# Confidence and Contrition: Is Cheating Internalized in Performance Assessments?*

Nathan R. Adams

Michael A. Kuhn

Glen R. Waddell

July 5, 2018

**Abstract**

Self-assessed ability in the workplace motivates self-advancement—whether an employee asks for a raise or puts their name forward for a promotion, solicits external offers, and takes on visible, valuable tasks. Rewards for past successes can serve as signals of ability, so long as the relationship between ability and those rewards is understood and accounted. In this paper, we examine whether rewards obtained by cheating at a task influence self-assessed ability at that task. We design an experiment that allows us to estimate the relationship between past cheating and both stated beliefs of ability and, in a version of the task without the potential for cheating, revealed confidence. Our results are suggestive that cheaters have both higher stated beliefs in their ability and will reveal themselves to be more confident in their ability even when they cannot cheat again. We also experimentally vary the *ex-post* reward to cheating, and find that a larger reward from cheating may also cause an increase in stated beliefs, but it has no impact on revealed confidence.

*Keywords*: Overconfidence; Cheating; Beliefs; Experiment

*JEL Classifications*: J24, D83, C93

*Adams (nadams@uoregon.edu) is an economist at the Equal Employment Opportunity Commission. Kuhn (mkuhn@uoregon.edu) is an Assistant Professor of Economics at the University of Oregon. Waddell (waddell@uoregon.edu) is a Professor of Economics at the University of Oregon and a Research Fellow at IZA.

# 1 Introduction

In a summary of surveys of undergraduate academic dishonesty between 1962 and 2010, McCabe et al. (2012) finds that academic dishonesty was, in essence, routine: in the 1999/2000 wave, cheating behavior ranged from 8 percent of the sample "turning in papers done entirely or in part by other students," to 56 percent "getting questions or answers from someone who has already taken the same exam." Of the nine cheating behaviors surveyed, 83 percent of the sample reported engaging in at least one. In a 2009 Harris poll, 28 percent of American workers also admitted that they would "act immorally" to keep their job (Park, March 12 2009). Even with layers of safeguards in place, 300 public companies in the U.S. were found to have committed $120 billion in financial misstatement and misappropriation between 1998-2007 (Beasley et al., 2010). Dishonest behavior is widespread.

Becker (1968) is among the earliest studies on the determinants of cheating, and forms the view that people will engage in dishonest behavior when the benefits of that behavior outweigh the costs. This precipitated literatures on the pecuniary and probabilistic determinants of cheating in the workplace: executive-compensation packages (Burns and Kedia, 2006; Efendi et al., 2007), competition and tournament incentives (Jacob and Levitt, 2003; Gilpatric, 2011; Berentsen, 2002; Kräkel, 2007; Schwieren and Weichselbaumer, 2010; Bunn et al., 1992), decreased deterrence (Curry and Mongrain, 2009), decreased monitoring (Nagin et al., 2002; Kerkvliet and Sigmund, 1999), team environments (Conrads et al., 2013), and productivity (Gill et al., 2013). Recent experimental work suggests that cheating may be a function of individual character—more responsive to across-individual variation in social- and self-image than to within-individual variation in motive, means, and opportunity (Mazar et al., 2008; Fischbacher and Föllmi-Heusi, 2013; Weisel and Shalvi, 2015; Gneezy et al., 2018). (See Abeler et al. (2016) for a broad review.)

While the determinants of cheating are well-studied, the consequences of cheating have for the most part been overlooked. Chance et al. (2011) finds that those who are given answers to an experimental test while taking the exam interpret their elevated performance as a sign of intelligence. Robert and Arnab (2013) exploits experimental variation in peer dishonesty to identify increased dishonesty, suggesting that dishonesty in one participant induces more dishonesty in others. Gneezy et al. (2014) finds that immoral behavior leads to feelings of guilt, and thereby to increased charitable donations. In this paper, we consider the link between cheating and confidence.

The connection between cheating and confidence is natural, we believe. For example, consider two employees who report having achieved the same level of productivity—Employee A having done so honestly, but Employee B having inflated his productivity. While they might both receive performance pay for their work, they subsequently face different signal-extraction problems in evaluating their own workplace ability. That is, while Employee A can attribute the performance pay to her productivity quite easily, Employee B must consider that his pay may have been induced at the margin by dishonesty. By extension, where such a signal extraction is not fully executed, Employee B will form a biased self assessment—thus, we imagine, a role for dishonesty in the endogenous development of overconfidence.

There is also reason to believe that individuals are actually quite poor at tasks similar to that faced by Employee B. Haggag and Pope (2016) identifies "attribution biases," in which consumers are unable to separate the state of the world in which consumption occurs from the state-independent utility of consumption. Enke and Zimmerman (2018) identifies "correlation neglect," in which forecasters treat correlated signals about future economic growth as independent. Enke (2018) identifies "selection neglect," in which individuals fail to recognize censoring in the news-generation process that informs their opinions. A large literature identifies "outcome bias," in which outputs that are produced by both effort and luck are over-attributed to effort (Charness and Levine, 2007; Cushman et al., 2009; Gurdal et al., 2013; Rubin and Sheremeta, 2015; Sarsons, 2017; de Oliveira et al., 2017; Brownback and Kuhn, 2018).

Beyond the general difficulty of signal extraction problems, in order for Employee B to accurately assess his ability, he must recall and accept the fact that he engaged in immoral behavior in the past. Yet, studies on motivated reasoning and "moral wiggle room" suggest that individuals are less responsive to negative information than to positive (Eil and Rao, 2011), and will pay costs to avoid this information (Dana et al., 2007). Thus, we expect full attribution in this environment to be particularly difficult.

We also examine the role that gender might play in ability assessments. Beginning with Niederle and Vesterlund (2007), a sizable experimental literature has analyzed why there appears to be differential selection into competition and cooperation between men and women. Recent work suggests that overconfidence may play a larger role in that difference than previously thought. Veldhuizen (2017) finds that 48 percent of the competition gap can be explained by differences in confidence.[1] Kuhn and Villeval (2015) finds that under-confidence in women drives greater selection into team cooperation than is evident in men. Could male overconfidence come in part from differences in dishonest behavior? Dreber and Johannesson (2008), Erat and Gneezy (2012), and Kajackaite and Gneezy (2017) all find that men lie more than women, so long as they can personally benefit from the lie. Immoral behavior is often risky, of course, and Charness and Gneezy (2012) and Borghans et al. (2009) find that

[1] An additional 37 percent of the gap can be explained by the interaction between confidence and risk preferences.

women are more risk-averse than men. Thus, we anticipate that dishonesty may well be an important mechanism by which overconfidence propagates in men.

In this paper, we report on the results of two online experiments designed to measure the relationship between cheating and confidence. In both experiments, we first identify cheating at the individual level. Roughly half of subjects cheat, making the online implementation of our task more effective at drawing out cheating than previous laboratory efforts (Abeler et al., 2016). We then measure subsequent confidence with a Gneezy and Potters (1997) style instrument, in which subjects invest in their own future performance. This measure of confidence is referred to as "revealed" confidence. We also measure confidence with an un-incentivized "cheap-talk" assessment. This measure is referred to as "stated" confidence.

Cheaters are more confident, by both measures. This means that a manager attempting to infer productivity based on stated and revealed signals of employee confidence may instead identify propensity to cheat. Additionally, we find that this assessment problem is different for men and women. For women, high confidence is indicative of marginal cheating—productive individuals nudge their performance report just over a threshold that earns them a bonus. For men, high confidence is indicative of maximum cheating—individuals report perfect performance, likely obtained without exerting effort.

We find important differences between our two methods of eliciting confidence. The association between cheating and confidence is much larger for stated confidence than for revealed confidence, and the expected gender gap exists *only in stated confidence*. In Experiment 1, we randomly vary the *ex-ante* incentive to cheat, but find little impact on cheating—this is consistent with the experimental literature noted above. In Experiment 2, we randomly vary the *ex-post* reward from cheating, and find that stated confidence is increased by the reward from cheating (driven by men), but that revealed confidence, if anything, is *reduced* by the reward from cheating (driven by women). These results suggest that cheating is not fully integrated out of self assessments, and that revealed confidence performance assessments may limit both unjust confidence from bad actors and the gender gap among them.

# 2 Experiment 1

## 2.1 Design

We used Amazon's Mechanical Turk (MTurk) for our study—in doing so, we expect the social distance and monitoring difficulty inherent in interacting remotely and anonymously to be conducive to cheating. All participants received a baseline $1 participation fee, and the median time for subjects to complete the study is roughly 17 minutes.

The study is built around subjects' performance on a hidden-object task. Participants are shown a picture (see Figure A1) and asked to find hidden items from a list of twelve potential objects. They are told that if they find nine of the twelve objects within the four minutes they are given, they will earn a reward. Likewise, they are told that if they find all twelve objects they will earn an even larger reward. However, only eight of the twelve objects on the list appear in the picture. Subjects self-report the number of objects they find and can thereby misrepresent their true performance on the task. Below the picture, subjects can tick off each object, allowing us to track which objects they reported finding. We can therefore distinguish cheaters who "barely" cheated by nudging themselves over the payment threshold (i.e., from eight to nine) from cheaters who report finding several missing objects. Subjects can advance from the picture at any time. 574 subjects completed this experiment, 350 (61.0 percent) of whom reported finding the correct eight objects in the picture. The reward for 'finding' nine objects was randomly assigned ($0.10, $0.50, $1.50, or $2.75), but was always made known to the subject prior to performing the task (this will be a key difference between Experiment 1 and 2). We varied the reward in order to create an instrumental variable for cheating, which we discuss in depth in Section 2.2.3. The marginal reward for "finding" twelve objects was also varied ($0.40, $0.50, or $2.25).

After Task 1, subjects move on to a second object search task, Task 2. There are a number of key differences between Task 1 and Task 2. First, subjects are told that the new picture (see Figure A2) in Task 2 will be overlaid with a grid and they will have to report the grid location of each object that they find. In this way, we signal to participants that cheating is not possible on this task. Second, subjects learn that they will not be able to advance past Task 2 before time expires.

Third, subjects learn that all earnings from the second object-search task—both successful investments and uninvested endowments—are given to the Make-a-Wish® Foundation. Separating Task 2 from personal financial gain in Task 1 is designed to limit the impact of income effects on investment choices in the second.

Fourth, we describe a Gneezy and Potters (1997) style instrument to subjects in which they can invest in their own performance on Task 2. Each participant is given an endowment of $2 that they can invest in any cent-increment. If they are successful –which again means finding nine of twelve objects– their investment is tripled. If they are unsuccessful their investment is lost. Whatever they don't invest is kept. Assuming that subjects would like to maximize their expected donation to the Make-a-Wish® Foundation, their investment is a revealed measure of their confidence. Mean investment is $1.07 (S.D. = $0.75), and we use standardized investment as our "revealed confidence" measure. Importantly, the Gneezy and Potters (1997) investment decision is designed to elicit risk preference and, as such, our subjects' investment should also be related to risk preference. Therefore, we elicit stated risk preference and use it as a control variable.[2] All subjects have to answer three comprehension questions correctly before proceeding past the description of Task 2.

Following Task 2, subjects complete a brief survey.[3] In the survey, we ask subjects to provide a statement of their confidence: "How well do you believe you would perform on similar hidden object tasks in the future? Please choose a value from 0 to 10."

## 2.2 Results

We break the results from Experiment 1 into three sections. First, we examine the frequency and nature of cheating. Second, we examine the relationship between cheating and confidence. Third, we exploit the varying financial incentive to cheat in the first task as an instrumental variable for the impact of cheating on confidence.

### 2.2.1 Prevalence of Cheating

Unlike many experimental cheating paradigms, we find considerable cheating in our mTurk study. While it was only possible to find eight objects, 48.8 percent of subjects reported finding more than eight. Subjects also responded to the incentive to cheat fully, and claim that all objects were found—18.3 percent of subjects reported finding twelve objects. The distribution of reports among cheaters is bimodal. In an environment where there were rewards for nine and for twelve objects to be found, very few cheaters reported finding ten or eleven objects; there is a clear collapsing on the reporting of nine or twelve objects. This distinction, within the set of those who cheated, increases our confidence that our study exhibited its intended moral framework. Clearly, if the difference between cheaters and non-cheaters was purely a realization of the ability to cheat, we would expect to see no reports of nine objects. Conditional on finding all eight objects that were in the picture, cheating rates are much higher—of subjects who correctly indicated finding the eight feasible objects, 73.1 percent reported finding more than eight objects.

The partition of the sample into cheaters and non-cheaters is endogenous, as we would expect it to be in the workplace. However, the focus of this study is specifically on cheating, and barring exogenous variation in cheating, we look for observable determinants of cheating that can mitigate omitted variable bias when examining the relationship between cheating

[2]Subjects respond to, "In general, are you a person who likes to take risks or do you try and avoid taking risks? Please choose a value from 0 to 10." In this query, zero corresponds to "I am not at-all willing to take risks," and ten corresponds to "I am very willing to take risks." The average response is 4.74 (S.D. = 2.48), and we use standardized risk as a control variable.

[3]Full survey is available upon request.

and confidence. We anticipated that risk preference, in particular, would be a strong predictor of cheating. In Column (1) of Table 1, we regress an indicator variable for cheating on our measure of risk tolerance. We find that a standard-deviation increase in risk tolerance is associated with a 3.8-percent increase in the likelihood of cheating. However, when we control for performance (number of real objects found), or limit the sample to those who find all eight possible objects, this relationship is attenuated. In Column (2), we add performance, impulsivity, gender, employment status, and education as other personal characteristics that could correlate with cheating, as well as fixed effects for hour of day, day of week, week of month and month of year.[4] In so doing, the coefficient on risk is reduced by nearly 50 percent. In columns (3) and (4), we limit the sample to subjects who found the eight possible objects—the risk coefficient remains small and insignificant. In Column (4), being employed and having a college degree are both predictive of cheating. We proceed by using these control variables, and showing results both with and without the limitation to subjects finding the eight real objects.

In Figure 1 we show the full distribution of the number of reported objects, separately by gender. When we consider the overall group of cheaters, we find no difference in the likelihood of cheating between men and women—48.3 percent of women cheat in our environment, and 49.3 percent of men cheat (difference: $p = 0.83$, two-tail $t$-test). However, men are more likely than women to report that they have found twelve objects—22.8 percent of men, and only 14.2 percent of women report finding twelve (difference: $p = 0.01$, two-tail $t$-test). As individuals who report twelve have checked all of the available boxes, their stated performance need not inform their true performance on the task at all. In this sense, men are significantly more likely to *substitute* cheating for effort. On the other hand, among the individuals who report fewer than twelve objects, we can observe whether the eight correct objects are a subset of the report. In this case, women are more likely to *complement* effort with cheating, wherein they seemingly first exert effort and then nudge themselves over the threshold (28.8 percent of women versus 23.2 percent of men, $p = 0.12$, two-tail $t$-test). Indeed, individuals who cheat maximally spend an average of 50 seconds less time on the task than individuals who cheat marginally ($p < 0.01$, two-tail $t$-test).[5] Marginal cheaters spend *significantly more* time on the task than non-cheaters.[6]

[4]Impulsivity is measured using the standardized number of incorrect questions from the Cognitive Reflection Test (CRT, Frederick (2005)). Employed is an indicator variable equal to one for those employed either full or part time. College educated is an indicator variable equal to one for those who have obtained at least a bachelor's degree.

[5]300 seconds is the time limit, and the typical "marginal cheater" spends 280 seconds on the task.

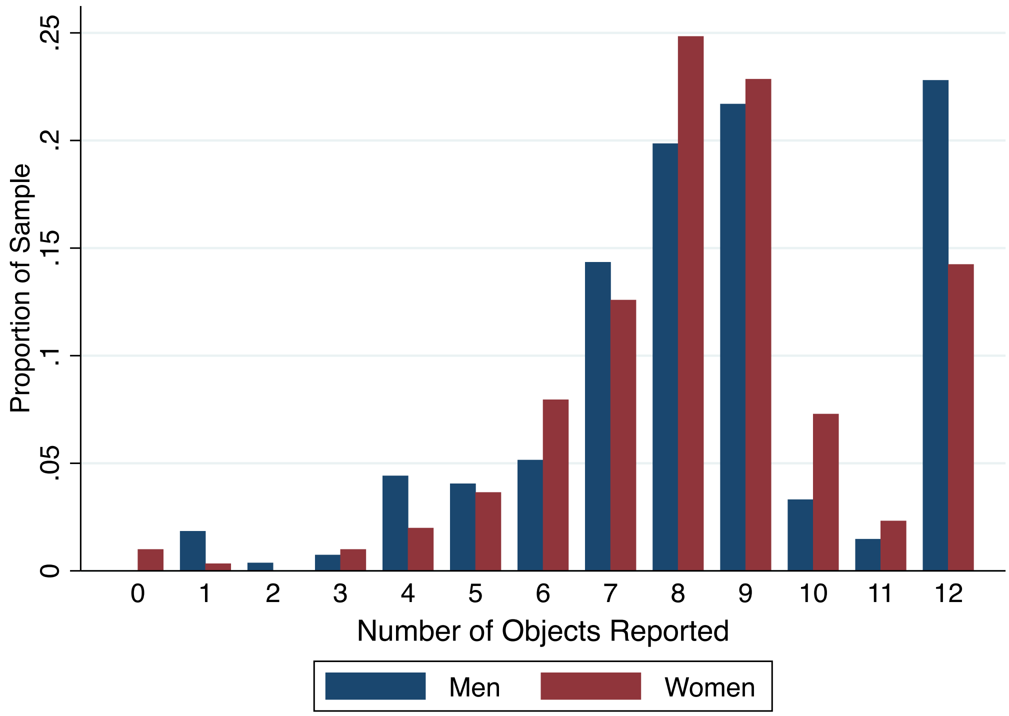
[6]Marginal cheaters: 280 seconds, non-cheaters: 265 seconds, difference: $p = 0.01$, two-tail $t$-test.

Table 1: Determinants of Cheating

| | Full Sample | | Restricted to those who found all possible objects | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Risk Tolerance | 0.038* | 0.021 | 0.022 | 0.011 |
| | (0.021) | (0.020) | (0.024) | (0.025) |
| Performance | | 0.160*** | | |
| | | (0.019) | | |
| Impulsivity | | -0.007 | | -0.005 |
| | | (0.020) | | (0.025) |
| $\mathbb{1}$(Female) | | 0.004 | | -0.002 |
| | | (0.042) | | (0.052) |
| $\mathbb{1}$(Employed) | | 0.113** | | 0.115* |
| | | (0.047) | | (0.066) |
| $\mathbb{1}$(CollegeEducated) | | 0.063 | | 0.106** |
| | | (0.039) | | (0.049) |
| Constant | 0.489 | | 0.731 | |
| | (0.021) | | (0.024) | |
| Time & Date FEs | N | Y | N | Y |
| Observations | 574 | 574 | 350 | 350 |

*Notes:* Robust standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%. Dependent variable is an indicator for cheating, $\mathbb{1}$(Objects found $\geq$ 9).

Figure 1: Objects Reported by Gender, Experiment 1




### 2.2.2 Cheating and Confidence

As described in Section 2.1, we elicited both stated measures of subjects' confidence, and revealed measures in Task 2. We first consider the problem faced by a manager trying to infer the productivity of an employee following an assessment of their confidence. In Table 2, we show the fraction of the sample who cheated, separately by gender and confidence-assessment tercile. In Column (1), we show the fraction reporting 9-to-11 objects, and in Column (2) we show the fraction reporting all-twelve objects for the maximum reward. We find that the manager's inference should depend on employee gender when the employee's confidence assessment is high. Specifically, 43 percent of female workers who state that they are highly confident are marginal cheaters, 35 percent are non-cheaters, and 23 percent are maximum cheaters. These are similar in revealed measures of confidence—42 percent, 37 percent, and 22 percent, respectively. Highly-confident men are more likely to be maximum cheaters than highly-confident women: 40 percent (31 percent) of male workers who state (reveal) that they are highly confident are also maximum cheaters. They are also less likely to be marginal cheaters: 31 percent of male workers both state and reveal that they are highly confident are also marginal cheaters. Especially when making inference based on cheap talk, managers should be aware that reporting high levels of confidence implies different things

Table 2: Confidence and Propensity to Cheat

| | | Cheated to 9-11 (1) | Cheated to 12 (2) |
|---|---|---|---|
| *Panel A: Stated Confidence* | | | |
| Low Confidence | Men | 0.043 | 0.043 |
| | Women | 0.122 | 0.061 |
| | | $p = 0.16$ | $p = 0.68$ |
| Medium Confidence | Men | 0.301 | 0.086 |
| | Women | 0.316 | 0.094 |
| | | $p = 0.81$ | $p = 0.84$ |
| High Confidence | Men | 0.311 | 0.402 |
| | Women | 0.426 | 0.228 |
| | | $p = 0.05$ | $p < 0.01$ |
| *Panel B: Revealed Confidence* | | | |
| Low Confidence | Men | 0.154 | 0.209 |
| | Women | 0.225 | 0.135 |
| | | $p = 0.22$ | $p = 0.19$ |
| Medium Confidence | Men | 0.329 | 0.151 |
| | Women | 0.345 | 0.106 |
| | | $p = 0.82$ | $p = 0.37$ |
| High Confidence | Men | 0.306 | 0.306 |
| | Women | 0.420 | 0.210 |
| | | $p = 0.09$ | $p = 0.12$ |

*Notes:* We report the proportion of men and women within confidence terciles who cheated to 9-11 and who cheated to 12. Variables are standardized stated confidence in future performance and standardized investment in future performance.

about the productivity and cheating behavior of male versus female employees.

Moving away from the manager's association problem, perhaps without true performance and other variables to condition on, we present regression estimates of the relationship between cheating and confidence. We first analyze stated confidence, based on how well subjects

Table 3: Cheating and Stated Confidence

| | Full Sample | | | Restricted to those who found all possible objects | | |
|---|---|---|---|---|---|---|
| | All | Women | Men | All | Women | Men |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\mathbb{1}$(Cheater) | 0.585*** | 0.461*** | 0.742*** | 0.634*** | 0.567*** | 0.714*** |
| | (0.094) | (0.115) | (0.151) | (0.116) | (0.137) | (0.197) |
| Risk Tolerance | 0.195*** | 0.209*** | 0.195*** | 0.178*** | 0.157** | 0.171** |
| | (0.040) | (0.059) | (0.063) | (0.047) | (0.069) | (0.079) |
| Performance | 0.125*** | 0.116** | 0.127** | | | |
| | (0.039) | (0.049) | (0.056) | | | |
| Impulsivity | 0.041 | 0.006 | 0.065 | 0.049 | 0.063 | 0.036 |
| | (0.040) | (0.053) | (0.059) | (0.046) | (0.062) | (0.072) |
| $\mathbb{1}$(Employed) | 0.087 | 0.019 | 0.235* | 0.037 | -0.063 | 0.202 |
| | (0.088) | (0.114) | (0.128) | (0.107) | (0.135) | (0.174) |
| $\mathbb{1}$(College Educated) | -0.042 | -0.023 | -0.097 | -0.006 | 0.067 | -0.117 |
| | (0.076) | (0.106) | (0.114) | (0.091) | (0.125) | (0.143) |
| $H_0$ : Female = Male (Cheater) | | $\chi^2(1) = 2.41$ $p = 0.12$ | | | $\chi^2(1) = 0.44$ $p = 0.51$ | |
| Time & Date FEs | Y | Y | Y | Y | Y | Y |
| Observations | 574 | 302 | 272 | 350 | 183 | 167 |

*Notes:* Robust standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%. Dependent variable is standardized stated confidence in future performance.

expect to do on a similar task in the future. In Table 3, we regress pooled and gender-stratified stated levels of confidence in future performance on a similar task on an indicator variable for whether the individual cheated on the first task. In columns (1) through (3), we present estimates for the full sample. We control for risk tolerance, true performance on the task, impulsivity, employment status, and education, as well as time and date fixed effects. Being a cheater is associated with having three-fifths of a standard-deviation higher stated confidence. The effect is considerably larger for men than for women, although this difference is not significant at conventional levels ($p = 0.12$). In columns (4) through (6), we limit the sample to those who found all eight possible objects, and obtain similar estimates.

Next, we consider the variation in revealed confidence by analyzing subjects' decisions

Table 4: Cheating and Revealed Confidence

| | Full Sample | | | Restricted to those who found all possible objects | | |
|---|---|---|---|---|---|---|
| | All | Female | Male | All | Female | Male |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\mathbb{1}$(Cheater) | 0.320*** | 0.330*** | 0.360** | 0.328*** | 0.249 | 0.445*** |
| | (0.086) | (0.113) | (0.138) | (0.109) | (0.156) | (0.161) |
| Risk Tolerance | 0.312*** | 0.293*** | 0.351*** | 0.299*** | 0.311*** | 0.331*** |
| | (0.040) | (0.060) | (0.058) | (0.050) | (0.076) | (0.073) |
| Performance | 0.005 | 0.033 | -0.024 | | | |
| | (0.033) | (0.050) | (0.048) | | | |
| Impulsivity | -0.065* | -0.076 | -0.078 | -0.051 | -0.092 | -0.071 |
| | (0.039) | (0.053) | (0.061) | (0.052) | (0.076) | (0.080) |
| $\mathbb{1}$(Employed) | -0.067 | -0.108 | 0.045 | -0.046 | -0.018 | -0.033 |
| | (0.093) | (0.113) | (0.165) | (0.117) | (0.141) | (0.224) |
| $\mathbb{1}$(College Educated) | -0.086 | -0.277** | 0.122 | -0.064 | -0.291** | 0.231 |
| | (0.080) | (0.108) | (0.125) | (0.102) | (0.146) | (0.158) |
| $H_0$ : Female = Male (Cheater) | | $\chi^2(1) = 0.03$ $p = 0.63$ | | | $\chi^2(1) = 0.88$ $p = 0.35$ | |
| Time & Date FEs | Y | Y | Y | Y | Y | Y |
| Observations | 574 | 302 | 272 | 350 | 183 | 167 |

*Notes:* Robust standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%. Dependent variable is standardized investment in future performance.

on Task 2, the task in which subjects made an investment decision. In Column (1) of Table 4, we find that cheaters are willing to invest significantly more money in their future *verified* performance—cheaters invest about one-third of a standard deviation more than do non-cheaters. Unlike in stated preference, in the full sample there is little evidence of a gender difference in the relationship between cheating and confidence in revealed preferences, as shown in columns (2) and (3). Limiting the sample to those who found all possible objects, in columns (4) through (6), reveals an effect that is larger for men than women, but the difference is not statistically significant.

We also test whether this relationship between cheating and confidence differs for standardized stated and revealed preference, in Table 5. We report the difference between the

Table 5: Testing Stated vs. Revealed Preference (Table 3 vs. Table 4)

| | Full Sample | | | Restricted to those who found all possible objects | | |
|---|---|---|---|---|---|---|
| | All | Women | Men | All | Women | Men |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Difference in $\mathbb{1}$(Cheater) Coefficients (Stated − Revealed) | 0.265** | 0.131 | 0.382** | 0.306** | 0.318 | 0.270 |
| $H_0$ : Female = Male | | $\chi^2(1) = 1.21$ <br> $p = 0.27$ | | | $\chi^2(1) = 0.03$ <br> $p = 0.87$ | |
| Observations | 574 | 302 | 272 | 350 | 183 | 167 |

*Notes:* Robust standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%. Dependent variable is standardized investment in future performance.

point estimates from the stated- and revealed-preference models and also report the statistical significance from a test of the null that the coefficients are equal across models. Notably, these differences are positive across all columns, suggesting a larger positive association between cheating and confidence in stated preference than exists in revealed preference. The gender-pooled difference and the difference for men (in columns 1 and 3) are statistically significant at the five-percent level. While the difference is larger for men than women, it is not statistically different, and in addition, this gap goes away when we restrict the sample to those finding all eight objects.

In the case of revealed confidence through investment in Task 2, we find substantial bunching at no investment, investing exactly half of the endowment and full investment. As such, we also examine the relationship between cheating and the full distribution of investment. Figure 2, shows the distribution of investment by the decision to cheat for the full sample. In Panel A, we show the unadjusted-investment variable, and in Panel B we adjust for risk preference by using the residual investment from a regression of investment on risk tolerance. The distributions for cheaters dominate the distributions for non-cheaters.[7] The same is true when we treat women and men separately. Within both men and women, we reject the equality of distributions by cheating for both unadjusted and risk-adjusted investment, as well.[8]

[7]A Kolmogorov-Smirnov (KS) test of distributions rejects the null hypothesis of equal distributions ($p <$ 0.01 for both risk-adjusted and unadjusted investment).

[8]For women, $p < 0.01$ for both unadjusted and risk-adjusted investment. For men, $p = 0.01$ ($p = 0.02$) for unadjusted (risk-adjusted) investment.

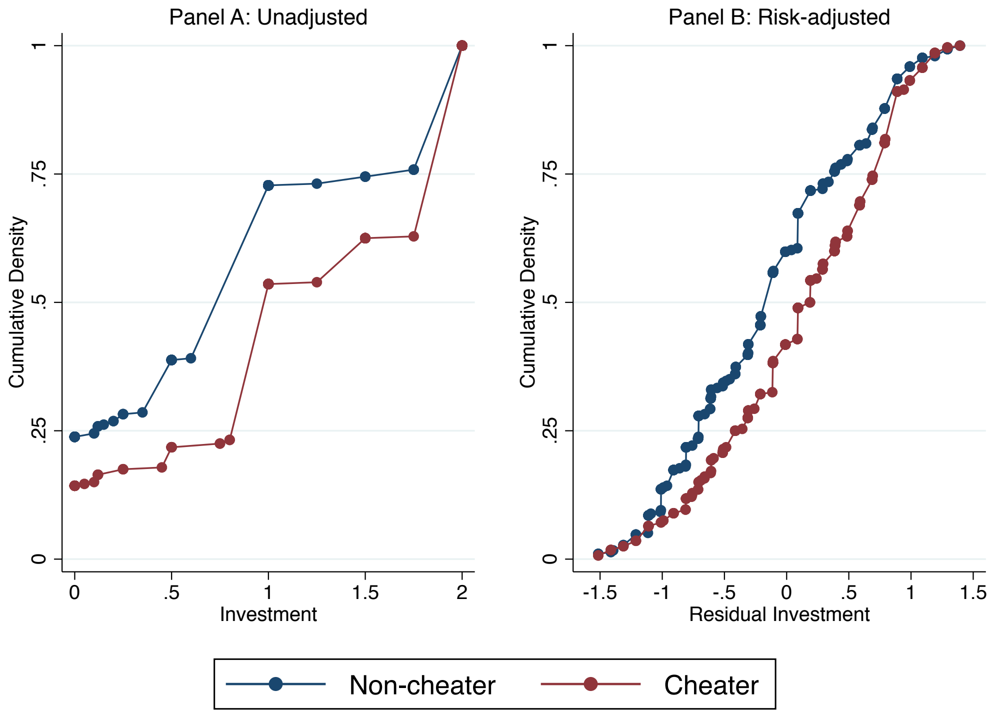



Figure 2: Distribution of Investment by Cheating, Experiment 1

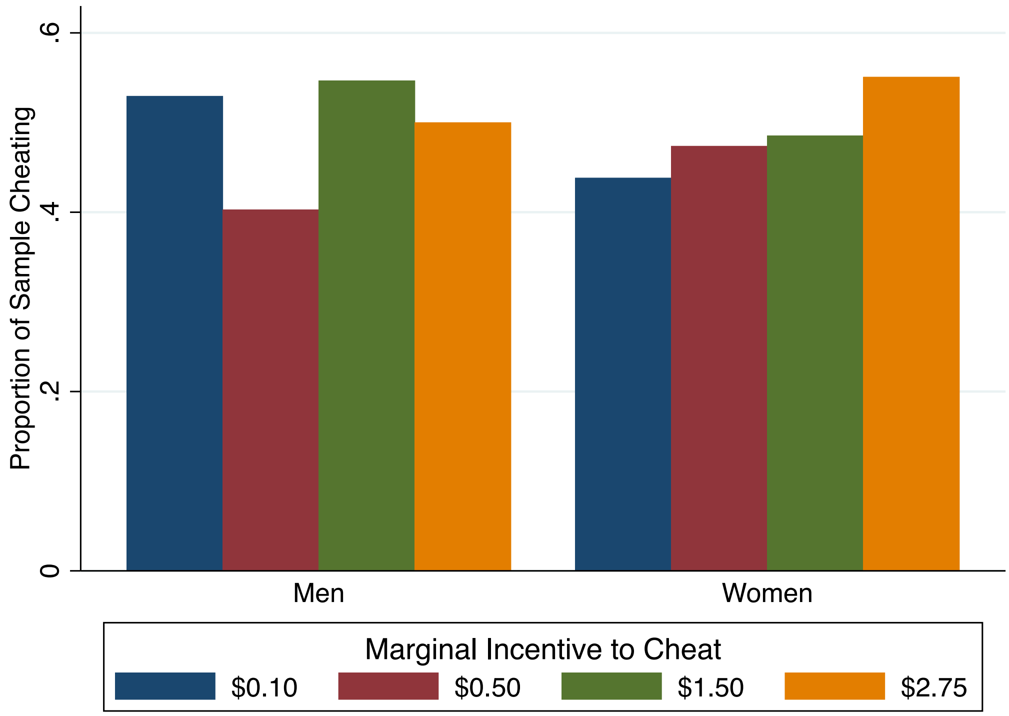
#### 2.2.3 Induced Cheating and Confidence

Within Experiment 1, we attempted to induce cheating by experimentally varying the marginal reward associated with cheating. In order for this incentive to serve as a valid instrumental variable (IV) for cheating, it must predict cheating and have no direct effect on stated or revealed confidence. The exclusion restriction we satisfy by experimental design.[9] When we regress an indicator for cheating on the marginal incentive to cheat, we find a coefficient of 0.028 ($p = 0.17$, robust standard errors), suggesting that a \$1-increase in the marginal incentive to cheat would only increase cheating by 2.8 percent. Thus, while the incentive is predictive of cheating, its relevance is not significant at conventional levels.

In Figure 3, we present the proportion of individuals cheating by gender and the marginal incentive to cheat. This reveals that the impact of the incentive is very different for men and women. For women, cheating is linear in the incentive, and of the expected sign, which

[9] There is some nuance to this issue. Incentives determine wealth, and there could be an income effect (although we do not expect them over such a small range). However, the incentive size predicts wealth *only among cheaters*. An income effect among cheaters would imply that cheaters are inferring greater skill from greater wealth, failing to adjust for their past behavior. This is behavior that we want to capture in our estimate. There could be alternative impacts of wealth on confidence, but we test for these directly in Experiment 2, and find no evidence thereof. Moreover, revealed confidence elicited in Task 2 is on behalf of a charity, which is unaffected by the participant's income in Task 1.

Figure 3: Cheating propensity, by incentive to cheat, Experiment 1




suggests that it should work well as an instrument. When we regress cheating on the incentive for women only, the coefficient is substantially larger (0.039), although it is not more precise ($p = 0.17$). For men, behavior does not respond so clearly to incentives. If anything, cheating is distinctly lower when the reward for cheating is equal to \$0.50 than it is when the reward is \$0.10. We regress cheating on an indicator for whether the reward is \$0.50, and find that cheating at this reward is 12.2 percent lower than at other incentive levels ($p = 0.07$).

These somewhat-weak first stages motivate the alternative approach we take in Experiment 2. However, in Table 6 we present the instrumental-variable estimates of the impact of cheating on both stated and revealed confidence. We do this separately for men and women, using the incentive itself for women, and an indicator variable for an incentive equal to \$0.50 for men.[10] For women, cheating increases stated confidence by 2.1 standard deviations ($p = 0.21$) and revealed-preference investment by 1.7 standard deviations ($p = 0.26$). For men, cheating increases stated preference by 0.7 standard deviations ($p = 0.52$) and revealed-preference investment by 1.9 standard deviations ($p = 0.17$). While imprecise, in most cases our IV estimates are substantially larger than the OLS estimates. We interpret this as weak evidence that the significant relationship between cheating and confidence belies a causal

[10]Different instruments for men and women mean that the estimates are average treatment effects specific to different localities for men and women. As such, coefficients should not be compared across genders.

Table 6: Impact of Cheating on Stated and Revealed Confidence

| | Women | | Men | |
|---|---|---|---|---|
| | Stated (1) | Revealed (2) | Stated (3) | Revealed (4) |
| $\mathbb{1}$(Cheater) | 2.076 | 1.690 | 0.696 | 1.883 |
| | (1.660) | (1.505) | (1.077) | (1.361) |
| Constant | -1.005 | -0.814 | -0.297 | -0.880 |
| | (0.811) | (0.735) | (0.536) | (0.673) |
| Observations | 302 | 302 | 272 | 272 |

*Notes:* Robust standard errors in parentheses. Dependent variables are standardized stated confidence in future performance and standardized investment in future performance.

impact.

# 3 Experiment 2

In Experiment 2, we modified our design to feature randomization of the *ex-post* rewards gained from cheating. We also added a new treatment in which succeeding at Task 1 is possible without cheating, to determine whether an income effect exists.

In this version of the study, only the expected marginal value of cheating ($1.50) is known prior to Task 1. Specifically, we told subjects that, "The average bonus payment that people receive is $1.50, but it can be more or less." Subjects learn the realized reward after the first task is performed (and the opportunity to cheat has passed). This experimentally tests whether, within the set of cheaters, higher rewards from cheating lead to higher confidence.

## 3.1 Design

As before, MTurk subjects are asked to find twelve objects in a picture, needing to find nine to earn the reward. In the 'Impossible' treatment, only eight of the listed objects are present, just as in Experiment 1. In the 'Possible' treatment, however, nine of the listed objects are actually present, and success is therefore possible without cheating. Subjects are randomized into one of these two treatments upon entry into the study.

We do not provide an incentive for finding all-twelve objects in this version of the experiment. If a participant in either treatment reports finding nine or more objects, their realized reward is drawn randomly from the set $\{\$0.25, \$1.50, \$2.75\}$, with equal probabilities. The Possible treatment serves to difference out any impact of the reward itself, apart from the interaction between cheating and the reward. Following the first task, and the revelation of the reward, subjects participate in a verified investment task similar to that in Experiment 1. We make one change to the investment task for Experiment 2: subjects participate for their own gain rather than for a charity. Because the Possible treatment serves as a control group, we do not need to rely on the charity task to avoid an income effect.

We identify the effect of rewards on confidence for cheaters using a difference-in-differences style design. Our empirical specification is

$$\text{Confidence}_i = \alpha + \beta_1 \mathbb{1}(\text{Impossible})_i + \beta_2 \text{Reward}_i + \beta_3 \mathbb{1}(\text{Impossible}) \times \text{Reward}_i + \epsilon_i \quad . \quad (1)$$

Because we use our treatment variation between Impossible and Possible to identify the impact of rewards to cheating separately from the impact of rewards, the coefficient of interest in these models comes from the interaction of an "Impossible" indicator variable and the realized reward for success.

Initially, we limit the sample to those who 'found' nine objects and received a reward—these participants were cheaters in the Impossible treatment and non-cheaters in the Possible treatment.[11] Of subjects in the Impossible treatment, 41.7 percent cheated to obtain a reward with expected value \$1.50. This is slightly less than the percent who cheated for a guaranteed reward of \$1.50 in Experiment 1 (48.3 percent). 71.6 percent of subjects in the Possible treatment earned a bonus, but a number of them did so by claiming to have found more than nine objects. Accounting for this, 60.9 percent of subjects in this treatment reported nine objects and received a bonus. Overall, we have 158 Impossible subjects and 110 Possible subjects in our sample. When we limit the Impossible treatment to include only those who found all eight real objects, this excludes 19 individuals.

## 3.2 Results

We first estimate the impact of the rewards to cheating on stated confidence, which we present in Table 7. In columns (1) through (3), all cheaters in the Impossible treatment are included in the sample. We find no impact of the randomized reward in the Possible treatment, suggesting that there is no direct income effect on confidence in our studies.

[11] Technically, they could also be very lucky guessers in the Possible treatment, but any minor noise of that nature would only bias our estimate of the interaction term towards zero.

Table 7: Impact of Rewards from Cheating on Stated Confidence

| | Full Sample | | | Restricted to those who found all possible objects | | |
|---|---|---|---|---|---|---|
| | All | Women | Men | All | Women | Men |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Reward | 0.011 | 0.062 | -0.048 | 0.011 | 0.062 | -0.048 |
| | (0.071) | (0.095) | (0.106) | (0.071) | (0.095) | (0.106) |
| $\mathbb{1}$(Impossible) | -0.571*** | -0.601*** | -0.486* | -0.467** | -0.435* | -0.444* |
| | (0.192) | (0.253) | (0.285) | (0.189) | (0.254) | (0.263) |
| Reward × $\mathbb{1}$(Impossible) | 0.230** | 0.178 | 0.253* | 0.177* | 0.105 | 0.224* |
| | (0.100) | (0.138) | (0.141) | (0.010) | (0.140) | (0.135) |
| Constant | 0.230 | 0.107 | 0.384 | 0.230 | 0.107 | 0.384 |
| | (0.133) | (0.161) | (0.214) | (0.133) | (0.161) | (0.214) |
| $H_0$ : Female = Male (Reward × Impossible) | | $\chi^2(1) = 0.15$ $p = 0.70$ | | | $\chi^2(1) = 0.39$ $p = 0.53$ | |
| Observations | 268 | 145 | 123 | 249 | 138 | 111 |

*Notes:* Robust standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%. Dependent variable is standardized stated confidence in future performance.

There is a dramatic level-difference of 0.57 standard deviations between the two treatments. This reflects the fact that those in the Possible treatment *actually succeeded* at the task. Their confidence should be very high. There is a positive and significant effect of the reward on stated confidence in the Impossible treatment. Pooling women and men (in Column 1), we find that among cheaters in the Impossible treatment a \$1 (two-thirds of the expected reward) increase in the *ex-post* random reward to cheating increases stated confidence in future performance by about one-quarter of a standard deviation more than it does among successful individuals in the Possible treatment. Although this effect is slightly larger for men than women, the difference is not statistically significant. In columns (4) through (6), we limit the Impossible sample to include only cheaters who found all-eight objects. Results are very similar in these specifications, albeit with a slightly larger gender gap. In both selection-inclusive (Experiment 1) and selection-exclusive (Experiment 2) specifications, our findings are clear that being rewarded for cheating is associated with higher stated confidence.

Next, in Table 8, we consider whether the rewards to cheating likewise influence revealed confidence, as exhibited by the subjects' costly investments in their future performance. We find very different empirical regularities in revealed preference: the ex-post-random rewards to cheating have little influence on investment in either treatment. In Column (5), we find

Table 8: Impact of Rewards from Cheating on Revealed Confidence

| | Full Sample | | | Restricted to those who found all possible objects | | |
|---|---|---|---|---|---|---|
| | All | Women | Men | All | Women | Men |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Reward | -0.070 | 0.061 | -0.193 | -0.070 | 0.061 | -0.193 |
| | (0.076) | (0.091) | (0.119) | (0.076) | (0.091) | (0.120) |
| $\mathbb{1}$(Impossible) | -0.197 | -0.069 | -0.317 | -0.133 | 0.068 | -0.359 |
| | (0.195) | (0.244) | (0.316) | (0.202) | (0.247) | (0.340) |
| Reward × $\mathbb{1}$(Impossible) | -0.030 | -0.155 | 0.085 | -0.070 | -0.240* | 0.102 |
| | (0.104) | (0.133) | (0.160) | (0.108) | (0.135) | (0.173) |
| Constant | 0.322 | 0.170 | 0.477 | 0.322 | 0.170 | 0.477 |
| | (0.146) | (0.177) | (0.238) | (0.146) | (0.177) | (0.239) |
| $H_0$ : Female = Male | | $\chi^2(1) = 1.37$ | | | $\chi^2(1) = 2.50$ | |
| (Reward × $\mathbb{1}$(Impossible)) | | $p = 0.24$ | | | $p = 0.11$ | |
| Observations | 268 | 145 | 123 | 249 | 138 | 111 |

*Notes:* Robust standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%. Dependent variable is standardized investment in future performance.

that rewards have a negative, marginally significant effect on investment for women who cheat (relative to non-cheaters). On the other hand, in Column (6) we find that rewards have a positive, but insignificant effect for men who cheat (relative to non-cheaters). Switching from a cheap talk elicitation of confidence to a costly signal appears to mitigate the causal impact of the rewards from cheating on confidence, even though it did not fully mitigate the association between cheating and confidence.

As before, we test whether the Reward/Impossible interaction is different for stated and revealed preference in Table 9. Again, the calculated differences are all positive, suggesting that the impact of a large ex-post reward on confidence is higher for stated preference than it is for revealed preference. This difference is again larger for men than women, although the difference-in-differences is not statistically significant.

Table 9: Testing Stated vs. Revealed Preference (Table 7 vs. Table 8)

| | Full Sample | | | Restricted to those who found all possible objects | | |
|---|---|---|---|---|---|---|
| | All | Women | Men | All | Women | Men |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Difference in Reward × Impossible Coefficients (Stated − Revealed) | 0.259** | 0.169 | 0.333* | 0.246* | 0.122 | 0.344* |
| $H_0$ : Female = Male | | $\chi^2(1) = 0.43$<br>$p = 0.51$ | | | $\chi^2(1) = 0.72$<br>$p = 0.40$ | |
| Observations | 268 | 145 | 123 | 249 | 138 | 111 |

*Notes:* Robust standard errors in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%. Dependent variable is standardized investment in future performance.

# 4 Discussion

Despite the prevalence of cheating, lying, and other forms of dishonest behavior in the workplace, we still know little about the consequences of this behavior. In this paper, we examine the relationship between cheating and confidence. Using an experimental design that captures substantially more cheating than other work in this field, we link cheating to changes in both stated and revealed confidence. We find a positive relationship between cheating and levels of both stated beliefs of future ability and revealed beliefs through investment, suggesting that cheaters are more confident in their ability than non-cheaters. There are also important gender differences. First, the relationship between cheating and confidence is stronger for men than for women when confidence is only stated, but not when it is revealed. Moreover, managers faced with reports of high confidence should treat them differently for men and women. For men, such reports are more indicative of maximal cheating that substitutes for effort. For women, they are more indicative of marginal cheating that complements effort.

We also took two approaches to identifying a causal relationship between cheating and confidence. In Experiment 1, we varied the *ex-ante* rewards to cheating to create an instrumental variable. While we estimate a strong effect of cheating on confidence, our IV first stage is weak, not allowing strong inference in the resulting second stage. In Experiment 2, we varied the *ex-post* rewards to cheating to create experimental variation in the degree to which cheating paid dividends. We also introduced a new control group—the Possible treatment—

to distinguish the effects of ill-gotten gains from properly-earned rewards. Cheaters who earned a higher reward have a higher stated confidence (an effect that is weakly greater for men), but we find no difference in subsequent investment decisions based on the reward from cheating. If anything, women who cheat display contrition in the revealed measure (lower confidence) in response to larger rewards to cheating, while men do not.

While employers seemingly continue to embrace methods of performance review that facilitate cheap talk, or the strategic revelation of information by the informed agent, there is little known about the systematic nature by which cheating or dishonest revelation can influence either stated beliefs of ability or costly signals thereof. Given that the accumulated rewards from cheating do appear to influence confidence, we should worry that workplaces that feature the potential to cheat or opportunities for cheap-talk self promotion will feature excess advancement of men who are willing to substitute cheating for effort. Similarly confident women may not be completely honest, but they are more likely to be non-cheaters or cheaters who complemented their hard work with a slight nudge over the finish line.

Goldin (2014) attributes differences in gender composition and earnings gaps across industries to long-hours and/or low-flexibility premiums. Niederle and Vesterlund (2007) and Babcock et al. (2017) single out gender differences in the participation in competitive and non-promotable tasks, respectively, as contributing to gender differences in occupation choices and in advancement trajectories. Similar industries can be categorized as conducive to gender gaps based on both theories; business, finance, and law are typical examples. These industries also feature ample opportunities to cut corners and strong upward pressure within firms. Our work suggests that the link between cheating and confidence may explain some excess advancement of unproductive male cheaters within such industries, and that firms could select more equally on gender if they are careful to consider only costly signals of employee confidence.

## References


**Abeler, Johannes, Daniele Nosenzo, and Collin Raymond**, "Preferences for Truth-telling," 2016. CESifo Working Paper Series No. 6087.

**Babcock, Linda, Maria P. Recalde, Lise Vesterlund, and Laurie Weingart**, "Gender Differences in Accepting and Receiving Requests for Tasks with Low Promotability," *American Economic Review*, 2017, *107* (3), 714–747.

**Beasley, Mark S., Joseph V. Carcello, Dana R. Hermanson, and Terry L. Neal**, "Fraudulent Financial Reporting 1998-2007," Technical Report, Committee of Sponsoring Organizations of the Treadway Commission 2010.

**Becker, Gary S**, "Crime and Punishment: An Economic Approach," *Journal of Political Economy*, 1968, *76* (2), 169–217.

**Berentsen, Aleksander**, "The economics of doping," *European Journal of Political Economy*, 2002, *18* (1), 109 – 127.

**Borghans, Lex, Bart H. H. Golsteyn, James J. Heckman, and Huub Meijers**, "Gender Differences in Risk Aversion and Ambiguity Aversion," *Journal of the European Economic Association*, 2009, *7* (2/3), 649–658.

**Brownback, Andy and Michael A. Kuhn**, "Understanding Outcome Bias: Asymmetric Sophistication and Biased Beliefs," 2018. Working Paper.

**Bunn, Douglas N, Steven B Caudill, and Daniel M Gropper**, "Crime in the classroom: An economic analysis of undergraduate student cheating behavior," *The Journal of Economic Education*, 1992, *23* (3), 197–207.

**Burns, Natasha and Simi Kedia**, "The impact of performance-based compensation on misreporting," *Journal of financial economics*, 2006, *79* (1), 35–67.

**Chance, Zoe, Michael I. Norton, Francesca Gino, and Dan Ariely**, "Temporal View of the Costs and Benefits of Self-Deception," *Proceedings of the National Academy of Sciences*, 2011, *108* (3), 15655–15659.

**Charness, Gary and David I Levine**, "Intention and stochastic outcomes: An experimental study," *The Economic Journal*, 2007, *117* (522), 1051–1072.

_ **and Uri Gneezy**, "Strong Evidence for Gender Differences in Risk Taking," *Journal of Economic Behavior and Organization*, 2012, *83*, 50–58.

**Conrads, Julian, Bernd Irlenbusch, Rainer Michael Rilke, and Gari Walkowitz**, "Lying and team incentives," *Journal of Economic Psychology*, 2013, *34*, 1–7.

**Curry, Philip A. and Steeve Mongrain**, "Deterrence in Rank-Order Tournaments," *Review of Law and Economics*, 2009, *5*, 723.

**Cushman, Fiery, Anna Dreber, Ying Wang, and Jay Costa**, "Accidental Outcomes Guide Punishment in a "Trembling Hand" Game," *PloS one*, 2009, *4* (8), e6699.

**Dana, Jaosn, Roberto A. Weber, and Jason Xi Kuang**, "Exploiting Moral Wiggle Room: Experiments Demonstrating an Illusory Preference for Fairness," *Economic Theory*, 2007, *33*, 67–80.

**de Oliveira, Angela C.M., Alexander Smith, and John Spraggon**, "Reward the Lucky? An Experimental Investigation of the Impact of Agency on Luck and Bonuses," *Journal of Economic Psychology*, 2017, *62*, 87–97.

**Dreber, Anna and Magnus Johannesson**, "Gender Differences in Deception," *Economics Letters*, 2008, *99*, 197–199.

**Efendi, Jap, Anup Srivastava, and Edward P Swanson**, "Why do corporate managers misstate financial statements? The role of option compensation and other factors," *Journal of financial economics*, 2007, *85* (3), 667–708.

**Eil, David and Justin M. Rao**, "The Good News-Bad News Effect: Asymmetric Processing of Objective Information about Yourself," *American Economic Journal: Microeconomics*, 2011, *3*, 114–138.

**Enke, Benjamin**, "What you see is all there is," 2018. Working paper.

**_ and Florian Zimmerman**, "Correlation Neglect in Belief Formation," *Review of Economic Studies*, 2018, *Forthcoming.*

**Erat, Sanjiv and Uri Gneezy**, "White Lies," *Management Science*, 2012, *58* (4), 723–733.

**Fischbacher, Urs and Franziska Föllmi-Heusi**, "Lies in Disguise—An Experimental Study on Cheating," *Journal of the European Economic Association*, 2013, *11* (3), 525–547.

**Frederick, Shane**, "Cognitive Reflection and Decision Making," *Journal of Economic Perspectives*, 2005, *19* (4), 25–42.

**Gill, David, Victoria Prowse, and Michael Vlassopoulos**, "Cheating in the workplace: An experimental study of the impact of bonuses and productivity," *Journal of Economic Behavior and Organization*, 2013, *96*, 120 – 134.

**Gilpatric, Scott M**, "Cheating in contests," *Economic Inquiry*, 2011, *49* (4), 1042–1053.

**Gneezy, Uri, Agne Kajackaite, and Joel Sobel**, "Lying aversion and the size of the lie," *American Economic Review*, 2018, *Forthcoming.*

**_ , Alex Imas, and Kristof Madarasz**, "Conscience Accounting: Emotion Dynamics and Social Behavior," *Management Science*, 2014, *60* (11), 2645–2658.

**_ and Jan Potters**, "An Experiment on Risk Taking and Evaluation Periods," *Quarterly Journal of Economics*, 1997, *112* (2), 631–645.

**Goldin, Claudia**, "A Grand Gender Convergence: Its Last Chapter," *American Economic Review*, 2014, *104* (4), 1091–1119.

**Gurdal, Mehmet Y, Joshua B Miller, and Aldo Rustichini**, "Why blame?," *Journal of Political Economy*, 2013, *121* (6), 1205–1247.

**Haggag, Kareem and Devin G. Pope**, "Attribution Bias in Consumer Choice," 2016. Working Paper.

**Jacob, Brian A and Steven D Levitt**, "Rotten apples: An investigation of the prevalence and predictors of teacher cheating," *The Quarterly Journal of Economics*, 2003, *118* (3), 843–877.

**Kajackaite, Agne and Uri Gneezy**, "Incentives and Cheating," *Games and Economic Behavior*, 2017, *102*, 433–444.

**Kerkvliet, Joe and Charles L Sigmund**, "Can we control cheating in the classroom?," *The Journal of Economic Education*, 1999, *30* (4), 331–343.

**Kräkel, Matthias**, "Doping and cheating in contest-like situations," *European Journal of Political Economy*, 2007, *23* (4), 988 – 1006.

**Kuhn, Peter and Marie Claire Villeval**, "Are Women More Attracted to Cooperation Than Men?," *Economic Journal*, 2015, *125*, 115–140.

**Mazar, Nina, On Amir, and Dan Ariely**, "The Dishonesty of Honest People: A Theory of Self-Concept Maintenance," *Journal of Marketing Research*, 2008, *45* (6), 633–644.

**McCabe, Donald L, Kenneth D Butterfield, and Linda K Trevino**, *Cheating in College: Why Students Do it and What Educators Can Do About It*, Johns Hopkins University Press, 2012.

**Nagin, Daniel S., James B. Rebitzer, Seth Sanders, and Lowell J. Taylor**, "Monitoring, Motivation, and Management: The Determinants of Opportunistic Behavior in a Field Experiment," *The American Economic Review*, 2002, *92* (4), 850–873.

**Niederle, Muriel and Lise Vesterlund**, "Do Women Shy Away from Competition? Do Men Compete Too Much?," *Quarterly Journal of Economics*, 2007, *122* (3), 1067–1101.

**Park, Alice**, "Lie, Cheat, Flirt. What People Will Do to Keep a Job," *Time*, March 12 2009.

**Robert, Innes and Mitra Arnab**, "Is dishonesty contagious?," *Economic Inquiry*, 2013, *51* (1), 722–734.

**Rubin, Jared and Roman Sheremeta**, "Principal–Agent Settings with Random Shocks," *Management Science*, 2015, *62* (4), 985–999.

**Sarsons, Heather**, "Interpreting Signals: Evidence from Doctor Referrals," 2017. Working Paper.

**Schwieren, Christiane and Doris Weichselbaumer**, "Does competition enhance performance or cheating? A laboratory experiment," *Journal of Economic Psychology*, 2010, *31* (3), 241–253.

**van Veldhuizen Roel**, "Gender Differences In Tournament Choices: Risk Preferences, Overconfidence or Competitiveness?," 2017. Working Paper.

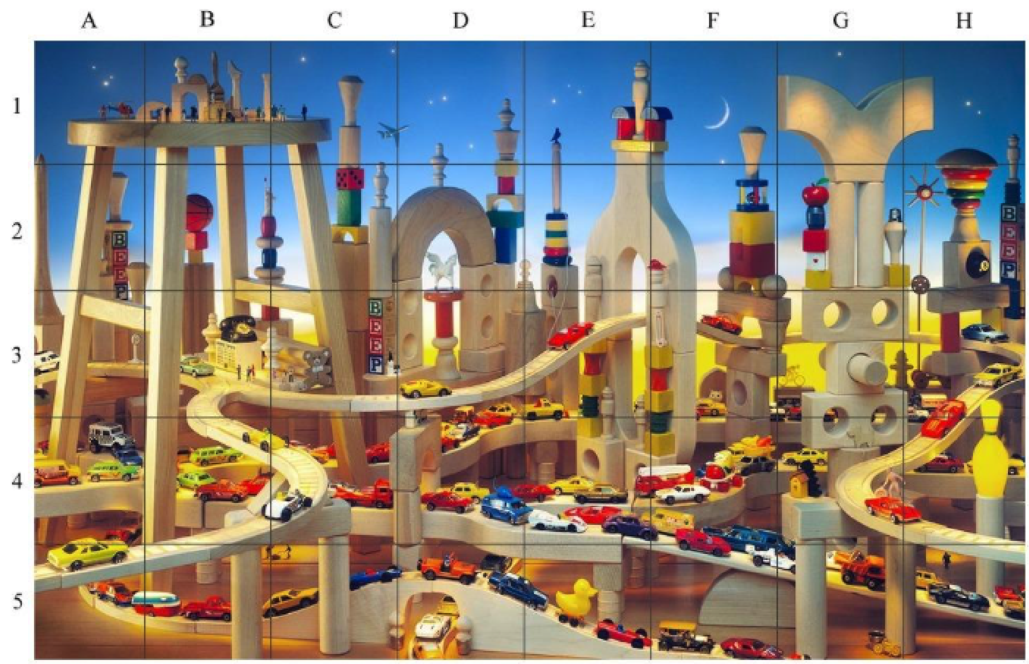
**Weisel, Ori and Shaul Shalvi**, "The collaborative roots of corruption," *Proceedings of the National Academy of Sciences*, 2015, *112* (34), 10651–10656.

# A Online Appendix

Please check each object as you find it. Remember, you must find at least 9 objects to earn a bonus payment.

- ☐ A horse
- ☐ An orange crayon
- ☐ A dinosaur
- ☐ A striped candy cane
- ☐ A yo-yo
- ☐ A banana
- ☐ An alligator
- ☐ A rolling pin
- ☐ A gun
- ☐ A green car
- ☐ A sailboat
- ☐ A black and yellow flag

Figure A1: Task 1




Write the location of the hidden object in the boxes below. For example, if you found a bird in row 4 and column D, write 4D in the box under bird.

| | a duck | an elephant | a roller skate | a red apple | a black 8 ball | a helicopter |
|---|---|---|---|---|---|---|
| Location | | | | | | |

| | a teddy bear | a clock | a red dice | a winged horse | a chair | a tennis racket |
|---|---|---|---|---|---|---|
| Location | | | | | | |

Figure A2: Task 2