Play	2	4	7	4.00	1	-		
6	Responder talks, restricted	Play	3	1	7	3.00	0	-		
6	Responder talks, restricted	Play	3	2	8	3.50	1	-		
6	Responder talks, restricted	Play	3	3	5	0.50	0	-		
6	Responder talks, restricted	Play	3	4	6	3.00	1	-		
6	Responder talks, restricted	Play	4	1	8	2.00	1	-		
6	Responder talks, restricted	Play	4	2	7	3.50	0	-		
6	Responder talks, restricted	Play	4	3	6	0.50	0	-		
6	Responder talks, restricted	Play	4	4	5	4.00	1	-		

<i>Session</i>	<i>Treatment</i>	<i>Method</i>	<i>Round</i>	<i>Proposer Cabin</i>	<i>Responder Cabin</i>	<i>Offer in €</i>	<i>Accept</i>	<i>Threshold in €</i>
7	Baseline, no communication	Play	1	1	5	1.00	0	-
7	Baseline, no communication	Play	1	2	6	3.50	1	-
7	Baseline, no communication	Play	1	3	7	3.00	1	-
7	Baseline, no communication	Play	1	4	8	1.50	1	-
7	Baseline, no communication	Play	2	1	6	1.00	0	-
7	Baseline, no communication	Play	2	2	5	2.00	0	-
7	Baseline, no communication	Play	2	3	8	3.00	1	-
7	Baseline, no communication	Play	2	4	7	1.50	0	-
7	Baseline, no communication	Play	3	1	7	1.00	0	-
7	Baseline, no communication	Play	3	2	8	3.00	1	-
7	Baseline, no communication	Play	3	3	5	3.00	0	-
7	Baseline, no communication	Play	3	4	6	2.00	1	-
7	Baseline, no communication	Play	4	1	8	1.50	1	-
7	Baseline, no communication	Play	4	2	7	3.00	1	-
7	Baseline, no communication	Play	4	3	6	3.00	1	-
7	Baseline, no communication	Play	4	4	5	3.50	0	-
10	Baseline, no communication	Strategy	1	1	5	4.50	1	3.00 ⁺
10	Baseline, no communication	Strategy	1	2	6	4.00	1	3.00
10	Baseline, no communication	Strategy	1	3	7	4.50	1	3.00
10	Baseline, no communication	Strategy	1	4	8	4.50	1	3.50
10	Baseline, no communication	Strategy	2	1	6	3.50	1	3.00
10	Baseline, no communication	Strategy	2	2	5	2.00	0	3.50
10	Baseline, no communication	Strategy	2	3	8	4.50	1	3.00
10	Baseline, no communication	Strategy	2	4	7	3.50	1	0.50
10	Baseline, no communication	Strategy	3	1	7	4.00	1	3.00
10	Baseline, no communication	Strategy	3	2	8	3.00	1	3.00
10	Baseline, no communication	Strategy	3	3	5	4.50	1	3.50
10	Baseline, no communication	Strategy	3	4	6	4.50	1	3.50
10	Baseline, no communication	Strategy	4	1	8	4.00	1	3.00
10	Baseline, no communication	Strategy	4	2	7	5.00	1	2.50
10	Baseline, no communication	Strategy	4	3	6	4.50	1	3.00
10	Baseline, no communication	Strategy	4	4	5	2.50	0	3.50
12	Unrestricted communication	Strategy	1	1	5	4.00	1	3.50
12	Unrestricted communication	Strategy	1	2	6	4.50	1	2.00
12	Unrestricted communication	Strategy	1	3	7	4.50	1	4.00
12	Unrestricted communication	Strategy	1	4	8	4.50	0	5.00
12	Unrestricted communication	Strategy	2	1	6	3.50	1	2.00
12	Unrestricted communication	Strategy	2	2	5	5.50	1	3.50
12	Unrestricted communication	Strategy	2	3	8	4.50	1	4.50
12	Unrestricted communication	Strategy	2	4	7	4.50	1	4.50
12	Unrestricted communication	Strategy	3	1	7	4.50	1	4.50
12	Unrestricted communication	Strategy	3	2	8	4.50	1	4.50
12	Unrestricted communication	Strategy	3	3	5	4.50	1	4.50
12	Unrestricted communication	Strategy	3	4	6	4.50	1	3.00
12	Unrestricted communication	Strategy	4	1	8	4.50	1	4.50
12	Unrestricted communication	Strategy	4	2	7	4.50	1	4.50
12	Unrestricted communication	Strategy	4	3	6	2.00	1	1.00
12	Unrestricted communication	Strategy	4	4	5	4.50	1	4.50

⁺ Rejected offer $x_2=7.00$.

<i>Session</i>	<i>Treatment</i>	<i>Method</i>	<i>Round</i>	<i>Proposer Cabin</i>	<i>Responder Cabin</i>	<i>Offer in €</i>	<i>Accept</i>	<i>Threshold in €</i>
13	Restricted communication	Strategy	1	1	5	4.00	1	0.50
13	Restricted communication	Strategy	1	2	6	5.00	1	3.50
13	Restricted communication	Strategy	1	3	7	4.50	1	3.00*
13	Restricted communication	Strategy	1	4	8	4.50	1	3.00
13	Restricted communication	Strategy	2	1	6	4.50	1	3.50
13	Restricted communication	Strategy	2	2	5	3.50	1	0.50
13	Restricted communication	Strategy	2	3	8	4.00	1	2.50
13	Restricted communication	Strategy	2	4	7	4.00	1	1.50
13	Restricted communication	Strategy	3	1	7	4.00	1	1.50
13	Restricted communication	Strategy	3	2	8	4.50	1	2.00
13	Restricted communication	Strategy	3	3	5	4.50	1	0.50
13	Restricted communication	Strategy	3	4	6	4.00	1	3.00
13	Restricted communication	Strategy	4	1	8	4.00	1	2.00
13	Restricted communication	Strategy	4	2	7	5.50	1	1.50
13	Restricted communication	Strategy	4	3	6	4.00	1	3.00
13	Restricted communication	Strategy	4	4	5	4.50	1	0.50
15	Proposer talks, restricted	Strategy	1	1	5	4.00	0	4.50
15	Proposer talks, restricted	Strategy	1	2	6	4.50	1	2.00
15	Proposer talks, restricted	Strategy	1	3	7	4.50	1	4.00
15	Proposer talks, restricted	Strategy	1	4	8	0.50	0	3.50
15	Proposer talks, restricted	Strategy	2	1	6	4.00	1	3.00
15	Proposer talks, restricted	Strategy	2	2	5	5.00	1	0.50
15	Proposer talks, restricted	Strategy	2	3	8	4.50	1	3.50
15	Proposer talks, restricted	Strategy	2	4	7	0.50	0	2.50
15	Proposer talks, restricted	Strategy	3	1	7	4.50	1	2.50
15	Proposer talks, restricted	Strategy	3	2	8	5.00	1	3.50
15	Proposer talks, restricted	Strategy	3	3	5	4.50	1	0.50
15	Proposer talks, restricted	Strategy	3	4	6	0.50	0	3.00
15	Proposer talks, restricted	Strategy	4	1	8	4.00	1	0.50
15	Proposer talks, restricted	Strategy	4	2	7	4.50	1	2.50
15	Proposer talks, restricted	Strategy	4	3	6	4.50	1	2.00
15	Proposer talks, restricted	Strategy	4	4	5	0.50	1	0.50
16	Responder talks, restricted	Strategy	1	1	5	4.50	1	1.00
16	Responder talks, restricted	Strategy	1	2	6	4.50	1	4.50
16	Responder talks, restricted	Strategy	1	3	7	1.50	1	2.50
16	Responder talks, restricted	Strategy	1	4	8	4.50	0	5.50
16	Responder talks, restricted	Strategy	2	1	6	4.50	1	4.50
16	Responder talks, restricted	Strategy	2	2	5	4.50	1	1.00
16	Responder talks, restricted	Strategy	2	3	8	4.50	0	5.50
16	Responder talks, restricted	Strategy	2	4	7	4.00	1	2.50
16	Responder talks, restricted	Strategy	3	1	7	4.50	1	2.50
16	Responder talks, restricted	Strategy	3	2	8	4.00	0	4.50
16	Responder talks, restricted	Strategy	3	3	5	4.00	1	1.00
16	Responder talks, restricted	Strategy	3	4	6	3.50	0	4.50
16	Responder talks, restricted	Strategy	4	1	8	4.50	1	4.50
16	Responder talks, restricted	Strategy	4	2	7	4.50	1	2.50
16	Responder talks, restricted	Strategy	4	3	6	4.00	0	4.50
16	Responder talks, restricted	Strategy	4	4	5	4.00	1	1.00

* Rejected offers $x_2=8.00, 8.50$.