Journal of Economic Behavior and Organization 178 (2020) 629–643

Contents lists available at ScienceDirect

Journal of Economic Behavior and Organization

journal homepage: www.elsevier.com/locate/jebo

Externalities, stakes, and lying

Uri Gneezy[a,b], Agne Kajackaite[c,*]

[a] University of California San Diego, 9500 Gilman Drive, La Jolla, CA 92093, United States
[b] University of Amsterdam, the Netherlands
[c] WZB Berlin Social Science Center, Reichpietschufer 50, 10785 Berlin, Germany

ARTICLE INFO

Article history:
Received 20 February 2020
Revised 15 July 2020
Accepted 17 August 2020
Available online 26 August 2020

JEL classification:
C91
D82
D91

Keywords:
Lying
Cheating
Stakes
Fairness
Laboratory experiment

ABSTRACT

We study an observed cheating game in which senders can earn money by lying to the experimenter, knowing the experimenter will later be able to observe whether they told the truth or lied. We modify the game by matching each sender with a receiver, whose earnings negatively correlate with the earnings of the sender. Our results show that senders lie less when matched with a receiver who loses money if they lie. However, once we increase the stakes by a factor of five, participants lie as much in the two-player game as in the one-player game. That is, an externality reduces lying but only as long as the stakes are low.

1. Introduction

Many interactions in the marketplace and everyday life involve asymmetric information, which tempts some people to lie for their benefit. The assumption in standard economic models is that every individual would lie for some benefit as long as the cost of being caught is small enough in terms of probability and punishment (see Becker, 1968). Recent research in behavioral economics shows, however, that some individuals experience psychological disutility when lying due to impaired self-image (I see myself as a liar) and/or social-image (others see me as a liar) (e.g., Abeler et al., 2019; Fischbacher and Föllmi-Heusi, 2013; Gneezy, 2005, 2018). The evidence from these studies and many others confirm that due to the psychological cost of lying, some individuals refrain from lying and some lie but not to the maximum.

Behavioral economics uses two main types of games to study lying behavior—cheating games (as in Fischbacher and Föllmi-Heusi, 2013) and deception games (as in Gneezy, 2005). In cheating games, participants have private information about a random-draw outcome and report it to the experimenter; their payoffs, in turn, depend on the reports. The deception game is a two-player game in which a sender has private information regarding the payoff structure and sends a message about the payoffs to a receiver who then decides whether to follow the message, which in turn determines final payoffs.

* Corresponding author.
E-mail addresses: ugneezy@ucsd.edu (U. Gneezy), agne.kajackaite@wzb.eu (A. Kajackaite).

https://doi.org/10.1016/j.jebo.2020.08.020
0167-2681/Published by Elsevier B.V.

Table 1
Summary of treatments and number of independent observations.

Treatment	Payoffs	N
One-player low stakes	$Payoff = report$	200 (61.0% male)
Two-player low stakes	$Payoff_{sender} = report$ $Payoff_{receiver} = 11 - report$	200 (64.5% male)
One-player high stakes	$Payoff = report * 5$	100 (60.0% male)
Two-player high stakes	$Payoff_{sender} = report * 5$ $Payoff_{receiver} = (11 - report) * 5$	100 (60.0% male)

These games differ in three main aspects. First, whereas cheating games have no strategic element, deception games do because the sender's message may affect the receiver's beliefs about payoffs and her actions. Second, whereas in deception games the experimenter knows what the sender observes and hence what the true outcome is, in most of the cheating games the experimenter does not know the true outcome. Third, whereas in cheating games behavior has no impact on other participants' payoffs (only the experimenter's payoff), deception games also involve externalities that affect the receiver. In this paper, we focus on what happens to lying costs when an externality is added to cheating games.

We know of two papers in the cheating-games literature with a negative externality on others: an "externality" treatment in Fischbacher and Föllmi-Heusi (2013) and an "extended mind game" in Kajackaite and Gneezy (2017). In contrast to the deception-games literature, which finds that higher negative externalities on others lead to less lying (e.g., Erat and Gneezy, 2012; Gneezy, 2005; Sutter, 2009), the two experiments in cheating games mostly find no significant effect of an externality on lying.[1]

Do externalities matter only in a strategic version of a lying game? Alternatively, some aspects of the design of the two cheating games cited above may lead to externalities having no impact. For instance, in the game by Kajackaite and Gneezy (2017), the decision to lie was binary, without an option for partial lies, and avoiding an externality on another player was made expensive.[2] In Fischbacher and Föllmi-Heusi (2013), the cheating games were conducted at the end of other experiments. Furthermore, in the experiments of Fischbacher and Föllmi-Heusi (2013) and Kajackaite and Gneezy (2017) the experimenter did not know the true outcome of the random draw, which might be reducing the effect of an externality in cheating games when compared to deception games, in which the experimenter knows the true outcome observed by the sender. In this paper, we systematically test the effect of externalities on lying in observed cheating games (similar to Gneezy et al., 2018), with the goal of better understanding the structure of lying costs. We examine whether people lie less in an observed cheating game when their dishonesty imposes a negative externality on others than when it does not.

In our experiment, participants engage in two versions of an observed cheating game. In both of these versions, senders see a number (from 1 to 10), which they are asked to report. Higher reported numbers (regardless if they are true or not) result in higher payoffs. The two games differ in their negative externalities. The one-player version of the game is similar to the usual cheating experiments in which a lie affects only the sender and the experimenter. In the two-player version of the game, the sender's misreporting hurts the monetary payoff of a receiver. We test the null hypothesis of no difference between the treatments against the hypothesis that senders will lie less—both on the intensive and extensive margin—in the two-player game than in the one-player game.

Gneezy et al. (2018) discuss three motives that come into play when deciding whether and how much to lie in the one-player game: (i) the monetary benefit of the lie; (ii) the intrinsic disutility of lying, that is, the self-image cost; and (iii) the disutility of appearing dishonest, that is, the social-image cost.

Self-image and social-image concerns can lead some participants to avoid lying altogether. Due to the self-image costs, some participants may lie only partially by stating a number higher than the true number, but not the highest possible. The reasoning behind the partial-lying prediction is that in our design, the experimenter can later observe whether the sender told the truth. Hence, the social-image cost is binary in the game—because the experimenter can identify lying, a lie of any size causes one to gain a reputation as a liar. Gneezy et al. (2018) model the self-image cost as dependent on the size of the lie—the distance between the true and reported outcome—which can lead to some participants lying only partially. Finally, no participant in this game should underreport the actual number, because doing so would lead to pecuniary as well as intrinsic and reputational lying costs.

In the two-player game, the monetary benefit of lying and the disutility of appearing dishonest play the same role as in the one-player game: If a player over-reports and claims x instead of the observed y, she appears as much of a liar in the two-player game as in the one-player game. However, the intrinsic cost of lying may be higher in the two-player game than in the one-player version, because overreporting in this game also reduces the receiver's payoff. This negative externality may increase self-image costs when lying compared to the one-player game, and a sender may feel worse when the lie

[1] The exception is the \$5 treatment by Kajackaite and Gneezy (2017), in which an externality reduces lying. In the treatment, reporting the outcome that maximizes own payoff decreases from 47% to 29% when an externality is introduced ($p = 0.043$, Fisher exact test).

[2] Participants had to think of a number between 1 and 6 and then roll a six-sided die. If the number they thought about and the number they rolled matched, the participant was asked to report "Yes." If the numbers did not match, participants were asked to report "No." Each participant was matched to a passive player. The payoffs were such that if the active participant reported "Yes," she received \$X (between \$1 and \$50 depending on the treatment) and the other participant assigned to her received zero; if she reported "No," she received zero and the other participant received \$X.

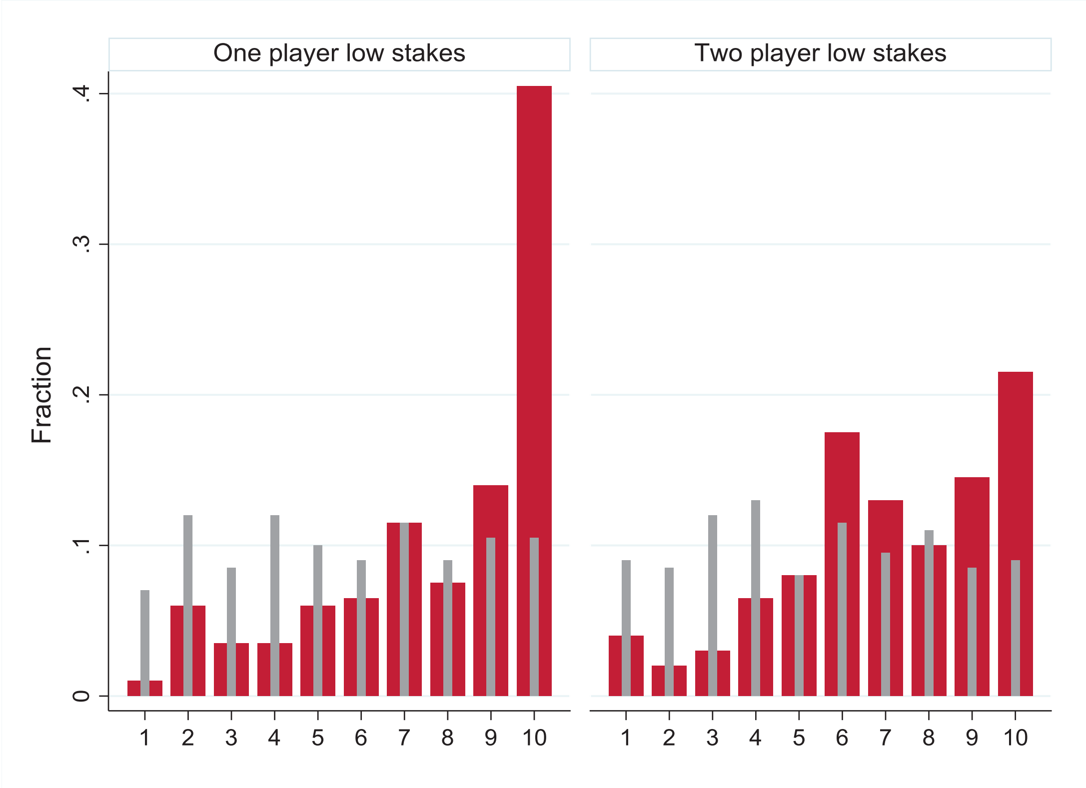

Fig. 1. Distribution of observed and reported numbers with low stakes.
Note: The thick bars show the reported numbers, whereas the thin bars show the actual numbers.

hurts a receiver. Social distance could also lead to the intrinsic cost of lying being higher in the two-player game than in the one-player game. In the one-player game, a subject plays with the experimenter and if she decides to over-report, her decision to lie affects the experimenter. In contrast, in the two-player game, a subject is matched with a passive player coming from the subject pool and if she decides to over-report, her decision to lie negatively affects this other person's income. Because the pool of subjects consists of people with common demographic characteristics, it is likely that the social distance among players in the two-player game is lower compared to the one-player game. The lower social distance in the two-player game may therefore lead to a higher intrinsic cost than in the one-player game when over-reporting. In return, the probability of lying and the extent of lying may be lower in the two-player game.

The previous paragraph considers the intrinsic cost of lying when lying up. When lying down, the change in the intrinsic cost of lying might be opposite. If a sender lies down, she benefits the receiver, which in turn may even boost her self-image. As a result, the intrinsic cost of lying down might be small or even negative in a two-player game. Underreporting, however, leads to a smaller monetary reward and a reputation as a liar.[3] Depending on the effect sizes, some senders might lie down.

Inequity aversion leads to three predictions in the two-player version of the game, both for the probability and the extent of overreporting. The first prediction is more frequent lying in a two-player game than in a one-player game when the true number is low. This prediction arises because in the two-player game when the true number is lower than the payoff-equalizing number, in addition to increasing the monetary payoff, lying also reduces disadvantageous inequality. Second, if people are averse to inequity even when it is advantageous for them, the senders with high true numbers may choose to underreport. The third prediction is a lower extent of lies, conditional on lying, due to advantageous inequity aversion, because over-reporting by reporting the largest numbers increases inequity.

[3] Lying downwards may increase sender's reputation in the eyes of the experimenter, since the sender signals she is as a person who is willing to sacrifice her own payoffs for the monetary benefit of the receiver. We, however, do not take this consideration into account, since the rules of the game are reporting the true outcome and we believe that the reputation that the senders, who have social-image concerns, are aiming for is appearing honest in front of the experimenter. We base our reasoning on the evidence from the one-player observed game by Gneezy et al. (2018), in which *none* out of 390 participants lied downwards, even though lying down could have been seen as "nice" by the experimenter, because it leaves more money on the table for the experimenter.

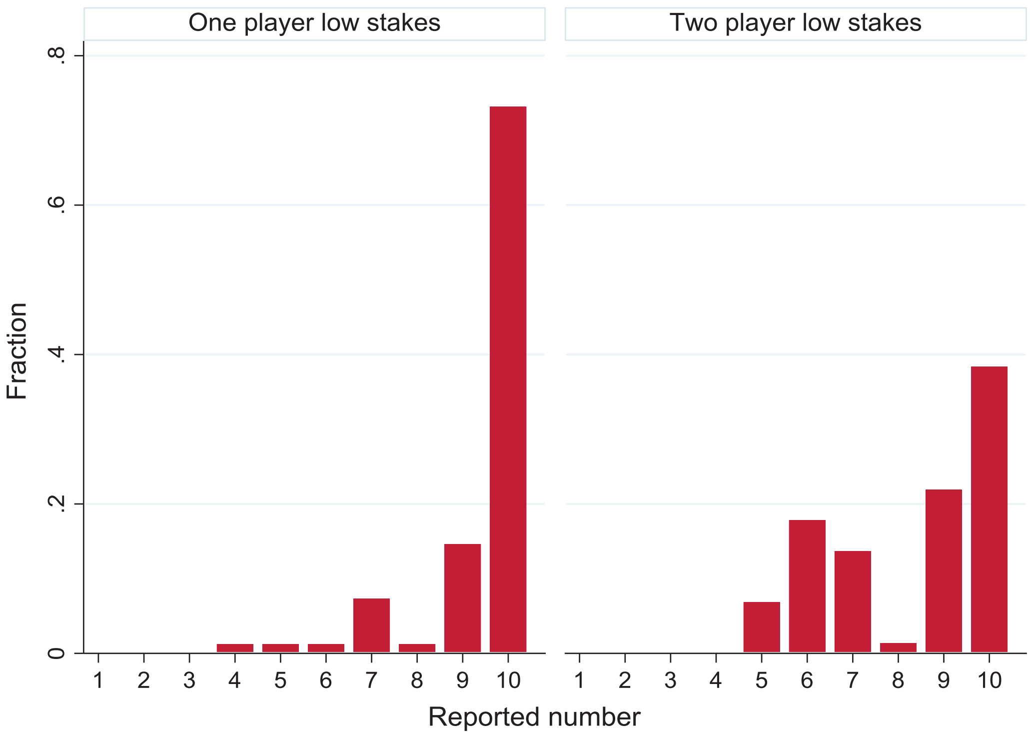

Fig. 2. Distribution of reports by participants who overreport with low stakes.

Intrinsic lying costs would lead senders to overreport less frequently in the two-player game than in the one-player game regardless of the number they see. Thus, the first inequity-based prediction does not overlap with the predictions of intrinsic lying costs, whereas the second and third predictions do. As a result, our design allows us to identify the role of the two mechanisms in the experiment.

Finally, to understand the relative size of the motives to lie, we manipulate the size of incentives. If a negative externality affects cheating, would the effect persist when we increase the stakes? To answer this question, we increase the stakes by a factor of five and compare lying in a one-player and two-player game with stakes up to 50 EUR.

2. Experimental design and procedure

In the experiment, we use a 2 × 2 between-subjects design, varying the number of players (one vs. two) and the stakes (low vs. high).

The first treatment, "One-player low stakes" is based on the game introduced by Gneezy et al. (2018), which is a variant of Fischbacher and Föllmi-Heusi's (2013) experimental design. In this treatment, we ask senders to privately click and open one of 10 boxes on a computer screen. Each box hides a different number between 1 and 10, placed in a random order. After seeing the number, senders are asked to report it to the experimenter. As their payment, senders receive the number they reported in euros, incentivizing them to overreport.

Our experimental design enables us to know whether and to what extent senders lie. Because the game takes place on a computer, we can later observe the numbers that senders actually saw and compare them with their reports. An observed version of the cheating game increases the statistical power of our analyses compared to a non-observed game. In addition, observing the true outcome keeps the game as similar as possible to the deception game.

The second treatment, "Two-player low stakes," is an extended version of the game, in which we match each sender with a passive receiver. The sender plays the game described above with one change: The reported number in this version of the game affects not only the payoff of the sender (as before), but also that of a receiver, who is paid $11 - x$ euros, with x being the number reported by the sender.

Whereas the sender knows the exact payoff functions, the receiver knows only that the payoffs depend on the reported number, but not how exactly. We chose this information structure to avoid the effects of the desire to appear honest in front of the receiver, which would come into play if the receiver knew the exact payoff functions. Also, not informing the receiver

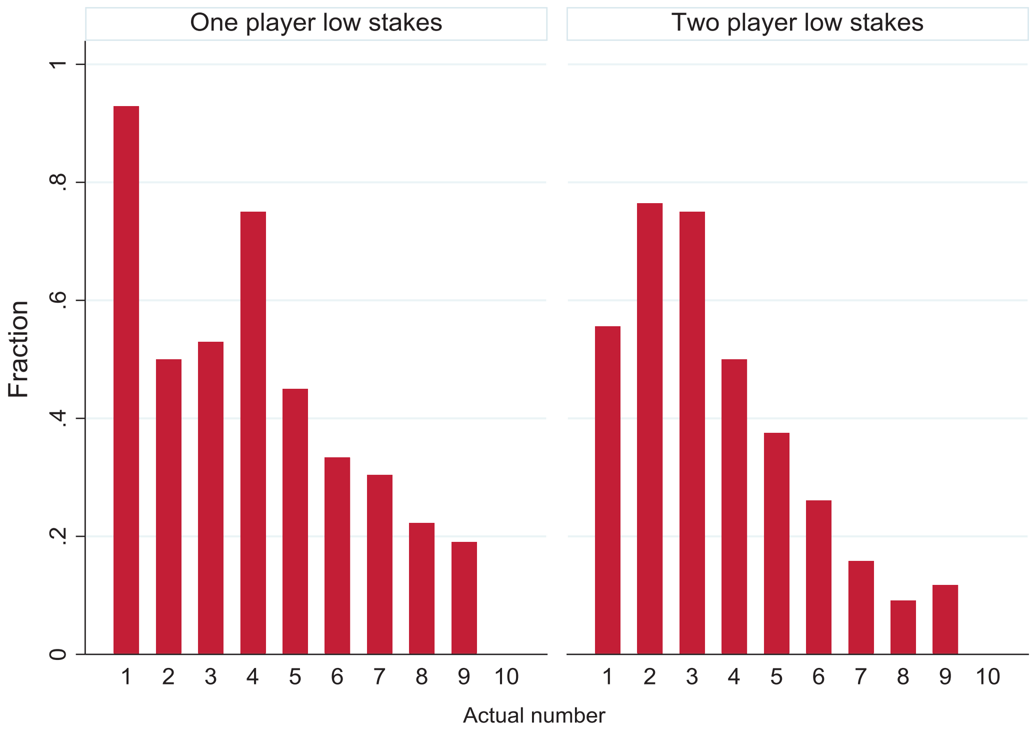

Fig. 3. Fraction of overreporters conditional on the actual number with low stakes.

about the payoff functions keeps the game as similar as possible to the deception game. Informing the receiver about the payoff functions may lead to less lying due to the willingness to appear honest not only in front of the experimenter, but also in front of the receiver.

The third treatment, "One-player high stakes," has the same structure as the "One player low stakes" but has stakes that are five times larger—the participant earns a euro amount equal to five times the number she reports. Finally, treatment "Two-player high stakes" is the same as "Two-player low stakes," but with incentives that are five times larger.

Table 1 presents the treatments, payoff functions, and the number of independent observations (only senders) in each treatment.

We conducted the experiment in November 2018 – January 2019 at the Berlin Experimental Economics Lab. Overall, we recruited 900 participants (600 senders and 300 receivers) via ORSEE (Greiner, 2004); none of them participated in more than one session. An experimental session lasted approximately 30 min.

After arriving to the lab, participants read the instructions (see Appendix B for the instructions) and were allowed to ask questions privately. When the game started, senders clicked on a box on the computer screen and reported what number they saw. Receivers just waited in their cubicle. After the game, participants learned about their payoffs and filled out a post-experiment questionnaire that included questions on gender, age, field of study, and motives behind their decisions. At the end, participants were paid privately and left the laboratory.

3. Results

In what follows, we present analyses of our data and discuss the results. We first present the results from the low-stakes treatments and then move to the high-stakes treatments.

3.1. Low stakes

The left panel of Fig. 1 presents the distributions of actual and reported numbers in the one-player game. The reported numbers are significantly higher than the actual numbers participants saw ($p < 0.001$; Wilcoxon Matched-Pairs Signed-Ranks Test; all tests in the paper are two-sided).

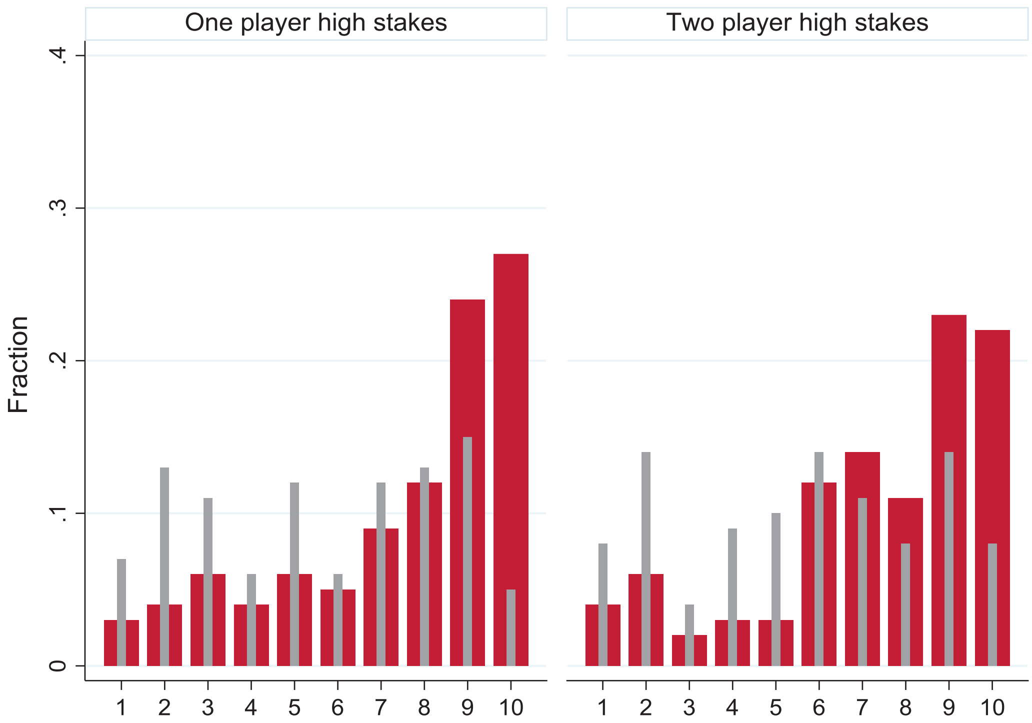

Fig. 4. Distribution of observed and reported numbers with high stakes.

In the one-player treatment, 42% of senders lie, with 41% overreporting. Underreporting is rare, with only 1% of senders lying downwards, possibly due to mistakes. In the analyses that follow, we concentrate on senders who over-reported only.

We categorize lies into "full-extent" lies (reporting the maximum possible outcome of 10) and partial lies (overreporting, but reporting less than 10). In line with Gneezy et al. (2018), we find that when participants lie in the observed game, they tend to lie all the way—71.43% of participants who lie report a 10 (see Fig. 2).

The right panel of Fig. 1 presents the distributions of actual and reported numbers in the two-player treatment. The reported numbers are also higher than the actually observed numbers ($p < 0.001$; Wilcoxon Matched-Pairs Signed-Ranks Test).

The over-reporting goes down in the two-player game compared to the one-player game. In the one-player treatment, the average reported number was 7.78; in the two-player game, it was 7.05 ($p < 0.001$, MWU). A similar fraction of senders lie in both treatments (42% in one-player vs. 41.50% in two-player; $p = 1.00$, Fisher exact test)—what changes is the nature of lying. We identify three main differences in lying between the two games.

First, in the two-player game, fewer senders lie by reporting the maximum outcome than in the one-player game (14% vs. 30%, respectively; $p < 0.001$, Fisher exact test). Second, in the two-player game, significantly more senders over-report partially than in the one-player game (22.50% vs. 11%, respectively; $p = 0.003$, Fisher exact test).[4] Third, more senders underreport in the two-player game than in the one-player game (5% vs. 1%, respectively; $p = 0.036$, Fisher exact test). Nonetheless, the fraction of underreporting remains small.[5]

The game also allows us to analyze the probability of lying conditional on the actual number observed (see Fig. 3). We can see from the figure that in both treatments, the lower the observed number is, the more likely senders are to overreport, which is in line with the results by Gneezy et al. (2018). For example, in the one-player game, only 19.05% of senders who observed a 9 overreport their number, whereas 92.86% of the senders who observed a 1 overreport. In both treatments, we find a significant negative correlation between the number observed and the probability of overreporting (one-player: Spearman's rho = − 0.45, $p < 0.001$; two-player: Spearman's rho = − 0.51, $p < 0.001$).

[4] See Appendix A for additional analyses on the size of the lie.

[5] Senders who underreported in this treatment had observed high actual numbers between 7 and 10. The way they lied was by reporting 6 instead of 7 (three participants); 5 instead of 8; 6 instead of 8; 7 instead of 9 (two participants); 6 instead of 10; 7 instead of 10; and 8 instead of 10.

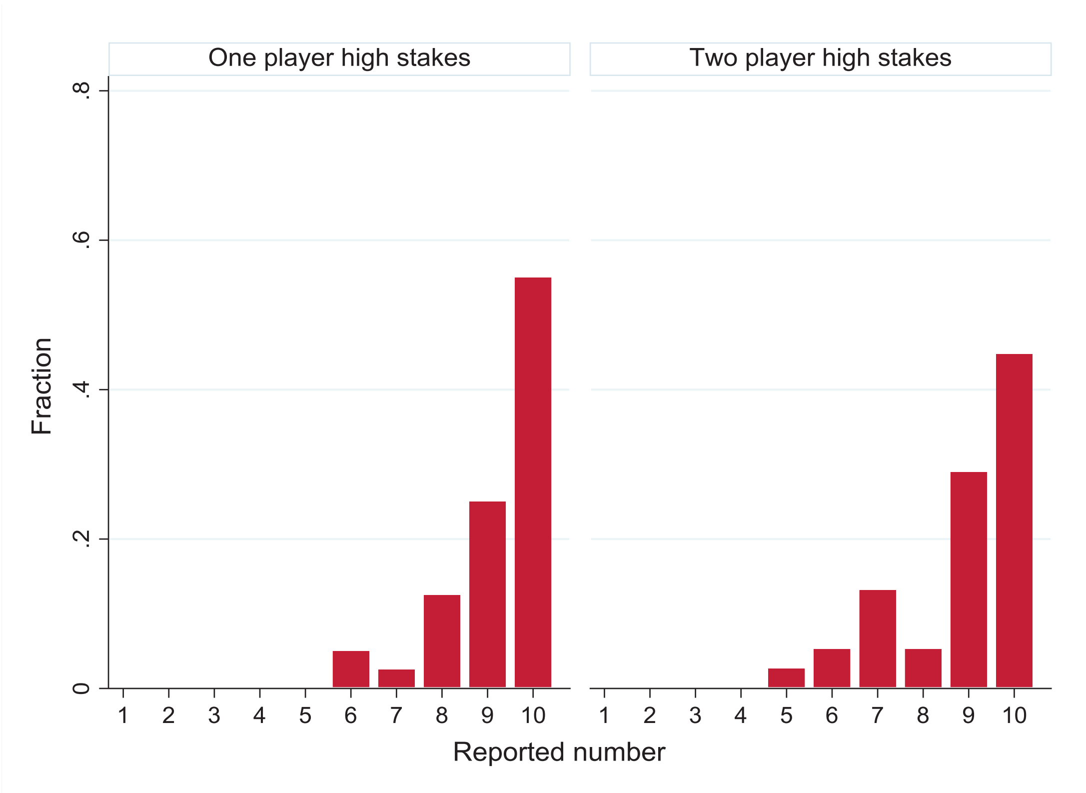

Fig. 5. Distribution of reports by participants who overreport with high stakes.

3.2. High stakes

So far, we have seen that a negative externality leads to less lying. Does the effect persist if we make the stakes really high?

The left side of Fig. 4 presents the distributions of actual and reported outcomes in the one-player game with high stakes. The reported numbers are significantly higher than the actual numbers participants saw ($p < 0.001$; Wilcoxon Matched-Pairs Signed-Ranks Test).

We observe a statistically insignificant decrease in overreporting when moving from low to high stakes in the one-player game (7.78 in low stakes and 7.50 with high stakes; $p = 0.186$, MWU).[6] A similar fraction of participants overreport in high and low stakes (40% vs. 41%, respectively).[7] What changes is that with high stakes, full-extent lying is slightly less frequent and partial lying is slightly more frequent when compared with the low stakes. With high stakes, only 55% of participants who lie report a 10 (see Fig. 5). However, the decrease in lying by reporting the maximum outcome (from 30% to 22%) and the increase in overreporting partially (from 11% to 18%) are not statistically significant ($p = 0.170$ and $p = 0.106$, respectively; Fisher exact test).

The right panel of Fig. 4 presents the distributions of actual and reported numbers in the two-player game with high stakes. In this treatment, the reported numbers are also higher than the actually observed numbers ($p < 0.001$; Wilcoxon Matched-Pairs Signed-Ranks Test).

We observe a statistically insignificant increase in overreporting when moving from low to high stakes in the two-player game (7.05 with low stakes, 7.34 with high stakes; $p = 0.197$, MWU). With high stakes, slightly more full-extent lying, slightly less partial lying, and slightly less underreporting occur than with the low stakes. However, the increase in full-extent lying (from 14% to 17%), the decrease in partial lying (from 22.50% to 21%), and the decrease in downwards lying (from 5% to 3%)[8] are not statistically significant ($p = 0.497$, $p = 0.883$, and $p = 0.555$, respectively; Fisher exact test).

[6] The result that lying does not increase when stakes increase is in line with other results in the cheating literature. For instance, Kajackaite and Gneezy (2007) find that increasing stakes in a non-observed cheating game does not lead to more lying. Abeler et al. (2019) show in a meta-study that, on average, lying does not increase in cheating games when stakes go up.

[7] Nobody underreports in the one-player high-stakes treatment.

[8] Only senders who observed a 10 lied downwards: two participants lied down to 8, and one participant lied down to 6.

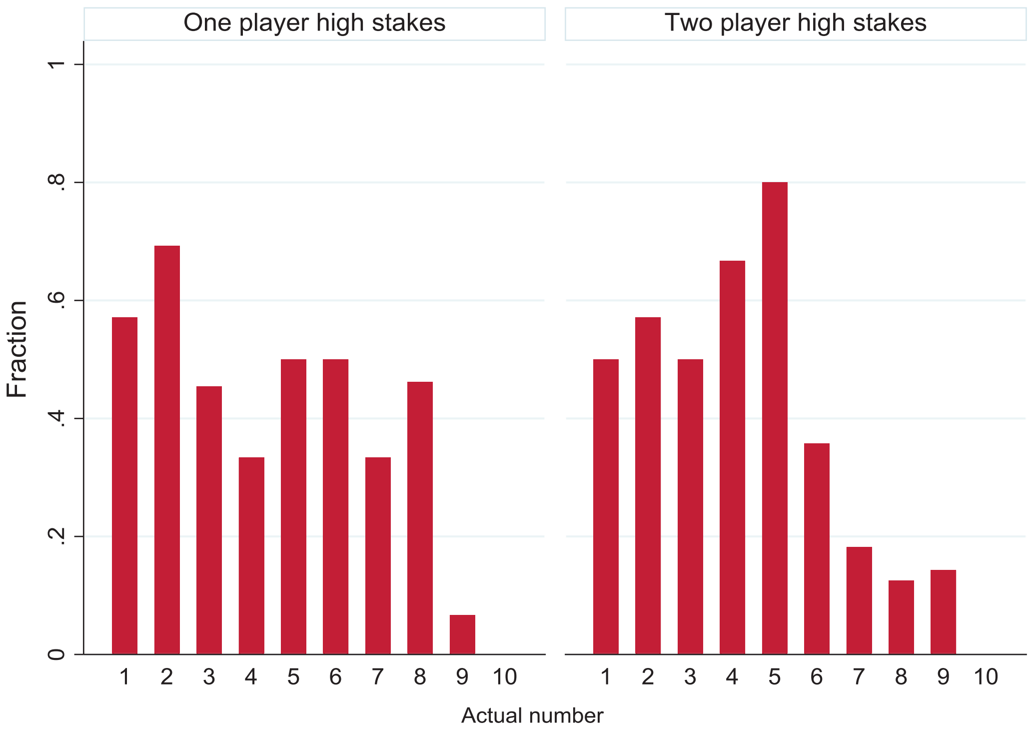

Fig. 6. Fraction of overreporting conditional on the actual number with high stakes.

That is, a slight decrease occurs in overreporting in the one-player game and a slight increase occurs in overreporting in the two-player game. As a result, the differences between the two treatments we saw when the stakes were low are not present when the stakes are high. In the high-stakes treatments, the average reported numbers are 7.50 versus 7.34, full-extent lying is 22% versus 17%, partial lying is 18% versus 21%, and underreporting is 0% versus 3% in the one-player game and the two-player game respectively, with none of the differences being statistically significant ($p = 0.458$, $p = 0.476$, $p = 0.721$ and $p = 0.246$, respectively; MWU and Fisher exact tests).

Finally, as with low stakes, in high-stakes conditions, we find that in one-player and two-player games, the probability of lying decreases with the actual observed number (see Fig. 6). In both treatments, we find a significant negative correlation between the payoff observed and the probability of overreporting (one-player: Spearman's rho $= -0.34$, $p < 0.001$; two-player: Spearman's rho $= -0.42$, $p < 0.001$).

4. Discussion and conclusion

We find that when stakes are low, senders overreport less in the two-player game than in the one-player game. More partial lying and less full-extent lying occur when we introduce a negative externality. Two possible channels can explain these differences in the two-player game. The first is a higher intrinsic cost of lying due to the negative externality of the lie on the receiver. The second channel is based on inequity aversion, because larger lies increase inequity. Because both channels work in the same direction, we cannot distinguish between them. In line with inequity aversion and low or negative intrinsic costs of lying when lying to benefit the receiver, we find that more participants underreport in the two-player game than in the one-player game.

A final prediction we had for the two-player game is based on the disadvantageous inequity aversion. If disadvantageous inequity aversion mattered in our game, we would observe more frequent overreporting in a two-player game than in a one-player game when the true number is lower than the payoff-equalizing number (in our case, 5.5), because overreporting would reduce disadvantageous inequality. However, Fig. 3 demonstrates that disadvantageous equity concerns have little to no effect on senders' lying decisions. For the observed numbers that are lower than 5.5, none of the lying fractions are significantly higher in the two-player game than in the one-player game, and the fraction of lies after observing a 1 is even higher in the one-player game ($p = 0.022$, Fisher exact test). That is, the disadvantageous inequity aversion does not explain our data. This result is not in line with the recent experiment by Barron et al. (2019). In their cheating game, senders are given four options: telling the truth, equalizing payoffs, maximizing own payoff, or maximizing the sender's payoff. Barron et al. find that when the observed number is low and thus senders experience disadvantageous inequity, many choose the option of equalizing payoffs. The difference between our results might be due to the salience of the inequity concerns in Barron et al. (2019). In their experiment, "equity" is one of four strategies and part of the instructions.

Although we find clear support for lying being costlier in a two-player game than in a one-player game when the stakes are low (either due to the intrinsic lying cost and/or advantageous inequity aversion), we find no support for it when the stakes are high. Once we increase the stakes by a factor of five, the differences between lying in the games disappear. That is, when stakes are high, neither the intrinsic cost of lying nor advantageous inequity aversion lead to differences in behavior between the two-player game and one-player game.

Finally, if disadvantageous inequity aversion mattered when stakes are high, we would observe more frequent overreporting for observed numbers that are lower than 5.5 in a two-player game. However, for the observed numbers that are lower than 5.5, none of the lying fractions are significantly higher in the two-player game than in the one-player game ($p > 0.1$, Fisher exact test). That is, in line with low-stakes treatments, the disadvantageous inequity aversion cannot explain lying behavior in high-stakes treatments.

We finish by noting that our findings do not directly translate to non-observed cheating games. Future work should analyze how externalities affect lying in non-observed cheating games.

Declaration of Competing Interest

We have no conflicting interest to declare.

Appendix

A. Additional analyses on the size of the lie

Fig. A1 presents the average numbers that senders who overreported claim to have observed in the low-stakes treatments. We find a positive correlation between the actual and reported number when one overreports for both games (Spearman's rho = 0.25, $p = 0.025$ for the one-player game; rho = 0.32, $p = 0.006$ for the two-player game). Note that Gneezy et al. (2018), by contrast, found no significant correlation between the reports and actual numbers in the observed

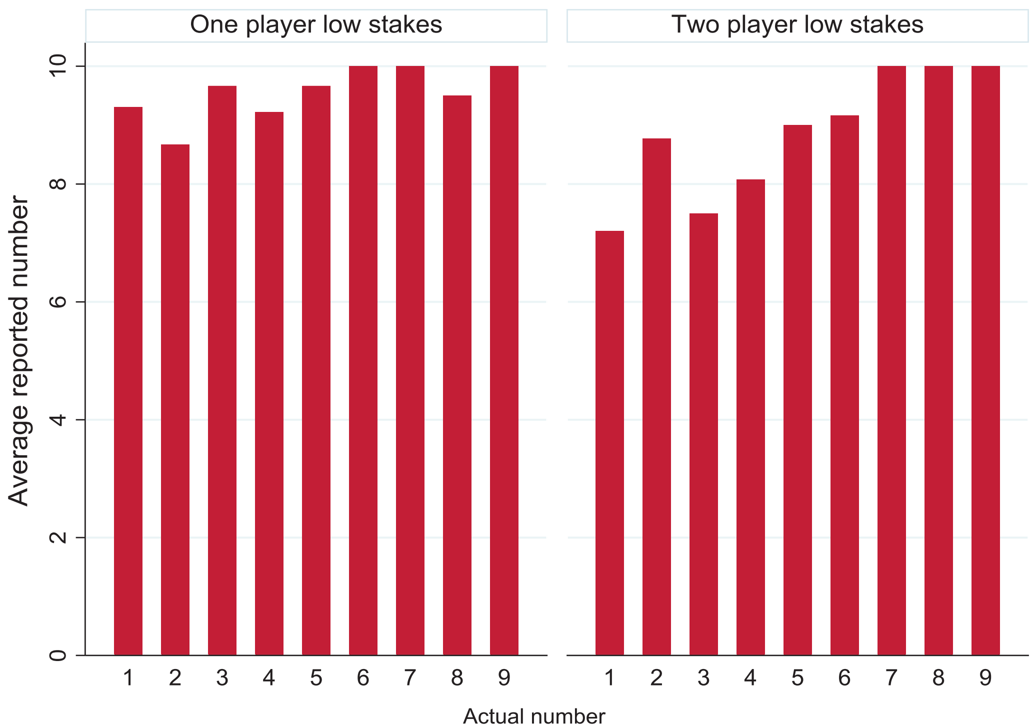

Fig. A1. Average numbers reported by senders who overreport with low stakes.

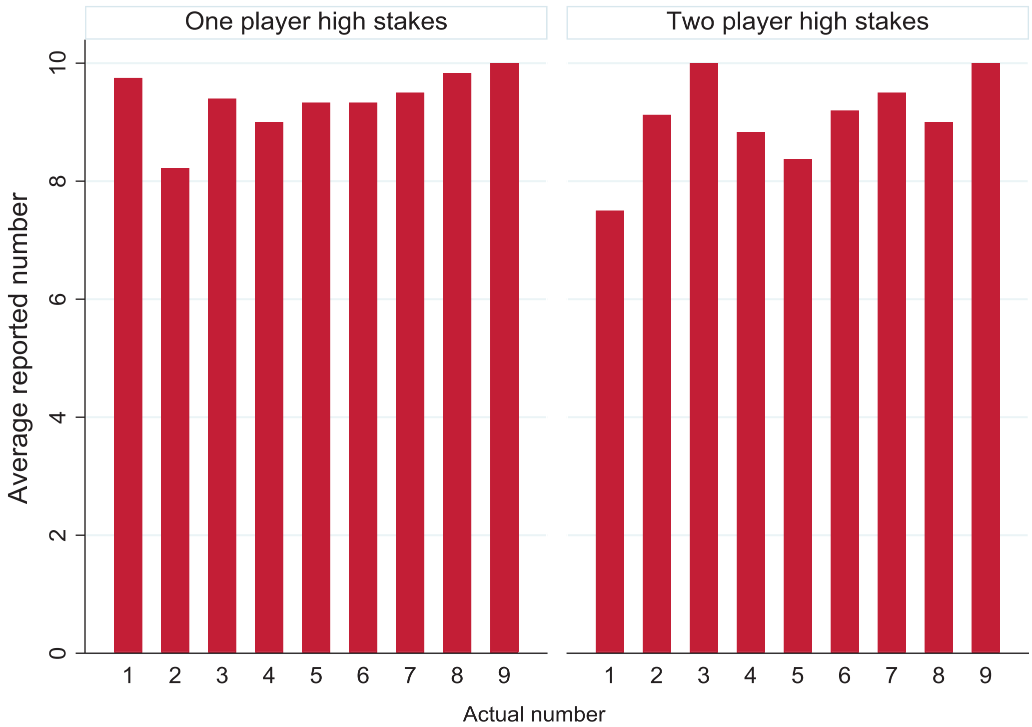

Fig. A2. Average numbers reported by participants who lie upwards with high stakes.

game (Spearman's rho was positive but non-significant). That is, the senders' intrinsic cost of lying in this experiment seems to be more sensitive to the size of the lie in the outcome dimension than in the experiment by Gneezy et al. (2018).

Fig. A2 presents the average numbers that senders who overreport claim to have observed in the high-stakes treatments. Unlike in low-stakes treatments, in high-stakes treatments, the positive correlation between the actual and reported number conditional on over-reporting is not significant at conventional levels, which might be due to a lower number of observations in high-stakes treatments (Spearman's rho = 0.29, $p = 0.071$ for the one-player game; rho = 0.16, $p = 0.340$ for the two-players game).

B. Instructions

Translation to English

Instructions: One-player low stakes

Welcome to our experiment. Please read the instructions carefully. If you have a question, please raise your hand and we will come over to you.

Please use only the programs and functions intended for the experiment. If you violate these rules, we must exclude you from the experiment and the payout.

Each participant today will receive 6 euros for attending, which will be paid out independently of the decisions made in the experiment.

Furthermore, you will be able to earn additional money, as we explain below. At the end of the experiment, you will receive the money you earned plus the 6 euros for attending in cash.

Your decisions are private and no other participant will know about them.

You will later see on the computer screen 10 boxes with numbers hidden behind them. The numbers in the boxes are 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 and they are placed in a random order. We will ask you to click on one box and memorize the number you see.

We will then ask you to report the number you had by choosing one of the following:

"The number I observed was 1"
"The number I observed was 2"
"The number I observed was 3"

"The number I observed was 4"
"The number I observed was 5"
"The number I observed was 6"
"The number I observed was 7"
"The number I observed was 8"
"The number I observed was 9"
"The number I observed was 10"

The number you report will determine how much money you will be paid.

You will be paid the equivalent in Euros to the number you report. In other words, if you report 1, you receive 1€, if you report 2, you receive 2€, if you report 3, you receive 3€, and so on.

The following table illustrates all possible payoffs:

Reported number	1	2	3	4	5	6	7	8	9	10
Your payoff	1€	2€	3€	4€	5€	6€	7€	8€	9€	10€

There will be no further rounds in this experiment. That is, you participate in the task described above only once and this task is the only task you will have today in the session. After the task, you will fill in a demographic post-questionnaire, pick up your earnings, and leave the laboratory.

If you have any questions, please raise your hand and we will come to you.

The experiment will continue on the computer screen.

Instructions: Two-player low stakes, senders

Welcome to our experiment. Please read the instructions carefully. If you have a question, please raise your hand and we will come over to you.

Please use only the programs and functions intended for the experiment. If you violate these rules, we must exclude you from the experiment and the payout.

Each participant today will receive 6 euros for attending, which will be paid out independently of the decisions made in the experiment.

Furthermore, you will be able to earn additional money, as we explain below. At the end of the experiment, you will receive the money you earned plus the 6 euros for attending in cash.

Your decisions are private and no other participant will know about them.

There are two types of participants in this experiment: players A and players B. Each player A is assigned to one player B. You are

Player A

You are matched with a player B who is also participating in this experimental session, and who also earns 6 euros for attending.

You will later see on the computer screen 10 boxes with numbers hidden behind them. The numbers in the boxes are 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 and they are placed in a random order. We will ask you to click on one box and memorize the number you see.

We will then ask you to report the number you had by choosing one of the following:

"The number I observed was 1"
"The number I observed was 2"
"The number I observed was 3"
"The number I observed was 4"
"The number I observed was 5"
"The number I observed was 6"
"The number I observed was 7"
"The number I observed was 8"
"The number I observed was 9"
"The number I observed was 10"

Player B makes no decisions in this experiment. Player B is informed that you are drawing a random number between 1 and 10 and sees which number you have reported.

The number you report will determine how much money you and Player B will be paid.

You will know how the reported number affects payments. Player B will not know how the reported number affects payments.

You will be paid the equivalent in euros to the number you report. In other words, if you report 1, you receive 1€, if you report 2, you receive 2€, if you report 3, you receive 3€, and so on.

Player B is paid 11€ minus the number you report. In other words, if you report 1, player B will earn 10€; if you report 2, he or she earns 9€; if you report 3, he or she earns 8€, and so on.

The following table illustrates all possible payoffs:

Reported number	1	2	3	4	5	6	7	8	9	10
Your payoff	1€	2€	3€	4€	5€	6€	7€	8€	9€	10€
Player B's payoff	10€	9€	8€	7€	6€	5€	4€	3€	2€	1€

There will be no further rounds in this experiment. That is, you participate in the task described above only once and this task is the only task you will have today in the session. After the task, you will fill in a demographic post-questionnaire, pick up your earnings, and leave the laboratory.

If you have any questions, please raise your hand and we will come to you.

The experiment will continue on the computer screen.

Instructions: Two-player low stakes, receivers

Welcome to our experiment. Please read the instructions carefully. If you have a question, please raise your hand and we will come over to you.

Please use only the programs and functions intended for the experiment. If you violate these rules, we must exclude you from the experiment and the payout.

Each participant today will receive 6 euros for attending, which will be paid out independently of the decisions made in the experiment.

Furthermore, you will be able to earn additional money, as we explain below. At the end of the experiment, you will receive the money you earned plus the 6 euros for attending in cash.

Your decisions are private and no other participant will know about them.

There are two types of participants in this experiment: players A and players B. Each player A is assigned to one player B. You are

Player B

You are matched with a player A, who is also participating in this experimental session and who also earns 6 euros for attending.

On the computer screen, player A will see 10 boxes with numbers hidden behind them. The numbers in the boxes are 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 and they are placed in a random order. Player A will be asked to click on one box and memorize the number he or she sees.

We will then ask player A to report the number he or she had by choosing on one of the following:

"The number I observed was 1"
"The number I observed was 2"
"The number I observed was 3"
"The number I observed was 4"
"The number I observed was 5"
"The number I observed was 6"
"The number I observed was 7"
"The number I observed was 8"
"The number I observed was 9"
"The number I observed was 10"

The number that Player A reports determines how much money you and Player A will be paid.

Only Player A receives information about how the reported number affects payments.

There will be no further rounds in this experiment. That is, you participate in the task described above only once and this task is the only task you will have today in the session. After the task, you will fill in a demographic post-questionnaire, pick up your earnings, and leave the laboratory.

If you have any questions, please raise your hand and we will come to you.

The experiment will continue on the computer screen.

Instructions: One-player high stakes

Welcome to our experiment. Please read the instructions carefully. If you have a question, please raise your hand and we will come over to you.

Please use only the programs and functions intended for the experiment. If you violate these rules, we must exclude you from the experiment and the payout.

Each participant today will receive 6 euros for attending, which will be paid out independently of the decisions made in the experiment.

Furthermore, you will be able to earn additional money, as we explain below. At the end of the experiment, you will receive the money you earned plus the 6 euros for attending in cash.

Your decisions are private and no other participant will know about them.

You will later see on the computer screen 10 boxes with numbers hidden behind them. The numbers in the boxes are 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 and they are placed in a random order. We will ask you to click on one box and memorize the number you see.

We will then ask you to report the number you had by choosing one of the following:

“The number I observed was 1”
“The number I observed was 2”
“The number I observed was 3”
“The number I observed was 4”
“The number I observed was 5”
“The number I observed was 6”
“The number I observed was 7”
“The number I observed was 8”
“The number I observed was 9”
“The number I observed was 10”

The number you report will determine how much money you will be paid.

You will be paid the equivalent in euros to the number you report, multiplied by 5. In other words, if you report 1, you receive 5€, if you report 2, you receive 10€, if you report 3, you receive 15€, and so on.

The following table illustrates all possible payoffs:

Reported number	1	2	3	4	5	6	7	8	9	10
Your payoff	5€	10€	15€	20€	25€	30€	35€	40€	45€	50€

There will be no further rounds in this experiment. That is, you participate in the task described above only once and this task is the only task you will have today in the session. After the task, you will fill in a demographic post-questionnaire, pick up your earnings and leave the laboratory.

If you have any questions, please raise your hand and we will come to you.

The experiment will continue on the computer screen.

Instructions: Two-player high stakes, senders

Welcome to our experiment. Please read the instructions carefully. If you have a question, please raise your hand and we will come over to you.

Please use only the programs and functions intended for the experiment. If you violate these rules, we must exclude you from the experiment and the payout.

Each participant today will receive 6 euros for attending, which will be paid out independently of the decisions made in the experiment.

Furthermore, you will be able to earn additional money, as we explain below. At the end of the experiment, you will receive the money you earned plus the 6 euros for attending in cash.

Your decisions are private and no other participant will know about them.

There are two types of participants in this experiment: players A and players B. Each player A is assigned to one player B. You are

Player A

You are matched with a player B who is also participating in this experimental session, and who also earns 6 euros for attending.

You will later see on the computer screen 10 boxes with numbers hidden behind them. The numbers in the boxes are 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 and they are placed in a random order. We will ask you to click on one box and memorize the number you see.

We will then ask you to report the number you had by choosing one of the following:

“The number I observed was 1”
“The number I observed was 2”
“The number I observed was 3”
“The number I observed was 4”
“The number I observed was 5”
“The number I observed was 6”
“The number I observed was 7”
“The number I observed was 8”
“The number I observed was 9”
“The number I observed was 10”

Player B makes no decisions in this experiment. Player B is informed that you are drawing a random number between 1 and 10 and sees which number you have reported.

The number you report will determine how much money you and Player B will be paid.

You will know how the reported number affects payments. Player B will not know how the reported number affects payments.

You will be paid the equivalent in euros to the number you report, multiplied by 5. In other words, if you report 1, you receive 5€, if you report 2, you receive 10€, if you report 3, you receive 15€, and so on.

Player B is paid 11€ minus the number you report, multiplied by 5. In other words, if you report 1, player B will earn 50€; if you report 2, he or she earns 45€; if you report 3, he or she earns 40€, and so on.

The following table illustrates all possible payoffs:

Reported number	1	2	3	4	5	6	7	8	9	10
Your payoff	5€	10€	15€	20€	25€	30€	35€	40€	45€	50€
Player B's payoff	50€	45€	40€	35€	30€	25€	20€	15€	10€	5€

There will be no further rounds in this experiment. That is, you participate in the task described above only once and this task is the only task you will have today in the session. After the task, you will fill in a demographic post-questionnaire, pick up your earnings, and leave the laboratory.

If you have any questions, please raise your hand and we will come to you.

The experiment will continue on the computer screen.

Instructions: Two-player high stakes, receivers

Welcome to our experiment. Please read the instructions carefully. If you have a question, please raise your hand and we will come over to you.

Please use only the programs and functions intended for the experiment. If you violate these rules, we must exclude you from the experiment and the payout.

Each participant today will receive 6 euros for attending, which will be paid out independently of the decisions made in the experiment.

Furthermore, you will be able to earn additional money, as we explain below. At the end of the experiment, you will receive the money you earned plus the 6 euros for attending in cash.

Your decisions are private and no other participant will know about them.

There are two types of participants in this experiment: players A and players B. Each player A is assigned to one player B. You are

Player B

You are matched with a player A, who is also participating in this experimental session and who also earns 6 euros for attending.

On the computer screen, player A will see 10 boxes with numbers hidden behind them. The numbers in the boxes are 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 and they are placed in a random order. Player A will be asked to click on one box and memorize the number he or she sees.

We will then ask player A to report the number he or she had by choosing on one of the following:

"The number I observed was 1"
"The number I observed was 2"
"The number I observed was 3"
"The number I observed was 4"
"The number I observed was 5"
"The number I observed was 6"
"The number I observed was 7"
"The number I observed was 8"
"The number I observed was 9"
"The number I observed was 10"

The number that Player A reports determines how much money you and Player A will be paid.

Only Player A receives information about how the reported number affects payments.

There will be no further rounds in this experiment. That is, you participate in the task described above only once and this task is the only task you will have today in the session. After the task, you will fill in a demographic post-questionnaire, pick up your earnings, and leave the laboratory.

If you have any questions, please raise your hand and we will come to you.

The experiment will continue on the computer screen.

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