Experimental evidence on deceitful communication: does everyone have a price ?

Radu Vranceanu, Delphine Dubart

ESSEC BUSINESS SCHOOL

EXPERIMENTAL EVIDENCE ON DECEITFUL COMMUNICATION: DOES EVERYONE HAVE A PRICE?

RESEARCH CENTER

RADU VRANCEANU, DELPHINE DUBART

ESSEC WORKING PAPER 1806

JANUARY 2019

January 22, 2019

Experimental evidence on deceitful communication: does everyone have a price ?*

Radu Vranceanu† **and Delphine Dubart**‡

Abstract

This paper introduces a new task to elicit individual aversion to deceiving, based on a modified version of the Deception Game as presented in Gneezy (Am. Econ. Rev. 95 (1): 384–395: 2005). A multiple-price-list mechanism is used to determine the deception premium asked by an individual to switch from faithful to deceitful communication. The results show that, depending on payoffs, 71% of the subjects will switch at most once. Among them, 40% appear to be either "ethical" or "spiteful". The other 60% respond to incentives in line with the cost of lying theory; they will forego faithful communication if the benefit from deceiving the other is large enough. Regression analysis shows that this deception premium is independent of the risk aversion and social preferences of the subject; it would thus capture an inner preference for behaving well.

Keywords: Deception, Communication strategy, Cost of lying, Inequality aversion, Multiple price list.
JEL Classification: C91, D83.

---

*This research was founded by a grant provided by the ESSEC Alumni Foundation. Forthcoming in the *Journal of Behavioral and Experimental Economics*, 2019 (new title: Deceitful Communication in a Sender-Receiver Experiment: Does Everyone Have a Price? doi.org/10.1016/j.socec.2019.01.005).

†Corresponding author. ESSEC Business School and THEMA, 1. Av. Bernard Hirsch, 95021 Cergy, France. E-mail: vranceanu@essec.edu.

‡ESSEC Business School, 1. Av. Bernard Hirsch, 95021 Cergy, France. E-mail: dubart@essec.edu.

1 Introduction

In the last few years, both scholars and laymen became aware of the importance of earnings manipulation, fake news, and other forms of false messages in shaping economic and political outcomes. Therefore, it is not a surprise that experimental research on lies and deception has been expanding rapidly, backed by a solid set of theoretical studies in strategic communication. A key insight from these empirical studies is that some persons would resist the temptation to lie regardless of the benefit and other persons would lie, but only a minority of people would push lies to the extreme even if they forgo positive gains (inter alia, Ariely, 2012; Rosembaum et al., 2014; Aberler et al., 2016). Other experiments revealed that many people tell the truth even when lying would make both the sender and the receiver better off (Erat and Gneezy, 2012; Cappelen et al., 2013; Biziu-van-Pol et al., 2015).

Leaving to philosophers the question of whether borderline communication strategies can be considered to be lies or not, economists choose to focus on "obvious lies" of the kind one may often face in economic life.[1] A large set of studies analyzed cheating in performance reporting. When an individual's gains are related to his performance of a task through an exogenously given rule, and his actual performance is private information to him, this person might exaggerate his performance to maximize his payoffs.[2] In a classic study, Fischbacher and Föllmi-Heusi (2013) asked participants to roll a six-sided die in private, and then report the outcome. Gains are proportional to the number reported, unless the number is six; reporting a six brings zero gain. While "statistical" dishonesty was observed (more than 1/6th of the participants reported a 4 or 5), many persons reported six, a choice representative of some type of cheating aversion.[3] This cheating in performance reporting experiment helped scholars explaining many real life situations;

[1] Scholars in social sciences acknowledge that it can be very difficult to provide a neat definition of what a lie is (Mahon, 2015). A consensual definition was provided by Isenberg (1973, 248) who argued that "A lie is a statement made by one who does not believe it with the intention that someone else shall be led to believe it".

[2] Depending on the experiment, performance is driven by skills, effort or luck.

[3] Several other studies use closely related reporting schemes (inter alia, Mazar et al. 2008; Pascual-Ezama, 2013; Jiang, 2013; Fischbacher, Kajackaite and Gneezy, 2017; Gneezy et al. 2018) and found similar results. Out of the experimental lab, Aberler et al. (2014) run the die experiment on-line on a representative sample of the German population, and found little departure from the truth-telling distribution. See Aberler et al. (2016) for a meta-analysis. Gächter and Schulz analyzed data collected from a cross section of 23 countries and revealed that cheating in the die-in-the cup experiment is correlated with prevalence of rule violation.

however, it cannot properly describe situations in which the sender uses dishonest communication to alter the beliefs of the receiver and prompts him into taking an action that he would not have taken otherwise.

To analyze the important strategic dimension of lying, Gneezy (2005) developed a "pure" communication game in which an informed sender simply tells an uninformed receiver which of two options will bring him a higher payoff.[4] The payoffs of the two players depend on the choice of option made by the receiver, who has no information about the payoff structure of the game. A tension is introduced in the sender's choice by making the lie profitable to him and harmful to the receiver. Three different treatments varied the benefit to the sender and the loss to the receiver in a typical between-subjects design. To confirm that people refrain from lying because of a lying aversion and not because of social preferences, the author also studied a modified dictator game with the same allocations and probability of implementation as the dishonest recommendation in the deception game. Table 1 summarizes the treatments (with 75 pairs each) and key results.

	Payoff option A		Payoff option B		Results	
	Sender	Receiver	Sender	Receiver	Frequency of senders lying	Dictators choosing B
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment 1	5	6	6	5	0.36	0.66
Treatment 2	5	15	6	5	0.17	0.42
Treatment 3	5	15	15	5	0.52	0.90

Table 1: Percentage of senders/dictators who recommend/chose Option B. (Payoffs in dollars)

The results reveal that many subjects would not send false messages even though it was profitable to them; furthermore, the extent of honest communication increases with the loss imposed on the other, and decreases with the benefit to the sender (column 5). As shown in column (6), dictators chose the favorable allocation more often than senders in the Deception Game, which has been interpreted by Gneezy (2005) as proof that participants display an intrinsic aversion to lying. This aversion to lying among such "consequentialist agents" can be grounded in how

[4] Ultimatum games with imperfect information also provided a relevant setting for the study of strategic lies. See for instance: Croson et al., 2003; Kriss et al., 2013; Besancenot et al., 2013; Anbarci et al., 2015; Chavanne and Ferreira, 2017.

individuals view and perceive themselves with respect to their own norms (Gneezy, 2005; Mazar et al., 2008; Vanberg, 2008; Aberler et al., 2014), or express guilt when not living up to their partner's expectations (Charness and Dufwenberg, 2006; Battiagli and Dufwenberg, 2007; Aberler et al., 2016; Behnk et al., 2017; Schwartz et al., 2018).[5]

Sutter (2009) analyzed the data from Gneezy (2005) and argued that, in this game, some "sophisticated" senders would tell the truth not because of a lying aversion but because they believe that the receiver will follow the opposite recommendation. The extent of "deceitful communication" (through which the sender aims to make a benefit at the expense of the receiver) might therefore be larger than the frequency of lying. Thus, his analysis makes an important distinction between unconditional lying and lying contingent upon the beliefs of the sender, as well as between intended and actual deception.

On the other hand, Hurkens and Kartik (2009) remark that similar figures to those in Table 1 could have been generated in a sample in which 50% of the subjects would never lie regardless of the benefit, and 50% who would lie if they prefer the outcome of lying over the outcome of telling the truth. Indeed, if dictators choosing B (column 6) were randomly allocated to the "ethical" and "economic" type, we would obtain a figure quite close to the frequency of senders lying in the deception game (column 5). Whether the observed distribution of liars is the outcome of a fixed lying cost distributed across individuals performing a cost-benefit analysis, or whether individuals can be separated between an "ethical" type that never lies regardless of the benefit and an "economic" type that lies whenever he/she obtains a marginal benefit from lying, is of utmost importance when seeking to implement policies to support telling the truth.

This paper aims to contribute to this debate by observing individual decisions in a modified Deception Game à la Gneezy (2005) (GDG hereafter) with variable stakes, using a multiple payoff list design.[6] This setting will allow us to elicit the "deception premium" for which an individual agrees to switch from faithful to deceitful communication; by deceitful communication we mean issuing a recommendation with negative monetary consequences for the receiver. The paper also

[5] Charness and Dufwenberg (2006) explain: "A guilt averse person who lies and thereby influences others' beliefs suffers from guilt when he does no live up to these beliefs."

[6] See Andersen et al. (2006) for an analysis of the advantages and disadvantages of this format.

analyzes to what extent this reservation payoff is characteristic of a fixed cost of deceiving, and whether social preferences or risk aversion, and other personal characteristics, have an influence on it.

In our experiment, senders must choose a message for each of 11 different pairs of binary allocations, referred to as Option A_i and Option B_i, with $i = (1, ..., 11)$. In all Options A, payoffs are invariant: 10€ for the sender and 10€ for the receiver; in Options B, the receiver's payoff is invariant at 5€, while the sender's payoff can vary between 10€ and 20€. As in the original GDG, senders know these allocations, while receivers have absolutely no information about the payoff structure of the game.

The key hypothesis being tested is that a person who initially uses faithful communication may change his mind and resort to deceitful communication if the benefit of doing so is large enough. If subjects switch only once, the deception premium required by the individual to switch from faithful to deceitful communication can be seen as a measure of his aversion to deceiving his partner. Once the senders make their 11 choices, the computer will select one of them at random and send the selected message to the receiver. This mechanism ensures that senders truthfully reveal their reservation payoff. Then, the receiver will choose between Option A and Option B, exactly as in the GDG, and this option will determine the payment for both of them.

In the GDG, a "successful lie" would not only bring to the sender a higher benefit, but will also switch a disadvantageous inequality (in Option A) into an advantageous inequality for the sender (in Option B). Reverting payoff inequality could by itself provide a justification for lying. To rule out this additional incentive for lying, in our experiment Option A provides an equal payoff to both players. Thus, the only motivation for a selfish lie is obtaining a higher benefit, not reverting the payoff inequality. However, in our experiment, if the receiver follows the sender's recommendation, not only will the sender obtain a higher payoff, but he will also see the gap between his payoff and the payoff of the receiver increasing. If the sender features advantageous inequality aversion, this could contain his temptation to resort to deceitful communication. We will thus use a specific task to elicit the advantageous inequality aversion of the participants. Additionally, the shape of the utility function (attitudes toward risk) can explain variations in the deception premium claimed by individuals to switch from honest to dishonest communication. We use the self-reported risk aversion measure introduced by Dohmen et al. (2011) to elicit individual risk aversion.

In short, the results show that 71.4% of the senders will implement pure or threshold (single switch) strategies; the other participants implement multiple-switches, or switch in a way that cannot be easily rationalized.[7] Among the first set of subjects, 9.2% are of the "spiteful" type (they strive to deceive even if they gain nothing), 30.8% are of the "ethical" type (they never deceive), and 60% will switch from faithful to deceitful communication only if they deem the benefit of deceiving satisfactory. Regression analysis suggests that this aversion to deceiving is unrelated to the subjects' gender, age, risk aversion or inequality aversion, suggesting that our measure captures an inner taste for "doing good" in line with the fixed cost of lying theory (Gneezy, 2005). Self-reported religiosity and trust in the government are positively correlated with the aversion to deceiving measure.

Studies that use the deception game to test various assumptions use a payoff structure similar to that used by Gneezy (2005) or Erat and Gneezy (2012).[8] It must be acknowledged that most of these studies use between-subject designs: different groups of subjects are exposed to choices with different stakes or stimuli, and draw conclusions on observing differences in frequencies of dishonest persons across groups. This methodology does not allow us to monitor whether an honest subject can be "bought into dishonesty", or in other words, what is the price the individual requires to give up honesty in a strategic context. This is the main contribution of our paper. To our knowledge, the only study of individual lying behavior in a strategic setting was developed by Behnk et al. (2017) to investigate the diffusion of responsibility in antisocial behavior. They also use a variant of the GDG and a multiple price list design in which one or two senders can chose the preferred message. If a deceitful recommendation is implemented, the receiver loses 7 euros; the benefit of deception for the sender varies between zero and 7 euros. As a main result, they show that antisocial behavior is more widespread when the decision is shared compared to the individual

[7] More precisely, they are faithful when the benefit of deception is high, and deceitful when the benefit of deception is low.

[8] See for instance Dreber and Johanneson, (2008), Childs (2012) and Gylfasson (2013) on gender differences in lying behavior, Gawn and Innes (2018) on the interaction lies-trust, Jacquemet et al. (2018) on the role of pre-commitment devices (oath).

choice. They also reveal that many subjects switch from faithful to deceitful communication if the benefit derived from dishonesty is large enough. By contrast with Gneezy (2005) and our paper, in their study the table of payoffs is common knowledge, which modifies in a substantial way the outcome of the game, insofar as receivers become aware that it is in the interest of a selfish sender to deceive them. It must be acknowledged that for their analysis of "white lies", Erat and Gneezy (2012) use both a between-subject and a within-subject design. The later allowed them to show that the (benevolent) person who lies for a small benefit, will also lie for a large benefit.

The alternative non-strategic approach provided by the cheating on reporting game (Fischbacher and Föllmi-Heusi, 2013) was used to analyze the effect of varying stakes on the same individual by Gibson et al. (2013). They developed a framed experiment in which subjects must play the role of the CEO of a listed company and can manipulate earnings without any risk of being sanctioned. The subject's payoff is related to his financial statement according to a predetermined rule. The benefit of reporting the true earnings varies from 0.30 CHF to 1.50 CHF by 0.30 cents increments. The benefit of lying is set invariant at 1.50 CHF. Therefore, each subject must make five choices. If only 21% of the subjects stated the truth for a benefit of 0.30 CHF, this frequency raised to 82% for a benefit of 1.50 CHF equivalent to the benefit of telling the truth. This unambiguously reveals that some individuals switch from dishonest to honest reporting if the benefit of telling the truth increases. Unfortunately, the paper reports only the frequency of dishonest choices, and does not describe how individuals respond to changes in benefits.

Gneezy et al. (2013) use an original experiment based on a variant of the "die-in-a-cup" task in which, contrary to the "standard" case, lying has consequences for a partner and not only for the impersonal administrator of the experiment. They also directly observed individual behavior, as subjects played the game repeatedly for 24 rounds, with varying stakes. Their study also reveals that individuals would lie more frequently when the gain from lying is larger. The time dimension of the experiment allowed them to reveal a tendency for honesty depletion, with the frequency of lying increasing over time for the low payoff states.

As with many other experiments, our study presents limitations. The inequality aversion task can be affected by an ordering effect, which we tried to contain by providing results from the deception game only at the end of the experimental session. We did not measure "pure altruism", as we were afraid that adding a third task (a standard dictator choice) would make the experiment too tedious. However, the task used to elicit advantageous inequality aversion combines elements of altruism with the preference for an equal distribution. The results, obtained in a choice experiment with relatively small monetary stakes might not hold for high stakes. Furthermore, observing individual behavior can prompt subjects to self-refrain from behaving in a morally challenging way.

The paper is organized as follows. We first study the elementary decision problem of the sender in the deception game. The next section introduces the experimental design. Section 3 presents the results. The last section concludes.

2 The sender's elementary decision problem

In this section, we study an elementary decision problem that helps us explaining the purpose of the main task in the experiment, and also to call attention on the numerous factors, other than the cost of deceiving that can interfere with the sender's communication strategy.

As already mentioned, subjects in the sender role will be exposed to a binary choice between an Option A and an Option B, with payoffs for each of the two players as indicated in Table 2. They can state a message for the receiver along the lines of "Option A is better for you" or "Option B is better for you", and the receiver, who has no idea about the payoff structure of the experiment, must make a choice based only on the received message.

Payoffs Option A		Payoffs Option B	
Sender	Receiver	Sender	Receiver
10	10	s	5

Table 2: The payoff structure in the deception game. (Payoffs are expressed in euros)

In the experiment, the payoff s can take integer values in the interval $[10, 20]$, in this decision problem we consider that s is a continuous variable with $s \geq 10$. The potential loss for the partner is constant (5 euros), regardless of the payoff of the sender. We remark that, unlike in the GDG, in which the allocation with a lower payoff for the sender (Option A) also involved a higher gain for the receiver (the sender was subject to disadvantageous inequality), in this problem, Option A provides an equal payment to the two players (10€, 10€); as in the GDG, Option B brings a higher gain for the sender at the expense of the receiver whose payoff falls from 10 to 5 euros. If implemented, Option B is deceitful insofar as it involves a loss for the receiver, and also turns payoff equality into sender advantageous inequality.

Let us assume that the sender has a utility function $u(x)$ where x is his income, with $u'() > 0$, $\forall x > 0$. The shape of the function is characteristic of his attitude toward risk in a Von Neumann-Morgenstern expected utility framework (a concave function being representative of a risk-averse individual, and a convex function being representative of a risk-seeking individual).

If Option A is chosen by the receiver, the sender's utility is simply $u(10)$. If Option B is implemented, his monetary payoff is s; furthermore, because $s > 5$ (the receiver's payoff), a sender who dislikes unequal distributions, including those which are favorable to him, would bear a cost c, with $c \geq 0$. In this simple problem we assume this cost to be fixed, but the solution would not change much if we use instead a linear cost as suggested by Fehr and Schmidt (1999). We also assume that the sender will bear a fixed cost of deceiving, denoted by k, if his misleading recommendation, entailing a loss for his partner, is followed by the latter. The decision problem would not change in a significant way if instead of the cost of deceiving we consider a lying cost that is borne by the individual who states a lie, whether this entails a loss for the partner or not.

Let p denote the probability assigned by the sender to the event that the receiver will follow his recommendation; $(1 - p)$ is the probability that the receiver will implement the opposite recommendation. This probability is independent of the payoffs that are unknown to the receiver, it therefore reflects the sender's subjective beliefs. The fact that these beliefs cannot be represented as an equilibrium solution is an interesting feature of the GDC in which the receiver does not dispose of "enough" information to make Bayesian inference conditional on the received message.[9]

Former experiments with the GDG found that, on average, approximately 75% of the receivers

[9] If subjects know or just assume that objectives of the two players are opposite, Sanchez-Pages and Vorsatz (2007) have shown the Nash equilibrium strategy for both players is to randomize between telling the truth or lying, and respectively following the recommendation or not.

will follow the sender's recommendation (Gneezy, 2005; Dreber and Johanneson, 2008; Sutter, 2009). In our experiment, 77% of the responders followed the recommendation of the sender.

Our definition of deception involves that the sender tells a lie if he believes the receiver will rather follow his recommendation ($p > 0.5$) and vice versa. We focus hereafter on the case $p \in (0.5, 1)$, the case $p < 0.5$ being symmetric.[10] We compare the expected utility the sender is attaching to each message (true: "A is better for you", and false: "B is better for you"). He will choose deception (state the message "B is better for you") if:

$$pu(s - c - k) + (1 - p)u(10) > pu(10) + (1 - p)u(s - c), \quad \text{with } s \geq 10, \tag{1}$$

or, using the notation $(s - c) = 10 + x$, and denoting the left (right) hand term of the inequality as $L(x)$ and respectively $R(x)$, if:

$$L(x) = pu(10 + x - k) + (1 - p)u(10) > pu(10) + (1 - p)u(10 + x) = R(x), \quad \text{with } x \geq 0. \tag{2}$$

First, we note that, regardless of the shape of the utility function, for $x = k$, $L(k) < R(k) \Leftrightarrow u(10) < pu(10) + (1 - p)u(x + 10)$, which reflects the trivial case in which the individual does not deceive his partner for a very small benefit. We seek to determine whether there is a positive critical gain $\hat{x}$ (and a connected deception premium $\hat{s} = 10 + \hat{x} + c$) such that $L(\hat{x}) = R(\hat{x})$ and $L(x) > R(x)$ for $x > \hat{x}$.

Let us denote by $\Delta(x) = L(x) - R(x)$. This gap, negative for $x = k$, should vanish for $x = \hat{x}$. A necessary but not sufficient condition for existence of $\hat{x}$ is that $\Delta'(x) > 0$. The explicit form of this derivative is:

$$\Delta'(x) = pu'(10 + x - k) - (1 - p)u(10 + x)'. \tag{3}$$

For an increasing concave function $u()$, the derivative $\Delta'(x)$ is positive for all x, insofar as $u'(10 + x - k) > u(10 + x)'$ and $p > (1 - p)$. With an increasing convex utility function, the existence of a positive solution is not guaranteed. The necessary condition $\Delta'(x) > 0$ is equivalent to $\frac{u'(10+x-k)}{u'(10+x)} > \frac{(1-p)}{p} \Leftrightarrow \frac{u'(10+x-k)-u'(10+x)}{u'(10+x)} > \frac{(1-2p)}{p}$. To get some intuition about this condition, we use the the approximation $u'(10 + x - k) - u'(10 + x) = -ku''()$, acceptable for a small k, to

[10] In the trivial case in which the sender is certain that the receiver will follow his recommendation ($p = 1$), the preference toward risk no longer matters, and deception occurs whenever the benefit exceeds the cost, $x > k$.

write condition (3) as $-\frac{u''()}{u'()} > \frac{(1-2p)}{kp}$. The left hand term of this inequality is nothing else but the Arrow-Pratt measure of absolute risk aversion. In other words, the "deception premium" $\hat{x}$ does not exist if the utility function is "too convex". With risk neutral agents, $u(x) = x$, and the critical benefit is simply: $\hat{x} = pk/(2p-1)$.

Since the purpose of this elementary analysis is just to raise our awareness about the essential factors that can have an impact on the decision, we will assume that the individual has a constant absolute risk aversion (CARA) utility function that will allow us to obtain a closed form solution for $\hat{x}$. In general, these utility functions belong to the family of exponential functions $\alpha + \beta e^{-ax}$, with $\{\alpha, \beta, a\} \in \mathbb{R}$. Preferences toward risk are invariant to changes in parameters α and β; they are captured by the Arrow-Pratt coefficient of absolute risk aversion; we can check that $-\frac{u''()}{u'()} = a$, a constant for this family of functions. For $a > 0$ the individual is averse to risk (the utility function is concave), for $a < 0$, the individual is risk-seeking (the utility function is convex). For our analysis we will use the specific function $u(x) = sgn(a)\,(1 - e^{-ax})$ for for $a \neq 0$, where $sgn(a)$ stands for sign of a. For $a = 0$, the function is $u(x) = x$.

As shown in the Online Appendix A, the equation $L(x) = R(x)$, determining $\hat{x}$, is equivalent to:

$$e^{ax} = \frac{pe^{ak} - (1-p)}{2p-1} \tag{4}$$

The existence of a solution $\hat{x} > 0$ requires that $pe^{ak} - (1-p) > 0$ or $e^{ak} > \frac{(1-p)}{p} \Leftrightarrow a > \bar{a} = \frac{1}{k}\ln\left(\frac{1-p}{p}\right)$, with $\bar{a} < 0$. Obviously the condition is fulfilled for $a \geq 0$ (concave or linear utility functions). For negative a values, the condition requires that the function $u()$ be not too convex. If this condition is fulfilled, the single solution to equation (4) is:

$$\hat{x} = \frac{1}{a}\ln\left[\frac{pe^{ak} - (1-p)}{2p-1}\right] \tag{5}$$

We can easily check that $\hat{x} > k$. Indeed, if $a > 0$, this is tantamount to $e^{ax} > e^{ak} \Leftrightarrow \frac{pe^{ak}-(1-p)}{(2p-1)} > e^{ak} \Leftrightarrow (1-p)e^{ak} > (1-p)$ which is true. If $a < 0$, $\hat{x} > k \Leftrightarrow e^{ax} < e^{ak} \Leftrightarrow (1-p)e^{ak} < (1-p)$ which is also true.

Therefore, differences in the deception premium $\hat{s} = 10 + \hat{x} + c$ can be related (at least) to differences in the cost of deceiving, in aversion to advantageous inequality, to the strength of the beliefs that the partner will follow the recommendation, or to the shape of the utility function. In the Online Appendix A, we show that the threshold $\hat{x}$:

a) Is increasing in the deception cost (k);

b) Is decreasing in the subjective probability that the partner will follow one's recommendation (p);

c) Is decreasing in a, the (constant) coefficient of absolute risk aversion.[11]

As an empirical strategy, if we want to make sure that differences in $\hat{s}$ from one individual to another measure variation in the cost of deceiving k, in a regression model with $\hat{s}$ as the dependent variable, we must control for risk aversion and sensibility to advantageous inequality aversion. The residual of this linear equation would be the cost of lying.

In this section we have assumed that an individual averse to advantageous inequality would incur a constant (or linear) cost. With a convex inequality aversion cost we cannot rule out that for a very large s, the individual will switch back from Option B to Option A (he would switch twice). Azar et al. (2013) carried out a field experiment in which clients of a restaurant received either 3$ or 12$ excessive change. Interestingly, those who received the high amount were more likely to return it. If intentional, this behavior could reveal strong social preferences for the server's wellbeing, if the latter is hold responsible for the mistake.

3 Experimental design

3.1 Outlook of the experiment

The experiment was conducted at the ESSEC Business School (France) using students recruited from the subject pool of the ESSEC Experimental Lab.[12] Nine sessions were organized in January and February 2018 with a total of 182 subjects. The experiment instructions and data collection were computerized; the program was developed using z-Tree (Fischbacher, 2007). Subjects were seated in cubicles, and could not establish eye contact with one another. The experiment preserved

[11] Properties (a) and (b) are proven analytically, the proof of (c) draws on the study of the upper and lower bounds of $\hat{x}$, backed by a numerical simulation.

[12] Students are selected for the French Grande Ecole higher education track through a demanding national examination. Thus this group is relatively homogenous in terms of computing and cognitive abilities, age and educational background. See Lamiraud and Vranceanu (2017) for a thorough description of this population.

the anonymity of the participants.

During a typical experimental session, all participants must execute two tasks referred to as Part A and Part B. Part A comprises the modified deception game. Part B elicits the advantageous inequality aversion through a modified dictator game. A final section includes some complementary questions on personal characteristics and attitudes. Instructions are presented in Appendix B.

The final cash payment, for all the parts, is delivered at the end of the experiment. Experimental sessions lasted 28 minutes on average; subjects received an average payment of 14.85€.

We now present the details of each task.

3.2 The aversion to deceiving task

Our key and original task is a modified version of the GDG. At the outset of the experiment, participants are matched at random in pairs and are assigned the roles of sender and receiver (these role labels are used only in this presentation text; they are not explicitly stated in the instructions, which refer to "you" and "your counterpart" in a neutral way). Like in the GDG, there are basically two possible payoffs for each player, and these payoffs are associated with an Option A and an Option B. Only the sender has the information about the possible payoffs; the receiver's only information is a message sent by the sender, either Message 1: "Option A will earn you more money than Option B" or Message 2: "Option B will earn you more money than Option A".

Unlike in the Gneezy (2005) design, in this paper, the sender must indicate his preferred message for the 11 possible pairs of allocations displayed in Table 3, knowing that only one of the allocations will be selected at random by the computer as the "active" one. The receiver will receive the selected message for this allocation, and, depending on his choice of option, the payment of *this* allocation will be implemented at the end of the experiment.

To contain the would-be ordering effect, neither the sender nor the receiver will obtain any feedback after the task. The outcome of the decisions and the payoffs will be communicated at the end of the experimental session.

In the lab we alternate the names of the allocations (for instance, the (10€, 10€) allocation was called either A or B), and attributed them at random to the pairs of participants. However, to keep this presentation simple, we will refer to allocations that provide the low payoff to the receiver as Option B. Regardless of the row, Option B provides 5€ to the receiver, which is less than his payoff in Option A; the payoff of the sender varies from 10€ to 20€ by one-euro increments, depending on the row. We notice that in row 1, the sender obtains the same payoff of 10€, whatever the option chosen by the counterpart; in all the other rows, the sender's payoff is higher if the receiver selects Option B.

Given that the receiver is losing money if he selects Option B, Message 1 is *true*, while Message 2 is *false*.

	Option A		Option B		Message:	
#	Sender	Receiver	Sender	Receiver	1. Option A will earn you more money than Option B	2. Option B will earn you more money than Option A
1	10	10	10	5	☐	☐
2	10	10	11	5	☐	☐
3	10	10	12	5	☐	☐
4	10	10	13	5	☐	☐
5	10	10	14	5	☐	☐
6	10	10	15	5	☐	☐
7	10	10	16	5	☐	☐
8	10	10	17	5	☐	☐
9	10	10	18	5	☐	☐
10	10	10	19	5	☐	☐
11	10	10	20	5	☐	☐

Table 3: The aversion to deception task. Payoffs are expressed in euros.

Following Sutter (2009), *deceitful communication* occurs when the sender sends a false message if he believes that the responder will follow his recommendation, *and* sends a true message if he believes that the responder will implement the opposite recommendation.

As there is no theoretical prediction about the behavior of the receiver, we preferred to directly ask the sender what were his/her beliefs with respect to the receiver's decision on whether he/she will follow his/her recommendation. In response to the question "Do you think the counterpart will follow your recommendation?", senders can answer: "he/she will follow my recommendation", "I can't make a guess" or "he/she will follow the opposite". Similar to Sutter (2009) and Hurkens and Kartik (2009), the answer to this question was not cash incentivized. The question was asked (immediately) after the execution of the price-list task and not before the task, because we did not want to raise the awareness of the subjects about the importance of this question. This should also allow for the comparability of our results with those in the experiment by Gneezy (2005), which did not raise this question. However, it is possible that subjects made less effort in answering this question, and some of the answers might not reflect their expectations at the very moment of the decision.

If the sender believes that the receiver will follow his recommendation and switches from Message 1 (A is better for you) to Message 2 (B is better for you) at most once, the number of times the individual chooses the Message 1 (starting with row 1) is a plausible measure of the aversion to deceiving the other. On the other hand, if the sender believes that the receiver will implement the opposite recommendation (sophisticated agents), then lying aims to protect the interest of the receiver (no intended deception). In this special case, the right measure of aversion to deceiving is the number of times B is chosen.

In the following, we calculate an *index of aversion to deceiving the other* as the number of Messages 1 (A is better for you) divided by 11, for subjects that stated that they believe receivers will follow their recommendation, or cannot guess what receivers will do. For subjects who declared that the receiver will follow the opposite recommendation, the index of aversion to deceiving is the number of B choices divided by 11. An index of 1 indicates a maximum aversion to deceiving.

It is important to note that the design of the experiment has imposed a maximum benefit of 10€ for a sender who succeeds in deceiving the receiver. However, if a benevolent individual foregoes a net gain of 10€ and resorts to faithful communication, we cannot be sure whether he would have maintained his choice for a larger gain. Thus, the deception premium for which the individual switches from faithful to deceitful communication might be (or might not be) a truncated variable (with an upper bound at 10€, or 1 for the index).

In our setting, the sender would resort to deceitful communication to get a payoff s equal to or larger than 10€, (i.e., his benefit from benevolent communication). If the deceitful strategy succeeds, then the receiver obtains 5€ instead of 10€. Thus, not only does the sender makes a profit, but the initial payoff equality between the sender and the receiver (10€, 10€) will turn into a sender advantageous inequality (s; 5€). If senders are averse to advantageous inequality, this effect might offset the direct benefit of deceiving the other and might create an incentive to avoid it. It is therefore important to gauge the distributional preferences of the participants, which is what our second task does.

3.3 Distributional preferences

Several scholars used variants of the modified dictator game (Kahneman et al., 1986), to elicit subjects' aversion to favorable inequality (Kerchbamer, 2015; Blanco et al., 2011; Balafoutas et al., 2012; He and Villeval, 2017). In the standard dictator game, an active player (the dictator) is paired at random with a passive player and is given the choice of how to share a received endowment with him, knowing that the passive player receives nothing. In the modified dictator game, the dictator must make binary choices among various payoff distributions. In particular, he is offered the possibility to sacrifice some of his higher payoff in an inegalitarian distribution, to the benefit of an equal distribution with a lower payoff for himself.

In Part B of the experiment, we measured the inequality aversion of all participants. All subjects were (re)matched in pairs at random without being informed about their role. All participants were required to execute the task as a dictator. At the end of the experiment, the computer chose at random the attribution of roles (dictator, passive), and assigned the related payoffs.

Each subject was exposed to a series of twenty-one binary choices, between the (10€, 0€) inegalitarian distribution (LEFT), and a (z, z) egalitarian distribution (RIGHT), where z varies from 0€ (in row one) to 10€ (last row) by 0.50€ increments (see Table 4). He and Villeval (2017) constrained participants to switch only once, making the implicit assumption that a dictator who prefers the equal distribution (z, z) to the unequal distribution (10€; 0€) will also prefer all allocations (z', z') that provide $z' > z$ to the same unequal distribution (10€; 0€). We will make the same assumption; however, instead of using a multiple choice list with a compulsory single switch, which requires relatively complex instructions, we use a slider task with identical properties that is easier to implement and simpler to explain.

Initially, the slider is set in the middle of the table; such an individual prefers (10€, 0€) to all egalitarian distributions that provide to players in a pair less than a cumulative 10€, but would prefer the egalitarian distribution (5.5€; 5.5€) and all those above it to the inegalitarian one. By moving the slider UP, fewer LEFT choices and more RIGHT choices are selected, showing that the individual is more averse to advantageous inequality. The opposite happens when the slider is moved down; the individual reveals that he is less inequality averse, and his personal gain is more important to him than the implementation of the equal distributions.

At the bottom of the table, the slider allows a person to select the (10€; 0€) distribution against the (10€, 10€) distribution. This choice is hard to justify on moral grounds but might be observed in special cases. On the other hand, if the slider is set at the top of the table, this extremely egalitarian person signals that he would prefer (0€, 0€) rather than (10€, 0€).

	LEFT		Your choice:		RIGHT	
#	Your payoff	Counterpart's payoff	LEFT	RIGHT	Your payoff	Counterpart's payoff
1	**10**	**0**	■	□	0	0
2	**10**	**0**	■	□	0.50	0.50
3	**10**	**0**	■	□	1	1
4	**10**	**0**	■	□	1.50	1.50
5	**10**	**0**	■	□	2	2
6	**10**	**0**	■	□	2.50	2.50
7	**10**	**0**	■	□	3	3
8	**10**	**0**	■	□	3.50	3.50
9	**10**	**0**	■	□	4	4
10	**10**	**0**	■	□	4.50	4.50
11	**10**	**0**	■	□	5	5
12	10	0	□	■	**5.50**	**5.50**
13	10	0	□	■	**6**	**6**
14	10	0	□	■	**6.50**	**6.50**
15	10	0	□	■	**7**	**7**
16	10	0	□	■	**7.50**	**7.50**
17	10	0	□	■	**8**	**8**
18	10	0	□	■	**8.50**	**8.50**
19	10	0	□	■	**9**	**9**
20	10	0	□	■	**9.50**	**9.50**
21	10	0	□	■	**10**	**10**

Table 4: The advantageous inequality aversion slider task. Payoffs are expressed in euros.

As already mentioned, at the end of the experiment, the computer assigned the roles (dictator or passive player) at random. One row was randomly chosen for payment, and the payment reflected the decision of the dictator.

Depending on the choices, individuals can be assigned to one of four categories:

- *Egalitarian inefficient* (or strongly egalitarian) individuals will switch to the equal outcome on rows 1 to 10. In these rows, the dictator prefers an equal distribution (z, z) to (10€,0€) although $2z < 10$.

- *Egalitarian efficient* subjects will switch to the equal outcome on rows 11 to 20. On row 11, the amount to be split between the two is equal to the payoff of the dictator in the unequal distribution ($2z = 10$); it is larger ($2z > 10$) on row 12 and beyond.

- *Selfish benevolent* subjects prefer (10€, 0€) to earning less than 10€ in any egalitarian distribution, but will switch to (10€, 10€) on row 21.

- *Selfish spiteful* people will select (10€, 0€) all of the time, including on row 21 where he has the choice of (10€, 10€).

The number of RIGHT choices is thus a good measure of inequality aversion. We can further obtain an index of inequality aversion by dividing the number of RIGHT choices by 21; in this case, the highest advantageous inequality aversion is 1. At the opposite bound, an index of 0 is characteristic of the selfish spiteful person.

3.4 Attitudes

In the last part of the experiment, participants were asked a series of unincentivized questions.

As we showed in Section 1, differences in the threshold $\hat{s}$ in the modified GDG can also originate in differences in risk aversion. To elicit this personal characteristic, we used the self-reported measure introduced by Dohmen et al. (2011):

Thinking of yourself, do you think you are fully prepared to take risks? 1 if not at all, ..., 5 if very much.

Answers were converted into a (0;1) tolerance for risk index (tr). We then transform it into a *risk aversion measure* by inverting the scale ($ra = 1 - tr$).

We also seek to find a set of attitudinal variables directly related to the unobservable lying cost. This is of course a difficult task. Gächter and Schulz (2016) revealed that, in a cross section of 23 countries, honesty (measured by the die-in-the-cup task) tends to be related to the quality of the institutions and the respect of the rule of law. In general, individuals who assign an important role to the group they belong to, and to its shared beliefs, might be less prone to deceive their unknown, anonymous partner. If this assumption is true, general trust and religiosity can be correlated to the hidden cost of deceiving the other. Indeed, several studies have noted the positive correlation between aversion to deception/lying and trust (Bok, 1978; Butler et al., 2016; Gawn and Innes, 2018). Other scholars argued that religiosity/spirituality and genuine prosocial behavior are positively related (inter alia., Conroy and Emerson, 2004; Saroglu et al., 2005; Ariely, 2012; Arbel, 2014). Therefore, we also asked subjects to self-assess their trustfulness and religiosity.

Are you a religious person? 1 if not at all, ..., 5 if very much;

In general, do you trust other people? 1 if not at all, ..., 5 if very much;

In general, do you trust the government? 1 if not at all, ..., 5 if very much.

We convert all answers into (0;1) indexes.

Finally, subjects also had to report their gender, age and admission track (arts and letters, science, economics, other).

4 Results

Online Appendix B presents the descriptive statistics of the sample.

4.1 Deceitful communication

As already mentioned, whether a false message is intended to deceive the receiver depends on the sender's beliefs about the response of the receiver. In this context, if the sender believes that the responder will follow his advice, message 1 (truth) is faithful and message 2 (lie) is deceitful. The opposite holds if the sender is "sophisticated" and has opposite beliefs about the receiver's response.

Table 5 reports the different communication strategies, depending on the beliefs of the sender. The second column indicates the distribution of the senders depending on their answers to the question: *Do you believe the counterpart will follow your recommendation?* For each category of beliefs, columns 3 to 7 indicate the communication strategies.

Answer:	Nb.	all times "message 1"	all times "message 2"	single switches	others
Yes	49	14	4	27 (switch to lying)	3 multiple switches 1 switch to truth
I don't know	18	3	0	9 (switch to lying)	6 multiple switches
Follow opposite	24	2**	3*	3 (switch to truth)	6 multiple switches *10 switch to lying*

Table 5: A summary of communication strategies. Legend: *) They want to avoid deception by telling a lie. **) They would deceive all the time.

Out of the 91 senders:

♦ 49 subjects (53,8%) stated that they believed their recommendation would be followed by the receiver. Only 3 of them switched several times (this could be justified for instance by a significant inequality aversion), and one switched from lying to truth-telling (which is harder to justify).

♦ 18 subjects (19,8%) stated that they can make no inference about the response of the receiver. However, 12 of them implemented a strategy in line with beliefs consistent with the assumption that the other will follow the recommendation (switch from truth to lies for a positive gain). On the other hand, 6 of them "randomized" (multiple switches), which is consistent with the assumption that the other will also randomize (playing Nash mixed-strategies might be an equilibrium of this game), regardless of whether the sender is faithful or not.

♦ 24 subjects (26,4%) reported that they expected the receiver to implement the opposite recommendation. For this category, the lie (Message 2) aims to avoid the receiver's deception and thus corresponds to faithful communication. Out of the 24, 10 subjects behaved as if they believed that the receivers would follow their recommendation, because they switched to lying for a positive gain. As their behavior is inconsistent, we will exclude them from the main analysis.

However, as a robustness check, we will also perform a regression analysis including these subjects, under the assumption that they just made a mistake when reporting their beliefs.

If we exclude all those who switched several times, and those who switched in a "wrong" direction, a total of 26 (3+1+6+6+10), 65 out of 91 proposers remain (71,4%) who behave in a consistent way (they either never deceive the receiver, or would deceive him provided that the benefit of deception is large enough, or always deceive). In Online Appendix B, we present the personal characteristics of the multiple switchers; we cannot infer any specific pattern; in particular, they do not present a different inequality aversion from the rest of the group.[13]

Figure 1 summarizes the distribution of choices of these 65 subjects. The horizontal axis represents the sender's expected benefit from deceiving the partner, varying from 0€ (in row 1) to 10€ (in row 11) in Table 3. We recall that in all cases when the sender makes a zero or positive benefit, the receiver will lose 5€ (obtains 5€ instead of 10€). The vertical axis represents the cumulative distribution (number) of persons who seek to deceive or be faithful.

Out of these 65 persons (71,4% of the total sample):

♦ Six persons (9.2%) aim to deceive their partner systematically, including if they gain nothing, as if they have a "taste for deceiving the other". The presence of spiteful behavior has been observed in many other experimental settings (e.g., Falk et al., 2005). In the "cheating CEO" experiment by Gibson et al. (2013), spiteful behavior represented 18% of the reported choices.

♦ 39 subjects (60%) will switch from faithful to deceitful communication if they obtain a satisfactory payoff. This reservation payoff differs from one person to another. As shown in Figure 1, four persons turned to deception for a 1-euro gain, 3 more would deceive for a 3-euro gain, and so on.

♦ 20 persons (30,8%) never resort to deceitful communication, even if the potential gain is as high as 10 euros. This frequency is not in contrast with Gneezy (2005)'s data, in which 48% of the senders were "honest"; they forego a gain of 10 euros while the receiver avoided a loss of 10 euros (instead of 5 euros in our experiment).

[13] A probit model on the indicator variable Multiple switch = 1 and personal characteristics as covariates reveals no prominent determining factor.

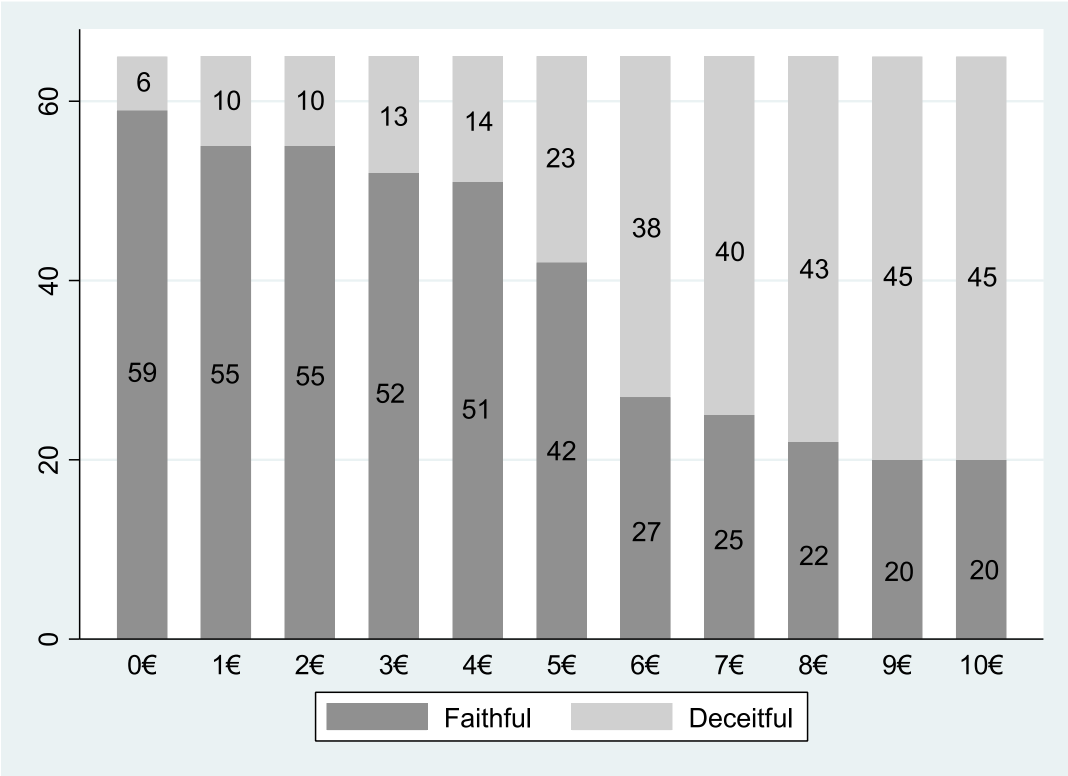


Figure 1: The distribution of senders using deceitful/faithful communication depending on the benefit of deceiving

Hurkens and Kartik (2009) argued that the results in Gneezy (2005) might be the outcome of a configuration where 50% of the sender population never lies, and 50% randomize between lying or not regardless of the benefit. Our study confirms the existence of subjects who behave honestly even if their benefit from deception is as high as 10 euros (we do not know, however, how they would behave for a larger gain). However, 60% of the senders respond to incentives, i.e., will switch from faithful to deceitful communication if their benefit is large enough, at a constant loss (5 euros) for the receiver. The behavior of these subjects is much in line with the theory of consequence-dependent lying costs. However, we need to check whether this threshold communication strategy is not just the outcome of the sender's social preferences over the allocation of payoffs or differences in risk aversion.

Our typology of subjects can be related to that provided by Barcelo and Capraro (2018). In their two-stage cheating on reporting experiment, subjects first need to make an effort to "discover" their gain by checking a series of numbers, then they can report it truthfully or lie by reporting a higher gain. In their data, approximately 50% are "good", (i.e., report honestly regardless of the payoff), 34% of the subjects invest time to determine the payoff and lie only if the actual payoff is low, and 16% make no effort to determine the truth and lie "spontaneously" to maximize their payoff. These results can also be compared to the findings in Gneezy et al. (2013) from their "hybrid" reporting game with consequences for both the sender and receiver. They report that some players will be honest regardless of the payoff (33% of the times), some players are dishonest systematically (5% of the times),and most of the players respond to incentives and lie more frequently if the benefit of lying increases. Interestingly, 11% of the time the sender lies in some states and tells the truth in other states without any particular pattern, a behavior which is similar to that of our "multiple switchers" (16%).

4.2 What determines the aversion to deceiving?

Descriptive statistics

We report in this section detailed results pertaining to the set of 65 subjects who switched at most once from faithful to deceitful communication. On average, their index of deception aversion is 0.599 (standard dev.: 0.334). If we focus only on those 39 subjects who switched from honesty to dishonesty, the average index is 0.484 (standard dev.: 0.183) which corresponds to an average deception premium of 5.33 euros (standard dev.: 2.01).

The analysis of the decision problem has shown that subjects with a higher aversion to advantageous inequality would ask a higher premium to forego deceitful communication. Table 6 represents the aversion to deceiving depending on the degree of advantageous inequality aversion (we use the categories defined in subsection 3.3). We note that, at 0.69, the aversion to deceiving index for the Egalitarian Inefficient group is higher than 0.55, the average of the Egalitarian Efficient group, but the difference is not statistically significant (p=0.143). The averages for the Selfish groups are not statistically relevant, as the numbers of observations is too low (3 and respectively 7 subjects).

We also argued that individuals featuring higher risk aversion could ask a lower premium to

	Egalitarian inefficient	Egalitarian efficient	Selfish benevolent	Selfish spiteful
	n=20	n=35	n=3	n=7
Av. aversion to deceiving	0.69	0.55	0.67	0.55
Standard deviation	0.23	0.36	0.58	0.37

Table 6: Distribution of the aversion to deception index with respect to inequality aversion

forego deceitful communication. Data in table 7 indicate little connection between risk aversion and the deception benefit (p=0.63, between the average aversion to deception of the risk averse and the risk-neutral subjects; p=0.13, between the risk neutral and risk lovers).

	Risk lovers (ra<0.5)	Risk neutral (ra=0.5)	Risk averse (ra>0.5)
	n=23	n=22	n=20
Av. aversion to deceiving	0.58	0.53	0.69
Standard deviation	0.36	0.38	0.23

Table 7: Distribution of the aversion to deception index with respect to risk aversion

In our modified GDG, a comparison of the gender averages reveals no gender effect (male average aversion to deceiving=0.61; female average =0.59; p=0.87). Conrads et al. (2013) point out that the existing literature on the gender effect in lying behavior has reached contrasting conclusions so far. In the specific context of the GDG with selfish lies, Dreber and Joahnneson (2008) and Erat and Gneezy (2012) found that women present a higher aversion to lying than men, while Childs (2012) and Gylfason et al. (2013) find no gender effect. As revealed by Capraro (2018), these contradictory results might be explained by the small size of the effect, combined with the small sample size specific to experimental research. His meta-analysis of 65 sender-receiver studies reveals a statistically significant gender effect (women are more averse to lying than men).

Regression analysis

Regression analysis allows us to move beyond these descriptive statistics. We aim to study whether these significant differences in the aversion to deceiving the other depend on the personal characteristics of the subjects, and, in particular, if the aversion to deceiving index depends on inequality aversion and risk aversion, two variables that the analysis of the decision problem (section 1) has identified as a possible source of variation in the index.

We use the *Aversion to Deceiving Index* (min=0, max=1) as the dependent variable. The main covariates are Age, Gender (Female=1), Inequality Aversion, Risk Aversion, Trust in People, Trust in Government and Stated Religiosity. We also include two dummy variables. *D_ Doubt* takes the value of 1 if the sender reported that he cannot make a guess on whether the receiver will follow the recommendation, and 0 otherwise. *D_ Soph* takes the value of 1 if the "sophisticated" sender reports that he believes that the receiver will follow the opposite recommendation, and 0 otherwise. When these dummies are introduced into the analysis, the benchmark is the case where the sender believes that the receiver will follow his recommendation.

Table 8 presents the output of the OLS regressions:

	Model 1	Model 2	Model 3	Model 4	Model 4'
	coef.	coef.	coef.	coef.	coef.
Age	0.018	0.020	0.023	0.030	0.032
	(0.033)	(0.033)	(0.038)	(0.033)	(0.031)
Gender (Fe =1)	-0.017	-0.020	0.017	0.019	0.013
	(0.102)	(0.104)	(0.094)	(0.085)	(0.070)
D_Doubt	-0.074	-0.050	-0.044	-0.036	-0.064
	(0.084)	(0.069)	(0.092)	(0.090)	(0.089)
D_Soph	-0.069	-0.055	0.018	0.046	-0.103*
	(0.065)	(0.083)	(0.054)	(0.042)	(0.045)
Inequality Aversion	0.173	0.125	0.201	0.199	0.233
	(0.146)	(0.163)	(0.210)	(0.176)	(0.182)
Risk Aversion	–	0.165	0.145	0.106	0.050
		(0.231)	(0.222)	(0.214)	(0.203)
Trust in People	–	–	-0.226	-0.227	-0.190
			(0.146)	(0.151)	(0.145)
Trust in the Government	–	–	0.484**	0.416*	0.326*
			(0.168)	(0.198)	(0.173)
Stated Religiosity	–	–	–	0.310*	0.220
				(0.138)	(0.158)
Constant	0.151	0.034	-0.182	-0.403	-0.367
	(0.744)	(0.821)	(0.905)	(0.831)	(0.811)
N	65	65	65	65	75
R2	0.03	0.04	0.15	0.21	0.18

Table 8: The determinants of the aversion to deceiving. Legend: Significance levels: * $p<.10$, ** $p<0.05$; Standard errors within brackets. OLS, errors clustered by session.

In models 1 and 2, the coefficients of aversion to advantageous inequality and risk aversion are not statistically significant.[14] These results confirm that our individual measure of aversion

[14] Age and gender are not significant either. A dummy variable for "admission track economics" was not found to be significant.

to deceiving is capturing an inner preference for behaving well, tantamount to a fixed cost of deceiving specific to each individual.

In models 3 and 4, we add the trust and religiosity measures, which serve as a proxy for the fixed cost of deceiving. It can be seen that deception aversion is correlated with both Trust in the Government and Stated Religiosity. In a less expected way, the Trust in People variable is not significant. Adding these three variables raises the R2 from 0.04 to 0.21.

As a robustness check, we perform the same regression analyses including observations pertaining to the ten senders who declared that the receiver will follow the opposite advice, but switched once, in a direction as if they thought that the receiver would follow them. The results reported in Model 4' show no significant change in coefficients, except the vanishing significance of religiosity, and a significant dummy for these sophisticated subjects.

As we already mentioned, among the 65 senders who implement pure communication strategies, there are 20 individuals who forego deceitful communication even if the benefit was as high as 10 euros. If these persons were to switch to deceitful communication for a higher benefit, our aversion to deceiving index should be interpreted as a truncated variable. Thus, we estimate the same equations using a Tobit model with an upper bound of 1. The results presented in the Online Appendix B Table A12 are similar to those in the OLS regressions.

Finally, we built a probit model, using as the dependent variable the indicator 1 if the subject never deceives, and 0 otherwise (20 observations). The purpose of this analysis is to obtain a better understanding of who these most ethical persons are. Only Stated Religiosity appears to be positively related to this indicator, no other personal characteristic is related to the dummy variable.

5 Conclusion

The economic literature on lying and deception is expanding rapidly, driven by an increasing awareness of how important dishonest communication can be in shaping major economic and political outcomes. A significant number of papers studied cheating on reporting performance, when payment is related to reported performance through a predetermined payment rule, and performance is private information to the subject. Other studies focus on the strategic nature of some form of dishonest communication, where a sender would send a false message only to manipulate the beliefs of the receiver and prompt him to take an action the he would not have taken otherwise.

This paper makes a contribution to the latter strand of research, extending the classic deception game by Gneezy (2005) to a multiple choice setting which allows us to observe changes in individual behavior. In the experiment, succeeding in deceiving the other brings a benefit (from a list of payoffs) to the sender, and entails a constant loss for the receiver; it also turns payoff equality into sender advantageous inequality. The core task allows us to determine the reservation payoff that prompts a sender to switch from faithful to deceitful communication.

To the question raised in the title, "Does everyone have a price?", in the specific context of this experiment with "normal" monetary stakes, the answer is "no". We found that only 65 out of 91 senders implement "pure" communication strategies. Among these 65 subjects, as many as 9.2% are "spiteful": they try to deceive their partner without expecting any monetary benefit. As many as 30.8% are "ethical": they would not deceive the other even if they forgo a net gain as high as 10 euros. Thus, our study corroborates the existence of process-driven subjects in the classical Deception Game by Gneezy (2005) as hypothesized by Hurkens and Kartik (2009).

However, 39 participants (60% of the 65), play according to price theory. They implement a threshold communication strategy, switching from faithful to deceitful communication if the net benefit from deceiving the other is large enough. This group of single switchers exhibits an average deception premium of 5.33 euros. However, this reservation payoff varies from one individual to another. We found that the measured aversion to deceiving is independent of individuals' risk aversion or aversion to payoff inequality. Furthermore, aversion to deceiving is related to stated religiosity and trust in the government. These results would corroborate the assumption that there is an individual-specific cost of deception. A majority of senders respond to incentives; they communicate faithfully if the benefit from deceiving the other is low, and switch to deceitful communication if the benefit is large enough.

Observing individual behavior allowed us to obtain an individual measure of aversion to deceiving the other similar to risk aversion or aversion to inequality; on the other hand, because the experiment gives to the subject the possibility to change their behavior (more specifically, turn from honesty to dishonesty), it raises the salience of this choice. In further research, it would be interesting to study whether and to what extent individuals in our game tend to behave more prosocially than in the original deception game by Gneezy (2005) in which the experimenter observes only group behavior.

References

Andersen, Steffen, Glenn Harrison, Morten Igel Lau, Elisabet E. Rutstrôm, 2006, Elicitation using multiple price list formats, *Experimental Economics* 9, 4: 383-405.

Aberler, Johannes, Anke Becker and Armin Falk, 2014. Representative evidence on lying costs, *Journal of Public Economics*, 113: 96-104.

Aberler, Johannes, Daniele Nosenzo and Collin Raymond, 2016. Preferences for truth-telling, *CESifo Working Paper*, 6087.

Anbarci, Nejat, Nick Feltovich and Mehmet Y. Gürdal, 2015. Lying about the price? Ultimatum bargaining with messages and imperfectly observed offers, *Journal of Economic Behavior and Organization*, 116: 346-360.

Ariely, Dan, 2012. *The (Honest) Truth about Dishonesty: How We Lie to Everyone– Especially Ourselves*. New York, NY: Harper Collins.

Arbel, Yuval , Ronen Bar-El, Erez Siniver and Yossef Tobol, 2014. Roll a die and tell a lie – What affects honesty?, *Journal of Economic Behavior and Organization*, 107, A: 153-172

Azar, Ofer H., Shira Yosef and Michael Bar-Eli, 2013. Do customers return excessive change in a restaurant?: A field experiment on dishonesty, *Journal of Economic Behavior and Organization,* 93: 219-226.

Balafoutas, Loukas, Rudolf Kerschbamer and Matthias Sutter, 2012. Distributional preferences and competitive behavior, *Journal of Economic Behavior and Organization,* 83, 1: 125-135.

Battigalli, Pierpaolo and Martin Dufwenberg, 2007. Guilt in games. *American Economic Review* 97, 2 : 170-176.

Barcelo, Hélène and Capraro, Valerio, 2018, The Good, the Bad, and the Angry: An experimental study on the heterogeneity of people's (dis)honest behavior, Available at SSRN: dx.doi.org/10.2139/ssrn.3094305.

Behnk, Sascha, Li Hao, and Ernesto Reuben, 2017, Partners in crime: Diffusion of responsibility in antisocial behaviors, *IZA Discussion Paper* 11031.

Besancenot, Damien, Delphine Dubart and Radu Vranceanu, 2013. The value of lies in an ultimatum game with imperfect information, *Journal of Economic Behavior and Organization*, 93: 239-247.

Biziou-van-Pol, Laura, Jana Haenen, Arianna Novaro, Andrés O. Liberman and Valerio Capraro, 2015. Does telling white lies signal pro-social preferences?, *Judgement and Decision Making*, 10, 6,: 538-548.

Bok, Sissela. 1978. *Lying: Moral Choice in Public and Private Life*. Pantheon Books, NY.

Butler, Jeff, Giuliano, Paola, Guiso, Luigi, 2016. Trust and cheating, *Economic Journal*, 126, 1703-1738.

Cappelen, Alexander W., Eric Ø. Sørensen and Bertil Tungodden, 2013. When do we lie?. *Journal of Economic Behavior and Organization*, 93, 258-265.

Capraro, Valerio, 2018. Gender differences in lying in sender-receiver games: A meta-analysis. *Judgment and Decision Making*, 13(4), 345-355.

Charness, Garry and Martin Dufwenberg, 2006. Promises and partnership, *Econometrica*, 74: 1579-1601.

Chavanne, David and Mark Ferreira, 2017. When knowledge is not power: Asymmetric information, probabilistic deceit detection and threats in ultimatum bargaining, *Journal of Behavioral and Experimental Economics*, 69: 4-17.

Childs, Jason, 2012. Gender differences in lying. *Economics Letters*, 114 (2): 147-149.

Conrads, Julian , Bernd Irlenbusch, Rainer M. Rilke, Gari Walkowitz, 2013. Lying and team incentives, *Journal of Economic Psychology*, 34: 1-7.

Conroy, Stephen J. and Tisha L.N. Emerson, 2004. Business ethics and religion: Religiosity as a predictor of ethical awareness among students, *Journal of Business Ethics,* 50, 4: 383-396.

Croson, Rachel T. A., Terry L. Boles and Keith J. Murnighan, 2003. Cheap talk in bargaining experiments: Lying and threats in ultimatum games, *Journal of Economic Behavior and Organization*, 51: 143-159.

Dohmen, Thomas, Armin Falk, David Huffman, Uwe Sunde, Jürgen Schupp and Gert G. Wagner, 2011. Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association*, 9, 3: 522-550.

Dreber, Anna, and Magnus Johannesson, 2008. Gender differences in deception, *Economics Letters*, 99, 1: 197-199.

Erat, Sanjiv and Uri Gneezy, 2012. White lies, *Management Science* 58, 4: 723-733.

Falk, Armin, Ernst Fehr and Urs Fischbacher, 2005. Driving forces behind informal sanctions. *Econometrica*, 73, 6: 2017–2030.

Fehr, Ernst, and Klaus M. Schmidt, 1999, A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics,* 114, 3: 817-868.

Fischbacher, Urs, 2007. z-Tree: Zurich toolbox for ready-made economic experiments, *Experimental Economics*, 10, 2: 171-178.

Fischbacher, Urs and Franziska Föllmi-Heusi, 2013. Lies in disguise – an experimental study on cheating, *Journal of the European Economic Association,* 11, 3: 525-547.

Gächter, Simon, and Jonathan F. Schulz., 2016. Intrinsic honesty and the prevalence of rule violations across societies. *Nature*, 531(7595), 496.

Gawn, Glynis, and Robert Innes, 2018. Do lies errode trust?, *International Economic Review*, 59, 1: 137-161.

Gibson, Rajna, Carmen Tanner, and Alexander F. Wagner, 2013. Preferences for truthfulness: Heterogeneity among and within individuals. *American Economic Review*, 103, 1: 532-48.

Gneezy, Uri, Agne Kajackaite, and Joel Sobel. 2018., Lying aversion and the size of the lie, *American Economic Review*, 108 (2): 419-53.

Gneezy, Uri, Bettina Rockenbach, and Marta Serra-Garcia, 2013. Measuring lying aversion, *Journal of Economic Behavior and Organization* 93: 293-300.

Gneezy, Uri, 2005. Deception: The role of consequences, *American Economic Review*, 95, 1: 384-394.

Gylfason, H. Freyr, Arna A. Arnardottir and Kari Kristinsson, 2013. More on gender differences in lying. *Economics Letters*, 119 (1): 94-96.

He, Haoran and Marie Claire Villeval, 2017. Are group members less inequality averse than individual decision makers?, *Journal of Economic Behavior and Organization* 138: 111-124.

Hurkens, Sjaak and Navin Kartik, 2009. Would I lie to you? On social preferences and lying aversion, *Experimental Economics*, 12: 180–192.

Isenberg, Arnold, 1973. Deontology and the ethics of lying, In: *Aesthetics and Theory of Criticism: Selected Essays of Arnold Isenberg*, Chicago: University of Chicago Press: 245–264.

Jiang, Ting, 2013. Cheating in mind games: The subtlety of rules matters, *Journal of Economic Behavior and Organization*, 93: 328-336.

Jacquemet, Nicholas, Stéphane Luchini, Julie Rosaz and Jason F. Shogren, 2018. Truth Telling Under Oath. *Management Science*, doi.org/10.1287/mnsc.2017.2892.

Kajackaite, Agne and Uri Gneezy, 2017. Incentives and cheating, *Games and Economic Behavior*, 102: 433-444.

Kerschbamer, Rudolf, 2015. The geometry of distributional preferences and a non-parametric identification approach: The equality equivalence test, *European Economic Review,* 76: 85-103.

Kriss, Peter H., Rosemarie Nagel and Roberto A. Weber, 2013. Implicit vs. explicit deception in ultimatum games with imperfect information, *Journal of Economic Behavior and Organization*, 93: 337-346.

Lamiraud, Karine, and Radu Vranceanu, 2017, Group gender composition and economic decision-making, *Journal of Economic Behavior and Organization*, 146: 294-305.

Mahon, James E., 2016. The definition of lying and deception, In: Edward N. Zalta (ed.), *Stanford Encyclopedia of Philosophy*, https://plato.stanford.edu/archives/win2016/entries/lying-definition.

Mazar, Nina, On Amir and Dan Ariely, 2008. The dishonesty of honest people: A theory of self-concept maintenance, *Journal of Marketing Research*, 45, 6: 633-644.

Pascual-Ezama, David, Drazen Prelec and Derek Dunfield, 2013. Motivation, money, prestige and cheats, *Journal of Economic Behavior and Organization*, 93: 367-373.

Sánchez-Pagés, Santiago, and Marc Vorsatz, 2007. An experimental study of truth-telling in a sender–receiver game. *Games and Economic Behavior,* 61, 1: 86-112.

Saroglou, Vassilis, Isabelle Pichon, Laurence Trompette, Marijke Verschueren and Rebecca Dernelle, 2005. Prosocial behavior and religion: New evidence based on projective measures and peer ratings. *Journal for the Scientific Study of Religion*, 44(3), 323-348.

Sutter, Matthias, 2009. Deception through telling the truth?! Experimental evidence from individuals and teams, *Economic Journal*, 119, 534: 47-60.

Schwartz, Steven, Eric Spires, Rick Young. 2018. Why do people keep their promises? A further investigation, *Experimental Economics*.

Utikal, Verena and Urs Fischbacher, 2013. Disadvantageous lies in individual decisions, *Journal of Economic Behavior and Organization*, 85: 108-111

Vanberg, Christoph, 2008. Why do people keep their promises? An experimental test of two explanations, *Econometrica*, 76, 6: 1467-1480.

6 Online Appendix

6.1 Appendix A. The critical benefit and its determinants

To determine the threshold $\hat{x}$, we start from the indifference condition:

$$L(x) = pu(10 + x - k) + (1 - p)u(10) = pu(10) + (1 - p)u(10 + x) = R(x).$$

With the specific utility function $u(x) = sgn(a)\,(1 - e^{-ax})$ for $a \neq 0$, the condition becomes:

$$\begin{aligned} p\left[1 - e^{-a(10+x-k)}\right] + (1-p)\left[1 - e^{-a10}\right] &= p\left[1 - e^{-a10}\right] + (1-p)\left[1 - e^{-a(10+x)}\right] \\ pe^{-a(x-k)} + (1-p) &= p + (1-p)e^{-ax}. \end{aligned}$$

The critical benefit $\hat{x}$ is the implicit solution to:

$$e^{ax} = \frac{pe^{ak} - (1-p)}{2p-1}. \tag{6}$$

The necessary and sufficient condition for existence of the solution is: $\left[pe^{ak} - (1-p)\right] > 0 \Leftrightarrow a > \bar{a} = \frac{1}{k}\ln\left(\frac{1-p}{p}\right)$ with $\bar{a} < 0$. The explicit from of $\hat{x}$ is then:

$$\hat{x} = \frac{1}{a}\ln\left[\frac{pe^{ak} - (1-p)}{2p-1}\right]. \tag{7}$$

In the special case $a = 0$ (agents are risk neutral), we have $u(x) = x$, and $\hat{x} = \frac{p}{2p-1}k$.

a) Changes in k.

The critical benefit is increasing in the deception cost k.

$$\frac{d\hat{x}}{dk} = \frac{pe^{ak}}{pe^{ak} - (1-p)} > 0. \tag{8}$$

b) Changes in p.

The critical benefit is decreasing in p.

$$
\begin{aligned}
ad\hat{x} &= \frac{e^{ak}+1}{[pe^{ak}-(1-p)]}dp - \frac{2}{(2p-1)}dp & (9)\\
\frac{d\hat{x}}{dp} &= \left\{ \frac{(2p-1)(e^{ak}+1) - 2\left[pe^{ak}-(1-p)\right]}{(2p-1)\left[pe^{ak}-(1-p)\right]} \right\} \\
&= \frac{1}{a}\frac{1-e^{ak}}{(2p-1)\left[pe^{ak}-(1-p)\right]}. & (10)
\end{aligned}
$$

For $a > 0$, $\left(1-e^{ak}\right) < 0$, thus we have $\frac{dx}{dp} < 0$; and for $a < 0$, we have $\left(1-e^{ak}\right) > 0$, thus $\frac{dx}{dp} < 0$.

c) Changes in a (risk aversion)

Recall that the problem has a solution only for $a > \bar{a} = \frac{1}{k}\ln\frac{(1-p)}{p}$, with $\bar{a} < 0$.

We notice that:

$$
\lim_{a \searrow \bar{a}} \hat{x} = \lim_{a \searrow \bar{a}} \frac{\ln\left[pe^{ak}-(1-p)\right]}{a} = \infty \tag{11}
$$

and, by using l'Hôpital's rule, we determine that:

$$
\lim_{a\to\infty} \hat{x} = \lim_{a\to\infty} \frac{\ln\left[pe^{ak}-(1-p)\right]}{a} = \frac{\lim_{a\to\infty} f'}{\lim_{a\to\infty} g'} = \lim_{a\to\infty} \frac{pke^{ak}}{[pe^{ak}-(1-p)]} = k > 0.
$$

We also recall that for $a = 0$, $\hat{x} = \frac{pk}{2p-1} > k$. These ordered important points suggest that $\hat{x}$ might be a decreasing function in a.

It is difficult to determine the sign of the derivative:

$$
\begin{aligned}
\frac{d\hat{x}}{da} &= -\frac{1}{a^2}\ln\left[\frac{pe^{ak}-(1-p)}{2p-1}\right] + \frac{1}{a}\left[\frac{pke^{ak}}{pe^{ak}-(1-p)}\right] \\
&= \frac{\left[pe^{ak}-(1-p)\right]\ln\left[\frac{2p-1}{pe^{ak}-(1-p)}\right] + apke^{ak}}{a^2\left[pe^{ak}-(1-p)\right]}, & (12)
\end{aligned}
$$

because the two terms in the numerator have opposite signs. Indeed, for $a > 0$, $\frac{2p-1}{pe^{ak}-(1-p)} < 1$ and for $a < 0$, $\frac{2p-1}{pe^{ak}-(1-p)} > 1$. We can show however that the limit for $a = 0$ is:

$$
\lim_{a\to 0}\frac{d\hat{x}}{da} = -\frac{p(1-p)k^2}{2(2p-1)^2}. \tag{13}
$$

Numerical simulations within a wide range of parameters reveal that $\hat{x}$ is indeed a decreasing function in a, in line with the intuition provided by the analysis of the lower and upper bounds of $\hat{x}$. Figure 1 presents the plot of $\hat{x}(a)$, for $p = 0.75$ and three values of k, i.e.: $k = \{0.75, 1, 1.25\}$.

6.2 Appendix B. Additional descriptive statistics and Tobit regressions

	Overall sample	Senders		Receivers
		Overall	Multiple switchers	
Nb. observations	182	91	15	91
Female =1	0.55	0.55	0.60	0.55
Age	22.8 (1.85)	22.65 (1.71)	22.67 (1.18)	22.87 (2.00)
Stated Religiosity	0.34 (0.34)	0.35 (0.31)	0.40 (0.34)	0.32 (0.30)
Trust in People	0.51 (0.28)	0.52 (0.28)	0.40 (0.30)	0.50 (0.27)
Trust in the Government	0.47 (0.24)	0.46 (0.23)	0.52 (0.26)	0.49 (0.25)
Risk Aversion	0.50 (0.24)	0.48 (0.24)	0.53 (0.25)	0.51 (0.23)
Inequality Aversion	0.49 (0.26)	0.46 (0.25)	0.45 (0.24)	0.53 (0.27)
Economics Track	0.45	0.45	0.60	0.44

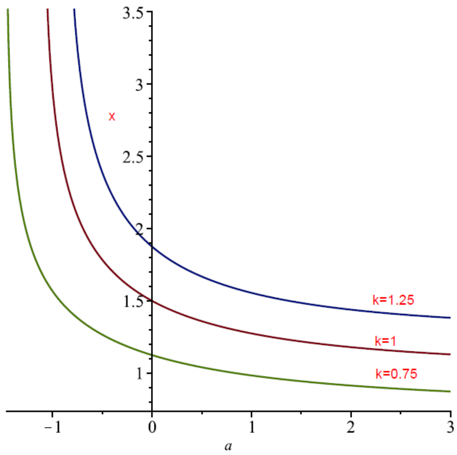
Table 9: Average values. (Standard errors within brackets)

Type	(definition)	Overall sample (n=182)	Senders (n=91)
Egalitarian inefficient	prefer (z,z) to (10,0), when 2z<10	70	20
Egalitarian efficient	prefer (z,z) to (10,0), when 2z>10	91	35
Selfish benevolent	prefer (10,10) to (10,0)	9	3
Selfish spiteful	prefer (10,0) to (10,10)	12	7

Table 10: Categories of subjects with respect to inequality aversion

	Not religious (ctg. 1 and 2)	Moderately religious (ctg. 3)	Very religious (ctg. 4 and 5)
	n=39	n=14	n=12
Av. aversion to deceiving	0.54	0.62	0.75
Standard deviation	0.34	0.30	0.31

Table 11: Distribution of the aversion to deception index with respect to stated religiosity. N=65, subjects who switched at most once



7 Appendix C. Instructions

Screen 1

Good afternoon

Welcome to an experiment in decision making. We thank you for your participation.

During the experiment, you and the other participants will be asked to make a series of decisions. Your own decisions as well as the decisions of the other participants will determine your payment from the experiment, according to the rules that will be described in what follows.

The experiment will be conducted on the computer. You make your decisions on the screen. All decisions and answers will remain confidential and anonymous.

The experiment consists in two parts, Part A and Part B. The two parts are completely independent from each other. First we describe and conduct Part A, Part B will follow.

Your total earnings from the experiment will be the sum of your payments in parts A and B. The money that you will earn will be paid to you privately and in cash.

Please do not talk to each other during the experiment. Switch off cellular phones. If you have any questions, please raise your hand and call the administrator.

Screen 2 - SENDER INSTRUCTIONS

Part A

	Model 1	Model 2	Model 3	Model 4	Model 4'
	coef.	coef.	coef.	coef.	coef.
Age	0.031	0.034	0.036	0.049	0.045
	(0.046)	(0.047)	(0.052)	(0.046)	(0.042)
Gender (Fe=1)	-0.028	-0.030	0.015	0.015	0.003
	(0.134)	(0.136)	(0.115)	(0.104)	(0.084)
D_Doubt	-0.120	-0.092	-0.740	-0.050	-0.082
	(0.109)	(0.091)	(0.110)	(0.103)	(0.106)
D_Soph	-0.058	-0.044	0.051	0.100*	-0.136**
	(0.095)	(0.114)	(0.073)	(0.052)	(0.060)
Inequality Aversion	0.223	0.156	0.251	0.245	0.264
	(0.209)	(0.233)	(0.269)	(0.213)	(0.222)
Risk Aversion	–	0.228	0.193	0.133	0.079
		(0.326)	(0.304)	(0.285)	(0.267)
Trust in people	–	–	-0.311*	-0.302	-0.234
			(0.183)	(0.193)	(0.169)
Trust in the Government	–	–	0.621***	0.515**	0.891*
			(0.210)	(0.253)	(0.208)
Stated Religiosity	–	–	–	0.465**	0.295
				(0.186)	(0.199)
Constant	-0.066	-0.242	-0.445	-0.829	-0.653
	(1.068)	(1.166)	(1.228)	(1.155)	(0.199)
N	65	65	65	65	75
pseudo-R2	0.02	0.02	0.09	0.15	0.18

Table 12: The determinants of the aversion to deceiving. Legend: Significance levels: * $p<.10$, ** $p<0.05$; Standard errors within brackets. Tobit regressions, censored up to 1.

In this part of the experiment, you will be matched at random and anonymously with another participant in the room. Neither of you will ever know the identity of the other.

Two possible monetary payments are available to you and your counterpart, each associated to an Option A or an Option B. The final choice between Option A and Option B belongs to your counterpart in the experiment.

The counterpart will choose between Option A and Option B without having any information about the payoffs associated to these options. The only thing he/she will receive as an information, is a message:

- Message 1: "Option A will earn you more money than Option B"

Or:

- Message 2: "Option B will earn you more money than Option A"

As an example (in the table below) there might be an Option A which delivers 10€ to you and 10€ to the other and an Option B that delivers 15€ to you and 5€ to the other. You will be asked to decide whether you prefer to send to the counterpart the Message 1 or Message 2. The decision problem would look like this on the computer screen:

Option A		Option B		Choose message	
Your amount	Counterpart's amount	Your amount	Counterpart's amount	1.Option A will earn you more money than Option B	2. Option B will earn you more money than Option A
10€	10€	15€	5€	☐	☐

Table 13:

You will have to indicate the preferred message for 11 distinct allocations of resources between an Option A and an Option B.

In all of the Options A, your gain is constant at 10 €, and the gain of the counterpart is also constant at 10€. Options B present a constant gain of the counterpart of 5€, but your gain can vary between 10€ and 20 € in one euro increments.

The 11 allocations and choices of message will be presented as an 11-row Table in the next screen. Once that you make your choice of message for each row, the computer will select one of them as the active row. This will be the paid row. The computer will deliver to the counterpart the selected message for this row.

The counterpart will receive the message, then will be asked to choose between Option A and Option B. His/her choice will determine the cash payment for Part A at the end of the experimental session.

Please keep in mind that the counterpart will never know his/her payment in the option not chosen for payment (that is, he/she will never know whether the message was true or not). He/she will never know your payment.

IS THERE ANY QUESTION BEFORE YOU MOVE FORWARD? IF YES, PLEASE RAISE YOUR HAND AND CALL THE ADMINISTRATOR.

Screen 3. - SENDER INSTRUCTIONS

Active page

Please indicate your preferred choice of message for each row, taking into account the payoffs associated to each row and each option.

Once you make a choice for all of the 11 rows and validate your choices, the computer will draw at random one of the rows, and sent to your counterpart the message that you selcted for that row.

After receiving the message, the counterpart will select one option, and this choice will determine the cash payment for the Part A. The result and payment will be delivered at the end of the experimental session.

Here follows Table 3 as displayed in the main text.

Validate.

Screen 4. - SENDER INSTRUCTIONS

Before moving to Part B, please make a guess on whether the counterpart will select or not the option that you indicated as bringing to him the highest payoff:

☐ He will follow my recommendation

☐ He will follow the opposite advice

☐ I can't make a guess

PART A IS OVER. YOU CAN MOVE NOW TO PART B

Screen 2'. - RECEIVER INSTRUCTIONS

Part A

In this part of the experiment, you will be matched at random and anonymously with another participant in the room. Neither of you will ever know the identity of the other.

Two possible monetary payments are available to you and your counterpart, each associated to an Option A or an Option B. The final choice between Option A and Option B belongs to your counterpart in the experiment.

The counterpart will choose between Option A and Option B without having any information about the payoffs associated to these options. The only thing he/she will receive as an information, is a message:

- Message 1: "Option A will earn you more money than Option B"

Or:

- Message 2: "Option B will earn you more money than Option A"

We will ask you to choose either Option A or Option B. Your choice will determine the payment in the experiment. You will never know what the actual payment was in the option not chose (that is, if the message sent by your counterpart was true or not). Moreover, you will never know how much money your counterpart was paid.

We will pay the two of you according to the choice you make at the end of the experiment.

IS THERE ANY QUESTION BEFORE YOU MOVE FORWARD? IF YES, PLEASE RAISE YOUR HAND AND CALL THE ADMINISTRATOR.

Screen 3'. - RECEIVER INSTRUCTIONS

Active page.

Your counterpart decided to send you the message "....".

We now ask you to chose either option A or option B. Your choice will determine the payment in the experiment. You will never know what the actual payment was in the option not chose. Moreover, you will never know how much money your counterpart was paid.

We will pay the two of you according to the choice you make at the end of the experiment.

Your choice: Option A □. Option B □.

Validate.

PART A IS OVER NOW. YOU CAN MOVE TO PART B

Screen 5. - ALL PARTICIPANTS

PART B

In this part, participants are matched again in pairs, selected at random from the participant to this experiment. In each pair, there is a Player 1 and a Player 2. The roles are assigned at random as well.

Player 1 is asked to choose several times between two possible distributions of money, each of them involving his payoff and the payoff of Player 2.

Player 2 has only a passive role; he will accept the distribution chosen by Player 1.

You must indicate the choice you would make as the Player 1.

However, you will learn whether you were assigned the role of the Player 1 or the Player 2 only at the end of the session. If you were selected as Player 1, your payoff will be determined as the amount you have chosen. If you were selected as Player 2, your payoff will be the payoff chosen for you by the Player 1 with whom you were paired.

As an example, you might be asked whether you prefer to choose between Option LEFT and Option RIGHT. Option LEFT pays you 10€, and nothing to the Player 2 paired with you. Option RIGHT pays 2 € to you, and 2€ to the Player 2 paired with you.

The decision problem would look like this on the computer screen:

Option LEFT		your choice		Option RIGHT	
Player 1 payoff	Player 2 payoff			Player 1 payoff	Player 2 payoff
10€	0€	☐	☐	2€	2€

Table 14:

Overall, you must make 21 decisions of this type. To simplify the decision problem, the task involves a slider that selects (in green) the set of preferred option. Option LEFT always delivers 10 € to you, and nothing to the Player B. Option RIGHT provides an equal payoff to both Player A and Player B, increasing from (0€; 0€) to (10€; 10€) by increments of 50 cents.

To simplify the decision problem, the task involves a slider that selects in green the set of preferred options.

The slider constraints the decision, by making the assumption that if one prefers the allocation (z; z) to (10€; 0€), he/she will prefer to (10,0) all equal allocations (z'; z'), that provide z'>z.

Furthermore, the slider also allows to select the (10€; 0€) distribution all of the time, and also to rule it out completely.

On the last row, the slider allows to choose between (10,0) and (10,10).

At the end of the game, the computer will draw one row at random among the 21 rows, and pay the subjects the payoff selected by the Player 1 for that row.

IS THERE ANY QUESTION BEFORE YOU MOVE FORWARD? IF YES, PLEASE RAISE YOUR HAND AND CALL THE ADMINISTRATOR.

Screen 6. Decision page

Part B.

You can choose between optin LEFT and Option RIGHT by shifting the slider UP or DOWN. The preferred option will be displayed in green (bold) text. Once you made your choice, please press VALIDATE. Then the computer will draw a row at random and deliver the payment for that row at the end of the experiment.

Here follows Table 4 as displayed in the main text.

Screen 7. Complementary questions.

- How do you see yourself ? Are you generally a person who is fully prepared to take risks, or do you try to avoid taking risks ? Unwilling to take risks 1 ... 5 Fully prepared to take risks

- Are you a religious person? Not at all 1 ... 5 Very much

- In general, do you trust other people? Not at all 1 ... 5 Very much.

- In general, do you trust the government? Not at all 1 ... 5 Very much.

- Your gender male /female

- Your age

- Admission track or background Arts and Science / Economics / Science / Other

Screen 8. Results

The experiment is over now.

- Part A brings you ... euros

- Part B brings you ... euros.

- Total earnings in the session ... euros

Thank you for your participation.

PARIS — SINGAPORE

ESSEC Business School
3 avenue Bernard-Hirsch
CS 50105 Cergy
95021 Cergy-Pontoise Cedex
France
Tel. +33 (0)1 34 43 30 00
www.essec.edu

ESSEC Executive Education
CNIT BP 230
92053 Paris-La Défense
France
Tel. +33 (0)1 46 92 49 00
www.executive-education.essec.edu

ESSEC Asia-Pacific
5 Nepal Park
Singapore 139408
Tel. +65 6884 9780
www.essec.edu/asia

ESSEC Africa-Atlantic
Plage des Nations
Sidi Bouknadel
Rabat-Salé
Morocco
Tel. +212 (0)5 30 10 40 19
www.essec.edu

ESSEC Africa-Indian Ocean
Royal Road, Pierrefonds
Mauritius
Tel. +230 401 2400
www.essec.edu
www.icsia.mu

MOROCCO — MAURITIUS

Contacts

Centre de Recherche
+33 (0)1 34 43 30 91
research.center@essec.fr

ESSEC BUSINESS SCHOOL