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Gender differences in cheating:
Loss vs. gain framing

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Abstract

We use the die-paradigm to study gender differences in cheating behavior. We find that *i*) both males and females do not cheat in the absence of financial incentives, *ii*) both males and females cheat (but not maximally) if reports are associated with financial gains or losses, and *iii*) males and females do not cheat differentially.

Keywords: cheating, incentives, gender differences, loss aversion, framing, experiment.

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1. Introduction

There is mounting evidence on the factors that influence unethical behavior (Rosenbaum *et al.*, 2014; Jacobsen *et al.* 2017). Our interest is to investigate how incentives to cheat vary along an observable dimension -- the person's gender. Croson and Gneezy (2009) suggest the existence of gender differences in preferences and highlight that males and females react differently to the context. Our aim is to see how these findings apply to cheating behavior when subjects have to report a piece of private information to the experimenter.

We use the die-paradigm of Fischbacher and Föllmi-Heusi (2013), where subjects roll a die privately and then report the outcome they allegedly obtained. We consider three different treatments. In the Baseline, the subjects' payoffs are unaffected by their reported outcomes. In the Gain treatment, subjects' reported outcomes determine the amount they receive in a sealed envelope at the end of the session. In the Loss treatment, subjects are announced the maximum earnings at the beginning of the session and their reports determine the amount to be deducted from their initial endowment. By comparing the reported outcomes with the expected (uniform) distribution, we can detect cheating at the aggregate level. We compare males' and females' reported outcomes within and across treatments to test for gender differences in cheating behavior and investigate whether or not males and females cheat differently in the Gain and Loss frame.

Our study is the first to test for gender differences in cheating using the die-paradigm and considering separately the Gain and Loss domains. Childs (2012, 2013), Cappelen et al. (2013) and Grolleau et al. (2016), among others, investigate gender differences in cheating using other tasks. In the die-paradigm, the experimental evidence when reports are associated with gains is mixed; e.g., Clot et al. (2014) find that females cheat more than males, while Conrads *et al*. (2017)

find the opposite, and Muehlheusser *et al*. (2015) do not observe gender differences (see Abeler et al. (2016) for a recent meta-study on the die-paradigm).

We contribute to the literature by reporting no gender differences in cheating and extending the discussion to the gain and loss domains. Loss aversion posits that it hurts more to lose what you already have rather than not gain something you never had. We do not detect, however, for fixed gender, any differences in cheating across the gain and loss frames, thus we do not find evidence of loss aversion for males and females.

2. Experimental Design

Our experiment was added at the end of a session, following the procedures in Fischbacher and Follmi-Heusi (2013). Subjects were asked to roll a 10-sided die privately in their cubicles and then report the number they obtained (from 0 to 9) on the computer screen. Subjects received their payoffs at the end of the session in a sealed envelope depending on the reported outcome (see Table 1).

Table 1: Payoffs (in Euros) per treatment depending on the reported number

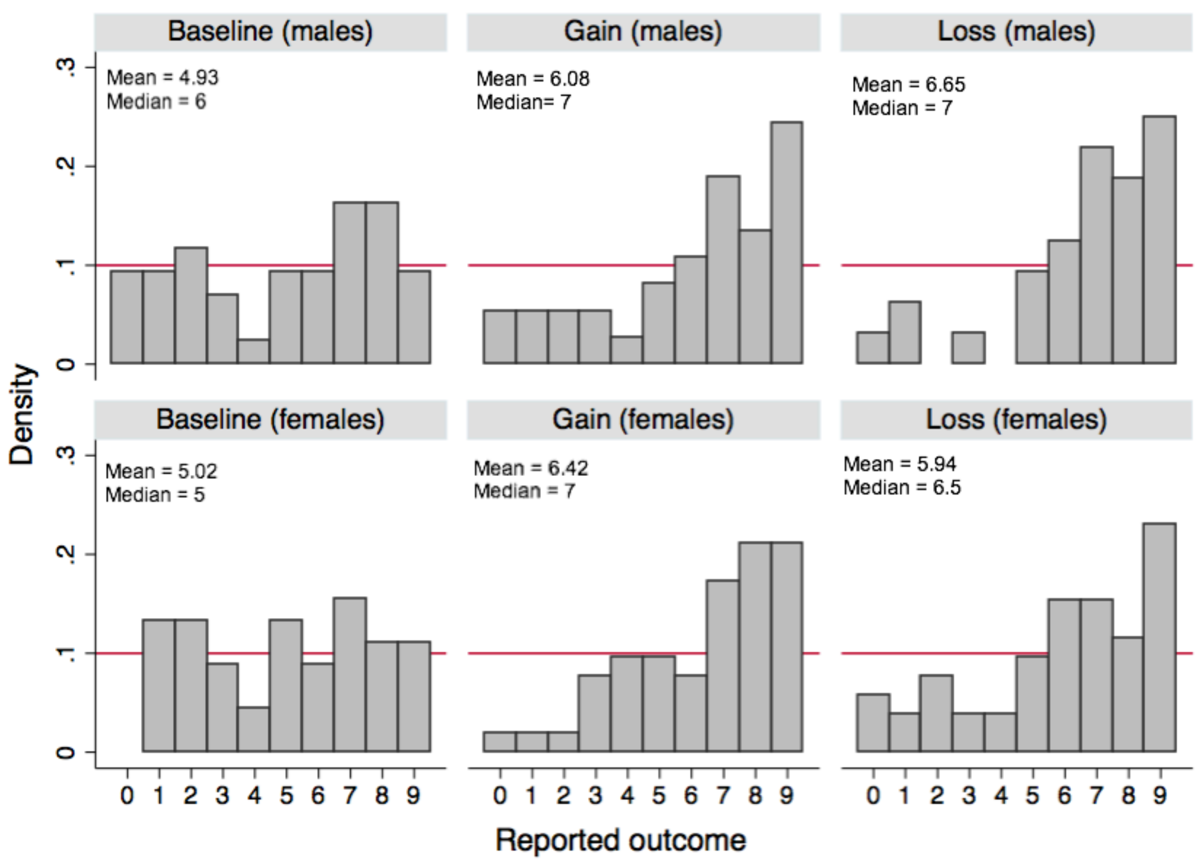
Reported outcome	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Baseline	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Gain	0	1	1.5	2	2.5	3	3.5	4	4.5	5
Loss	-5	-4	-3.5	-3	-2.5	-2	-1.5	-1	-0.5	0

In the Baseline (43 males, 45 females), subjects received a fixed amount (2.5€), regardless of the reported outcome. In the Gain treatment (37 males, 52 females), earnings ranged between 0€ (when reporting 0) and 5€ (when reporting 9). In the Loss treatment (32 males, 52 females), subjects were informed that they had been allocated 5€ at the beginning of the session. The reported outcome determined the amount to be deducted (by the experimenter) from their envelope.

3. Results

Figure 1 displays the distribution of the reported outcomes in each of the treatments, disaggregated by gender. The horizontal red line indicates the expected frequency if reports followed the theoretical uniform distribution.

Figure 1: Distribution of reported outcomes per treatment disaggregated by gender.



We reach our preferred specification following the marginality principle (Nelder, 1972; Weisberg, 2014, p. 139). We start with a regression model that includes a three-way interaction of the treatment, gender and age, and all lower level two-way interactions, and all main effects. Our data suggest to eliminate the three-way (p = 0.383) and the two-way interactions (p = 0.250). We also eliminate the quadratic in age (p = 0.493).

Table 1 reports the estimates of our final specification. We standardize the outcome, i.e., we subtract the theoretical expected value of the die roll outcome (4.5), and divide by the theoretical standard deviation of the die outcome (2.872). Our model is saturated by omitting the constant term and including a full set of indicator variables taking the value of one if the observation falls within one of the mutually exclusive and exhaustive categories. The estimated parameters have the interpretation of amount of cheating that takes place in the category flagged by the given indicator expressed in units of standard deviation. The test statistics are computed with Eicker-White robust to arbitrary heteroskedasticity covariance matrix. This is necessary because our dependent variable has limited range (integers from 0 to 9).

Table 1: Standardized Die Outcome: Linear regression.

Regressor is an indicator for:	b	t-stat	p-value
Female & Baseline	0.182	1.29	(0.199)
Male & Baseline	0.150	0.94	(0.350)
Female & Gain	0.670***	5.90	(0.000)
Male & Gain	0.550***	3.41	(0.001)
Female & Loss	0.502***	3.74	(0.000)
Male & Loss	0.751***	4.98	(0.000)
R^2	0.055		
N	261		

Notes. Dependent Variable is Standardized Die Outcome, (Die Outcome – Theoretical Expectation of Die Outcome)/(Theoretical Standard Deviation of Die Outcome) = (Die Outcome – 4.5)/ 2.872. Interpretation of the b coefficients is, e.g., in the Male & Loss treatment category the observed average die outcome is 0.751 of one theoretical standard deviation above the theoretical expected die outcome.

We find that males and females do not cheat in the Baseline ($p > 0.199$), but they do it in the Gain and the Loss treatments ($p < 0.001$) (see Table 1). Both males and females over-report high numbers in these treatments (e.g., 7, 8 and 9 are reported more than 50% of the times), but there is no single large spike at the payoff-maximizing outcome, indicating that subjects refrain from cheating maximally (Fischbacher and Föllmi-Heusi 2013, Abeler et al. 2016).

Result 1. ***a***) *There is no evidence of cheating behavior in the Baseline for males and females;* ***b****) Both males and females cheat (but not maximally) in Gain and Loss frames*.

We use the estimated regression in Table 1 to test for gender differences. Table 2 summarizes our results for a fixed treatment (Panel A) and a fixed gender (Panel B).

Panel A indicates that the magnitudes of the gender differences in cheating are very small; the largest gender difference is in the Loss treatment, where males cheat ¼ of a standard deviation more than females. Statistically, we fail to reject the null hypothesis that males and females report the same outcomes in each treatment separately ($p > 0.219$). We also fail to reject the null that males and females report the same outcomes if we test for gender difference for the three treatments jointly ($p > 0.593$).

Table 2. Gender differences in cheating behavior

Panel A. Cheating behavior across gender (holding the treatment fixed).

	Value	F-stat	p-value
1. Baseline: Female − Male	0.03	0.02	(0.881)
2. Gain: Female − Male	0.12	0.36	(0.546)
3. Loss: Female − Male	-0.25	1.52	(0.219)
1. & 2. & 3. F(3,255)		0.64	(0.593)

Panel B. Cheating behavior across treatments (holding the gender fixed).

	Males			Females		
	Value	F-stat	p-value	Value	F-stat	p-value
1. Gain − Baseline	0.401*	3.12	(0.079)	0.488***	7.25	(0.008)
2. Loss − Baseline	0.601***	7.49	(0.007)	0.320*	2.71	(0.101)
3. Loss − Gain	0.200	0.82	(0.365)	-0.167	0.91	(0.342)
1. & 2. F(2,255)		3.83	(0.023)		3.64	(0.028)

Notes. Values are in units of standard deviations; e.g., Panel A indicates that in the Loss treatment, males report 0.25 of a theoretical standard deviation higher outcomes than females. F-stat is for the null hypothesis Ho: Value=0. Last row of Panel B test whether Gain – Baseline and Loss – Baseline are equal to 0 jointly, which implies that Loss – Gain is equal to 0 too.

In Panel B we find that males and females cheat more in Gain and Loss frames, compared to the Baseline ($p < 0.101$). Importantly, the size of the effects are bigger and range from 0.320 to 0.601 of a standard deviation. Loss aversion would predict more cheating in the loss treatment, compared with the gain treatment. However, we do not find support for loss aversion in our task for males or females ($p > 0.342$). It is possible that our design (where we simply change the reference point) is not enough to trigger loss aversion. One further explanation is that there is a moral cost of cheating (Mazar et al. 2008) and subjects do already cheat maximally in the Gain frame, thus the Loss frame cannot induce more cheating (Charness et al. 2017). At any event, our result is in line with recent articles that do not find evidence of loss aversion (Harinck et al. 2007, Gal and Rucker 2017).

Result 2. *Males and females cheat when they are incentivized to do so, that is in the Gain and Loss treatments. Within each frame, males and females do not cheat differently. We do not find evidence of loss aversion for males or females.*

4. Conclusions

We use the die-paradigm to study cheating behavior. We find that both males and females cheat (but not maximally) in the presence of financial incentives; i.e., when reports are associated with financial gains or losses. We do not find support for loss aversion for males and females. When testing for gender differences, our data suggest no gender differences in cheating in the gain or the loss frames.

In our experiment, the identity of the experimenter was never disclosed to subjects. All sessions were conducted in the presence of two research assistants: one male and one female. We believe that a fruitful area for future research would be looking at gender differences when subjects know the identity of the experimenter[1]; e.g., we can investigate whether males and/or females cheat more to males and/or females.

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[1] In a different context, Tan and Vogel (2008) show that indeed the behavior of subjects in the trust game change depending on with whom they are interacting--more religious trustees are trusted more, and this effect is more pronounced among more religious trusters.

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