Truth and Trust in Communication

An experimental study of behavior under asymmetric information

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Abstract

The paper presents an experimental study of truth telling and trust in communication under asymmetric information. In a two-player Communication Game (cf., Gneezy, 2005), an informed "advisor" sends a message to an uninformed "decision maker", who then has to decide whether to follow the advice. The advisor may gain more by lying in the message. In two treatments, either a cooperative or a competitive context is induced before participants play the Communication Game. Advisors are unaffected by this contextual variation. In contrast, decision makers in the competitive context trust the advice less than in the cooperative context. The data provide evidence that this change in trust is due to different perceptions of the incentive structure. Individual differences in behavior can be related to certain personal characteristics (field of studies, gender, personality test scores). The data are largely in line with Subjective Equilibrium Analysis (Kalai & Lehrer, 1995).

Keywords: experimental economics, truth telling, trust, asymmetric information, individual differences, context effects, subjective beliefs

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1 Introduction

It has been shown that trust in institutions and in fellow citizens is related to the smooth functioning of societies and to their economic development (Knack and Keefer, 1997). Trust promotes cooperation, especially in large organizations, including firms (La Porta et al., 1997).[1] As such, trust is a main component of "social capital". In his famous work on trust and prosperity, Fukuyama (1995) provides a very general definition of *trust*. In his view, "trust is the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on part of other members of that community". In this study, the focus is on trust with respect to honesty in communication, i.e., telling the truth. Telling the truth is a particularly important norm, which is shared by communities around the globe. Trust with respect to truth telling is also what Rotter (1971, 1980) emphasizes when he defines trust as a "generalized expectancy held by an individual that the word, promise, oral or written statement of another individual or group can be relied on". In short, such trust can be described as the *belief that others tell the truth*.[2]

Both truth telling and trust - as specified here - play a role in situations of information asymmetry, where people have to rely on a report or on advice from a better informed person. These situations have received great attention in the theoretical economic literature, which is by no means surprising if one considers their ubiquity in social and economic life, e.g. any sales situation where the seller has superior knowledge (cf., Akerlof, 1970). Far more surprising is the fact that truth telling and trust have been neglected for so long in empirical work. This may be due to the dominance of the economic rationality paradigm, which assumes that people lie whenever they have an incentive to do so. According to such analysis,

[1] These studies use survey data to measure the level of trust, more specifically the question "Generally speaking, would you say that most people can be trusted, or that you can´t be too careful in dealing with people?".
[2] The notion of trust both in everyday usage and in the interdisciplinary literature is broad (McKnight and Chervany, 2001). Some experimental work in economics employs a game which was introduced by Berg, Dickhaut and McCabe (1995) as a behavioral measure of trust. That "Trust Game" tests whether and to what extent participants' reveal trust that a counterpart will reciprocate and return a "fair" share of money.

"cheap talk" conveys informational content only in a limited number of settings, where both parties know that incentives are aligned (Farrell and Rabin, 1996; Crawford, 1998)[3]. Yet, it is questionable whether that kind of confidence should be called trust at all, or whether trust should rely on a belief in truth telling independently of the incentive structure (see Knack, 2001; Rotter, 1980; Yamagishi and Yamagishi, 1994). Moreover, experimental testing of the theoretical predictions have frequently reported "overcommunication", i.e., more truth telling than economic equilibrium theory would predict (e.g., Blume et al., 2001, Cai and Wang, 2006). Recently, Gneezy`s (2005) contribution on the role of consequences for lying started a discussion about the motivations behind such costly truth telling (Charness and Dufwenberg, 2005; Sutter, 2006; Hurkens and Nartik, 2006).

A central motivation for this work is to test the influence of a competitive context on truth telling and trust. The importance of context for individual perception and decision-making is increasingly recognized in the Economics literature (Levitt and List, 2006). But this insight is not novel. Lewicki et al (1998) note that the influence of the social context on trust has been neglected in research across all social sciences. With respect to truth telling, Ross and Robertson (2000) find in a survey study that people's inclination to deceive others changes depending on the role of the counterpart, e.g. own firm, a client, or a competitor. One may argue that if there were an effect of competition on the disposition to lie, this would also suggest an effect on the degree of trust on the side of the uninformed decision maker. In fact, numerous authors have investigated to what extent competition may potentially change human behavior. Hegarty and Sims (1978) find in a lab experiment that increased competition results in more unethical behavior when this serves to enhance own profits. Ford and Richardson (1994) point out that, among others, specifics of the reward systems and competitiveness of the organizational structure are contextual variables that may influence how ethical decisions are made and that this should be examined further. Recently, Brandts,

[3] It is even consistent with rationality to treat cheap talk as meaningless in all settings (Farrell and Rabin, 1996, p. 108; Crawford, 1998, p.288).

Riedl and Van Winden (2004) demonstrate experimentally that competition has a negative effect on the emotional disposition towards others, and that it decreases the subjective well being of the competing parties. The present study pursues this line of research by investigating experimentally the effect of a competitive context on truth telling and trust. From a practical perspective, this can be related to work environments where competition can be induced through a ranking-based reward scheme. If increased competition affected truth telling and trust in communication, then a dimension that is difficult to observe and to measure may undermine overall efficiency. On the other hand, inducing cooperation may have positive effects due to an increase in trust.

In the experiment, participants interact in a two-player Communication Game with asymmetric information (Crawford and Sobel, 1982; Gneezy, 2005). An uninformed decision maker can rely on a message from a better-informed advisor for his choice between three options. The data provide evidence that decision makers do not regard the messages as meaningless. Instead, they condition their behavior on the message that they receive, i.e., their decision depends on their belief of how likely the message is truthful. Advisors, in turn, base their decision on the belief of how likely the decision maker will follow the advice. Since individual beliefs about the counterpart's behavior vary widely, Subjective Equilibrium Analysis (Kalai and Lehrer, 1995) is suggested as a theoretical model. In this model, players are said to be “subjectively rational” if they maximise their gains in accordance with subjective beliefs. Indeed, barring the fraction of truth-telling advisors, this model is in line with most of the remaining data.

In two experimental treatments, either a cooperative or a competitive context is induced before participants play the Communication Game. Results show that the context does not influence the advisors' propensity to lie. However, decision makers have less trust in the advice of others when the interaction takes place in a competitive context. When decision makers lack information, the context influences their perception of the situation. More

specifically, decision makers who have been involved in competition are more likely to perceive the situation as one of opposing interests. Last, behavior in the Communication Game is compared to personal characteristics of the participants. Regression analysis relates some of the individual differences to gender, field of studies, and the score on a personality test.

The paper is organized as follows. Section 2 motivates and specifies the experimental design. Section 3 introduces Subjective Equilibrium Analysis (SEA) (Kalai and Lehrer, 1995) as a model for behavior in the Communication Game. Section 4 presents the results of behavior and subjective beliefs in the Communication Game. In section 5 I analyze the results and discuss the questions raised above. Section 6 concludes.

2 Experimental Design

The experiments were conducted in the Experimental Economics Laboratory at Pompeu Fabra University. Subjects were 216 undergraduate volunteers from various fields of studies who had signed in via a computerized recruiting system and earned on average € 7.72. Each experimental session consisted of 18 participants and lasted around sixty minutes – this included completing the post-experimental questionnaire. At the beginning of the experiment, participants were randomly assigned to computers, and then the basic instructions were distributed and also read out aloud. Detailed instructions for the different parts of the experiment were shown on the computer screen (for further details, see Appendix). The analysis focuses on behavior in the Communication Game, which was played by nine pairs of advisors and decision makers per experimental session. However, the Communication Game was embedded into a series of exercises and interactions, for which a cooperative and a competitive treatment are distinguished. Six sessions were run for each treatment.

The Communication Game

Communication Games represent situations in which communication links the information of one person with the action of an uninformed other (Crawford and Sobel, 1982). In this specific version there are three options (A, B, or C) with consequences for the two players. One player – the *decision maker* – has to choose one of the three options. However, she has only limited knowledge about the consequences. In particular, she only knows that one option leads to a high payoff (€ 5) for her, another one to a medium payoff (€ 3), and a third to a low payoff (€ 1). She does not know which of the three options brings about which of the payoffs. Also, she does not know the consequences for the other player. The second player – the *advisor* – has full information of the consequences, and both participants know this. The options give the following gains:

option A:	**€ 1** to the advisor	**€ 1** to the decision maker
option B:	**€ 4** to the advisor	**€ 3** to the decision maker
option C:	**€ 3** to the advisor	**€ 5** to the decision maker.

The advisor moves first by filling in i = A, B, or C to send one of three possible messages:

" With option [i] you earn more money than with the other two options.".

The decision maker receives the message and subsequently makes a choice between the three options.

Motivation of Communication Game Design

The class of "cheap talk" Communication Games is very broad (see, e.g., Farrell and Rabin, 1996; Crawford, 1998). For any particular game within this class, theoretical predictions, as well as the interpretation of behavior may differ substantially. I now clarify and motivate the particular features of this version.

Payoff structure: The game is similar to – and was inspired by – the design in Gneezy (2005). As in Gneezy's game, the payoff structure for the advisor and the decision maker is non-aligned. The truthful message C recommends an option which does not lead to the highest

payoff to the advisor. This may give the advisor an incentive to lie in the message. Gneezy showed that the differences in consequences (i.e., how much the advisor can gain from a lie and how much the decision maker may lose) matters for the advisor decision. With the payoff differences between options B and C in this game - where the decision maker stands to lose more (€ 2) than the advisor can gain (€ 1) - a significant fraction of truth-telling can be expected.

Number of options available to the decision maker: An additional third option (A) is added to Gneezy's two-option design. Sutter (2006) demonstrates that with two options and a non-aligned payoff structure, a considerable fraction of advisors send the truthful message and expect the decision maker to deviate from the advice. These advisors tell the truth as a strategic choice for their own benefit. In the design here, an expectation that the decision maker will deviate should result in the choice of message A, and not of the truthful message C.[4] Hence, it serves as a parsimonious modification that potentially rules out strategic considerations for truth-telling.

Degree of asymmetry in information: Two experimental studies have highlighted the possible differences in the degree of information asymmetry: In Blume et al. (1998), both advisors and decision makers know the (finite) set of possible payoff structures (in their words: the set of "types" of advisors), and they know that these types occur with equal probability. The only difference in information is that the advisor alone is told which of the types actually prevails. In contrast, in Gneezy (2005) the decision maker has no information at all (apart from the message). While the former case has the advantage of being theoretically tractable with standard game-theoretic tools, the latter is probably more representative of ambiguous situations in natural environments. Decision makers in the present game are not informed about the possible payoff structures and probabilities; only advisors know that both players' interests are in fact negatively aligned. However, decision makers know what payoffs are

[4] This assumes that the advisor expects the decision maker to deviate to both remaining options with equal probability.

possible for them to obtain (1,3, and 5). This additional information ensures that, first, the decision maker can infer that there is only one truthful message and, second, it is possible to make expected value calculations based on subjective beliefs about whether the advisor will lie or tell the truth. Section 3 will provide a detailed analysis of a model for that calculation.

Type of message: The type of message is similar to Gneezy's game. Note that its content is restrictive and that, unlike e.g. in the work by Blume et al. (1998), it assumes the existence of a commonly understood language between the advisor and the decision maker ("rich-language assumption"). However, the content of the message reflects well the information that is typically asked from an advisor.

Behavioral measures

Advisors

The choice of message C is labeled *truth telling*.

It is emphasized that the design does not allow to disentangle possible motivations for truthful reporting, especially to what extent altruism, efficiency considerations, or an aversion to the act of lying play a role. In natural settings with asymmetric information all of these motivations may influence the decision to tell the truth or to lie. A recent experimental study by Hurkens and Natik (2006) discusses this issue with respect to Gneezy's (2005) results.

Decision makers

The choice to follow the given advice is labeled *trust*.

Additional elicitations

After the actions (i.e., message and choice) in the Communication Game, specific beliefs are elicited from participants in order to gain insight into the perception and reasoning that underlie actions in the Communication Game.

Advisors

Advisors state how many out of the nine decision makers in the session they expect to follow the advice. Advisors receive € 0.50 for a correct guess (i.e., when guess and actual frequency of following in that session coincide). Their guess is labeled *"sender belief*".

Decision makers

Decision makers state how many out of the nine advisors in the session they expect to tell the truth. Decision makers also receive € 0.50 for a correct guess. Their guess is labeled "*decision maker belief".*

In addition, decision makers are asked to indicate on a scale from 0 to 9 how well the following statements fit their expectations of the situation.

*(1) "The option that gave the highest gain to the advisor was **not** the option that gave the highest gain to me."*

(9)"The option that gave the highest gain to the advisor was also the option that gave the highest gain to me."

The statement linked to 0 means that the decision maker is sure to face a situation of non-aligned interests; the one linked to 9 means that the decision maker is sure to face a situation of aligned interests. The statement is labeled "*expected alignment*".

Experimental procedure

The experimental procedure is illustrated in table 1. The experiment consists of six independent parts (participants are told in advance only that it consists of "various" parts). For each part, the 18 participants are matched randomly with a new counterpart to build teams of two. Random (re)matching assures that behavior in the Communication Game is not influenced by reputation effects. In parts 1, 2, 4, and 5, participants perform different sets of exercises and are rewarded for their performance. In part 3, they interact in a simultaneous move game with two-by-two symmetric actions. Participants are informed about their personal gain and the accumulated gain after each part. In part 6, participants play the

Communication Game. Subsequently, all participants' *beliefs* and the decision makers' *expected alignmen*t are elicited. After this, participants learn their payoff from the Communication Game. A post-questionnaire is used to collect data on gender, field of studies, verbal explanations of decision in the Communication Game, and the "MachIV" personality test (Christie and Geis, 1970)[5]. Finally, participants are paid their experimental gains.

------Table 1 here ------

Contextual variation: Cooperative vs. competitive treatment

Participants perform several exercises (parts 1, 2, 4, an 5) and an additional game (part 3) to create a contextual setting. The following variation in the context serves to distinguish a cooperative (COOP) from a competitive treatment (COMP):

Reward-structure in the exercises: The individual performance of both team members is rewarded in a piece-rate fashion and is summed to determine the total team gain. In COOP this total gain is split in equal parts between the two team-members. In COMP, the best performer receives two thirds of the total gain, while the other receives the remaining third. Hence, participants in both treatments have the incentive to perform as well as possible in each exercise. In COMP, however, we add competition, defined as a situation in which the goals of the two parties are negatively linked (cf., van Knippenberg et al., 2001; Schwieren et al., 2006). It becomes profitable to outperform the other team member.[6]

Wording and information: In the exercises (parts 1, 2, 4, and 5) in COMP, participants are explicitly told that they *compete* against the other participant, and they are informed whether

[5] The test is designed to capture three components of an individual's behavioral dispositions: (1) the extent to which a subject has a cynical view of human nature, and believes that others are not trustworthy; (2) the willingness of a subject to engage in manipulative behavior; and (3) the extent of the subjects' concern (or lack thereof) with conventional morality. A higher test score means a higher degree of "Machiavellianism".

[6] In practical terms, these reward structures closely resemble team performance pay with (COMP) or without (COOP) rewarding the team members for their rank in individual contribution. For a discussion of different forms of team performance pay see e.g. Lawler (2000, ch.9).

they have *won* or *lost* against the other (after each exercise). None of this is said in COOP. (See Appendix for the instructions of the first exercise.)

Game in part 3: In this game, both team members have to choose simultaneously between "square" and "circle". In COOP, both are paid € 2 if they make the same choice and nothing if they choose differently (i.e., a coordination game structure). In COMP, one player gains € 2 if both have chosen the same, the other gains if both have chosen differently (i.e., a matching pennies game structure). This reinforces the positively (COOP) or negatively (COMP) aligned objectives for team members in the different treatments.

3 Subjective Equilibrium Analysis (SEA)

I expect that both advisors' and decision makers' behavior will be related to the *beliefs* about what the counterpart does. In addition, *beliefs* are likely to vary between individuals and the hypothesis is that they can be influenced by the social context, i.e. a competitive vs. a cooperative situation. Bayesian Nash equilibrium analysis (cf., Harsanyi, 1967) - apart from being very complex for situations under uncertainty – usually predicts uniform beliefs across individuals and no sensitivity of beliefs to the context. In accordance with the hypotheses, behavior is compared to a model of expected payoff maximization based on subjective first-order beliefs. Subjective Equilibrium Analysis (Kalai and Lehrer, 1995) – henceforth SEA - aggregates all uncertainty a player may have and describes it by an "environment response function". This function specifies a probability distribution over all outcomes that may result from a particular action. A player is *subjectively rational* if his action is optimal given his subjective environment response function. Importantly, the model explicitly allows for individually subjective assessments of the probabilities. They are neither assumed to be "correct" nor to coincide with those of other players.

Let the advisor's action space be the possible messages $a_{adv} \in A_{adv} = \{A, B, C\}$ and the decision maker's action space the possible choices $a_{dm} \in A_{dm} = \{A, B, C\}$. Denote $o^* \in O^* =$

{A*, B*, C*} as the states in which A, B, C, respectively, is the option with the highest gain (€ 5) for the decision maker. Clearly, only the advisor knows that in fact C* is the true state, i.e., the probability P_{adv} (C*) = 1, and P_{adv} (A*) = P_{adv} (B*) = 0. The *Principle of Insufficient Reasoning (PIR)* (Laplace, 1824) suggests that the decision maker attributes the same probability to all $o^* \in O^*$, i.e., P_{dm} (A*) = P_{dm} (B*) = P_{dm} (C*) = 1/3. Consequently, the following assumption is made:

> *Indifference:* Ex ante, the decision maker has no preference for a particular option over the others, and the advisor knows this.

Under this assumption, the decision maker's choice is between the option that is indicated in the advice (*follow)* or selecting randomly one of the remaining two options *(deviate)*. Hence, one can specify the advisor's environment response function based on the belief about the probability with which the decision maker follows the advice. For the decision maker, an environment response function can be based on his subjective belief about the probability that the message is truthful.

Advisors

Let $P_{adv}(a_{dm} / a_{adv})$ be the probability that the advisor attributes to the decision maker's choice of a_{dm} given message a_{adv}. Let s be advisor's subjective belief of the probability that the decision maker follows the advice. In accordance with *Indifference*, s is independent of the message, so that

$$P_{adv}(A / A) = P_{adv}(B / B) = P_{adv}(C / C) = s .$$

Indifference also ensures that the advisor expects the decision maker to deviate to the two remaining options with equal probability. Since $\sum_{a_{dm} \in A_{dm}} P_{adv}(a_{dm} / a_{adv}) = 1$ must hold for all a_{adv},

$$P_{adv}(B / A) = P_{adv}(C / A)$$

$= P_{\text{adv}}(\text{A} / \text{B}) = P_{\text{adv}}(\text{C} / \text{B})$

$= P_{\text{adv}}(\text{A} / \text{C}) = P_{\text{adv}}(\text{B} / \text{C})$

$= \frac{(1 - s)}{2}$

This specifies the advisor's environment response function. Expected gains ($E\pi_{adv}$) from messages A, B and C are

$$E\pi_{adv}[A] = s + 4\frac{(1-s)}{2} + 3\frac{(1-s)}{2} = 3.5 - 2.5s$$
$$E\pi_{adv}[B] = 4s + 1\frac{(1-s)}{2} + 3\frac{(1-s)}{2} = 2 + 2s$$
$$E\pi_{adv}[C] = 3s + 1\frac{(1-s)}{2} + 4\frac{(1-s)}{2} = 2.5 + .5s$$

Figure 1 shows graphically $E\pi_{adv}$ for each message a_{adv} as a function of s. For an advisor who maximizes expected gains, it is profitable to choose message A if $s < 1/3$ and to choose message B if $s > 1/3$. For $s = 1/3$ the advisor is indifferent between all messages, in particular it is the only belief for which the truthful message C is a gains-maximizing response.

---- Figure 1 here ----

<u>*Decision makers*</u>

Let $P_{\text{dm}}(o^* / a_{\text{adv}})$ be the probability that the decision maker attributes to o^* given that she received message a_{adv}. Let r be the decision maker's subjective belief of the probability that the received message is truthful. *PIR (Principle of Insufficient Reasoning)* ensures that r is the same for all received messages; i.e.

$$P_{\text{dm}}(\text{A}^* / \text{A}) = P_{\text{dm}}(\text{B}^* / \text{B}) = P_{\text{dm}}(\text{C}^* / \text{C}) = r\,.$$

PIR also ensures that given he received a message a_{A}, the decision maker attributes equal probability to the two remaining options being the ones with the highest payoffs. Under the condition that $P_{\text{dm}}(\text{A}^* / a_{\text{adv}}) + P_{\text{dm}}(\text{B}^* / a_{\text{adv}}) + P_{\text{dm}}(\text{C}^* / a_{\text{adv}}) = 1$ for all a_{adv},

$$P_{dm}(B^*/A) = P_{dm}(C^*/A)$$

$$= P_{dm}(A^*/B) = P_{dm}(C^*/B)$$

$$= P_{dm}(A^*/C) = P_{dm}(B^*/C)$$

$$= \frac{(1-r)}{2}.$$

This specifies the decision maker's environment response function. The following expected gains ($E\pi_{dm}$) result:

$$E\pi_{dm}[follow] = 5r + \frac{(1-r)}{2} + 3\frac{(1-r)}{2} = 2 + 3r$$

$$E\pi_{dm}[deviate] = \frac{r}{2} \times (1+3) + \frac{1}{2}\left[\frac{(1-r)}{2} \times (1+5) + \frac{(1-r)}{2}(3+5)\right] = 3.5 - 1.5r$$

Figure 2 shows the decision maker's expected monetary gains $E\pi_{dm}$ from following or deviating as a function of r. It is profitable to follow if $r > 1/3$ and to choose deviate if $r < 1/3$. For $r = 1/3$ the decision maker is indifferent between following and deviating.

----Figure 2 here ---

4 Results

Actions

Table 2 shows the joint distribution of messages and choices by the 108 pairs of players in the Communication Game. The marginal distributions summarize advisor and decision maker behavior separately, i.e., they reflect how often each message and each option are chosen.

-----Table 2 here----

Advisors

Messages A, B, and C are chosen 11 (10%), 65 (60%), and 32 times (30%), respectively. Recall that sending message C means telling the truth in the message.

Decision makers

28 (26%) decision makers opt for A, 54 (50%) for B, and 26 (24%) for C. The diagonal of the joint distribution in Table 2 shows the frequencies with which decision makers follow the given advice; all entries off the diagonal reflect deviation from the advice. 81 out of 108 decision makers (75%) follow the given advice. The data suggests a bias towards choosing option A over the other two options.[7]

Beliefs

Table 3 for the advisors and table 4 for the decision makers depict how individual messages and choices are associated with individual beliefs.

Advisors

Advisor beliefs indicate how many out of the nine receivers in the session they expect to follow the advice. The row of totals on the right side of table 3 shows how *advisor beliefs* varied between 0 and 9 (mean 4.6, standard deviation 2.3). On average, advisors underestimate decision makers' true propensity to follow the advice, since the actually observed 75% following would coincide with a belief of 6.8.[8] Those advisors that send message A have a mean belief of 2.3, which is significantly lower than the mean of 5.0 for those that sent message B ($t = 4.23$, $p < .01$). Hence, sending message A is correlated with having a low belief ($r = -.35$, $p < .01$), and sending message B is correlated with having a high

[7] When message A is sent, 91% of the decision makers follow the advice, compared to 75% and 69% when B and C are sent, respectively. Also, decision makers deviate to A more often – in 75% of the cases when message B is sent and 60% when message C is sent. No explanation for this preference for A will be offered here, but it appears to be a behavioral regularity. The qualitative data do not indicate that advisors anticipate such a bias.

[8] This in line with Camerer et al.'s (1989) finding, that under information asymmetry it is difficult for the informed party to neglect own information (i.e. the non-aligned payoff structure) when building expectations about how the uninformed party will behave.

belief (r = .19, p < .05). In contrast, there is no correlation between sending the truthful message C and the belief about decision makers' behavior (r = .02, not significant).

-----Table 3 here----

Decision makers

Decision maker beliefs indicate how many out of nine advisors in the session they expect to have told the truth in the message. The row of totals in table 4 shows how *decision maker beliefs* vary between 0 and 9 (mean 5.3, standard deviation 2.8). On average, they overestimate the advisors' true propensity to tell the truth; the actually observed 30% truth telling would coincide with a belief of 2.3.[9] Decision makers who follow the advice have an average belief of 6.7; those that deviate from the advice have an average belief of 2.7 (t = 6.8, p < .01; correlation between belief and following with r = .55, p < .01).

-----Table 4 here----

Differences between treatments

Table 5 shows the frequencies of messages and choices separately for the cooperative treatment (COOP) and for the competitive treatment (COMP). In addition, it includes the means of beliefs about the counterparts' behavior in both treatments.

-----Table 5 here-----

[9] This is not surprising since decision makers did not know that the payoff-structure was in fact non-aligned. Below it will become clear that many expected it to be aligned, in which case there is no incentive to lie.

Advisors

For advisors there are almost no differences in behavior across treatments; in both treatments 30% of the advisors tell the truth. The mean of beliefs is 4.3 in COMP and 4.9 in COOP (Mann-Whitney rank test: $p = .17$).

Decision makers

In COMP 37 decision makers (69%) follow the advice, 44 (81%) do so in COOP (Fisher Exact test - 1-tailed - for independence between the two treatment: $p = .09$). The mean of beliefs is 4.7 in COMP and 5.9 in COOP (Mann-Whitney rank test: $p = .02$). The mean expectation of alignment is 3.8 in COMP and 5.4 in COOP (Mann-Whitney rank test: $p < .01$).

5 Analysis and discussion of results

Is communication regarded as meaningless?

Let us first compare observed behavior to what would be obtained if communication were meaningless. Such a benchmark behavior can be justified from standard Bayesian Nash equilibrium analysis, which shows that a "babbling equilibrium" always exists (see Farell and Rabin, 1996, p.108). Also, if communication were ignored, the Principle of Insufficient Reasoning (Laplace, 1824) would suggest choosing messages and options randomly, i.e. with equal probability. In this case, messages and options should be distributed equally, with an expected frequency of 36 out of 108 for A, B and C. The marginal distributions in table 2 reveal that the hypothesis of equal proportions can be rejected both for the messages sent by the advisors (Chi-squared = 13.56; dof = 2; $p < 0.01$) and for the decision makers' choices (Chi-squared = 41.17; dof = 2; $p < 0.01$). Hence, messages are not regarded as meaningless.

Is behavior consistent with SEA?

In accordance with the analysis introduced in section 3, advisors may choose based on their subjective belief of how likely it is that decision makers follow the advice. Decision makers may choose an option based on their subjective belief of how likely it is that advisers tell the truth in the message. The significant correlations between actions and beliefs for lying senders and for decision makers suggest that such a relationship exists. Tables 3 and 4 indicate in bold those combinations that are in line with the predictions from SEA. Table 6 shows in detail how advisor and decision maker actions correspond with the model. For those advisors that choose to lie in the message, the maximization of expected gains based on the subjective belief describes behavior correctly in 72 out of 76 cases (95%). However, the majority of truth-tellers (81%; with belief $\neq 3$) is not in line with the model. Decision maker behavior is largely in line with the model (88%). Many of the 13 decision makers that do not behave in line deviate with a belief of little above the critical value of $r = 1/3$.

-----Table 5 here----

From this comparison, it is evident that behavior of lying advisors and of decision makers is related to the belief about what the other side does. SEA describes behavior well for this population, whereas a model that predicts uniform beliefs would clearly fail to do so. Yet, there is an important difference between the advisor and receiver population. Advisors face an ethical dilemma in their decision, i.e. they have to trade off between maximising their own gains and telling the truth. Decision makers have no ethical component to consider. Hence, while most decision makers are indeed *subjectively rational* with respect to their gains, truth-tellers in the advisor population deviate from the model predictions. This shows that a descriptively adequate model should also allow for non-self-interested motivations. The extent to which truth telling in this situation reflects altruism, an aversion towards the act of

lying, or even others, is the topic of research on deception. Hurkens and Nartik (2006) show that what looks like behavior motivated by lying aversion may be explained also by (social) preferences over outcomes. For modeling purposes, several authors have suggested a behavioral type approach in which certain types of players act upon preferences or action tendencies that deviate from self-interest and economic rationality (Crawford, 2003; Chen, 2004; Cai and Wang, 2006).

Does a competitive context influence behavior?

Advisors

The data show no influence of the induced contextual change on advisor behavior. One may conjecture that the propensity to tell the truth is generally insensitive to a competitive context. This paper does not go so far. Possibly, the contextual variation in this experiment is just too small to create an effect, i.e., it is dominated by the more general context of a laboratory experiment with a student population. This should be addressed in further research.

Decision makers

The data suggest a mild effect of competition on the decision makers' side (difference in *following: p-value* < *.1*; difference in *decision maker beliefs*: p-value < .05). It is important to note that the decision maker's uncertainty consists of two components – uncertainty about the underlying situation – measured by *expected alignment* - and uncertainty about advisor behavior for any given situation. The significant difference in *expected alignment* suggests that the context influences how decision makers perceive the uncertain situation. In a competitive situation they are less likely to believe that interests are aligned. Additional information from the post-questionnaire gives further insight into what motivated decision makers' choices. As will be discussed shortly, an important finding is that the difference in *following* understates the true size of the context effect on trust. The below classification scheme shows that in COMP several decision makers follow for strategic reasons.

Classification of decision maker strategies: In the post-questionnaire, decision makers are asked to explain their decision in the communication game. Decision makers are classified according to their actions in the game: *follower* or *deviator*. Their explanations are then sorted into categories. Two colleagues volunteered as independent judges. The categories are:

Naïve: The decision maker gives an explanation which describes that he/she simply "believed" / "trusted" / "followed" /... or "disbelieved" / "distrusted" / "deviated" /....

Positive alignment: The decision maker explains the action by stating explicitly that his/her expectation of the payoff-alignment was positive.

Negative alignment: The decision maker explains the action by stating explicitly that his/her expectation of the payoff-alignment was negative.

Random: The decision maker states that he/she chose randomly, i.e., independently of the message.

No classification possible: The judge cannot make sense of the explanation.

For *followers*, one additional category is included:

Strategic: The decision maker states explicitly that he/she followed the advice because he/she thought that the advisor would be strategic in telling the truth, i.e. expecting him/her to deviate.

Observations are counted for a particular category when both judges coincide. When their judgments differ, the observation is entered in the column *"judges do not coincide"*. The results are shown in table 7.

------Table 7 here----

In COMP there are fewer naïve trusters (17 vs. 24) and more naïve distrusters (6 vs. 2) than in COOP. Furthermore, in COMP there are fewer trusters that mention their expectation of a positively aligned payoff structure (9 vs. 14) and more distrusters that mention their

expectation of a negatively aligned payoff structure (10 vs. 7). Hence, the frequencies in all four categories support less trust and more distrust under a competive context. In general, the large fraction of "naïve" responders suggests that many decision makers do not rationally consider the payoff alignment. Nevertheless, the context has an effect on their decision.

An insight gained from this analysis is that the action to follow taken by some decision makers is strategic with second-level reasoning. Recall that the payoff structure in the game was selected to rule out strategic truth telling by advisors. However, the uninformed decision maker may have different expectations. Multi-level reasoning has been reported for many economic games (Wilson and Stahl, 1994; Nagel, 1995; Camerer et al, 2004). It is important to recognize that in the present game, this way of reasoning implies, first, a belief in a negative alignment, and second, a belief in a strategic, self-interested advisor. Consequently, for these decision makers the choice to follow reflects considerations that are contrary to the rest of the followers. In fact, they show distrust rather than trust, and reveal a weakness of *"following*" as a behavioral measure of trust. Strategic following occurs in seven out of 108 cases overall, six of which are in the COMP treatment. As a result, the difference in *following* understates the effect of the competitive context on trust. With a modified definition of trust as *"following not strategically*" a Chi-square test clearly rejects independence with respect to the treatments (see table 8) (Chi-square = 6.18, dof = 1, p = .02).[10]

---- *Table 8 here* ----

What explains individual differences?

The decision to tell a "costly" truth and to trust under information asymmetry is marked by large individual differences. A regression analysis is used to relate individual characteristics

[10] Analogously, for advisors in a two-option version of a Communication Game, Sutter (2006) proposes to include strategic truth telling in the category of "deception".

elicited in the post-questionnaire with differences in truth telling and trust. More specifically, the explanatory variables are a dummy for the field of studies being Economics / Business (Econ / Business student = 1), a dummy for gender (Male = 1), the accumulated gains prior to the communication game (Wealth), and the individual's score on "Machiavellianism" (see footnote 5) (MachIV score). In addition, a dummy is included for the treatment (COMP = 1) as test for context effects, and *advisor belief* (Belief) for the advisor regressions. For each analysis, a first regression is run with all these explanatory variables. Subsequently, a second ("reduced") regression excludes all those variables that turn out to be insignificant with a p-value greater than .5 in the first regression.

<u>*Advisors*</u>

"All advisors": Truth telling (advisor sends message C = 1) is first explained with a probit regression on all 108 advisor observations. The results are reported in the left column of table 9. Only the field of studies can be shown to have a significant impact on truth telling, i.e., students of economics and business tell the truth less. The overall fit of these regressions is poor (Pseudo R-squared = .04).

"*Low-belief" vs. "high-belief" advisors:* In Gneezy's (2005) version of the communication game, the assumption is made that all advisors believe that *most* decision makers follow their advice. Sutter (2006) challenges this assumption successfully by complementing experimental behavior with the elicitation of advisor beliefs. Equivalently, belief elicitation for the present game shows that expectations vary, and that they can be related to the choice of action. Even with the third option included, one may suspect that different subgroups of advisors have different motivations for their choice of the message.[11] Therefore, probit regressions are performed separately on *"low-belief"* advisors - who believe that few (≤ 3/9) decision makers will follow their advice, and on *"high-belief"* advisors - who believe that most (≥ 6/9) decision makers will follow their advice. In particular, for the latter group truth telling is

[11] It may be that some low-belief advisors told the truth for strategic reasons, even though our design intended to rule this out.

unambiguously "costly". The right side of table 9 shows that regressing the data of the subgroups leads to a better fit (Pseudo R-squared ≥ .09 and ≥ .22), and that the results differ.

------Table 9 here----

Results on the population of low-belief advisors are inconclusive. The only significant variable is the experimental gain prior to the Communication Game; those low-belief advisors that gain more are less likely to tell the truth. For the population of high-belief advisors, several coefficients turn out to be significant. Here, participants with a high score on "Machiavellianism" tell the truth less. This is what one might expect, since the MachIV score captures variations in personal predispositions toward engaging in manipulative or exploitative behavior. Other experimental studies show similar effects, e.g., high Machs have been shown to accept lower offers in the Ultimatum Game (Meyer, 1992).

The second finding is that men are significantly more likely to tell a costly truth than women. Gender effects have been reported in many studies on other-regarding behavior (e.g., Eckel and Grossman, 2000). In most studies, however, men show equal or more selfish behavior than women; e.g., they reciprocate less in the Trust Game (Croson and Buchan, 1999) and they give less in Dictator Games (Eckel and Grossman, 1998; Andreoni and Vesterlund, 2001). The present study tests gender differences in communication under information asymmetry. Note further that the result suggests that truth-telling in the Communication Game cannot be equated with altruistic giving.

As final finding, economics and business students tell the truth less. Differences in behavior between economic students and students from other fields have been reported for other experimental games, where economic students act more in line with the economically rational prediction (Marwell & Ames, 1981; Carter and Irons, 1991; Frank, 1993). In a recent study, Rode, Hogarth & Le Menestrel (2006) show that students of Economics and Business

at UPF are less prepared to pay an ethical premium for labelled goods than students from other fields. The results indicate that such behavioral differences also hold for Communication Games. However, the usual question applies, that is whether these differences are due to self-selection into studying Economics or to learning and conforming to "economic rationality".

Decision makers

"Trust = follow advice": Probit regressions are run with the 108 decision maker observations to explain trusting behavior. In a first analysis (see left column of table 10), a dummy for *"following"* is used as dependent variable. The overall fit is poor and no variable can be shown to be significant on a reasonable level.

"Trust = follow advice not strategically": In a second regression, decision makers that follow strategically are counted as not trusting. The results on the right side of table 10 show that, with this definition of trust, the overall fit of the regression is slightly better (Pseudo R-squared = .08), and the variables COMP and Econ/Business Student seem to have a significantly negative impact on trust. The result indicates that there is no influence of the MachIV test score on decision makers' propensity to trust. Related findings in the experimental Trust Game show equally ambiguous results with regards to trust and Machiavellianism. For example, Burks et al (2003) find that people high in Machiavellianism invest significantly less, while Gunnthorsdottir et al (2002) find no effect for Machiavellianism on investment.

------Table 10 here-----

6 Concluding remarks

As mentioned in the outline, trust is an important ingredient of "social capital". In Rotter's (1967) words, “one of the most salient factors in the effectiveness of our present complex social organization is the willingness of one or more individuals in a social unit to trust others.” The most interesting result of this study is that trust in advice from others can be inhibited when the surrounding context is a competitive one. While the difference in the initial measure of trust (“*following*”) between the treatments is only 12%, further analysis suggests that it may be as much as 23%. In either case the study shows that trust is indeed affected by a competitive context. The particular size of this difference should not be overemphasized for two reasons. First, I agree with Levitt and List (2006) that laboratory experiments are better suited for qualitative rather than precise quantitative predictions.

Second, as pointed out in the motivation of the experimental design, behavior depends on the features of the situation and on the degree of information asymmetry. For instance, I conducted an additional experiment with equal design, but where decision makers had five options to choose from and where they were not informed about possible payoffs. In that game, in COOP 11 out of 16 (69%) decision makers followed the advice, and only 3 out of 16 (19%) followed in COMP (Fisher exact test, 1-tailed: $p < .01$). This finding suggests that decision makers are even more affected by contextual changes when they have no information on which to base calculations. This is probably the case for many naturally occurring situations. The conditions under which contextual effects have more or less impact is a question left to further research.

The results of the current study suggest that the principal reason for the effect of context on trust is that under competition, uninformed decision makers are more likely to perceive the situation as one of conflicting interests. It has been pointed out to me that the one-shot characteristic of this experiment may not give appropriate predictions for

interactions in which repetition would allow for learning about the environment. I agree that repetition may moderate the effect, and emphasize that the study does not allow for predictions for that case. However, at least two reasons can be postulated as to why people in natural environments may be less receptive to (rational) learning than economic theory predicts. First, natural interaction is seldom characterized by repetition as studied in economic experiments. Rather, situations of information asymmetry occur sporadically (cf., Babcock and Loewenstein, 1997) over time, and any particular one may be perceived as more or less unique. Second, in psychological terms the context in the experiment acts as a "prime" for perceptions which lead to observed behavior. Bargh and Chartrand (1999) review experimental evidence related to many domains of human activity, showing that the role of conscious thought for judgment, decision, and action is quite limited. They conclude that "automatic evaluation of the environment is a pervasive continuous activity that individuals do not intend to engage in and of which they are largely unaware (p. 475)." This finding suggests that perceptions of the environment are not necessarily due to cognitive evaluation. Yet, this would be necessary for rational learning to take place.

Practical implications of the finding depend on the social unit in question. As an example, firms should consider this effect of competition when evaluating the efficiency of different corporate reward system. Overly competitive schemes may have the side effect of decreasing trust in communication among employees. This, in turn, has a negative impact on cooperation and overall efficiency (La Porta et al., 1997).

An additional finding is the influence of higher-level strategic reasoning by some participants on study outcomes. In the case of the current study it is demonstrated that even a minority of participants (7 out of 108) can potentially bias the results.

Finally, the paper emphasises Subjective Equilibrium Analysis as a model for decisions under uncertainty. It is increasingly recognized that the strong predictive power of Bayesian Nash equilibrium analysis is of little practical use for many complex games (cf.,

Aumann and Dreze, 2005). This study indicates that SEA may be a promising tool to maintain some consistency requirements for descriptive and predictive purposes in games where more complex models would fail.

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Tables

Table 1: Summary of the experimental procedure

Basic instructions
Part 1: Exercise 1 – participants have 3 minutes to solve 30 simple calculations (e.g., 8 – 4 + 19 = [ ])
Part 2: Exercise 2 – participants have 3 minutes to answer 15 general knowledge questions
Part 3: Coordination game (in COOP) / Matching pennies game (in COMP)
Part 4: Exercise 3 - participants have 3 minutes to estimate the distances between 8 pairs of cities (e.g., Paris – Rome [ ])
Part 5: Exercise 4 – participants have 4 minutes to complete 17 sequences of numbers (e.g., 6 7 9 12 [ ])
Part 6: Communication Game
Elicitation of *beliefs* from advisors and decision makers
Elicitation of *expected alignment* from decision makers
Post-questionnaire

Table 2: Distribution of messages and choices in the communication game (108 pairings)

		Choices made by decision makers			*Frequency of messages*
		A	*B*	*C*	
Messages sent by advisors	*A*	**10**	1	0	11
	B	12	**49**	4	65
	C	6	4	**22**	32
Frequency of choices		28	54	26	108

Table 3: Distribution of *advisor beliefs* about how many out of nine decision makers would follow the advice.

belief	*message* A	B	C	*total*
0	**2**	2	2	6
1	**1**	1	1	3
2	**4**	0	3	7
3	**2**	**13**	**6**	21
4	1	**19**	4	24
5	0	**6**	3	9
6	1	**10**	3	14
7	0	**8**	5	13
8	0	**2**	8	10
9	0	**0**	2	2
total	11	65	32	108
mean belief	2.3	5.0	5.2	4.6

The right column shows the total distribution of advisor beliefs. In the middle columns, this distribution is separated for advisors that send message A, B, C, respectively. We indicate in bold the message-belief combinations that are in line with SEA.

Table 4: Distribution of *decision maker beliefs* about how many out of nine advisors had told the truth in the advice.

belief	*(conditional) choice* *follow*	*deviate*	*total*
0	3	**6**	9
1	0	**2**	2
2	1	**4**	5
3	**9**	**6**	15
4	**3**	4	7
5	**17**	3	20
6	**5**	1	6
7	**17**	0	17
8	**6**	1	7
9	**20**	0	20
total	81	27	108
mean belief	6.7	2.7	5.3

The right column shows the total distribution of decision maker beliefs. In the middle columns, this distribution is separated for decision makers that followed the advice and for those that deviated. We indicate in bold the action-belief combinations that are in line with SEA.

Table 5: Comparison of actions and mean beliefs in COOP vs. COMP

	Advisors				Decision makers		
	Messages			Mean of beliefs	Choices		Mean of beliefs
Treatment	A	B	C		follow	deviate	
COOP	6	32	16	4.9	44	10	5.9
COMP	5	33	16	4.3	37	17	4.7

Table 6: Frequencies of actions in accordance with SEA

	Messages			*Choices*	
In accordance?	*A*	*B*	*C*	*Follow*	*Deviate*
Yes	9	63	6	77	18
No	2	2	26	4	9

Table 7: Classifications based on actions and verbal explanations

	Classification	*COOP*	*COMP*
Follower	naïve	24	17
	positive alignment	14	9
	negative alignment	-	-
	random choice	2	1
	no classification possible	-	1
	judges did not coincide	3	3
	strategic	1	6
	Total	**44**	**37**
deviator	naïve	2	6
	positive alignment	-	-
	negative alignment	7	10
	random choice	1	1
	no classification possible	-	-
	judges did not coincide	-	-
	Total	**10**	**17**

Table 8: Comparison of decision maker choices in COOP vs. COMP with modified definition of trust

Treatment	Trust		Distrust			Total
	Follow not strategically	Total trust	Follow strategically	Deviate	Total distrust	
COOP	43	**43**	1	10	**11**	54
COMP	31	**31**	6	17	**23**	54

Table 9: (Reduced) probit regression results for advisor behavior

Dependent variable: truth telling

Independent variable	*All*	*Low belief*	*High belief*
COMP	x	x	x
Belief	x	x	x
Econ/Business Student	-.52 (-1.99)*	x	-1.25 (-2.22)*
Male	.24 (.86)	x	1.15 (2.02)*
Wealth	-.09 (-.88)	-.30 (-1.70)+	.18 (0.82)
MachIV score	x	.02 (.94)	-.04 (-1.72)+
Constant	-.01 (-.02)	-.91 (-.46)	1.37 (.60)
Observations	108	35	39
Pseudo R-squared	.04	.09	.22

- x where the variable was dropped after being clearly insignificant in a first regression ($p > .5$)
- value of z statistics in parentheses
- + significant at 10%; * significant at 5%; ** significant at 1%

Table 10: (Reduced) probit regression results for decision maker behavior

Dependent variable: trust

Independent variable	*Trust = followed advice*	*Trust = followed advice not strategically*
COMP	-.37 (-1.33)	-.60 (-2.29)*
Econ/Business Student	-.45 (-1.51)	-.57 (-2.15)*
Male	x	x
Wealth	x	x
MachIV score	.01 (1.04)	x
Constant	.03 (.03)	1.11 (.4.62)**
Observations	103	108
Pseudo R-squared	.04	.08

- x where the variable was dropped after being clearly insignificant in a first regression ($p > .5$)
- value of z statistics in parentheses
- + significant at 10%; * significant at 5%; ** significant at 1%

Figures

Figure 1: The advisor's expected gains as a function of the her belief about the probability that the decision-maker follows

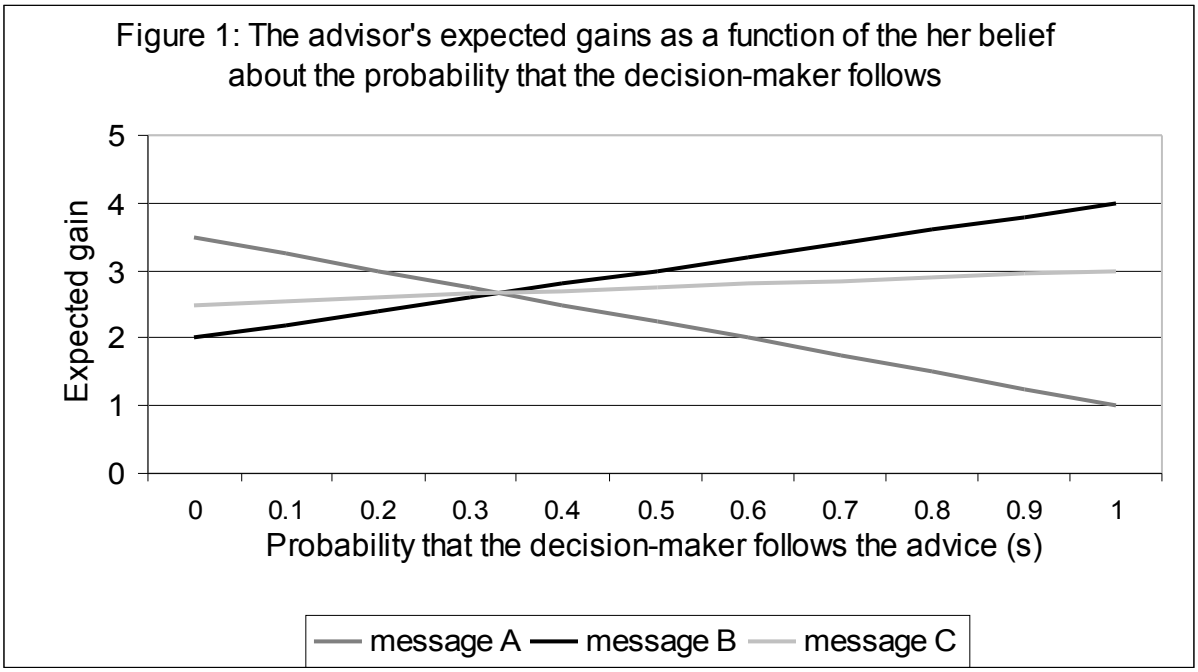
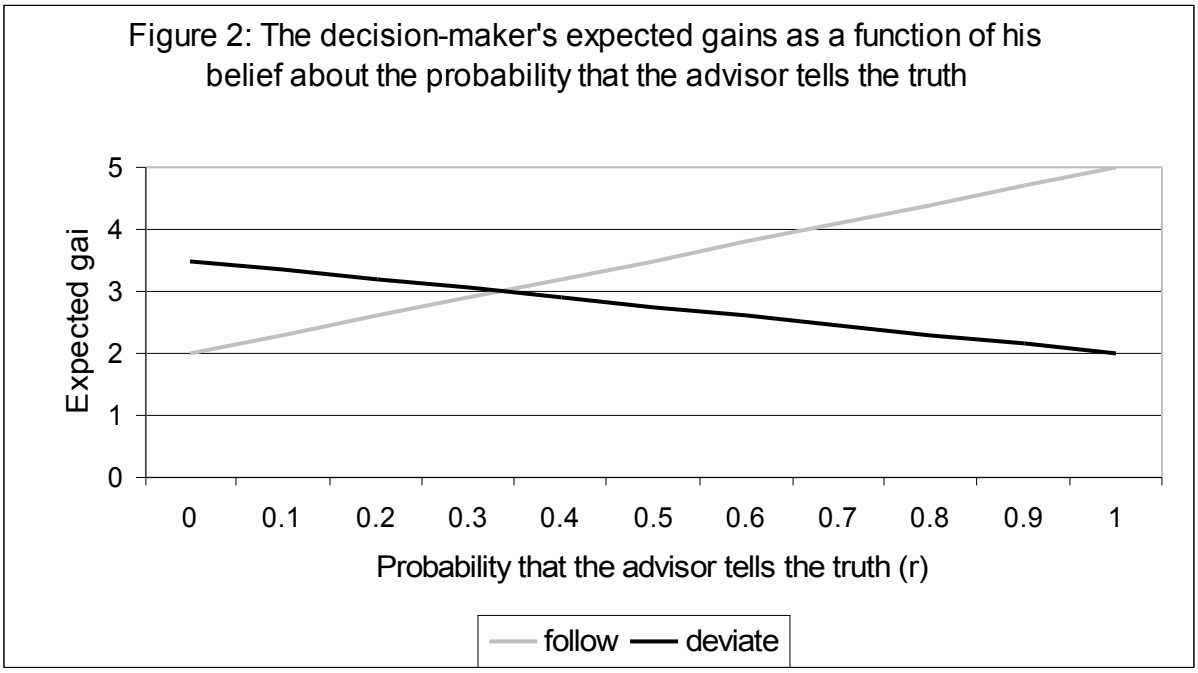


Figure 2: The decision-maker's expected gains as a function of his belief about the probability that the advisor tells the truth



Appendix: Instructions

Basic instructions

Experimental Instructions

Thanks for participating in this experiment, which is part of a research project. The money that you can gain depends on your results in the exercises and on your decisions, and the results and decisions of the other participants. From now on until the end of the experiment you are not allowed to talk. Thank you!

The experiment consists in several consecutive parts. At the beginning of each part of the experiment you will receive detailed instructions about what you have to do and how zou can gain money. Please read the instructions carefully. Press "OK" to continue only when you have fully understood the instructions. If you have any questions, raise your hand and one of the instructors will answer you. Please do not ask aloud!

In each part of the experiment you will be randomly assigned another participant. It will be someone different in each part, but you will never know who it is.

In each part, you and the other participant will encounter either an exercise in which your results will be rewarded, or an interaction, in which you have to make a decision. As said, you will receive further instructions at the beginning of each part.

After each part, you will be told how much you have gained, and how much money you have accumulated in total.

No one will know your results or your decisions in the experiment!

If you have a question, please ask the instructor at any time!

Thank you for your participation!

Instructions for first exercise

Part 1

This part consists of an exercise for you and another participant *[COMP: This part consists in an exercise in which you compete against another participant]*. Remember that the participant you get assigned to will change in the following parts.
The exercise consists in solving easy calculations.

You have to solve 30 calculation exercises. Fill in the correct solution behind each one of them. You have 3 minutes to solve as many calculations as possible.

Example: A calculation could be 7 + 3 = [10].

To determine the money that you and the other participant will receive, the numbers of correct solutions of each one of you are summed up. Then this sum is multiplied by 0.05 Euros. This will be the money accumulated for your gains in this part of the experiment.

Example: You have 25 correct solutions and the other has 20.
In this case you would have accumulated (25 + 20) x 0.05 € = 2.25 €.

You and the other participant each receive half of the accumulated gains.
Example: You receive both ½ x 2.25 € = 1.13 €.

[COMP: If you have more correct solutions than the other participant, then you win and receive two thirds of the accumulated money. If you have fewer correct solutions than the other, then you loose and receive one third of the accumulated money. If you have both the same number of correct solutions, then you both receive half of the money.
Example:
You win and receive 2/3 x 2.25 € = 1.50 €; the other looses and receives 1/3 x 2.25 € = 0.75 €.]

Please press "OK" when you are ready. The calculations will appear when you have pressed "OK" and the time (3 minutes) will begin to count.

Instructions for Communication Game

Advisor

Part 6

This part consists in an interaction between you and the other participant. You have to take a decision.

In this part you and the other participant have three possible options with different gains.

Option	for you	for the other
A:	1 €	1 €
B:	4 €	3 €
C:	3 €	5 €

You know these payments from the options while the other participant only knows that there are three options A, B, and C, and that with one of the options she gains 1, with another 3, and with another 5 Euros. SHE DOES NOT KNOW WHICH OF THE GAINS 1, 3, 5 BELONGS TO WHICH OPTION AND SHE DOES NOT KNOW ANYTHING ABOUT THE GAINS FOR YOU!

This means that the other knows the following:

Option	for you	for her
A:	?	1, 3 o 5 €
B:	?	1, 3 o 5 €
C:	?	1, 3 o 5 €

The other participant has to choose one of the options! To make her decision, the only additional information that she has will be a message that you send her before she decides.

Your possible messages are:

Message A: "With option A you receive more money than with the other options".
Message B: "With option B you receive more money than with the other options".
Message C: "With option C you receive more money than with the other options".

The other participant will receive your message and then has to choose one of the three options. To repeat, the choice of the other determines the gains in this part. However, she will never know which gains belong to the options that were not chosen and she will never know the value of the gains for you.

Decision maker

Part 6

This part consists in an interaction between you and the other participant. You have to take a decision.
In this part you and the other participant have three possible options with different gains. YOU HAVE TO MAKE A CHOICE BETWEEN THE THREE OPTIONS. OPTION A, B, or C. That means that the gains in this part depend on your choice. However, you only know the following:

ONE OF THE OPTIONS GIVES YOU A GAIN OF 1 €, ANOTHER A GAIN OF 3 €, ANOTHER OF 5 € (this means that you do not know the order).

The other participant knows the gains from each option for both of you. THIS MEANS THAT THE OTHER PARTICIPANT KNOWS EXACTLY WHICH GAINS FOR YOU (1, 3, and 5) BELONG TO WHICH OPTION!!! The only additional information that you have is a message that the other participant sends you.

The possible messages are:

Message A: "With option A you receive more money than with the other options".
Message B: "With option B you receive more money than with the other options".
Message C: "With option C you receive more money than with the other options".

After receiving the message, you will have to choose between the three options. You will never know which gains belong to the options that you have not chosen.