

In Your Shoes — A Video Experimental Study on Communication and Quasi-communication in Ultimatum Bargaining with Groups

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Abstract

Many experiments involve anonymous simultaneous one-shot situations of tacit bargaining like in the ultimatum game. Here, both players have to decide without communication and without any signals on how their counterpart might react. What are the cognitive processes underlying players' decisions? Do subjects argue on different levels of reasoning? We use in-group communication and video taping to learn about reasoning processes of individuals. Communication enters our study in (i) a direct and (ii) an indirect aspect. As to (i), we analyze communication frequencies within groups. As to (ii), we investigate how subjects cope with the anonymous situation to get a better insight into the structure of reasoning. We found that subjects solve the problem of lacking communication with their counterparts by two mechanisms that can be understood as quasi-communication: imagining their counterpart's behavior (imagination) and putting themselves in their counterpart's shoes (perspective change). Both devices are substitutive mechanisms for direct communication that allow subjects to cope with the tacit bargaining situation.

JEL: C72, C92, D63

Key words: communication, quasi-communication, imagination, perspective taking, strategic thinking, levels of reasoning, decision processes, video experiments, content analysis.

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1. Introduction

There is an extensive experimental literature on depth of reasoning, in particular on the beauty contest guessing game starting with Nagel (1995). The general finding is that the level of reasoning usually does not go beyond level three (Nagel 1998).

Reasoning processes are derived from participants' choices. Several authors criticize the neglect of verbal data and advocate direct investigations into reasoning processes (Camerer 1997, Loomes 1999, Nagel 1998). Our study aims at contributing to this research agenda by observing people during their decision processes. We use in-group communication to learn about reasoning processes of individuals.¹

Many experiments involve anonymous simultaneous one-shot situations of tacit bargaining like in the ultimatum game. Here, both players have to decide lacking direct communication with their counterpart. What are the cognitive processes underlying players' decisions? Do subjects reason as assumed by the literature quoted above? If so, which kinds of mechanisms prevail and how does this influence choices? Video experiments are a suitable means to answer these questions.

As our work horse we apply a simultaneous anonymous one-shot ultimatum game (UG) experiment (Güth et al. 1982) using the strategy method (Selten 1967). A player is represented by a group of three participants discussing with each other the decision task and then taking a consensus decision. The proposer group can decide on how to split a given amount of money (the pie) between herself and a responder. The responder group has to state acceptance or rejection for the full strategy space. In case of acceptance, both groups receive the amounts as allocated; in case of rejection both receive nothing. Intra-group communication is video taped subjects being given 15 minutes to reach their decision; inter-group contacts are anonymous with the experimenter transmitting choices. The communication is video taped and transcribed word for word. In addition to the choice data, the verbal communication data are analyzed by methods of content analysis.

Communication enters our study in two respects, (i) a direct and (ii) an indirect one. As to (i), we analyze communication frequencies within groups. As to (ii), we investigate how subjects cope with the anonymous situation to get a better insight into the structure of reasoning. How do subjects deal with the lack of between-group contact? Do they use cognitive mechanisms that replace direct communication with a kind of quasi-communication? Can we identify levels of reasoning as proposed in the literature?

We found two mechanisms how players deal with the lack of direct communication. Participants imagine what the counterpart will do and formulate an expectation on how the counterpart will behave. We call this mechanism *imagination*. Moreover, subjects put themselves into the counterpart's shoes and

¹ This technique is a valid tool when information on decision mechanisms is not directly observable with individuals and difficult to obtain by questionnaires or other elicitation methods

view the situation from the counterpart's perspective, the *perspective change*². Perspective change comprises a more complicated cognitive scheme than imagination. Both mechanisms together operate as a substitute for direct communication and can be understood as quasi-communication.

We also found different depths of reasoning in both modes. In line with the literature, subjects reason at most on the third level. On the first level, subjects in all groups reason in imagination mode, but only part of them use perspective change. The same is true for the second level. Only very few groups reason on the third level all of them using imagination mode only.

The remainder of the paper is organized as follows. In the next section we discuss our research questions, explain the experimental methods and present the design. In section 3, the results are given. The paper concludes with a summary of the results.

2. Research questions, experimental methods and experimental design

Research questions

Our main research goal is to identify subjects' reasoning processes. We use content analysis as our research method. Two coders independently assigned segments of the video-taped in-group communication to categories constructed to capture essential features of subjects' reasoning process.

We investigate the role of communication from a direct and an indirect perspective. As to the direct aspect, we analyze communication frequencies within groups. As to the indirect aspect, we investigate how subjects cope with the anonymous situation that does not allow direct communication with the other group. How do subjects deal with the lack of between-group contact? A common assumption is that individuals form beliefs about their counterparts' choices. Our research goal is to go behind the mere assumption of belief formation. We are interested in *how* subjects form expectations. For instance, do they use cognitive mechanisms that replace direct communication with a kind of quasi-communication?³ Can we identify levels of reasoning as proposed in the literature?

Experimental methods

Our main approach for eliciting subjects' reasoning processes are video experiments. As mentioned above, three subjects play together as a group and have to take a consensus decision. Proposer groups have to decide on dividing the pie, and responder groups have

² See e.g. Gigerenzer and Hug (1992), Keller et al. (2004), Beckenkamp (2005).

³ Selten (2000) for instance proposes a mechanism he calls "imaginary bargaining" In real bargaining situations the parties communicate with each other exchanging arguments and counterarguments. This experience can be used in experiments without communication. Subjects can imagine how they would solve the problem or how they would achieve an agreement with the other party under direct communication and base their final choices on these deliberations. This process does not involve a real exchange of arguments, but exists in the imagination of subjects only.

to decide on acceptance or rejection of the offer. Intra-group communication is video taped being transcribed word for word into text protocols by graduate students who have been particularly trained and instructed for this task. The transcripts are used for subsequent content analysis (Smith 2000).⁴

Video experiments change the standard experimental procedure in two respects. For one thing, individuals are substituted by groups. Second, groups are video taped. Both modifications may have an impact on behavior.⁵ Eliciting reasoning processes involves a tradeoff, however. On the one hand, directing subjects' attention to the research interest by, for instance, questionnaires or scales may influence their behavior. Also, subjects often are not able to report on their decision motives correctly (Nisbett and Wilson 1977). On the other hand, decisions might be affected as well if we avoid the attention impact and build a natural environment for spontaneous discussions in a group setting. We chose the latter approach because the video method provides us with the data necessary for our research agenda.

Another feature of our experiment is the application of the strategy method. Our design differs from Buchan et al. (2004) and Knez and Camerer (1995) in that we elicit the full strategy space and not only minimal acceptable offers (MAOs). The literature on how the strategy method affects behavior is inconclusive.⁶ As we needed intensive communication on all possible divisions of the pie to achieve our research goals we chose the strategy method keeping in mind its potential drawbacks.

Experimental design and procedures

Our experiment is based on a one-shot UG, with groups (of three participants) as players. A proposer P has to decide on the division of a given pie of 20 tokens that she can allocate between herself and the responder R. P decides on the amount $x \in \{0, 1, \dots, 20\}$ to be sent to R. Simultaneously and independently, R states acceptance or rejection for any possible offer. In case of acceptance of x , P receives the payoff $20 - x$, and R gets x . In case of rejection, both receive nothing. The sub-game perfect equilibrium is $x=0$ if money is infinitely divisible. P will keep the whole endowment

⁴ Other studies employing verbal data to explain quantitative results are Charness and Dufwenberg (2006), Cooper and Kagel (2005), Bewley (1999). They do not use content analysis though. Studies that do use content analysis are Bosman et al. (2006), Hennig-Schmidt et al. (forthcoming), Brosig and Hennig-Schmidt (2007).

⁵ It is not clear that both modifications indeed induce an effect. There is inconclusive evidence on whether groups behave differently from individuals. Moreover, the available evidence in the literature suggests that observation does not systematically affect behavior. See Bosman et al. (2006) for a detailed discussion of these two issues.

⁶ No differences in behavior are found by Cason and Mui (1998) in a dictator game, by Brandts and Charness (2000) in a prisoner's dilemma and a chicken game, and by Oxoby and McLeish (2004) in an ultimatum game. Brosig et al. (2006) find no behavioral divergence when investigating groups as decision makers in a gift exchange game. Güth et al. (2001) do find differences in binary-offer ultimatum game experiments as do Brosig et al. (2003) in a bargaining game with high and low-cost punishment.

that R will accept. With a smallest money unit of 1 token a second sub-game perfect equilibrium exists, namely $x=1$. P will send an amount equal to the smallest money unit which R will accept since he is better off than when rejecting.

Our video experiment was run at the University of Bonn, Germany. Subjects were mainly undergraduate students of economics and law. In total, 71 subjects participated in 12 experimental sessions⁷ comprising 12 proposer and responder groups with each group providing one independent observation. Subjects were recruited by campus advertisements promising a monetary reward for participation in a video decision-making task. Registration assigned the subjects playing together in a proposer group to one room separated from that of the responder group. This procedure guaranteed full anonymity between groups interacting in a session. Groups were randomly assigned to be proposers or responders.

All experimental sessions began with an introductory talk. The instructions were read in both the proposer and the responder group by one experimenter each. Subjects then were encouraged to ask questions. All participants were fully informed on all features of the experimental design and the procedures. See Appendix B for a translation of the German instruction.

Each proposer group had 15 minutes to decide on its proposal x and each responder group had 15 minutes to decide on acceptance or rejection of any possible offer. All in-group communication was video taped. The decisions had to be taken jointly by the respective group members and then had to be filled in on the corresponding forms (Appendix B). All group members had to agree by signing the forms. When decision time was over, the experimenters matched proposal and acceptance or rejection and informed the groups about the result. There was no face-to-face contact between proposer and responder groups. Finally, participants were paid out in their groups and dismissed.

Sessions lasted for about 35 minutes. The monetary reward was calculated to equal the hourly wage in a typical students' job. For each token retained by his/her group, each group member was paid 0.60€. In addition, a show-up fee of 4.00€ was paid independent of the subject's earning in the experiment. On average, proposers (responders) earned 10.56 (9.44) € including the show-up fee.

3. Results

3.1 Choices

Results on choices are in line with individual non-observation UG experiments. Proposers' mean offer is 8.75 Taler (43.75% of the pie), and responders on average reject offers lower than 4.25 Taler (21.25%). See Figure D1 in Appendix D for proposers' strategies. The lowest offer is 5 Taler (25.0%). In 25% of the sessions,

⁷ Due to no show-ups, 1 of the 24 groups consisted of only two people.

proposers offer the equal split (Table 1). These amounts are far above the standard game theoretic predictions stated in section 2. All sessions ended by agreement as no offer was smaller than the lowest acceptance level.

Table 1: Offers and lowest acceptance levels

Group	Proposers' offers	Responders' lowest acceptance levels (LAL)
11	5	5
3	6	6
1	8	3
7	8	5
10	8	1
2	9	2
12	9	4
4	10	6
6	10	8
8	10	3
9	10	3
5	12	5
Mean	8.75 (std. dev. 1.91)	4.25 (std. dev. 1.88)

Note: Groups are ordered according to proposer's offers.

3.2. Communication

Our main research interest is concerned with the impact of direct and quasi-communication on subjects' decision processes. We first analyze direct communication.

3.2.1 Direct communication

The verbal protocols reveal group members to very intensely communicate with each other making statements, arguing about pros and cons of proposals, agreeing and disagreeing with what other group members said, also spontaneously interrupting their companions' considerations. We base our analysis of communication on the following procedure. We count *communication units*, a communication unit comprising the articulation of a group member until another person starts to talk.

We found 3,109 communication units in all 23 groups that were video taped⁸. In each group, on average 135.2 times a different person raises his/her voice to contribute to the communication (Table 2). The protocols convey that group P5 made a mistake when offering more than the equal split; they intended to propose 8 instead of the 12 Taler they marked in the decision sheet. We therefore in the following base our analysis on the intended proposal of 8 Taler. As Table 1 shows this offer was accepted as well.

Table 2 shows most offers not to deviate substantially from the equal split. If the equal split in distributive tasks is the main reference point for instance with respect to inequity aversion as stated in the literature (see e.g. Fehr and Schmidt 1999, Bolton and

⁸ * Due to technical reasons, responder group R6 was not video taped.

Ockenfels 2000) then one might expect that the more an offer differs from this reference point the more communication will go on within a group until all group members agree.

Table 2: Offers/LAL, communication and strategic statements

Group*	Offer/LAL	Communication units (#)	Strategic statements	
			Absolute	rel.
(1)	(2)	(3)	(4)	(5)
P1	8	274	74	27.0
P2	9	78	20	25.6
P3	6	177	40	22.6
P4	10	48	20	41.7
P5	12 (8)	81	25	30.9
P6	10	59	26	44.1
P7	8	85	56	65.9
P8	10	29	18	62.1
P9	10	99	35	35.4
P10	8	192	60	31.3
P11	5	98	9	9.2
P12	9	160	24	15.0
R1	3	169	39	23.1
R2	2	132	36	27.3
R3	6	174	30	17.2
R4	6	209	75	35.9
R5	5	105	14	13.3
R6**	8	--	--	--
R7	5	115	35	30.4
R8	3	65	32	49.2
R9	3	138	36	26.1
R10	1	209	61	29.2
R11	5	168	29	17.3
R12	4	245	61	24.9
Sum		3,109	855	
Mean		135.2	37.2	27.5

*P: Proposer; R: Responder **Due to technical reasons, responder group R6 was not video taped.

RESULT 1: *Offers and frequency of communication units are negatively correlated.*
Support. There is a significant negative correlation between offers and frequencies of communication units (Spearman's rho = -0.599; $p \leq 0.05$, one-tailed). Group members in proposer groups obviously need more communication units to come to an agreement if offers are further apart from the equal split. Such an effect cannot be found in responder groups with regard to lowest acceptance levels (Spearman's rho = 0.360; not significant).

An interesting observation concerns communication in responder and proposer groups.

OBSERVATION 1: *Responders need more communication than proposers to arrive at an agreement.*

Support. A significant difference in communication frequencies between responder and proposer groups exist (Kolmogorov-Smirnov test, $p \leq 0.023$, two-tailed). Responders on average need more communication (157.18 units) than proposers (115.00 units) do. This is significant at the 5-% level (Mann-Whitney U-test, $p = 0.038$, one-tailed).

Next we analyze communication as to whether subjects form expectations about the behavior of their counterpart in order to cope with the tacit bargaining situation. We use content analysis as our research method. Content analysis is a technique used to extract the desired information from in our case a body of verbal material by identifying specified characteristics of the material in a systematic and objective way (Smith 2000).

Two coders provided with a detailed coding manual independently marked all communication units that reveal a member of a proposer or responder group to reflect on how their counterparts might behave. Proposers reflect on whether an offer is to be accepted or rejected by the responders, and responders discuss on whether to accept or reject any of the offers possible.

Coding was made very restrictive in order to rule out raters' own interpretations as far as possible. Communication units were coded only if subjects envision which choice their counterpart may take discussing their counterparts' potential actions.⁹ We term the coded communication units *strategic statements*. The total of all statements is called the *pool of strategic statements*.

855 strategic statements are found in the transcripts, i.e. in 27.5% of the 3,109 communication units, subjects reason about what the counterpart might do (table 2). On average, 37.2 strategic statements are made in each group the percentage differing considerably between groups (9.2% to 65.9% in P-groups, and 13.3% to 49.2% in R-groups). The number of strategic statements within a group correlates highly significantly with the total number of communication units within that group (Spearman's $\rho = 0.751$; $p \leq 0.01$).

3.2.2 Quasi- communication: imagination and perspective change

In our previous analysis, we investigated the in-group communication process with regard to frequency of discussions and strategic statements. We now turn to the cognitive mechanisms subjects use to cope with the tacit bargaining situation. How do they form expectations on their counterparts' likely actions? How do they achieve at taking their final choice even though no between-group communication is allowed?

⁹ Discussions on for instance the instructions as well as rules of the game and payoff computations were not coded.

Categories

We again use content analysis to investigate the transcripts with respect to the research goal formulated above. We designed categories to capture (i) possible mechanisms to deal with the lack of direct communication with the counterparts and (ii) levels of reasoning. The transcripts convey two mechanisms.

(i) *Mechanisms*

1. Imagination

In imagination mode, subjects imagine what their counterpart will do and formulate an expectation on how he/she will behave. Moreover, a valuation of the counterpart's behavior from the own perspective can enter the considerations.

2. Perspective change

When subjects change perspectives they put themselves into the counterpart's shoes and view the situation from the counterpart's point of view. Perspective change comprises a more complicated cognitive scheme than imagination as it proceeds a step further than mere imagination.

We also found different depths of reasoning in both modes. Following the literature we define levels of reasoning as follows.

(ii) *Levels of reasoning*

1. Imagination

We define a strategic statement as Level 1-*imagination* (I1; *Imagination1*) when a person imagines what the counterpart may do. *Imagination level 2* (I2; *Imagination2*) is present when a person contemplates about what the counterpart may think the person (group) herself¹⁰ will do. A person argues on *imagination level 3* (I3; *Imagination3*) when she reflects about what the counterpart may think the person (group) herself believes the counterpart will do.

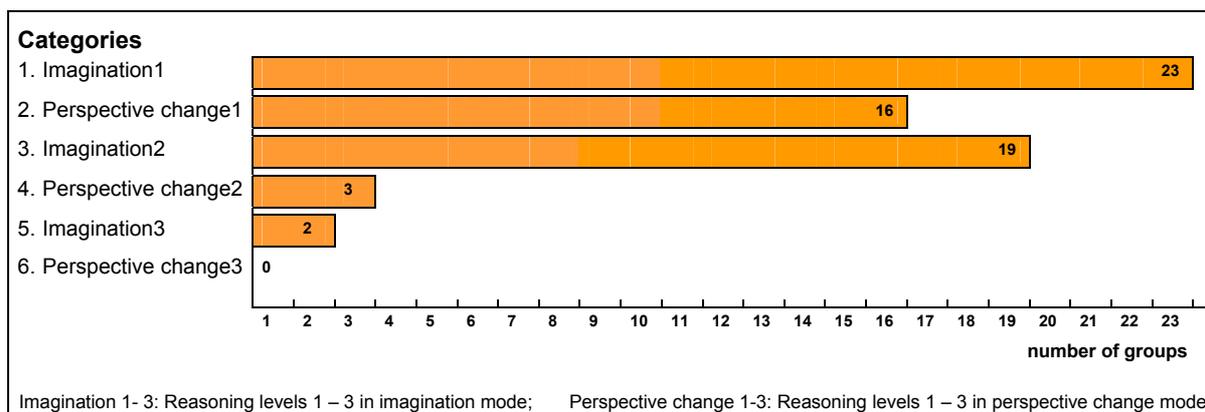
2. Perspective change (P)

A person argues on *Level 1- perspective change* (PC1, *Perspective change1*) when she puts herself in the shoes of the counterpart and argues from that perspective what she would do if she were the counterpart. *Level 2-perspective change* (PC2, *Perspective change2*) is present when a person contemplates about what she being the counterpart would think that she (her group) herself would do. *Level 3-perspective change* (PC3, *Perspective change3*) was not found in the transcripts.

The categories of our classification system are displayed in Figure 1. See Appendix D for examples from the transcripts.

¹⁰ To simplify the argumentation we denote the person as female.

Figure 1: Frequency of categories



Inter-coder reliability

The raters independently classified the strategic statements according to our classification system. Again, coding was made very restrictive. Only when imagination mode or perspective change together with the respective level of reasoning was explicitly mentioned during a discussion this text segment was assigned to a category.

Data are reliable only if inter-coder agreement on category assignments is high. A generally accepted measure for inter-coder reliability is Cohen’s Kappa K, which accounts for the agreement that would result if coders merely make random assignments (Siegel and Castellan 1988).¹¹ $K \geq .80$ indicates satisfactory inter-rater reliability (Merten 1995, Smith 2000).

For five categories, $K \geq .90$, and for only one category $K = .83$ (see Table A1 in Appendix A). We conclude that on average our classification system yields satisfactory data.

Finally, coder disagreement has to be resolved to base the analysis on as much data as possible. We followed a procedure suggested by Bartholomew et al. (2000). If two coders disagree on a categorical assignment, a third rater is added, and the classification agreed upon by two of the three raters becomes the final rating. With this procedure, all but two disagreements could be resolved. The remaining two strategic statements were not included in the analysis.

Analysis of verbal data

Reasoning levels

We first analyze reasoning levels. It is plausible to conjecture that subjects less frequently argue on higher levels.

¹¹ K is the ratio of the proportion of times the coders agree, $P(A)$ (corrected for chance agreement $P(E)$), to the maximum proportion of times they could have agreed (corrected for chance agreement), thus $K = [P(A) - P(E)]/[1 - P(E)]$. K can take values between +1.00 (complete agreement above chance) and -1.00 (complete disagreement). 0 means no agreement above chance.

Note that differences in reasoning levels cannot be tested for because within-statements are not independent. The same applies for the modes of imagination and perspective change.

714 of all 855 strategic statements (83.5%) are coded for reasoning level 1 (RL1) (Table 3). All 23 groups argue on RL1 the percentage of strategic statements varying greatly over groups (75.0% to 100.0% in P-groups, and 61.1% to 96.6% in R-groups). As conjectured much fewer strategic statements are coded for reasoning levels RL2 (139; 16.3%) and RL3 (2; 0.2%). 19 groups reason on RL2 (8 P-groups, and all 11 R-groups) while only 2 groups reason on RL3 (1 P-group, and 1 R-group).

An interesting observation concerns differences in depth of reasoning in responder and proposer groups.

OBSERVATION 2: Responders reason on higher levels than proposers do.

Support. Subjects in only 8 P-groups but in all 11 R-groups reason on levels higher than 1. This difference is weakly significant (Fisher exact test, $p = 0.056$, one-tailed.)

Imagination

We next analyze imagination. 645 of all 855 strategic statements (75.4%) are coded for imagination (Table 3). All 23 groups argue in imagination mode the percentage of statements differing considerably between groups (67.9% to 100.0% in P-groups, and 61.1% to 88.5% in R-groups). All these groups argue on imagination level I1 (Figure 1). Much fewer strategic statements are coded for imagination levels I2 (133; 15.6%) and I3 (2; 0.2%). 19 groups reason on I2 (8 P-groups, and all 11 R-groups) while only 2 groups reason on I3 (1 P-group, and 1 R-group) (Figure 1).

Perspective change

We next analyze perspective change. We conjecture that a switch in perspectives is found less frequently as it comprises a more complicated cognitive process than no perspective change.

As anticipated, we find a low frequency of communication units including perspective change. Only 75 of all 855 strategic statements (8.8%) are coded for this mechanism even though subjects in 16 groups switch perspectives, 9 P- and 7 R-groups. The percentage of strategic statements varies considerably over these groups (5.0% to 26.7% in P-groups, and 1.6% to 20.7% in R-groups).

69 of the 75 strategic statements regarding perspective change (8.1% of all strategic statements) are coded for level 1 (PC1). Only 6 statements (0.7%) are coded for level 2 (PC2). Level-3 strategic statements (PC3) are not made. While subjects in all 16 groups reason in PC1, only 3 groups argue in PC2 (1 P-group, and 2 R-groups) (Figure 1).

Table 3: Reasoning levels, imagination and perspective change

Group	Strategic statements	Reasoning											
		Level 1		Level 1		Level 2		Level 2		Level 3		Level 3	
		Imagination/ Perspective change		all (3)+(4)		Imagination/ Perspective change		all (7)+(8)		Imagination/ Perspective change		all (11)+(12)	
		I1	PC1	(5)/(2)	(6)	I2	PC2	(9)/(2)	(10)	I3	PC3	(13)/(2)	(14)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
P1	74	62	5	67	90.5	7		7	9.5			0	0.0
P2	20	19		19	95.0	1		1	5.0			0	0.0
P3	40	28	10	38	95.0	2		2	5.0			0	0.0
P4	20	17	1	18	90.0	2		2	10.0			0	0.0
P5	25	25		25	100.0			0	0.0			0	0.0
P6	26	20	6	26	100.0			0	0.0			0	0.0
P7	56	38	4	42	75.0	11	3	14	25.0			0	0.0
P8	18	16		16	88.9	1		1	5.5	1		1	5.5
P9	35	25	3	28	80.0	7		7	20.0			0	0.0
P10	60	39	16	55	91.7	5		5	8.3			0	0.0
P11	9	8	1	9	100.0			0	0.0			0	0.0
P12	24	21	3	24	100.0			0	0.0			0	0.0
R1	39	25	4	29	74.4	8	2	10	25.6			0	0.0
R2	36	22		22	61.1	14		14	38.9			0	0.0
R3	30	20		20	66.7	10		10	33.3			0	0.0
R4	75	51	2	53	70.7	22		22	29.3			0	0.0
R5	14	11	1	12	85.7	2		2	14.3			0	0.0
R6													
R7	35	27		27	77.1	8		8	22.9			0	0.0
R8	32	23	2	25	78.1	6	1	7	21.9			0	0.0
R9	36	26	4	30	83.3	6		6	16.7			0	0.0
R10	61	46		46	75.4	14		14	23.0	1		1	1.6
R11	29	22	6	28	96.6	1		1	3.4			0	0.0
R12	61	54	1	55	90.2	6		6	9.8			0	0.0
Sum	855	645	69	714	83.5	133	6	139	16.3	2	0	2	0.2
Mean	37.2	28.0	3.0	31.0		5.8	0.3	6.0		0.1	0.0	0.1	

* P: Proposer; R: Responder

SUMMARY: Subjects solve the problem of lacking communication with their counterparts by two mechanisms that can be understood as quasi-communication: (i) imagining their counterpart's behavior (imagination) and (ii) putting themselves in their counterpart's shoes (perspective change). Both devices are substitutive mechanisms for direct communication that allow subjects to cope with the tacit bargaining situation.

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Appendices

Appendix A

Table A1: Classification system and Cohen's Kappa K

Category	Proposer	Responder
1. Imagination1	0.95	0.95
2. Perspective change1	0.99	0.98
3. Imagination2	0.90	0.96
4. Perspective change2	0.96	0.94
5. Imagination3	0.83	1.00
6. Perspective change3	--	--

Appendix B

Decision Forms *(Original in German)*

Session:

Date:

Decision Sheet for PROPOSERS

Endowment of PROPOSER	PROPOSER allocates to RESPONDER	PROPOSER receives	MARK decision
20	0	20	
20	1	19	
20	2	18	
20	3	17	
20	4	16	
20	5	15	
20	6	14	
20	7	13	
20	8	12	
20	9	11	
20	10	10	
20	11	9	
20	12	8	
20	13	7	
20	14	6	
20	15	5	
20	16	4	
20	17	3	
20	18	2	
20	19	1	
20	20	0	

We allocate to the responding group Taler.

We as the proposing group receive Taler.

.....
Signature

.....
Signature

.....
Signature

Session:

Date:

Decision Sheet for RESPONDERS

Endowment of PROPOSER	PROPOSER allocates to RESPONDER	PROPOSER receives	Mark here to ACCEPT	Mark here to REJECT
20	0	20		
20	1	19		
20	2	18		
20	3	17		
20	4	16		
20	5	15		
20	6	14		
20	7	13		
20	8	12		
20	9	11		
20	10	10		
20	11	9		
20	12	8		
20	13	7		
20	14	6		
20	15	5		
20	16	4		
20	17	3		
20	18	2		
20	19	1		
20	20	0		

.....
Signature

.....
Signature

.....
Signature

Appendix C

Categories and examples from the transcripts

CATEGORIES

Com. unit #	Sub-ject #	Communication
-------------	------------	---------------

1. Imagination1

Proposer (P5)

53 1 **Also ich denke auch, dass die [Empfänger] die 12/8 noch mittragen. Auf jeden Fall.**

Well I think that they [Receiver] will accept 12/8 anyway.

Responder (R8)

41 1 **Ich denke, dass sie [Sender] entweder das hier nehmen oder hier in dem Bereich.**

I believe that they [Proposer] either chose here or in this area .

42 2 **Ja, so 9 oder 8 würde ich auch sagen.**

Yes, I would agree, 9 or 8.

43 1 Wo sie so einen ganz leichten Vorteil haben, aber uns auch nicht so richtig vergrätzen.

Where they have a slight advantage but we are not pissed off.

Com. unit	Subject #	Communication	
2. Perspective change1			
Proposer (P3)			
1	2	Ja, die erste Entscheidung, dass, wenn wir denen 0 geben und wir für uns 20 nehmen, dann werden sie, glaube ich, doch nicht akzeptieren. Das ist das Extrem. [...]	Well, the first choice, if we give them 0 and take 20 for ourselves, I guess they will not accept that. That's the extreme. [...]
2	3	Aber vielleicht? Nee, okay.	But maybe yes? No, okay.
3	2	Nein oder? Meinst du? Also, wenn ich in der Empfängergruppe wäre, würde ich das nicht akzeptieren.	No, or? You think so? Well, if I were in the responder group I would not be willing to accept that.
Responder (R9)			
116	2	[...] wenn ich Senderin wär', wär's einfacher. Weil, dann würde ich sagen: „10/10, schick das Ding los...“	[...] if I were the proposer that would be easier. Because, then I would say „10/10, let's go...“
3. Imagination2			
Proposer (P3)			
26	2	Und vor allem die [Empfänger] wollen ja auch...	And above all they [Responder] also want to...
27	1	... über 10 gehen, weil wir [Sender] sonst weniger haben als die [Empfänger].	... go above 10 because otherwise we [Proposer] will have less than they [Responder] have.
28	2	Ich meine, die [Empfänger] überlegen ja auch, wie wir [Sender] entscheiden. Weil, wenn das dann unstimmig ist, dann [...] bringt denen [Empfänger] das ja auch nichts.	In my opinion they [Responder] also reflect upon how we [Proposer] decide. Because, if things do not match, that [...] does not make any sense for them [Empfänger] either.
Responder (R7)			
9	1	Ich meine, sie [Sender] würden uns auf jeden Fall anbieten, dass sie [Sender] 20 und wir [Empfänger] nichts kriegen.	Well, they [Proposer] will propose anyhow that they [Proposer] get 20 and we [Responder] receive nothing.
9	2	Klar, aber die [Sender] wissen ja auch, dass wir nicht so blöd sind und das akzeptieren würden. Also ich meine, wir könnten auch alles akzeptieren, um dann sicherzustellen, dass wir ... Ich meine, 4€ kriegen wir ja sowieso. Und eigentlich ist es ja mehr so eine Art "Rachenspiel", wenn wir jetzt bei einer Aufteilung von 0/20 sagen, das akzeptieren wir nicht. Aber das muss so sein, oder?	O.k., but they [Proposer] also know that we are not so stupid to accept that. Well, we can also accept everything to ensure that we ... Well, we receive 4€ anyhow. It would be a kind of „revenge game“ if we do not accept an allocation of 0/20. But we have to, haven't we?
4. Perspective change2			
Proposer (P7)			
76	1	Obwohl... die [Empfänger] kriegen ja dann auch nichts [bei Ablehnung]. Die [Empfänger] müssen schon aufpassen, wie sie [Empfänger] uns [Sender] erziehen wollen.	Even though... they [Responder] won't get anything [when rejecting]. They [Responder] have to watch out how they [Responder] want to teach us [Proposer].
77	2	Nun muss man dann überlegen, ob wir [als Empfänger] das auch in Kauf nehmen würden. Ob wir [als Empfänger] sagen würden: „Nö, das gönnen wir [als Empfänger] denen [Sender] nicht, 12 Taler“. Ob wir [als Empfänger] dann lieber gar nichts bekämen. Ich [als Empfänger] würde wahrscheinlich vorsorglich auch da JA ankreuzen	Well, you have to consider whether we [as Responder] would put up with this [consequence]. Whether we [as Responder] would say: „No, we [as Responder] begrudge them [Proposer] 12 Taler“. Whether we [as Responder] prefer to leave with nothing. I [as Responder] probably would mark YES [accept] and hope that the others

Com. unit	Sub-ject #	Communication
		[akzeptieren] und hoffen, dass die anderen [die Sender] von uns [der Empfänger] denken, dass wir [die Empfänger] bis dahin nicht bereit sind [zu akzeptieren].
Responder (R8)		
45	3	Oder [Empfänger schicken] bis 5 vielleicht.
		Maybe [Proposers offer] up to 5.
46	2	Vielleicht. [...] Wenn ich in der anderen Gruppe [Sender] wäre, würde ich [als Sender] das schon nicht mehr nehmen. Weil, dann würde ich [als Sender] mir sagen, vielleicht sagen dann die anderen [die Empfänger], dann kriegen die [Sender] ja viel mehr als wir [Empfänger].
		Maybe. [...] If I were in the other group [Proposer] then I [as Proposer] would not accept that. Because I [as Proposer] would think to myself perhaps the others [Responder] will say that they [Proposer] will get much more than we [Responder] get.
5. Imagination3		
Proposer (P8)		
23	2	Vor allen Dingen ist es ja unsere Entscheidung, wie viel es dann hinterher wird. Das ist ja unsere Entscheidung. Wir dürfen ja nicht mehrere Kreuze machen. Die werden ja wohl auch kaum damit rechnen, dass wir uns ins eigene Fleisch schneiden. Die [Empfänger] wissen ja auch genauso, dass wir [Sender] nicht damit rechnen können, dass die [Empfänger] blöd genug wären, ... [...]
		Above all, it is our decision how much we get in the end. It's our decision. We are not allowed to make several marks. They will not count on our cutting off our nose to spite our face. They [Responder] know quite well that we [Proposer] cannot count on their [Responder] stupidness ... [...]
Responder (R10)		
240	2	Aber ich [Empfänger] denke, [...] die [Sender] denken bestimmt, wir [Empfänger] werden das hier ablehnen, wo die [Sender] mehr kriegen, weil wir [Empfänger] ja auch [mehr] haben wollen. Und die wissen auch, dass wir alles annehmen, wo wir mehr Profit kriegen. Und weil die ne Übereinstimmung suchen, werden wir uns genau in der Mitte treffen. Wenn die jetzt wüssten, dass wir das hier alles [an]genommen haben, ne... Aber ich denke mal, das denken die bestimmt nicht, also das wär' mal richtig Pech.... Dann wär' ich, glaub ich, lieber in der Sendergruppe.
		But I [Responder] think, [...] they [Proposer] certainly think that we [Responder] will reject those offers where they [Proposer] get more because we [Responder] want to get [more]. And they also know that we accept all offers where we have a higher profit. And because they are looking for a consensus, we will meet in the middle. If they knew that we have accepted all these offers, well ... But I think they won't think that, if yes that would be real bad luck. Then I guess I would prefer to be in the Proposer group.
Perspective change (general)		
Responder (R9)		
114	2	Weil, als Sender musst du dir überlegen, was denken die [Empfänger], und vor allem, was denken die [Empfänger], was wir [Sender] denken [wenn wir [Empfänger] Sender wären].
		Well, as Proposer you have to think about what they [Responder] think. And in particular what they [Responder] think what we [Proposer] think [if we [Responder] were Proposer].

NOTE:

- [Empfänger], [Sender], [Responder], [Proposer] [if we [Responder] were Proposer]: insertion by the authors to make the argumentation in the different levels of reasoning transparent.
- [...]: omission of parts of the communication not important in our context and not changing the meaning.

Appendix D

Figure D1: Senders' offers and responders strategies

