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Persuasion in Experimental Ultimatum Games

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Abstract. This paper experimentally studies persuasion effects in ultimatum games and finds that Proposers' payoffs significantly increase if, along with offers, they can send messages which Responders read before their acceptance decision. Higher payoffs are due to higher acceptance rates as well as more aggressive offers by Proposers.

JEL Classification: C72, C91, D83.

Keywords: Communication in Games; Cheap Talk.

1. Introduction

Speech is power: speech is to persuade, to convert, to compel. It is to bring another out of his bad sense into your good sense.
(Ralph Waldo Emerson, American essayist and poet, 1876)

The opportunity to communicate may be used in many bargaining situations when attempting to persuade the counterparty into accepting a particular offer. But does such communication have any effect? The question seems especially relevant in simple interactions under complete information where any verbal announcement is classified as *cheap talk* by traditional economic theory.

This paper studies the effects of one-way communication by Proposers in experimental ultimatum games (UG). Proposers' messages may persuade a Responder to accept a certain offer and, if such *persuasion effects* are anticipated, Proposers may also adapt their offer. In particular, a sufficiently self-interested Proposer should combine an expectedly persuasive message with a suitable offer in order to increase his expected

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payoff. We test the hypothesis that persuasion indeed increases Proposers' average payoffs.

There are potentially confounding factors at play, since messages may not only affect Responders, but also influence Proposers' emotions and preferences over monetary outcomes. For example, a Proposer may experience guilt when making a low offer, but may find relief from sending an apology or explanation for the low offer. Alternatively, Proposers may enjoy a positive self-image when making a high offer and such a feeling may be intensified by sending a friendly message to the Responder. We refer to such effects as *self-image effects.*

In order to disentangle persuasion and self-image effects, we propose an experimental design with three versions of the UG: a standard UG without communication (treatment *N*) and two treatments (*B* and *A*) in which the Proposer can compose a free form message before she submits her offer. In treatment *B* the Responder sees the message *before* she makes her acceptance decision while in treatment *A* the Responder sees the message only *after* she has made her decision. Thus, persuasion effects are not present in treatment *A* and we can attribute differences in outcomes between treatments *A* and *N* to self-image effects of the Proposer. In contrast, differences between treatments *B* and *N* capture both persuasion and self-image effects. We therefore identify persuasion effects as the differences between treatment *B* and treatment *A*.

Our finding is that persuasion effects indeed led to an increase in Proposers' payoffs. On average Proposers' payoffs in treatment *B* were 14,5% higher than in treatment *A*. Increased payoffs were due to both higher acceptance rates as well as reduced offers in treatment *B*, compared to treatment *A*. We do not find any significant influence of self-image effects on Proposers' offers.

2. Previous experimental evidence

Alternative forms of communication in games have been analyzed earlier in the experimental literature. Rankin (2003) used an UG in which the Responder could request an amount of money before the Proposer made her offer. Rankin found that average offers and Responders' payoffs were lower in the treatment where requests by Responders were possible.

The results by Rankin (2003) differ from the finding of a related study by Xiao and Houser (2005), where Responders in an UG were given the opportunity to send messages along with their decisions to accept or to reject the Proposers' offers. Xiao and Houser (2005) found that this led to significantly lower rejection rates of unfair offers and gave the interpretation that people facing unfair economic exchanges tend to substitute emotion expression for relatively more costly material punishment

The finding by Xiao and Houser (2005) has been complemented by two further experimental studies. Xiao and Houser (2007) compared a standard dictator game with

one, otherwise identical, in which, after Dictators' decisions, Receivers had the opportunity to write a message to their respective Dictators and found that,profit-maximizing offers were less frequent when Responders had the opportunity of emotion expression.

In a related work, Ellingsen and Johannesson (2008) studied pairwise interactions in which a Dictator decided how to split a sum of money between herself and a Receiver. who, thereafter, could send an unrestricted message to the Dictator. Ellingsen and Johannesson (2008) found that donations increased substantially when Receivers could communicate: with verbal feedback, the frequency of zero donations decreased from about 40 to 20%, with a corresponding increase in the frequency of equal splits from about 30 to 50%.

Our work may be seen as complementing the previous studies in that we let Proposers, instead of Responders, to communicate. While our frame did not allow us to study the effect of emotion expression by Responders, we focused on the role of persuasion. In the light of persuasion, Proposers may have more to gain from communication since they can plea for rationality in the form of subgame perfection.

3. Experimental design

We invited 76 students from Tilburg University to participate to our experiment. Subjects were divided into 6 sessions, taking place in CentERLab. Subjects were given aloud and written instructions of the experiment.

At the beginning of the experiment, subjects were randomly assigned the role of either Proposers or Responders. In each treatment every Proposer was randomly matched with one different Responder. The Proposer had to decide how many points X between 0 and 100 to offer to the Responder. The Responder then learned the Proposer's offer and could either accept or reject it. In case of acceptance, the Responder's payoff was X points, and the Proposer's payoff was $100\text{-}X$ points. In case of rejection, both subjects earned 0 points.

We employed three different treatments:

1. ***N* (no communication):** A standard UG without communication

2. ***B* (Responder got message *before* her decision):** The Proposer sent a message together with his offer which the Responder read *before* she decided to accept or to reject.

3. ***A* (Responder got message *after* her decision):** Like *B*, but the Responder read the message *after* she decided to accept or reject.

The experiment used a within design where all subjects in a session played each of three different treatments one time. Subjects knew in advance that there would be three different treatments and that in each treatment they were going to be matched with a different opponent, but did not know the content of the subsequent treatments before these were played. Moreover, subjects kept the same role of Proposer/Responder across all three treatments. Proposers were informed about their Responders' decisions only at the end of the experiment. To control for order effects, we employed a counterbalanced design containing the following six sequences with different orderings of the treatments: *NAB*, *NBA*, *ANB*, *ABN*, *BNA*, *BAN*.

We designed and ran the experiment using *z-Tree* (Fischbacher 2007). A show-up fee of 2.50€ was paid to subjects. In addition, participants received their pay-out of one randomly drawn game converted at a rate of 0.10€ per point. The 76 participating subjects spent about half an hour in the lab and earned on average 6.60€ each.

4. Results

Table 1 shows Proposers' average payoffs in the three treatments. In line with our hypothesis, average payoffs in treatment *B* were 14.5% larger than in treatment *A*. Since payoffs strongly differed between accepted and rejected offers, standard deviations were quite high, however.

Table 1: Proposers' payoffs across treatments

Treatment	*Proposers' average payoffs*	*Standard deviation*
N	42.87	27.23
A	41.71	26.31
B	47.76	27.06

Within subjects, 15 of the 38 Proposers received higher payoffs in treatment *B* than in treatment *A*, while only 6 Proposers had lower payoffs; for 17 Proposers payoffs were the same. A one-sided sign test confirms the hypothesis of positive persuasion effects at a 95% significance level (p-value = 0.039). The persuasion effect appears to be driven by a combination of lower offers and increased acceptance rates. Out of the 15 Proposers who achieved higher payoffs in treatment *B* than in treatment *A,* 9 made lower offers in treatment *B*, while 6 subjects made the same offer in both treatments that was only accepted in treatment *B*.

The full distribution of offers and acceptance rates across treatments are shown in Table 2. Average offers were slightly lower and average acceptance rates were slightly higher in treatment *B* than in both treatments *A* and *N*, which show very similar aggregated outcomes. In particular, for low offers acceptance rates were higher in treatment *B*. Taken together, our finding indicates the presence of persuasion effects, while no systematic self-image effects can be found.

Table 2: Offers and acceptance rates across treatments.

	Treatment N		*Treatment A*		*Treatment B*	
Offer	*No. of offers*	*Accept. Rate*	*No. of offers*	*Accept. rate*	*No. of offers*	*Accept. Rate*
10			1	0	1	1
20	1	1	1	1	2	1
25	1	1	2	0	1	1
30	9	0.55	7	0,43	8	0.63
32	1	0				
35	3	0.33	4	0,5	5	0.4
40	8	0.63	7	0,86	9	0.78
45	3	1	2	1		
50	11	1	13	1	11	1
55			1	1	1	1
56	1	1				
60					1	1
Avg. offer / accep. rate	39.8	0.74	39.6	0.74	38.4	0.79

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Appendix: Sample instructions

Instructions for B treatment

You have now been matched with another subject and together the two of you form a pair. One member of each pair is designated *Proposer* and the other is designated *Responder*. If you are *Proposer* you will choose a proposal on how to divide 100 points between you and the *Responder*. If you are *Responder* you will be presented with the *Proposer's* offer and you have a choice to either accept or reject it.

Whatever offer the *Proposer* makes,

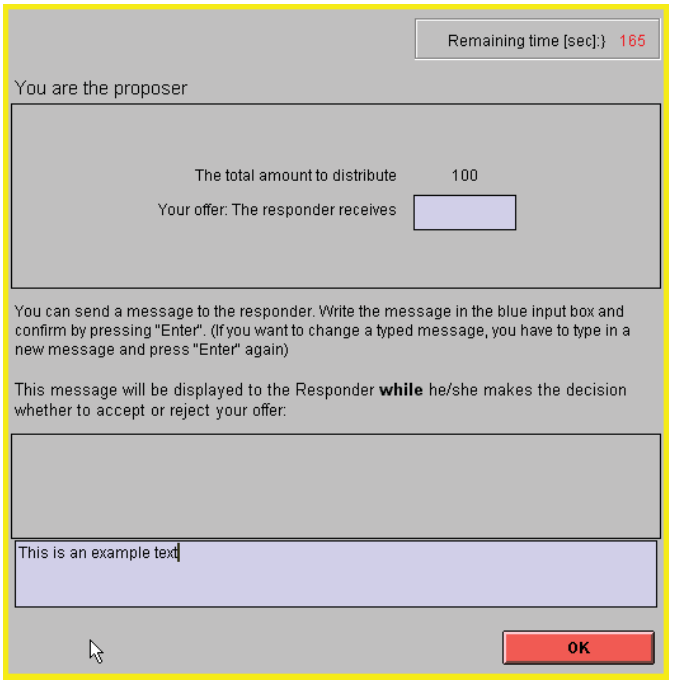
- if the *Responder* accepts, then he/she will receive the amount offered and the *Proposer* will receive 100 points minus the amount offered;
- if the *Responder* rejects, both will receive 0 points.

At the same time as the *Proposer* makes the offer he/she has the possibility to send a message to the *Responder*. This message will be displayed to the *Responder* **at the same time** as she/he sees the *Proposer's* offer. **Please note:** Foul language and threatening messages are not allowed.

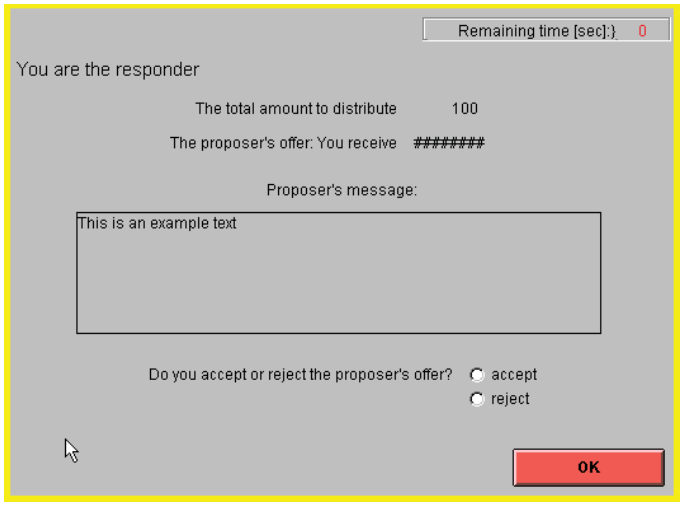
After both of you have made your choices you will be re-matched with a new subject and you will be given a new sheet of instructions. You will not know with whom you are paired either during or after the experiment.

To help you understand the structure of the experiment we have also included screen shots below

If you are the *Proposer* you will see the following screen:

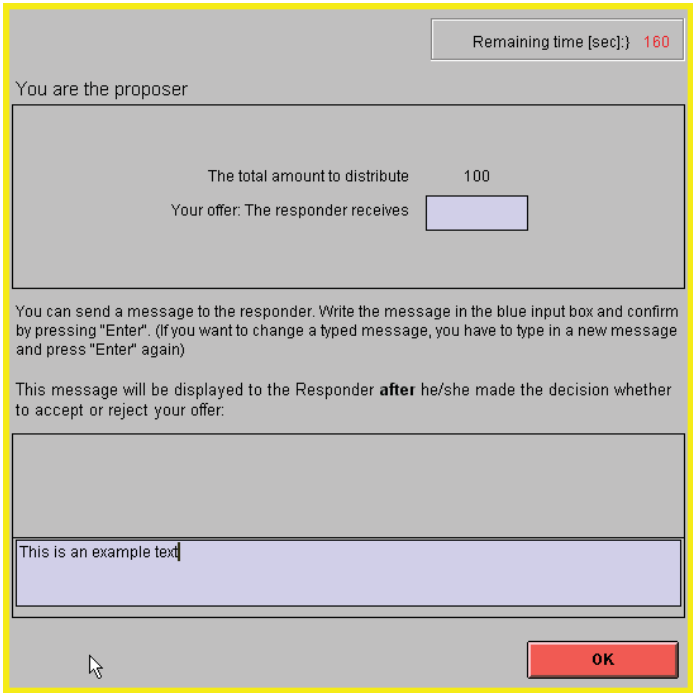


If you are the *Responder* you will see the following screen:

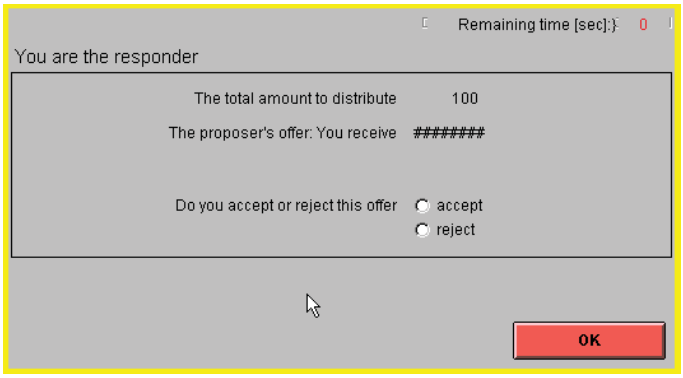


Instructions for A treatment

[…] At the same time as the *Proposer* makes the offer he/she has the possibility to send a message to the *Responder*. This message will be displayed to the *Responder* **after** she/he has decided to accept or reject the offer. […]
If you are the *Proposer* you will see the following screen:



The *Responder* first sees this screen:



After making a decision the *Responder* sees this screen: