February 13, 2020

Profession and deception: Experimental evidence on lying behavior among business and medicine students*

Damien Besancenot† and Radu Vranceanu‡

Abstract

This paper reports data from a sender-receiver experiment that compares lying behavior between two groups of students, one in business administration and the other in medicine. The two professions have different ethical standards, which might have an impact on the subjects' deceptive behavior. We use a modified version of the sender-receiver deception experiment designed by Erat and Gneezy (2012) to collect data on 393 subjects. The results show that there is little difference between the two groups in the domain of white lies; however, business students resort to selfish lies more frequently than do medicine students. This finding corroborates the hypothesis that the business environment tends to legitimate the use of selfish and dishonest communication. Furthermore, while the analysis does not confirm differences in altruism between the two groups, it does reveal differences in their risk tolerance.

JEL Classification: C91; D83; I19
Keywords: Lies, deception, communication, medicine, business administration.

---

*This research was funded by academic grants provided by the Direction de la Recherche, International, Valorization et Ecoles doctorales (DRIVE) of the University of Paris Descartes and the LABEX MME DII of the University of Cergy Pontoise. It benefited from the agreement of the Ethical Committee of University of Paris Descartes on April 18, 2019. The authors are grateful to Delphine Dubart, at the ESSEC Experimental Lab, for her technical assistance, as well to Thierry Aimar, Nathalie Charnaux, Cécile Badoual, Jeanne Bregier, Philippe Henry, Fabrice Jollant, Marie-France Mamzer, Sophie Ng Wing Tin, and Jean Ralph Zahar for their support during the different implementation stages of the experiment. They would like to thank Angela Sutan and Eli Spiegelman for their suggestions and remarks on an early version of the paper.

†University of Paris Descartes and LIRAES, 45 rue des Saints Pères, 75270 Paris. E-mail: damien.besancenot@parisdescartes.fr.

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

1 Introduction

Research on lying and deception has surged in the last fifteen years, driven by a rising awareness of how important dishonest communication can be in shaping economic and political outcomes, particularly in the era of unverifiable Internet news. In contrast to previous studies developed by psychologists on the motives and emotional consequences of false messages,[1] experimental economists have developed a set of studies emphasizing the material consequences of such ethically challenging behavior. A substantial body of evidence has established that some persons resist the temptation to lie regardless of the potential benefits and that those who do lie do not push the lies to extreme limits, even if the subjects forgo positive gains by doing so (see the surveys by Rosembaum et al., 2014; Jacobsen et al., 2018 and Abeler et al., 2019). Furthermore, many people refrain from lying even if this action is beneficial to the receiver of the information (Erat and Gneezy, 2012; Cappelen et al., 2013; Biziou-van Pol et al., 2015). These results suggest that humans have some form of aversion to lying (e.g., Gneezy, 2005; Mazar et al. 2008; Abeler et al., 2014).

A fundamental typology of lies with respect to the material consequences of a lie in a sender-receiver game has been introduced by Erat and Gneezy (2012), following a path-breaking paper in the research on lies by Gneezy (2005).[2] In this setting, lies have a strategic purpose: the sender issues a false message with the aim of influencing beliefs and the actual response of the receiver.[3] In general, the literature refers to a *selfish black lie* as a situation in which a false statement issued by the sender prompts the receiver to take an action

[1] See Doncan (2019) for a synthesis of this research.

[2] The classic theoretical framework for such games was laid out in the "cheap-talk" sender-receiver game by Crawford and Sobel (1982).

[3] Other studies focus on deception in a non-strategic context. The most widespread task is the die-in-the-cup game introduced by Fischbacher and Föllmi-Heusi (2013). When pay is related to performance and the latter cannot be observed, agents tend to exaggerate their performance, with significant heterogeneity among them (a non negligible fraction is faithfully reporting poor performance).

that improves the well-being of the sender and deteriorates the well-being of the receiver. These selfish lies are ubiquitous in the world of business and are part of many commercial negotiations, with sellers overestimating costs, and buyers understating their true willingness to pay (Schweitzer and Croson, 1999; Aquino and Becker, 2005; Gneezy 2005; Chelliah and Swamy, 2018). Erat and Gneezy (2012) focus on the more ethically ambiguous white lies, where the false message is beneficial to the receiver, and further distinguish between *Pareto white lies* from which both the sender and the receiver benefit if the latter follows the false statement, and *altruistic white lies*, whereby the sender sacrifices some of his/her benefit for the benefit of the receiver. As an example of such benevolent behavior, the authors refer to situations in which patients affected by medical conditions for no cure exists receive a placebo that at least improves their morale, and, in some cases, might bring positive material consequences. Figure 1, reproduced from Erat and Gneezy (2012), summarizes the typology of lies depending on their consequences for the sender and the receiver.[4]

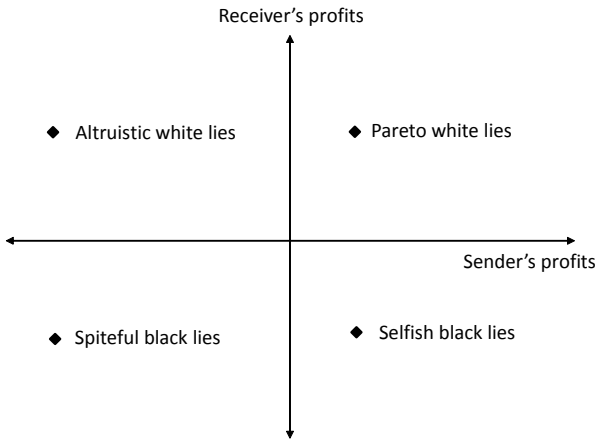

Figure 1: Typology of lies according to consequences (from Erat and Gneezy, 2012).

In this paper we compare the strategic lying behavior of two groups of people exposed to different professional norms and social expectations: students of business administration

[4] A last situation, in which the spiteful sender will take a loss only to harm the receiver, might exist, but hopefully in a limited way; it has therefore received only a limited research interest.

and students of medicine. The experimental design allows us to study whether differences in lying behavior can be attributed to differences in altruism, or to other factors. We also study the extent of the gender on lying behavior, if any. The paper thus aims to contribute to both the literature on lying and deception and to a growing literature on behavioral health economics (Cox et al., 2016; Galizzi and Wiesen, 2018).

The professional norms of physicians and business people can be very different, which in turn might attract people with a different character to the two professions. In the world of business, people are expected to pursue their own objectives with no restrictions other than the law, while the competitive market mechanism coordinates their self-interested choices towards the common interest. Individuals are expected to exploit any trading opportunity, and this is morally justified by the contribution to higher national wealth. Furthermore, rents of any sort can only be ephemeral, as competition should spread the benefit among the many (Hayek, 1945;Von Misses, 1949).[5] In this context, business people and students in business administration are supposed to embrace a materialistic mindset, endorsing a preference for competition, performance seeking and limited pro-sociality (Holland, 1985; Vansteenkiste et al., 2006).[6] Lies among traders who negotiate can be tolerated since, ultimately, competition guarantees the emergence of the market price at which social welfare is highest. Empirical research tend to corroborate these predictions about dishonest communication. McCabe and Trevino (1995) report higher self-reported frequencies of cheating on exams among undergraduate business students compared to other fields (including medical studies).[7] Other studies suggest that students in business and economics engage more easily in selfish lying

[5] See Knight (1923) for a clear account of why this view is too narrow.

[6] Some lab experiments show that students in economics tend to be less cooperative in Prisoners' Dilemma (Frank et al. 1993, 1996).

[7] See also McCabe et al. (1995) reporting higher self-reported propensity to engage in ethical misconduct by MBA students compared to law students.

than subjects in other fields, such as humanities or engineering (Lundquist et al., 2009; Lewis et al., 2012; López-Pérez and Spiegelman, 2019).

On the other hand, in the health care profession, bilateral exchanges are prevalent, and physicians' ability to abuse their informational monopoly is constrained by the high ethical standards of the profession. People who opt for a career in medicine may be follow a higher moral norm of refraining from doing harm, notwithstanding basic utility calculations; the fundamental moral principle of the medical profession - *primum non nocere* - is a moral imperative that can be traced back at least to *Epidemics* (2, 4-7), the famous book by Hippocrates' from 410 B.C. (Beauchamp and Childress, 1994; Hoerni, 2003). Furthermore, it is widely believed that the medical profession attracts intrinsically motivated people with strong pro-social values (Brock et al., 2016), including a high degree of altruism or concern for patients' health (Arrow, 1963; Ellis and MacGuire, 1986; Balsa and McGuire, 2003). In the last few years, a substantial body of research has emerged to test this belief. Hennig-Schmidt et al. (2011) use a lab experiment to compare medical students' behavior under the fee-for-service (FFS) and capitation (CAP, that is a fixed payment per patient) models and find results that can be explained only if subjects present a substantial degree of concern about the patients' well-being.[8] Godager and Wiesen (2013) use the data set from Hennig-Schmidt et al. (2011) to estimate the (positive) weight of patients' utility in the physician's own utility function. Martinsson and Persson (2019) show that the weigh of patients' utility varies with the severity of the disease, itself related to the physician's system of priorities. While the assumption of physicians' altruism seems to be corroborated by this evidence, the question of whether physicians (or medicine students) are more or less altruistic than other categories is still unsettled. Brosig-Koch et al. (2017) compare the decisions of medical

[8] Altruism tempers overprovision under FFS and fosters undeprovision under CAP beyond what pure profit maximization would suggest.

students with those of business students in a similar experiment and find evidence that nonmedical students are less altruistic albeit with significant heterogeneity. Ahlert (2012) compares the distributive preferences of medical and economics students and find evidence that, in an unframed setting, more economists choose the individualistic profit-maximizing allocation. In contrast with these results, Lee et al. (2017) study choices in a standard dictator game and find no difference in altruism between medical students and the general population or similar law students.

There is a substantial literature, surveyed in Searight and Meredith (2019), on the scale and scope of deceptive communication in physician-patient communication. These authors explain that traditionally physicians tend to avoid blunt communication of bad news and often hide or attenuate it, even in cases in which truth-telling can actually improve the condition of the patient. Despite the obvious importance of these issues, experimental studies on the lying behavior on the part of physicians and medicine students are rather scarce. As a notable exception, Hennig-Schmidt et al. (2018) build a framed experiment to analyze diagnosis-related group upcoding in neonatology, comparing the reporting by business and medicine students. In the absence of audits and sanctions, overreporting (which leads to higher payoffs) is the dominant strategy (with 70% of participants engaging in overt dishonesty); furthermore, medical students appear to be more prone to overreporting than economics students (the trend, however, reverses when controls are introduced).

Prosocial preferences should be an important determinant of lying behavior. For instance, altruism could restrain the desire to state a selfish black lie that would deteriorate the well-being of the receiver of the information. Cappelen et al. (2013) and Capraro et al. (2015), using experimental data, show that the aversion to telling a Pareto white lie is stronger

among altruistic individuals.[9] The latter study also shows that altruistic people are more prone to telling an altruistic white lie.[10]

In light of these theories, we consider two main hypotheses to be tested: (1) Because of their strong orientation toward competition and the winner-take-all norm of the profession, business students might be more tempted to telling selfish lies, in line with the results of previously cited studies comparing economics students with humanities and engineering students. On the other hand, medical students, following the do-no-harm principle and the higher ethical norms specific to their profession, might be less prone to telling selfish lies; (2) The degree of altruism is expected to be higher in the population of medical students. This could, in turn, explain a higher propensity to tell white lies among medicine students.

The core task of our experiment is similar to that of Erat and Gneezy (2012) (or hereinafter EG2012). There is a sender and a receiver, and two payment options, Option A and Option B, each providing specific payoffs to the two players. Only the sender knows the payoffs associated with each option. The receiver knows that there are payoffs associated with an Option A or B, but does not know what these payoffs are. At the onset of the game, the sender learns that the roll of a die issued a number, let us say 2. He/she can honestly convey the information to the receiver, or give him/her false information, i.e., disclose any other number between 1 and 6. With this information, the receiver can select any number between 1 and 6. If the selected number is the true number (i.e., 2), they both win the payoffs from Option A; otherwise they both win the payoffs from Option B. As we explain later in more formal terms, in this game with a complex message space, a sender who assigns a probability of at least 1/6 to the event that the receiver will follow his/her recommendation

[9] The first study use a sample of students in economics, the second study use an Internet sample of the US general population.

[10] Vranceanu and Dubart (2019) found no correlation between lying aversion and inequality aversion.

should tell the truth if he/she prefers Option A over Option B, and should lie in the opposite case. It is likely that the large majority of senders fall in this category.

We test for five conditions, each with its own set of payoffs, corresponding to an altruistic white lie, two Pareto white lies, and two selfish lies. Three of theses conditions are exacts replica of Erat and Gneezy (2012), and two of them are different. These within-subject choices are made by one group of business students, and one group of medicine students. We also elicit (self-reported) risk tolerance and the degree of altruism by means of a charity giving task.

In brief, our results do not confirm the higher-altruism assumption for medical students compared to business students. With respect to lying behavior, medical students are not more prone to telling a white lie than the business students. However, there is a substantial difference between the two populations in the domain of selfish lies; the frequency of selfish lies is 20% higher in the population of business students compared to medicine students. This comparison, revealing no differences in white lies but significant differences in selfish lies, would suggest that the business profession tends to legitimate the latter form of dishonest communication. This lie-specific difference in lying behavior might be explained by business and medical students differing not in their own perceptions of right and wrong, but in their beliefs about what the other members of their group believe to be right or wrong (Spiegelman, 2020). In this context, business and medicine students can have the same aversion to white lies, yet business students, unlike medical students, consider selfish lies to be normal practice within their profession.

Participants in our experiment are first-year students. Thus, the experiment tests the preferences of the students who self-select into two different professions; thus the results are based on innate character traits. While students might identify with their future decisions

(Hennig-Schmidt et al., 2011), socialization through education (Rako et al., 2017; Spiegelman, 2020) and internalization of professional norms (Ahlert et al., 2012; Kestenrich et al., 2015) can alter preferences and thus shape the behavior of future professionals in the two fields. As a path for future research, it would be interesting to study whether our results hold in an experiment involving last-year students or professionals instead of first-year students.

A known limitation of the within-subject design is that subjects might use information from early tasks in the experiment to second-guess and update their answers in later tasks. However, while this criticism may apply within one group of students, the analysis focuses essentially on the comparison between medicine and business students who were exposed to identical choices (in a between-subject setting). As a benefit of the within-subject design, we were able to elicit important subject characteristics such as altruism and risk tolerance and use them as controls in our analysis. We also ensured that we collected a relatively large number of observations to limit the measurement error problem.

The paper is organized as follows. The next section introduces the experimental design. The results are presented in Section 3. The last section offers our conclusion.

2 Experimental design

The paper and pen experiment was administered in a classroom setting. The sample comprised 178 subjects in their first-year of medical studies in a high-profile medical school in Paris, France, and 163 first-year students in business administration in an equivalently ranked business school in the same geographic area. Students attending regular class at one of the two institutions were asked, twenty minutes before the class break if they wished to participate in the experiment and had the option to leave the classroom. The sessions took place between October and December 2019. The instructions were very close to those in the

EG2012 within-subject design.[11] The core task is the deception game used in that paper enriched by two additional conditions, to which we add complementary tasks to measure risk tolerance and altruism (see the Appendix for the instructions).

Specifically, this lying game involved a sender and a receiver. The experiment featured two main stages. First, a paper questionnaire was distributed to a group of students in the sender role. The participants were informed that they would be paired within one week with a receiver: "he/she is a student like you, from another higher education institution". We used this general statement to rule out professional socialization or homophyly. The receivers were students in the other school. Similar to EG2012, one in twenty pairs were selected at random to be paid in cash within the three weeks after the senders' decision took place. On average, senders earned 23.8 euros, and receivers obtained 25.7 euros.

The paper questionnaire for the senders contained the main task. The senders were told that at the onset of the experiment, a six-sided die was rolled, and we communicate the outcome to the sender. The sender was presented with five payment possibilities or conditions, each including payment Option A $(s_A; r_A)$ and payment Option B $(s_B; r_B)$ in which s_A, s_B were the sender's payoffs, and r_A, r_B were the receiver's payoffs. The sender was informed that the payment in each condition depended on the choice made by the receiver. If the receiver chose the true outcome of the die roll (unknown to him/her), Option A would be implemented; otherwise, option B would be implemented. For each condition, the sender sent a message that "The outcome of the roll of the die was i". The receiver had no other information than this statement. From the instructions, he/she knew that there were payoffs associated with each option but had no idea what these payoffs were.

At the end of the experiment, one of the five conditions was be selected at random for

[11] Erat and Gneezy (2012) have implemented both a between-subject and a within-subject design. Or design combines within-subjects and between-groups comparisons.

payment in cash.

Table 1 summarizes the payoffs by condition.[12] Each subject had to make a choice for each scenario.

Condition	Option A $(s_A; r_A)$	Option B $(s_B; r_B)$
1. T[-1,10]	(20,20)	(19,30)
2. T[1,10]	(20,20)	(21,30)
3. T[10,10]	(20,20)	(30,30)
4. T[1,-5]	(20,20)	(21,15)
5. T[10,-5]	(20,20)	(30,15)

Table 1: Payoffs by condition (euros)

If option A was chosen, then both players received 20 euros. If option B was chosen, the payoffs were unequal, with gains/losses for the two players as displayed in the table. The within-brackets label of the conditions indicates *the change in payoffs* for the two players in Option B relative to their payoff in Option A. For instance, condition T[-1,10] means that the implementation of Option B provided the receiver with a benefit of 10 euros, and brings a 1 euro loss to the sender compared to payoffs in Option A.

Sutter (2009) analyzed the binomial true/false message space (Gneezy, 2005) and called attention to the problem of "sophisticated deceivers", i.e. individuals who assign a subjective probability $\pi > 0.5$ that the receiver will follow an opposite recommendation to the one given; these individuals would state the truth when they actually seek deception.

Erat and Gneezy (2012) explain that in the more complex message space with six possible statements, only one being true, such a sophisticated deception is much less probable. Their argument is quite compelling. Let U^A be the utility of the sender from Option A, and U^B his/her utility from Option B. Option A is implemented if the receiver chooses the true

[12] In the instructions, T[1,10] and T[10,10] were inverted, exactly as they were presented in Erat and Gneezy (2012). We reverse the labels to follow the intuitive order in which the payoff for the sender is increasing at constant payoff for the receiver.

number, and Option B is implemented if he/she chooses a different number. Denote now by p the probability assigned by the sender to the event that the receiver *does not* follow his/her recommendation. If the sender tells the truth ($dice\_nb = 2$), the expected utility is: $E[truth] = (1-p)U_A + pU_B$. If the sender sends a false message ($dice\_nb \neq 2$), the expected utility is $E[lie] = (1-p)U_B + p(4/5U_B + 1/5U_A)$. Let us assume that the sender prefers Option B to Option A, i.e., $U_B > U_A$. It is easy to check that for $U_B > U_A$, $E[lie] > E[truth]$ if $(1-p) > 1/6$ or $p < 5/6$. This person would lie if the probability that the other follows his/her recommendation is $(1-p) > 1/6$, which, as argued by Erat and Gneezy (2012), is a plausible assumption for a majority of senders.

In our experiment, receivers followed the sender's recommendation in 35% of the cases, which is more than 1/6. If the actual frequency is a good proxy for the expected probability of implemented recommendations, senders should lie about the number on the die if they prefer Option B to Option A, and vice-versa.

Stating that the roll of the die was different than the actual number is a lie that the sender delivers with the purpose of making the receiver choose Option B. Given the change in payoffs, $T[-1, 10]$ corresponds to an *altruistic white lie* (the sender sacrifices 1 euro for the benefit of the receiver), $T[1, 10]$ and $T[10, 10]$ correspond to *Pareto white lies*, and $T[1, -5]$ and $T[10, -5]$ correspond to *selfish black lies*, i.e., the sender is aware that his/her gain also involves a loss for the receiver.

After making the choice of the number to communicate (sender) or the number to select (receiver), each participant was instructed to move to the second part of the experiment, which was independent of the first part. The instructions for the second part were delivered in a sealed envelope, to avoid any influence of the second part task on the first.

After indicating their age and gender, participants were asked to report their risk tol-

erance on the scale introduced by Dohmen et al. (2011). The question used is as follows: *Thinking of yourself, do you think you are fully prepared to take risks?* Subjects could answer from 1, for "not at all", ..., to 5, for "very much". Answers were converted into a (0;1) risk tolerance index.[13]

The last task aimed to determine subjects' degree of altruism. They learned that they received an additional 10 euros, that they could share with a philanthropic organization from a list of 10 charities, all of them well known in France (we exclude organizations from the health sector; see the list in the Instructions). If the pair of subjects of which they were a part was selected for payment, the amount that they indicated would be transferred to one of the associations from the list, selected at random. This 0 to 10 (euro) donation was also converted into a (0;1) altruism index. The total amount transferred to charities was of 160 euros.[14]

3 Results

3.1 General results

Table (2) reports the frequencies of liars (senders who communicate a number other than the true one) in the overall sample (mixed population) and compares our results with the results in Erat and Gneezy (2012). The latter use undergraduate students taking classes in management as subjects. The similarities in our two sets of results are notable in the domain of Pareto white lies ($T[1, 10]$, $T[10, 10]$). A notable difference is observed in the domain of selfish lies ($T[1, -5]$), with a lower frequency of liars in our sample. Later we show that this outcome is related to the behavior of medicine students.

[13] The debate on the "best" method of eliciting risk aversion far from settled. Different incentivized methods appeared provide un-correlated measures and unstable in time (see Crosetto and Filippin, 2016; Beauchamp et al. 2016; Mata et al., 2019). Self-reported measures, in particular the scale introduced by Dohemen et al. (2011) imposed itself as a possible alternative, yet with its own limitations specific to un-incentivized measures.

[14] The donation went to the UNICEF.

	EG2012 (N=58)	This study (N=341)
1. T[-1,10]	43%	38%
2. T[1,10]	66%	67%
3. T[10,10]	76%	77%
4. T[1,-5]	52%	38%
5. T[10,-5]	n.a.	62%

Table 2: A comparison with Erat and Gneezy (2012).

Even if the lie benefits both subjects, approximately 1/4 of the senders never lie, as if they follow some categorical imperative, tantamount to experiencing a very large cost from lying.

The within subject design allows for an additional check that incentives have an impact on the decision to lie. We present contingency tables separately for Pareto white lies (Table 3) and selfish lies (4).

In the Pareto white lie situation, 62 of the 113 subjects who tell the truth in T[1,10] switch to lying in T[10,10] when their benefit from lying increases. A much smaller number (28 subjects) have the counterintutive reaction of telling the truth in T[10,10] yet switching to lying in T[1,10]; ($\chi^2 = 45.5$, $p < 0.01$).

		T[10,10]		
		Truth	Lie	Total
T[1,10]	Truth	51	62	113
	Lie	28	199	227
	Total	79	261	340

Table 3: Contingency table: Pareto white lies

In the selfish lie situation, 99 out of 212 subjects switch from telling the truth to lying for a higher benefit (at the same cost to the receiver); only 16 subjects lie in T[1,-5] and tell the truth in T[10,-5] when lying brings them a larger benefit; ($\chi^2 = 57.0$, $p < 0.01$).

We can now turn our attention to the key research question of the differences between the two professional profiles. We first analyze the differences in personal characteristics and then study the differences in lying behavior.

		T[10,-5]		
		Truth	Lie	Total
T[1,-5]	Truth	113	99	212
	Lie	16	113	129
	Total	129	212	341

Table 4: Contingency table: Selfish lies

3.2 Business vs. medicine students

Table 5 presents the key personal characteristics of the two populations of medicine and business students.

	Gender (Fe=1)	Age	Altruism (0-1)	Risk tol. (0-1)
Medicine students (N=178)	0.70 (0.04)	19.78 (0.23)	0.84 (0.02)	0.53 (0.02)
Business students (N=162)	0.41 (0.04)	18.43 (0.11)	0.79 (0.02)	0.64 (0.02)
Total (N=341)	0.56 (0.03)	19.13 (0.13)	0.81 (0.02)	0.58 (0.02)

Table 5: Personal characteristics by profile (s.e.)

In general, in France medical studies attract a larger proportion of women compared to business studies; in the two higher education institutions, women represent 68% and 51% of the total populations, respectively, which is reflected in the different proportions of female subjects across the two groups ($p < 0.01$). Additionally, the medicine students in our sample are one year older then the business students, on average. While the mean measure of altruism is slightly larger in the sample of medicine students than in the sample of business students (0.84 vs. 0.79), this difference is not statistically significant ($p = 0.13$).[15]

On average, business students present a higher risk tolerance ($p < 0.01$). This result might be qualified because the sample of business students includes a smaller percentage of women (who, on average, have a lower risk; see Table 9 in Appendix I). A regression model (unreported) confirms that this difference in self-reported risk tolerance between the two professions persists after controlling for the gender of the respondent.

[15] If no indication is provided, in this text p-values correspond to two-sided t-tests.

Table 6 presents the proportions of senders who lie, by type of lie (the five conditions) and sender profile.

	Medicine (N=178)	Business (N=163)	(p-val) diff. between m/b
1. T[-1,10]	36%	39%	(0.53)
2. T[1,10]	67%	66%	(0.79)
3. T[10,10]	79%	74%	(0.28)
4. T[1,-5]	27%	50%	(0.00)
5. T[10,-5]	53%	72%	(0.00)

Table 6: Proportion of senders who lie by type of lie and professional profile

Comparing the two profiles, we observe substantial similarities in the domain of white lies and substantial differences in the domain of selfish lies, with business students more willing to tell a selfish lie. We can confirm that the frequencies reported for business students only are now very close to those in the data reported by Erat and Gneezy (2012).

Figure 2 indicates the same proportion of senders who lie, using the four-quadrant typology in Figure 1.

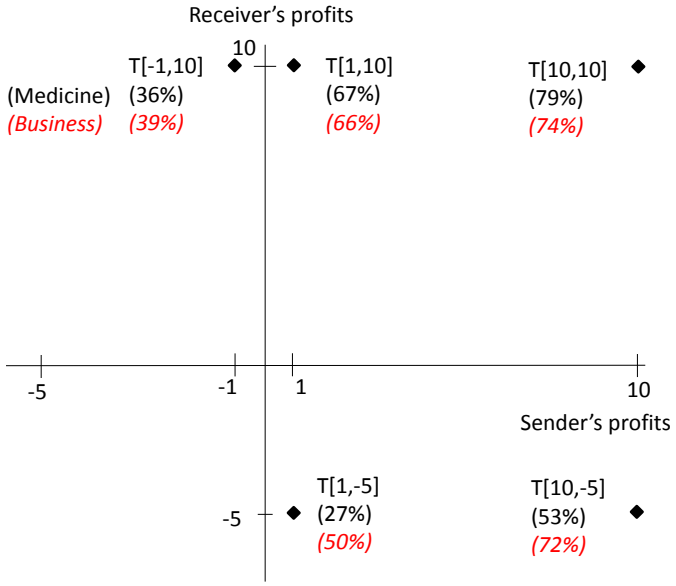

Figure 2: Proportion of senders who lie by type of lie and professional profile

A substantial proportion, 21% of the medicine students and 26% of the business students,

refuse to state a Pareto white lie that increases the payoffs of both participants by as much as 10 euros.

Both profiles of students respond to incentives as documented by Gneezy (2005) and Erat and Gneezy (2012):

- At a constant gain for the receiver, the sender lies more often if his/her benefit is large (in Figure 2, the frequency of lying increases from left to right on a given horizontal line).

- At constant gain for the sender, he/she will lie less often when the receiver is losing something compared to when the receiver is gaining something (in Figure 2, the frequency decreases from top to bottom on a given vertical line).

We can use a regression model to verify if this pattern holds when controlling for personal characteristics. Table 7 displays the output of OLS regressions where the dependent variable is a dummy "Lie" which takes the value of 1 if the subject has told a lie in a given condition. Table 11 in the Appendix presents the (similar) results of probit models. Individual data are stacked by condition, and the altruistic lie T[-1,10] serves as the benchmark. Observations are not independent since each subject provides five distinct answers. To correct for this bias, errors are clustered by subject. Other covariates are: gender (female=1), age, self-reported risk tolerance, and the elicited altruism measure.

*Result 1.*The former regressions corroborate the hypothesis of a strong incentive effect: individuals of both profiles lie more if their benefit is increasing at a constant payoff for the receiver, and lie less if the receiver is penalized, at a constant benefit for themselves.

Result 2. These regressions point to a result also present in Table 6. Medicine students appear to react much more strongly to the deterioration of the well-being of the other by reducing their lying: at a benefit of 1 euros for themselves, with payoff change going from

	Medicine students		Business students	
	Model 1	Model 2	Model 1	Model 2
T[1,10]	0.312*** (0.04)	0.312*** (0.04)	0.273*** (0.05)	0.281*** (0.05)
T[10,10]	0.434*** (0.05)	0.434*** (0.05)	0.350*** (0.05)	0.358*** (0.05)
T[1,-5]	-0.098* (0.05)	-0.098* (0.05)	0.100* (0.05)	0.101* (0.05)
T[10,-5]	0.156*** (0.05)	0.156*** (0.05)	0.331*** (0.05)	0.333*** (0.05)
Female (=1)	0.006 (0.05)	0.013 (0.05)	0.048 (0.04)	0.065 (0.05)
Age	-0.001 (0.01)	-0.002 (0.01)	-0.011 (0.01)	-0.010 (0.02)
Risk toler.		0.146 (0.10)	–	0.161 (0.13)
Altruism	–	-0.092 (0.07)	–	-0.059 (0.08)
Constant	0.382**(0.17)	0.390*** (0.17)	0.572** (0.28)	0.491 (0.37)
N	865	865	799	794
R2	0.153	0.160	0.082	0.09
Legend: * significant at 10%; ** significant at 5%; *** significant at 1%. Std. err. within parentheses.				

Table 7: The "general" lying equation

10 euros to -5 euros for the receiver, the average sender who is a medicine student reduces his/her frequency of lying by $31.2\% - (-9.8\%) = 41\%$. Moreover, at a payoff of 10 euros for themselves, going from 10 euros to -5 euros for the receiver, their frequency of lying falls by $43.4\% - 15.6\% = 27.8\%$. On the other hand, for the business students, the frequency of lying in the same situations falls by only $27.3\% - 10\% = 17.3\%$ and only $35\% - 33\% = 2\%$. Notice that these results are obtained while controlling for the degree of altruism. This suggests that the concern for truth-telling among medicine students could be grounded in the ethical norms of the profession rather in this personal characteristic of the subjects.

Table 6 has revealed similarities between the two profiles in the domain of white lies and differences in the domain of selfish lies. We would now like to check whether the professional profile is a relevant explanatory variable for each type of lie, particularly when controlling for other subject characteristics. Table 8 provides estimates of "condition-specific" lying equations, one for each of the five scenarios. For each condition, the dependent variable is a dummy variable taking the value of 1 if the subject has told a lie (i.e., in our case, reported a number different from 2). Other covariates are: gender, age, self-reported risk tolerance, and our elicited altruism measure, as well as a profile dummy that takes the value

of 1 for medicine students, and 0 for business students. We also include a gender×profession interaction term.

Table 8 reports the output of OLS regressions for each type of lie; coefficients can be interpreted directly as changes in the probability to state a lie.[16]

	T[-1,10]	T[1,10]	T[10,10]	T[1,-5]	T[10,-5]
Age	-0.004 (0.01)	0.010*** (0.00)	-0.013** (0.00)	-0.006* (0.00)	-0.003 (0.00)
Altruism	-0.003 (0.09)	-0.015 (0.09)	-0.019 (0.04)	-0.141* (0.08)	-0.183* (0.07)
Risk tol.	0.209 (0.14)	0.232*** (0.04)	0.096 (0.07)	0.131 (0.12)	0.118 (0.16)
Female (=1)	-0.054 (0.12)	-0.068*** (0.01)	0.119 (0.07)	0.107 (0.05)	0.117 (0.10)
Med. stud. (=1)	0.165* (0.06)	0.063 (0.03)	0.154* (0.07)	-0.217*** (0.03)	-0.182** (0.06)
Female×Med	-0.026 (0.04)	0.021 (0.02)	0.126* (0.05)	-0.113** (0.03)	-0.096 (0.05)
Constant	0.299* (0.11)	0.374** (0.09)	0.877*** (0.05)	0.582 (0.16)	0.797** (0.20)
N	332	331	332	332	332
R2	0.03	0.02	0.02	0.07	0.06
Legend: * significant at 10%; ** significant at 5%; *** significant at 1%. Stnd. err. within parentheses.					

Table 8: "Condition-specific" lying equations

These regression models corroborate the results from the descriptive statistics (Table 6) and provide new information.

Result 3. There is a significant medicine studies effect in the domain of selfish lies. Even when controlling for the degree of altruism and risk tolerance, medicine students have a 20% lower probability of telling a selfish lie compared to business students. This result is consistent with findings by Lundquist et al., (2009), Lewis et al., (2012) and López-Pérez and Spiegelman (2019), who show that students in business and economics tend to engage more easily in selfish lying than subjects in other fields. As we argued before, business students present a higher risk tolerance compared to medicine students; this might reinforce their decision to tell selfish lies. However, we can verify that the difference in the probability of lying persists even when controlling for differences in risk tolerance.

Result 4. There is no profession effect in the domains of altruistic white lies or Pareto

[16] Probit estimates reveal similar results (see Table 7 in the Appendix for the probit models).

white lies (there is a weak positive effect affecting medicine students when their benefit is large).

Result 5. As expected, altruism has a (weak) limiting effect on selfish lies (which deteriorate the income of the receiver). In our data, altruism is not related to the decision to tell a Pareto white lie or an altruistic lie; this result contrasts with the findings of Cappelen et al. (2013) and Capraro et al. (2015) who find that the aversion to telling a Pareto white lie is stronger among altruistic individuals.

Result 6. Data in the Appendix Table 10 show that the frequencies of males and females telling selfish lies are quite similar. López-Pérez and Spiegelman (2019) find that women studying business and economics engage more often in selfish lies than do women in other fields. This result is corroborated by our results, insofar as the coefficient of the interaction term between gender (female) and field of study (medicine) is negative (though it is statistically significant only in the fourth model, T[1,-5]).[17]

4 Conclusion

In the last fifteen years the literature in experimental economics on lies and deception has expanded at a steady pace. This paper analyzes differences in lying behavior between two groups of subjects exposed to different professional norms, expectations and stereotypes, namely, business and medicine students.

In the world of business, many professionals find it legitimate to exploit any trading opportunity, including a would-be informational advantage. Economists like to believe that strong competition among firms rules out systematic rent extraction but are relatively silent about the ethical consequences of trading with a player who has market power. However,

[17] We mention here that other sender-receiver lab experiments found that men tend to resort to selfish lies more often than women do (Gill et al., 2013; Conrads et al., 2013; Dreber and Johannesson, 2008; Erat and Gneezy, 2012; Kleinknecht, 2019).

lying in negotiations, with sellers exaggerating costs and buyers understating their willingness to pay, is a common practice. For many trading people, a "good" deal is one in which one party obtains most of the surplus from trade at the expense of the other, and sometime in sheer disregard of the interest of the other. In contrast, centuries of history of medical practice reveal that physicians seldom exploit their informational advantage and act in the interest of the patients even at personal cost. Such behavior is grounded in professional norms inspired by the Hippocratic oath, according to which the interest of the patient should always prevail. In turn, these professional norms should attract the most pro-social persons to this field. Selfish lies are not tolerated, while some white lies, such as placebo prescription or hiding very bad news, could be common.

Rather than assessing how differences in pro-social attitudes influence deceptive behavior, the experiment presented in this paper allowed us to directly observe the lying behavior of the respective groups. We used the classic design by Erat and Gneezy (2012) to determine and assess the importance of those behavioral differences. The complementary giving-to-charity task did not reveal any substantial difference in altruism between the two groups; however, business students present a higher risk tolerance.

Turning to the communication issue, it turns out that both profiles of students respond to incentives, as documented in Gneezy (2005) and Erat and Gneezy (2012). However, while many students lie, a non-negligible share of both medicine and business students refuse to tell even a Pareto white lie, which would deliver significant gains to both parties.

The propensity to tell white lies is similar between the two groups, with medicine students slightly more prone to telling such lies. This is in line with the tradition of the profession to communicate bad news in the most subtle way and even to hide such information. In line with the different ethical standards of the medical profession, medicine students appear to

be significantly more reluctant than business students to tell selfish lies, a result that holds when controlling for altruism and risk aversion. Medicine students exhibit a higher concern that their interlocutor will be harmed by misleading communication.

The fact that both types of students behave in the same way in terms of telling white lies but differently in terms of telling selfish lies reveals that the business profession, relative to the medical profession, tends to legitimate selfish behavior. Nonetheless, because the work context is so different between the two professions, it is very difficult to draw any moral criticism or lesson. However, from a methodological point of view, it is important to keep in mind that results obtained from samples of students in business and economics, which are the main public for economics lab economic experiments, might not be representative of the deception behavior of the general population. To strengthen the external validly of these studies, it might be useful to perform replication studies of the main deception experiments on different types of subjects.

References

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

Abeler, Johannes, Daniele Nosenzo, and Collin Raymond, 2019. Preferences for truth-telling. *Econometrica,* 87, 4: 1115-1153.

Ahlert, Marlies , Stefan Felder & Bodo Vogt, 2012. Which patients do I treat? An experimental study with economists and physicians, *Health Economics Review*, 2, 1.

Aquino, K., & Becker, T. E. 2005. Lying in negotiations: How individual and situational factors influence the use of neutralization strategies. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 26(6), 661-679.

Arrow, K. J., 1963. Uncertainty and the welfare economics of medical care. *American Economic Review*, 53, 941–973.

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

Beauchamp TL, Childress JF.; 1994. *Principles of Biomedical Ethics*. 4e éd. New York, Oxford: Oxford University Press.

Beauchamp, Jonathan P., David Cesarini, and Magnus Johannesson. 2017, The psychometric and empirical properties of measures of risk preferences. *Journal of Risk and Uncertainty* 54.3: 203-237.

Brosig-Koch, J., Hennig-Schmidt, H., Kairies-Schwarz, N., & Wiesen, D. (2017). The effects of introducing mixed payment systems for physicians: Experimental evidence. *Health Economics*, 26(2), 243-262.

Brock, J. Michelle, Andreas Lange, and Kenneth L. Leonard, 2016. Generosity and prosocial behavior in healthcare provision evidence from the laboratory and field, *Journal of Human Resources* 51, 1: 133-162.

Cappelen, Alexander W., Erik 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.

Chelliah, John, and Yogita Swamy. 2018, Deception and lies in business strategy. *Journal of Business Strategy,* 39, 6: 36-42.

Cox, J. C., Green, E., & Hennig-Schmidt, H. (2016). Experimental and behavioral economics of healthcare. *Journal of Economic Behavior and Organization*, 131, A1-A4. https://doi.org/10.1016/j.jebo.2016.10.011.

Conrads, J., Irlenbusch, B., Rilke, R. M. and Walmowitz, G. 2013. Lying and team incentives, *Journal of Economic Psychology*, 34: 1–7.

Crawford, Vincent P., and Joel Sobel, 1982. Strategic information transmission, *Econometrica*, 50, 6 1431-1451.

Crosetto, Paolo, and Antonio Filippin. 2016, A theoretical and experimental appraisal of four risk elicitation methods. *Experimental Economics* 19.3: 613-641.

Docan-Morgan, T. 2019, (Ed.), *The Palgrave Handbook of Deceptive Communication*, Palgrave Macmilan.

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, A. and Johannesson, M., 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.

Ellis, Randall P., and Thomas G. McGuire, 1986. Provider behavior under prospective reimbursement: Cost sharing and supply, *Journal of Health Economics* 5.2: 129-151.

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.

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

Galizzi, Matteo M. and Daniel Wiesen, 2018, Behavioral experiments in health economics, *Oxford Research Encyclopedia; Economics and Finance*, Online at: DOI: 10.1093/acrefore/9780190625979.013.244

Gill, D., Prowse, V. and Vlassopoumos, M. 2013. Cheating in the workplace: An experimental study of the impact of bonuses and productivity, *Journal of Economic Behavior & Organization*, 96 (1): 120–134.

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

Godager, Geir, and Daniel Wiesen, 2013. Profit or patients' health benefit? Exploring the heterogeneity in physician altruism. *Journal of Health Economics,* 32, 6: 1105-1116.

Hayek, Friedrich, 1945. The use of knowledge in society, *American Economic Review*, 35 (4): 519–530.

Henning-Schmidt, Heike and Jürges, Hendrik and Wiesen, Daniel, 2018, Dishonesty in healthcare practice: A behavioral experiment on upcoding in neonatology. *Available at SSRN*: ssrn.com/abstract=3152298 or http://dx.doi.org/10.2139/ssrn.3152298.

Hennig-Schmidt, Heike, Reinhard Selten, and Daniel Wiesen, 2011. How payment systems affect physicians' provision behaviour–an experimental investigation. *Journal of Health Economics* 30.4: 637-646.

Hoerni, Bernard, 2003, L'éthique médicale. Principales évolutions au fil des siècles, *Histoire des Science Médicale*, vol. 37 (3).

Holland, J. L. (1985). *Making vocational choices: A theory of careers.* Englewood Cliffs, NJ: Prentice-Hall.

Jacobsen, Catrine, Toke Reinholt Fosgaard, and David Pascual-Ezama, 2018. Why do we lie? A practical guide to the dishonesty literature. *Journal of Economic Surveys,* 32, 2: 357-387.

Kleinknecht, Janina, 2019, A man of his word? An experiment on gender differences in promise keeping, *Journal of Economic Behavior & Organization*, 168: 251-268

Kesternich, Iris, Heiner Schumacher, and Joachim Winter, 2015, Professional norms and physician behavior: homo oeconomicus or homo hippocraticus?, *Journal of Public Economics,* 131: 1-11.

Knight Frank H, 1923, The ethics of competition, *Quarterly Journal of Economics*, 37, 4: 579–624,

Li, Jing, William H. Dow, and Shachar Kariv, 2017. Social preferences of future physicians. *Proceedings of the National Academy of Sciences* 114, 48: E10291-E10300.

López-Pérez R., E. Spiegelman, 2019. Do economists lie more?, In: A. Bucciol and N. Montinari (Eds.), *Dishonesty in Behavioral Economics*: 143-162.

Mata, R., Frey, R., Richter, D., Schupp, J., and Hertwig, R., 2018. Risk preference: A view from psychology. *Journal of Economic Perspectives*, 32 (2), 155-72.

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.

Peter Martinsson and Emil Persson, 2019. Physician behavior and conditional altruism: the effects of payment system and uncertain health benefit, *Theory and Decision*, 87, 3: 365–387.

McCabe, Donald L., and Linda Klebe Trevino, 1995. Cheating among business students: A challenge for business leaders and educators. *Journal of Management Education* 19.2: 205-218.

McCabe, Donald L., Janet M. Dukerich, and Jane E. Dutton, 1994. The effects of professional education on values and the resolution of ethical dilemmas: Business school vs. law school students. *Journal of Business Ethics* 13 9: 693-700.

Racko, Girts, Karoline Strauss and Brendan Burchell, 2017, Economics education and value change: The role of program-normative homogeneity and peer influence, *Academy of Management Learning & Education*, 16, 3.

Rosenbaum, Stephen Mark, Stephan Billinger, and Nils Stieglitz, 2014. Let's be honest: A review of experimental evidence of honesty and truth-telling, *Journal of Economic Psychology* 45: 181-196.

Schweitzer, Maurice E. and RachelCroson, 1999. Curtailing deception: The impact of direct questions on lies and omissions, *International Journal of Conflict Management*, 1999; 10, 3.

Searight H. Russell and Taylor Meredith, 2019. Physician deception and telling the truth about medical "bad news": History, ethical perspectives, and cultural issues, In: T. Docan-Morgan (Ed.), *The Palgrave Handbook of Deceptive Communication*, pp. 647-672.

Spiegelman, Eli 2020. What are we really teaching them? Testing the socialization of a maximizing mindset, *mimeo*, Burgundy School of Busieness.

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

Vansteenkiste, M., Duriez, B., Simons, J., & Soenens, B. (2006). Materialistic values and well-being among business students: Further evidence of their detrimental effect, *Journal of Applied Social Psychology*, 36 (12), 2892-2908.

Vranceanu, R. and Dubart, D., 2019. Deceitful communication in a sender-receiver experiment: Does everyone have a price?. *Journal of Behavioral and Experimental Economics*, 79, 43-52.

Von Mises, Ludvig, 1949. *Human Action: A Treatise on Economics*, vol.2, Yale University Press.

A Appendix

A.1 Additional data: gender comparison

	Age	Altruism (0-1)	Risk tolerance to(0-1)
Male (N=146)	19.3 (0.27)	0.80 (0.03)	0.64 (0.02)
Female (N=188)	19.0 (0.12)	0.82 (0.02)	0.54 (0.01)
Total (N=334)	19.15 (0.13)	0.81 (0.02)	0.58 (0.01)

Table 9: Personal characteristics by gender. (std.err)

No differences in altruism: p=0.36 ; Difference in tolerance to risk : p=0.00.

	Males (N=146)	Females (N=188)	(p-val; two tailed) diff. between M/F
1. T[-1,10]	42%	34%	(0.15)
2. T[1,10]	67%	66%	(0.83)
3. T[10,10]	73%	80%	(0.16)
4. T[1,-5]	36%	38%	(0.71)
5. T[10,-5]	60%	63%	(0.64)

Table 10: Frequency of liars by lie and gender

A.2 Probit models

Changes in the frequency of lying by type of lie

	Medicine students		Business students	
	Model 1	Model 2	Model 1	Model 2
T[1,10]	0.805***(0.12)	0.810***(0.12)	0.699*** (0.13)	0.725*** (0.13)
T[10,10]	1.181***(0.15)	1.189***(0.15)	0.926**** (0.15)	0.954**** (0.15)
T[1,-5]	-0.279* (0.14)	-0.282**(0.14	0.255* (0.14)	0.259* (0.14)
T[10,-5]	0.398*** (0.12)	0.400***(0012	0.869*** (0.14)	0.877*** (0.14)
Female (=1)	0.019 (0.14)	0.036 (0.14)	0.135 (0.12)	0.183 (0.13)
Age	-0.004 (0.02)	-0.006 (0.02)	-0.030 (0.01)	-0.028 (0.04)
Risk tol.	_	0.422 (0.28)	_	0.445 (0.037)
Altruism	_	-0.268 (0.20)	_	-01.16 (0.23)
Constant	-0285 (0.48)	-0.258 (0.49)	0.210(0.76)	-0.013 (1.01)
N	865	865	799	794
Legend: ** significant at 5%; *** significant at 1%. Std. err. within parentheses.				

Table 11: Lies and incentives by profile

Marginal effects of various factors in explaining the probability to lie.

	T[-1,10]	T[1,10]	T[10,10]	T[1,-5]	T[10,-5]
Age	-0.001 (0.00)	0.010*** (0.00)	-0.010*** (0.00)	-0.008** (0.00)	-0.003 (0.00)
Altruism	0.003 (0.09)	-0.022 (0.09)	-0.017 (0.04)	-0.138* (0.07)	-0.181** (0.07)
Tol. to risk	0.197 (0.13)	0.245*** (0.04)	0.091 (0.07)	0.135 (0.12)	0.108 (0.16)
Female (=1)	-0.063 (0.11)	0.006 (0.04)	0.049 (0.04)	0.106*** (0.03)	0.103** (0.05)
Med. stud. (=1)	0.021 (0.05)	0.025 (0.02)	0.067*** (0.03)	-0.210*** (0.01)	-0.197*** (0.03)
N	332	331	332	332	332
Pseudo-R2	0.01	0.01	0.012	0.06	0.05
Legend: ** significant at 5%; *** significant at 1%. Std. err. within parentheses.					

Table 12: Determinants of lying by type of lie. Probit models

A.3 Instructions for the Sender

Introduction.

Welcome to this short experiment. Data collected will help us understanding a decision problem.

Please read these instructions carefully. You may earn a considerable sum of money, depending on the decisions you make in the experiment. The amounts in euro are presented here below. At the end we'll chose one in 20 participants and pay them in cash at the end of the experiment (no later than 2 weeks from now on).

You will be matched at random with another participant that will take his/her decision in a second stage. The other subject is a student in a different higher education institution. His/her identity will not be revealed to you, and you will not know who he/she is. All answers will be traded with the highest degree of privacy.

At the end of the form there is a 4 digit ticket. The number was generated at random. Please keep it, the ticket will help us call the subjects for the payment in this same room, after two weeks. The payment is executed in cash, and privately.

From now on, please stay focus and don't talk to each other.

The main task

Before starting this experiment, we have rolled a 6-sided die, and obtained the outcome 2.

The other participant will not be informed that the outcome of the die roll was 2. However, he or she will be told that you have been informed about the outcome of the die roll. There are five different payment possibilities. Only you will be informed of the particular monetary values in each payment option. The other participant will not be informed of these monetary values. However, he or she will be told that you have been informed of these monetary values.

At the end of the experiment, we will choose one of these payment possibilities at random for actual payment.

For each of the payment possibilities, we now ask you to send a message to the other participant. The message will correspond to a number from 1 to 6. There are six possible messages:

Message 1: "The outcome from the roll of the 6-sided die is 1."

Message 2: "The outcome from the roll of the 6-sided die is 2."

Message 3: "The outcome from the roll of the 6-sided die is 3."

Message 4: "The outcome from the roll of the 6-sided die is 4."

Message 5: "The outcome from the roll of the 6-sided die is 5."

Message 6: "The outcome from the roll of the 6-sided die is 6."

Your message will be shown to the other participant, and then he or she will be asked to choose a number between 1 and 6.

The choice of the number by the other participant will determine the payments in the experiment.

Payment possibility #1

• If he or she chooses the actual outcome of the roll of the dice, 2, then you will receive $20 and he or she will receive $20.

• If he or she chooses a number different than the actual outcome, you will receive $19

and he or she will receive $30.

The message I will send in this payment option is

"The outcome from the roll of the 6-sided die is _____."

(Please fill in a number from 1 to 6.)

Payment possibility #2

• If he or she chooses the actual outcome of the roll of the dice, 2, then you will receive $20 and he or she will receive $20.

• If he or she chooses a number different than the actual outcome, you will receive $21 and he or she will receive $30

The message I will send in this payment option is

"The outcome from the roll of the 6-sided die is _____."

(Please fill in a number from 1 to 6.)

Payment possibility #3

• If he or she chooses the actual outcome of the roll of the dice, two, then you will receive $20 and he or she will receive $20.

• If he or she chooses a number different than the actual outcome, you will receive $30 and he or she will receive $30.

The message I will send in this payment option is

"The outcome from the roll of the 6-sided die is _____."

(Please fill in a number from 1 to 6.)

Payment possibility #4

• If he or she chooses the actual outcome of the roll of the dice, 2, then you will receive $20 and he or she will receive $20.

• If he or she chooses a number different than the actual outcome, you will receive $21

and he or she will receive $15.

The message I will send in this payment option is

"The outcome from the roll of the 6-sided die is _____."

(Please fill in a number from 1 to 6.)

Payment possibility #5

• If he or she chooses the actual outcome of the roll of the dice, 2, then you will receive $20 and he or she will receive $20.

• If he or she chooses a number different than the actual outcome, you will receive $30 and he or she will receive $15

The message I will send in this payment option is

"The outcome from the roll of the 6-sided die is _____."

Complementary tasks

The main task is over now, you can move to the complementary tasks. You have received a sealed envelope. You can open it now and read the additional instructions.

Please indicate us: your gender M/F

Please indicate us: your age

Thinking of yourself, do you think you are fully prepared to take risks? Answer on this scale, from 0: "not at all", to 10: "fully prepared".

0 1 2 3 4 5 6 7 8 9 10.

This last task is completely unrelated to the previous tasks.

If you one of those chosen for payment, you obtained 10 more euros. You can chose to share it with a charity, to be selected at random from the list of these 10 charities. We will transfer the funds at the end of the experiment.

- *Les Restos du Cœur*

- *La Fondation Abbé Pierre*
- *Secours Populaire*
- *Action contre la faim*
- *Apprentis d'Auteuil*
- *Comité Français pour l'Unicef*
- *Greenpeace*

Please circle the amount you want to give: 0 1 2 3 4 5 6 7 8 9 10 euros.