Lying in Economics

Chapter for the Oxford Handbook of Lying

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1. Introduction

Lying has become an increasingly important topic in economics in recent years. Until recently, the standard assumption in economics was that individuals would lie whenever there is a material incentive to do so. For example, if the expected monetary gains from lying were to exceed the expected losses, *homo oeconomicus* would lie in his tax report and insurance claims.

Yet, many individuals file their insurance claims truthfully, despite incentives to report larger or inexistent losses, which are difficult for insurance companies to verify. Every year many people also report their taxes truthfully, despite the low probability of inspection.[1] Recent work in behavioral economics and psychology has shown that, in fact, many will not lie, even if there is a monetary incentive to do so. In other words, even in anonymous situations where lying can only be witnessed by the liar himself, a large share of individuals choose to be honest.

At the same time, there is wide heterogeneity in the population in lying behavior. Some individuals will always lie, even if incentives are small. Others will not lie, even if the lie benefits its receiver. Recent research has revealed rich patterns of individual morality. To understand how such patterns come about, a large body of work is currently studying the factors that govern moral norms in the context of lying. Such knowledge could lead to important changes in how we view human behavior in many economic transactions,

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[1] The overall audit rate for individuals is 1.03% according to the IRS 2012 Data Book. For a recent press article on declining audit rates of the IRS, see http://blogs.wsj.com/totalreturn/2015/02/25/fewer-taxpayers-are-audited-amid-irs-budget-cuts/.

including tax evasion, behavior in insurance markets and, more generally, markets in which private information is pervasive.

There are many studies in economics and psychology that examine dishonesty. In this chapter I will focus on some of the main findings on lying in behavioral economics to-date. I start by reviewing the standard approach to information transmission in economics in Section 1. The literature has generally studied two different scenarios: communication of private information and communication of intentions. The focus of this chapter will mainly be on the first type of communication, though the second will also be mentioned. Section 2 reviews studies that measure individuals' aversion to lying. Section 3 provides an overview of studies examining factors that influence lying. Section 4 concludes.

2. The Standard Approach

The classic theoretical framework to study strategic information transmission in economics is the model by Crawford and Sobel (1982).[2] This model studies the interaction between a sender and a receiver. The sender is provided with private information, relevant to the transaction, which he can transmit to the receiver, who is uninformed and takes an action that affects the sender.

Several everyday interactions have such a structure. Consider the purchase of a used car. The seller knows whether the car was involved in an accident or not and, if so, whether he repaired it at a friend's garage without reporting it to the insurance company and the police or not. This information is relevant to the buyer since it determines the true value of the car. But, if the accident was not reported, the buyer cannot verify the car's true condition, unless the seller reveals this information. The question of interest is whether when prompted about the car's condition, the seller will report it truthfully or lie.

The model by Crawford and Sobel (1982) addresses this question as well as the more general one, namely how the conflict of interests between the sender and the receiver

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[2] For early overviews of the literature on cheap talk, see Farrell and Rabin (1996) and Crawford (1998).

affects the transmission of information. They show that, as the conflict of interest increases, less information will be transmitted. The receiver (buyer in the above example) is aware of the sender's (seller in the above example) material interests and interprets his message accordingly. At the same time, the sender anticipates the interpretation of the receiver and optimally adjusts his messages. If the conflict of interest is strong enough, communication will not be informative. In other words, if the seller can only sell the car and make profit at the expense of the buyer, he will lie. The buyer will therefore dismiss the seller's statements. Even though the transmission of information could be beneficial to each of the parties, the conflict of interest is so large that no information will be transmitted. This provides a very pessimistic state of affairs. The important question is, will the predictions of the model be supported empirically?

Before examining existing evidence, let us mention that there are two potential interpretations to the messages sent by senders in the model of Crawford and Sobel (1982), depending on whether one only considers the messages within the particular interaction (voiding them of their literal meaning), or whether one considers the literal meaning of messages, as used outside of the given interaction. In the first interpretation messages do not have a meaning outside of the game. Hence, if the seller says, "the car had no accident", but it is commonly known and understood that this message means that the car *had* an accident, then the message would not be interpreted as a lie. Such interpretation raises questions about the emergence and evolution of language that have been studied in Blume et al. (1998).

The second, perhaps more natural, interpretation is that messages have a meaning outside the game, since as humans we already possess a language we communicate in.[3] In this case, if the seller says "the car had no accident", but it did, the message would be interpreted as a lie. The central assumption in economics, and in the work of Crawford and Sobel (1982) is that in one-shot interactions lying is costless, i.e. individuals do not experience any disutility (e.g., moral costs) when lying. Yet, recent experimental

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[3] The importance of natural language was first highlighted by Farrell (1993).

evidence, to which we now turn, suggests that in many contexts such an assumption is wrong. Some individuals are willing to give up a personal (monetary) gain to be honest.

3. The Aversion to Lying

A first step in understanding lying behavior is to understand the moral norms that guide an individual's decision to lie. There are two extremes on the spectrum of moral norms. The norm may be utilitarian, i.e., to always lie when there is a (monetary) benefit from doing so. This has been the standard assumption in economics, assuming there is no moral cost of lying. Alternatively, the norm may be Kantian, i.e. to never lie under any circumstances, which implies an infinite cost of lying. In between, there may be norms that approve of lying when the consequences of the lie are benevolent, for example. An important empirical question is what is the moral norm that most individuals follow. The studies reviewed below have pursued this question, and an even simpler one – whether there is a moral cost of lying.

One of the first studies on lying in economics was conducted by Gneezy (2005). In a simplified sender-receiver game, there were two payoff distributions (labeled "options"). Option A yielded a higher monetary payoff than option B to the sender, while option B yielded a higher payoff than A to the receiver. The sender was asked to send a message to the receiver indicating which option yielded a higher payoff to the receiver. The receiver was uninformed about the incentives of the sender or any characteristics of the option. Individuals, in this case students in an experiment, displayed an aversion to lying. A large portion chose to send a truthful message, "Option B will earn you more money than A", despite monetary incentives to do the opposite.

Gneezy (2005) investigated whether moral norms about lying were conditional on the consequences of the lie. In other words, whether individuals were willing to lie if the harm of the lie on the receiver were minor, but unwilling to do so when the harm inflicted on others by lying was large. To this end, he varied the monetary amount that the receiver and sender received when the sender lied (and was followed by the receiver) and when he was truthful. He found that fifty-two percent of the senders lied when the lie increased

their payoff by $10, and harmed the receiver by $10. This share dropped to 17% when the lie harmed the receiver by $10 but only increased the sender's payoff by $1. The design and results of this experiment are summarized in Table 1. The table offers a comparison of different experimental designs used to measure the aversion to lying. It describes the type of interaction (whether it was a sender-receiver game or an individual decision), the information that was known only to the sender, the messages available to the sender, the receiver's identity, the incentives of the parties involved and the main result, compared to the benchmark of no cost of lying, i.e. the standard assumption that an individual would lie whenever there is a material gain from doing so.

Contrary to standard economic assumptions, most individuals in Gneezy (2005) were willing to give up $1, and many individuals were willing to give up $10, when their lies harmed other individuals by $10. Additionally, their tendency to lie depended on the harm to others. If the harm to the receiver dropped from $10 to $1, significantly more lying was observed. This suggests that moral norms about lying may condition on the consequences of the lie.

Several papers have used a similar framework, with the aim of testing whether human behavior is in line with the predictions of the Crawford and Sobel (1982) model (Dickhaut et al., 1995; Blume et al., 1998 and 2001; Cai and Wang, 2006). In contrast to Gneezy (2005), in these studies receivers were aware of the conflict of interest with the sender, leading them to be more suspicious about the sender's message. These papers find that, even if there is a conflict of interests between the sender and the receiver, individuals are sometimes truthful, more so than the Crawford and Sobel (2005) model would predict. In a recent study, Sanchez-Pages and Vorsatz (2007) also showed that, when receivers were given the opportunity of punishing the sender – destroying the sender's payoff at a small cost to themselves –, punishing was most frequently observed after a receiver had been lied to. Interestingly, those receivers who were honest as senders were more likely to punish than individuals who were dishonest as senders. This suggests

that individuals with higher moral costs of lying may also have a preference for preserving such a norm in society.[4]

A careful analysis of these first experiments, especially Gneezy (2005), raised a number of questions about the reasons why individuals chose not to lie. The first question is how important the expected reaction of the receiver is. Perhaps senders chose to be honest in Gneezy's experiment because they expected the receiver to choose the opposite of whatever they recommended. For example, if the sender recommended option B, the receiver could choose A. The importance of the expected action by the receiver was shown in Sutter (2009). While such strategic concerns were observed, for many senders this concern did not apply.

Paper	Type of interaction	Information	Sender's message	Receiver	Incentives	Results (frequency of lying)
Gneezy (2005)	Sender-receiver game	Payoffs from choosing {A,B}	"Option X will earn you more money than Y"	Subject chooses {A,B}, not aware of conflict of interests	Sender and receiver have completely opposed interests	17% -52% (benchmark=100%)
Sanchez-Pages and Vorsatz (2007)	Sender-receiver game	State of nature {A,B}	"The state of nature is X"	Subject chooses {A,B}, aware of conflict of interests	Sender and receiver have completely opposed interests	45% (benchmark=50%)
Mazar, Ariel and Amir (2008)	Individual decision	Performance in a task	"I have X correct answers"	Experimenter	Sender obtains a higher payoff when more correct answers are reported	7% (Experiment 1, benchmark=100%)
Fischbacher and Heusi (2013)	Individual decision	Outcome of a die roll	"The outcome of the die roll is X"	Experimenter	Sender obtains a higher payoff when he reports a higher outcome, except 6	35% report 5 (benchmark=100%, chance=16.7%)
Gneezy, Rockenbach and Serra-Garcia (2013)	Individual decision	State of nature (1 to 6)	"The state of nature is X"	Subject decides whether to follow message or not	Sender obtains a higher payoff when he reports a higher number	40%-65% (benchmark=100%)

Table 1: Overview of experimental designs to measure lying aversion

An issue raised by the initial evidence was that the experimenter, who had invited and was going to pay the subjects for the study, observed the lie. If individuals wanted to look

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[4] See also Gibson et al. (2012) who study heterogeneity in lying within an individual and across individuals.

good in the eyes of the scientist, they may have been more honest than they would otherwise be. This would imply that moral norms about lying may not have been cleanly captured in the initial studies.

To address this issue some researchers studied settings in which the individual decided on his own, without a receiver and without observation by the experimenter, whether to lie or not. For example, Mazar et al. (2008) asked students to complete several math exercises. After they finished, they were provided with the answer key. Students were then asked to grade their exercises and report the number of correct answers to the experimenter. Importantly, students were asked to destroy their answer sheets using a shredding machine available in the room before providing their report, so that the experimenter never found out whether they cheated. The higher the number of reported correct replies, the more the students got paid for the task. Mazar et al. (2008) find that only 0.6% of the students reported the maximum amount of correct answers. On average, students only lied about 7% of the possible amount.

Fischbacher and Heusi (2013) developed an even simpler task to measure the aversion to lying. They asked students to roll a six-sided die and report the outcome of the roll. They were paid the outcome of the die roll in dollars if the reported outcome was between 1 and 5, and received nothing if the reported outcome of the die roll was 6. Students rolled their die in private and no one else other than the student could see the roll of the die. Their results revealed that there is an overwhelming amount of honesty. The highest payoff, 5, was reported only 35% of the time. While this rate is higher than chance (16.7%), indicating that some individuals lied, it is much lower than 100%, the rate expected if there was no aversion to lying.

These two settings were so anonymous that the scientist cannot tell whether a particular individual was honest or not; there was always the possibility that he may have actually rolled a 5! Nevertheless, there may still be a concern among individuals to appear honest. Reporting a 5 may look suspicious in the eyes of the experimenter, even if a 5 may have actually been the true outcome. In fact, many individuals in the die-roll experiment

reported a 4, consistent with such a concern. A further disadvantage of this simple task is that individual lying behavior – by design – cannot be observed. All tests compare the reporting behavior of a group of individuals to the distribution that would result from fully honest reporting, the null hypothesis.

To examine lying behavior at the individual level, Gneezy et al. (2013) developed a paradigm that allows observation of lying of each single individual. In their setting senders received information about the "state", which is a number between 1 and 6. Each sender was asked to send a message to the receiver about the state, who then chose whether or not to follow that message. Importantly, the sender's payoff did not depend on whether the receiver followed the message; it only depended on the message he sent – his payoff increase with the state reported. Hence, there were no strategic incentives to lie for a self-interested sender. The results revealed that a small fraction of individuals always lied and, similarly, a small fraction was always honest. A majority of individuals lie when the benefit to them was large and do not lie when the benefit was small. This suggests that individuals exhibit a cost of lying, but that this cost is moderate. Individuals may thus follow a moral norm that is conditional on the consequences of the lie.

4. When do individuals lie?

The evidence reviewed above suggests that individuals are not fully utilitarian about lying, as they will choose to be honest, despite monetary incentives to lie. However, many individuals will lie when the monetary gain is large, suggesting that they weigh the moral costs of lying against its material benefits. An important question that arises is whether there are factors or interventions that can change lying behavior. In this Section we investigate four main factors: the consequences of lies, lies and promises, social interaction and simple interventions that can affect lying behavior.[5]

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[5] See Cappelen et al. (2013) for an investigation of other factors that affect lying, such as individual characteristics and priming intuition or a market context. See also Dreber and Johannesson (2008) for gender differences in lying behavior.

The consequences of lies

In the studies reviewed above, lying was advantageous to the liar, often at the expense of the receiver of the lie. The strongest test for the moral costs of lying is to examine whether individuals lie when the lie is advantageous to the receiver, as well as to the sender. Erat and Gneezy (2012) studied such lies, commonly known as white lies. Their results revealed that 35% of participants told the truth, instead of sending a white lie that would benefit both the receiver and the sender. This shows that some individuals suffer a direct disutility from lying that is separate from the material consequences of the lie.

Promises

Lying in everyday life may be about information we know, and others do not (private information), or about actions we are planning to take and others cannot observe (private actions). In parallel with the literature on lying aversion focused on private information, a large and growing literature has examined lying about actions. In a well-known study, Charness and Dufwenberg (2006) showed that individuals who promise to behave in a trustworthy manner are likely to keep their promises. In their study a principal could trust an agent and benefitted from it if the agent acted in a trustworthy manner. The agent, however, had a monetary incentive to betray the principal. They found that, when agents were given the option of sending messages to principals, they often made promises. Promises increased trust by principals and agents often kept them. This finding is line with a large literature on pre-play communication in social dilemmas (see, e.g., Balliet, 2010 for a meta-analysis), which has found that when individuals promised to cooperate with others in environments where cooperation is socially beneficial but individually costly, a substantial proportion kept their promises, which led to more efficient outcomes.

Breaking a promise can thus have moral costs, similar to lying in the studies previously reviewed. Yet, is there a difference between these two types of lies? Serra-Garcia et al. (2013) conjectured that breaking a promise has a higher moral cost than lying about private information. The reason is that promises involve an individual's own actions while private information is extraneous to the decision maker. In their study, a leader and a follower could decide whether or not to contribute to a joint project. The leader knew

the return of the joint project and also moved before the follower. The follower, who was uninformed, could not observe the actual return or the leader's decision before deciding whether to contribute or not. The question was whether the content of the leader's message matters, i.e. whether the message was about the return of the project or about his decision to contribute. Both kinds of messages could achieve the same transmission of information. However, Serra-Garcia et al. (2013) found that individuals were more likely to lie about the return than about their contributions. These results suggest that sending a promise with the intention to break it has higher moral costs than sending other kinds of lies.

Social interaction

Moral norms about lying are often shaped by the society in which the individual lives. Observing frequent dishonesty of others may change an individual's perspective on the moral norm to follow about lying. In markets, for example, sellers may observe how dishonest other sellers are. This may lead to contagion effects that generate widespread dishonest behavior.[6] Innes and Arnab (2013) study whether the contagion of lying behavior differed by society, by comparing India and the U.S. In India individuals responded to a high level of dishonesty amongst others by behaving more dishonestly, and to a low level of dishonesty by behaving more honestly. Thus, not only "negative" norms (extensive dishonesty) generated imitation, but also "positive" norms did. In the US, social information only spread dishonest. When individuals were informed that a large majority of others are dishonest, they were more likely to behave dishonestly. Low levels of dishonesty did not lead to more honesty.

Ways to decrease dishonesty

A final question one may ask is whether there are the simple and costless ways – "nudges" – to increase honesty. Interventions that increase the moral saliency of honesty could ultimately increase individual honest. One such intervention has been discussed

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[6] Social interaction effects have been studied in a wide arrange of domains in economics, from labor (Mas and Moretti, 2009), to education (Sacerdote, 2001) and financial decision-making (Bursztyn et al., 2014). They have also been widely studied in psychology (see Cialdini and Goldstein, 2004, for an overview).

above: promise-making. When individuals make promises, they are less likely to break them.

A well-known intervention to increase moral behavior involves the timing of honesty statements when filling taxes or insurance claims. In Shu et al. (2012) individuals were in one scenario asked to certify that the information they had provided was truthful *after* having completed all the information. In another scenario individuals were first asked to certify that the information they would provide in what followed was truthful. Does the timing of such a promise matter? The answer is yes. Shu et al. (2012) showed that signing a form certifying the truthfulness of the statements in the beginning increased the honesty of reports to 63%, compared to 21% when signing occurred in the end.[7]

Another costless manipulation involves the use of language. Individuals were asked to complete a simple task that involved reporting a number they had thought about. They were told "please don't cheat" in one condition and "please don't be a cheater" in another condition. Does this simple linguistic manipulation affect lying behavior? Bryan et al. (2013) showed that this simple wording change decreased the extent of dishonesty significantly.

The results from these manipulations suggest that there are high moral costs to lying. More importantly, they suggest costless and simple ways in which dishonesty can be increased, by making the moral costs of lying more salient to individuals. Such ideas have recently been tested within policy circles. In a recent experiment, the Social and Behavioral Sciences Team, a group of experts in behavioral science who work for the U.S. Government, tested the timing manipulation among vendors of goods and services to the U.S. Government and other administrations (SBST Report, 2015). Placing a signature box to confirm the accuracy of self-reported sales at the beginning led to an additional $1.59 million in fees collected within a single quarter.

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[7] A related manipulation to increase honesty could involve limiting the time individuals have to report an event. Shalvi et al. (2012) show that under time pressure individuals are more likely to be honest.

5. Discussion and Conclusion

The robust evidence of an aversion to lying, among some individuals and under some circumstances, has changed the perspective of economists regarding behavior in strategic information transmission settings and will likely bring about further new insights in the near future. A first impact of the research on lying aversion has been its influence on theoretical work. Several recent papers no longer assume that individuals have no disutility from lying, but rather incorporate this disutility into their models (e.g., Kartik et al., 2007, Kartik, 2009).

Yet, there is an open discussion about the shape of lying costs. Existing work has assumed that the cost of lying depends on the size of the lie, i.e. the distance between the truth and the reported outcome. However, this may only hold if the distance between the truth and the reported outcome is directly related to the difference in material consequences for the parties involved. Further, lying costs potentially vary depending on multiple factors such as language and timing. More empirical and theoretical work is needed to provide a systematic framework that guides our understanding of the moral costs of lying.

Inspiring new papers suggest that biology and dishonesty may be tightly linked. Wang et al. (2010), for example, show that pupil dilation increases among those individuals who lied. This suggests that such a biological marker could be used to detect dishonesty. Further, a recent paper by Belot and van de Ven (2015) suggests that, in face-to-face interactions, individuals can be good at detecting others' dishonesty.

Research in biology also suggests further interesting questions to be addressed. For example, Trivers (2010) argues that the best liars are those who deceive themselves into believing their own lies. In a recent experiment, Gneezy et al. (2015) find evidence consistent with self-deception. In their experiment, individuals are significantly more likely to behave unethically when there is scope for self-deception. Further work studying

the origins of lying norms, including its evolutionary roots, could prove important to our understanding of morality in modern societies.

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