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The value of lies in an ultimatum game with imperfect information

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ABSTRACT

Humans often lie strategically. We study this problem in an ultimatum game with an informed proposer and an uninformed responder, where the former can send an unverifiable statement about his endowment. A simple message game with heterogenous players with respect to lying costs shows that in equilibrium liars should understate their endowment. The second part of the paper reports on an experiment testing this game. On average, 88.5% of the proposers understate the actual endowment by 20.5%. Regression analysis shows that a 1-euro gap between the actual and declared amounts prompts proposers to reduce their offer by 19 cents on average. However, responders' decision to accept/reject the offer does not depend on the message. It results a net welfare loss specific to such a "free-to-lie" environment.

1. Introduction

Humans sometimes resort to lies as a tool for leveraging on negotiation power (e.g., Lewicki, 1983; Anton, 1990; Shapiro and Bies, 1994). As noted by Lewicki and Stark, (1996, p. 77), in a negotiation context, "lies misinform the opponent, eliminate or obscure the opponent choice alternatives, or manipulate the perceived costs and benefits of particular choice options open to the opponent". However, in a world entirely populated by liars with divergent goals, messages would not be taken seriously by their recipients. The ability of less ethical people to manipulate the others' beliefs relies on the existence of at least some individuals who have a significant aversion to lying (Crawford and Sobel, 1982; Sobel, 1985; Kartik et al., 2007; Chen et al., 2008; Kartik, 2009).

There is a growing body of experimental economics literature on lying and deception aiming to reveal what motivates individuals to resort to such questionable communication methods. In an influential paper, Gneezy (2005) has introduced an interesting typology of lies with respect to their consequences on players' payoffs. If the lie, defined as a misrepresentation of reality, brings about an improvement in both players' well-being, we have a "Pareto white lie"; if the sender is worse-off but the receiver is better-off, we have "an altruistic white lie". If the sender is better-off while the receiver is worse-off, this is the typical "selfish black lie", which Gneezy (2005) acknowledges to be the most relevant category for economic interactions. Taking stock from an original sender–receiver experiment, he shows that when subjects can reap a non-negligible benefit

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from lying, many subjects do so, even if this involves a loss for their partner. Another important finding of these empirical studies is that humans present some form of aversion to lying, although its extent can vary greatly from one individual to another (Sánchez-Pagés, 2006; Vanberg, 2008; Lundquist et al., 2009; Hao and Houser, 2010; Charness and Dufwenberg, 2006, 2010; Erat and Gneezy, 2012).

In this paper, we aim to study the mechanism of misleading communication in the negotiation context specific to the ultimatum game (Güth et al., 1982). In line with the classical experiment, a "Proposer" is endowed with an amount of money and must make an offer to a second player as how to divide this sum between them. The "Responder" can accept the offer, in which case the endowment is divided as proposed, or reject it, in which case both players receive nothing. In order to allow the proposer to send misleading messages, we make sure that the responder has only imperfect information about the proposer's endowment.[1] The proposer is then asked to send a message indicating the amount of money received at the outset of the game; this is unverifiable information for the responder. Results of our analysis might shed some light on real life situations where private information can be used by a single party to manipulate beliefs and outcomes. It will be shown that proposers resort to dishonest communication quite frequently and do so strategically. However, because responders do not believe them systematically, such a free-to-lie environment brings about welfare losses for both players.

The first part of the paper analyzes this message game in a theoretical framework that emphasizes the responder beliefs' formation mechanism. The second part of the paper reports on a Lab experiment where randomly matched pairs of subjects were asked to play this ultimatum game with asymmetric information. Our experiment – combining an ultimatum game and a message game – can be seen as an extension of the empirical study by Croson et al. (2003).[2] In contrast to their study, in our experiment responders know the statistical distribution of the proposers' endowment; these amounts are drawn from an almost continuous distribution (Rapoport and Sundali, 1996). Proposers' lies are measured by the difference between the declared and the actual amount, not by a dummy variable. We can therefore estimate the "subjective value" of a 1-euro lie, i.e. by how much on average a proposer reduces his offer each time he understates his endowment by one currency unit. In this Special Issue, Kriss et al. (2013) also present results of an ultimatum game with one side imperfect information, where proposers have the opportunity to misrepresent their endowment, and to send a promise that the message was true. At difference with our analysis, they consider a binomial distribution of the endowment, that can be high or low with a predetermined probability. In general, their results go in the same direction with our results. Also, in the same journal, Lightle (2013) works out a sender–receiver game with imperfect information. There is one treatment where objectives of the two players are aligned, and another treatment where objectives are conflicting. In both treatments senders will resort to strategic lies, and the frequency of lies tends to increase over time.

The paper is organized as follows. The next section presents a theoretical analysis of the lying strategy in an ultimatum game with imperfect information. Section 3 introduces the experiment. The last section presents the conclusion.

2. Theory: the "message game"

2.1. Main assumptions

We consider a pair of players matched at random from a large population of individuals. To keep the analysis as simple as possible, we assume that individuals are identical in everything but in their aversion to lying. At the outset of the game, the "Proposer" gets a cash endowment Y, drawn at random in the interval $[0, A]$ according to an uniform distribution. The "Responder" does not observe this endowment, but knows the statistical distribution. Then the proposer must make two decisions. He must send a message M to the responder about the value of Y and must make a cash offer Z, with $Z < Y$. The message can be true ($M = Y$) or false ($M \neq Y$). The responder cannot verify it. At the last stage, the responder who gets the offer Z and the message M must decide whether to accept or to reject the offer. If he accepts the offer, the proposer gets $(Y - Z)$ and the responder gets Z; if he rejects the offer, both players get nothing.

Players aim to maximize their expected utility given their set of feasible strategies. In this simple model, we assume that – all things equal – players prefer more money to less, have a concern for fairness, and present an aversion to lying, i.e. they dislike misrepresenting reality. More in detail, for an individual k, aversion to lying is represented by a cost C_k that the individual incurs whenever he tells a lie; we admit that this cost is proportional to the "size of the lie", i.e. the gap between the declared and the true value of the variable of interest (Lundquist et al., 2009); we can write the total cost as $C_k = c_k|Y - M|$, where $c_k > 0$ is a constant marginal cost of lying. Note that a true message ($M = Y$) involves no lying cost, $C_k = 0$.

The ultimatum game is a two-player interaction where players' objectives diverge. If we use the index k and $-k$ to denote the two players, and denote their payoffs by respectively x_k and x_{-k}, we follow Fehr and Schmidt (1999) and write the utility of individual k as:

$$U_k(x_k) = x_k - \mathbf{1}_{(x_k < x_{-k})} \nu(x_{-k} - x_k) - C_k, \quad (1)$$

[1] Many authors have studied ultimatum games with imperfect information, be it uncertainty or ambiguity (inter alia, Mitzkewitz and Nagel, 1993; Straub and Murnighan, 1995; Kagel et al., 1996; Güth et al., 1996; Rapoport and Sundali, 1996; Crawford, 1996). A standard result is that proposers make substantially lower absolute offers as compared to the perfect information case.

[2] See also the companion paper by Boles et al. (2000).