Does Monitoring Affect the Agent's Preference for Honesty?

by

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Abstract

Trust and reciprocity have been widely studied in the economics literature. One robust conclusion from this research is that when individuals are trusted, they reciprocate with trustworthy behavior (e.g., Fehr and Gächter 1998). In contrast, research on monitoring and surveillance has shown that individuals view monitoring as a signal of distrust (Cialdini 1996; Falk and Kosfeld 2006; Frey 1993). In a work environment, the signal of distrust may lower the agent's internal motivation to treat the principal fairly and increase the agent's ability to rationalize dishonest behavior. We experimentally test this proposition by using a 3x2 experimental design where the participants are given a simple task, with a monetary reward based on performance, in one of three monitoring treatments—trust monitoring, human monitoring, or electronic monitoring—and in one of two outcome reporting regimes—self-report or verified. The results suggest that the monitoring environment does alter the agent's preference for honesty. As hypothesized, individuals in the trust monitoring treatment reciprocated the trusting environment with honest behavior, while individuals in the human monitored and electronically monitored treatments showed a higher propensity toward dishonest behavior. Interestingly, less dishonesty was detected in the electronic monitoring treatment than the human monitored treatment. It is unclear if the lower dishonesty in the electronic monitoring treatment was caused by a decrease in the propensity to be dishonest, an increased fear of being exposed in the highly controlled environment, or some other reason. These results shed light on several important topics related to fraud prevention, internal controls, and the principal-agent relationship. They also raise interesting questions that can be addressed in future research.

Keywords: monitoring, control, honesty, agency theory, fraud, internal controls

I. INTRODUCTION

It is firmly established in the business literature that monitoring increases effort and deters dishonest behavior within a firm (e.g., Hölmstrom 1979; Jensen and Meckling 1976). This conclusion is logical, and rational, since any self-interested agent should work hard and be honest to avoid the possibility of sanctions if caught shirking or being dishonest. Despite the importance of monitoring in the firm, there is little research in the accounting and managerial literature addressing the effects of monitoring and control on the individual psyche.[1] For instance, how monitoring affects the agent's attitude toward dishonesty and misreporting is largely an unanswered empirical question. This is an important issue because past research has shown that attitude is highly correlated with intent and future behavior (Ajzen and Fishbein 2005). Since attitude/rationalization is considered one of the three sides of the fraud triangle (PCAOB 2005; Cressy 1973), understanding the relationships among monitoring, attitudes, and (dis)honesty is vital to the design of internal controls, financial regulation, and the prevention of fraudulent behavior.

This study proposes that monitoring negatively affects the agent's attitude towards honest reporting by "crowding out" the agent's intrinsic motivation to be honest and enabling the rationalization of deviant behavior. This theory is tested by experimentally investigating whether the type of monitoring affects an individual's behavioral honesty. In this experimental design, participants were assigned to one of

[1] For a broad review of honesty in managerial research see Salterio and Webb (2006).

three monitoring treatment groups: a trust treatment,[2] a human monitored treatment, [3] and an electronically monitored treatment.[4] Once the treatment was induced, the participants performed a simple mental math task where a monetary reward was given based upon task performance. Half the participants in each treatment group self-reported their results, while the other half had their results verified by the researcher. Dishonesty was operationalized by examining the difference in means between the "self-score regime" and the "verify regime" of each treatment group (see Ariely et al. 2009 for a similar research design). As hypothesized, the results of the experiment show that there was more dishonesty in the human monitored treatment and the electronically monitored treatment than the trust treatment. Interestingly, less dishonesty was detected in the electronic monitoring treatment than the human monitored treatment.

Psychology research suggests that individuals can be either internally or externally motivated to perform a task or carry out a behavior. When an individual already is intrinsically motivated to perform a behavior, controlling or incentivizing that behavior may externalize the motivation (Ryan and Deci 2000; Frey and Oberholser-Gee 1997). Externalizing intrinsic motivation can have negative consequences such that

[2] Rousseau et al. (1998, 395) defined trust as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another."

[3] Human monitoring is sometimes referred to as "traditional monitoring" in the academic literature (e.g., Stanton 2000).

[4] While electronic monitoring and traditional human monitoring have the same fundamental purpose, past research suggest that the pervasive, continuous nature of electronic monitoring often elicits stronger reactions from the worker (Aiello and Kolb 1995; Lund 1992; Stanton 2000).

when the external control mechanism is removed or weakened the incentive to perform the behavior is diminished from its original state (Deci et al. 1999).

Researchers across multiple disciplines have found that most individuals are intrinsically motivated to be honest, and behave as if there is a "cost of lying" that must be covered before a lie is told (Lundquist et al. 2007; Gibson et al. 2012; Gneezy 2005). Although individuals behave as if there is a cost of lying, for most people that cost is not high; most individuals will lie for a small amount of gain (Gneezy 2005; Baiman and Lewis 1989). This suggests that there is a trade-off between being honest (internal gratification) and receiving a payoff by being dishonest. Empirical research suggests that personal characteristics and situational circumstances determine the point at which a lie becomes acceptable for each person.[5] Ariely et al. (2009) posit, in their theory of Self-Concept Maintenance, that individuals are only honest enough (partially honest) to convince themselves of their own integrity. They state that "a little bit of dishonesty gives a taste of profit without spoiling a positive self-view" (p. 3).This finding is consistent with several experiments which show that individuals are more likely to be a little dishonest than completely honest or completely dishonest. These two streams of research, together, suggest that individuals will lie for a small amount of gain, but will limit the impact of, or gain from, their lie to a certain threshold so that the lie does not alter their self-image. If monitoring negatively alters one's attitude toward honesty,

[5] Several researchers have looked at the causes of deviant behaviors such as lying and misreporting. Personal characteristics such as Machiavellianism (Fulmer et al. 2009; Murphy 2012) and self-control (Ariely et al. 2009) along with situational characteristics such as the business climate (Crutchley et al. 2007) and controls (Tayler and Bloomfield 2011) have been examined recently in the business literature.

facilitating rationalization of fraudulent behavior, then it is likely that it will also cause individuals to lower their threshold for dishonesty ("cost of lying"), and to the extent that rationalization allows one to be dishonest and still maintain their positive self-image, monitoring will also increase ones capacity for ill-gotten gains.

By examining the effects of monitoring on behavior, this research answers Christ et al.'s (2012) call to further develop our understanding of the potential consequences of formal controls. Also, by positing that monitoring affects the participant's attitude toward misreporting, leading to rationalization, we heed the call of Hogan et al. (2008) to design studies in which multiple elements of the fraud triangle are examined simultaneously. As discussed above, the evidence suggests there may be a natural tension between the effects of control mechanisms and the externalization of intrinsic motivation. Thus, an attempt to reduce one side of the triangle (opportunity) through monitoring may weaken another side of the triangle (rationalization). The understanding of the relationship between these two opposing forces is important to the design of effective regulation and internal controls.

This study continues an interesting line of research in the accounting literature that is concerned with how the business environment can influence an individual's propensity to commit fraudulent or deviant behavior in accounting and managerial related domains. With regard to the "fraud triangle," researchers are interested in the rationalization and attitudes related to dishonest behavior, whether they are developed through the tone at the top (Rezaee 2005), contract design (Evans et al. 2001), the vertical and horizontal equity of compensation (Matuszewski 2010), personality traits (Murphy 2012), or other factors. The current research adds to the managerial

accounting literature by investigating the possibility that monitoring, which is meant to prevent dishonest behavior, may actually promote dishonesty, under some circumstances, by making it easier for the agent to rationalize dishonesty.

The rest of this paper is organized as follows: Section II provides more theory and background, Section III develops the hypothesis, Section IV describes the research design, Section V provides the results, and Section VI gives the summary and conclusion.

II. THEORY AND BACKGROUND

For the most part, honesty in the accounting and finance literature is discussed in the framework of agency theory and/or fraud prevention. In both of these frameworks, monitoring is usually viewed in a positive light, where the only restraint on monitoring and control is the monetary limits of the principal (e.g., Zajac and Westphal 1994; Hansen 1997). However, some research suggests that that there are “hidden costs,” and unanticipated effects, of monitoring and control. Some of these costs and effects derive from the fact that, given an acceptable option or alternative, people will choose not to be controlled. In other words, as a person’s autonomy is removed, their internal motivation to cooperate with the authority is diminished (Spector 1986). However, the implicit costs of control are not well understood and are rarely considered in theoretical models. This paper addresses one dimension of these costs by looking at the effects of monitoring on the agent’s behavioral honesty.

Honesty in Economics and Psychology

Honesty in the psychology literature is often contrasted with the view of honesty in the economics literature. The standard economic perspective of behavior is one of *homo economicus,* where the individual is a rational and selfish entity interested only in maximizing their own external payoffs. For *homo economicus*, the decision to be honest, or dishonest, depends only on the expected benefit versus the expected cost. This cost-benefit tradeoff means that decisions about honesty are like every other decision that individuals face. For *homo economicus,* all else equal, an increase in reward will always increase a behavior, while an increase in punishment, or cost, will always decrease a behavior.

In contrast, the psychology literature holds that in addition to the external reward mechanisms, there also exist internal reward mechanisms and that these internal rewards influence individuals' decisions. The external and the internal reward mechanisms interact to determine if, and to what extent, an individual performs a behavior. From this interaction we get a non-linear relationship between honesty and the reward for being dishonest (see Ariely et al. 2008). However, because of differences in individual values, preferences, and cognition, the functional relationship between honesty and the reward for being dishonest seems to vary greatly between individuals and situations (Gibson et al. 2012).[6]

[6] In the article titled "*In Search of Homo Economicus: Behavioral Experiments in 15 Small Scale Societies*," Henrich et al. (2001) test individuals from different types of societies to determine how much their decision making deviates from rational models.

Gneezy (2005), in a simple game where one participant had the option to tell the truth or lie to another participant about the payoff from various options that they would split, found that the decision maker uses the “truth telling” outcome as a reference level when evaluating the benefits of lying. The monetary consequences of the lie are compared to this reference level. The decision maker is selfish in the sense of maximizing their own payoffs, but sensitive to the cost the lie imposes on the other side. Sensitivity diminishes with the size of payoffs. Moreover, since the perception of the counterpart’s cost is subjective, when there are differences in wealth as in employee-employer relationship or a consumer-insurer relationship, the lower wealth decision maker is more likely to be dishonest.

Since some behaviors, such as an individual’s concern for the counter-party, are not consistent with the characteristics of *homo economicus*, additional theories have been developed to help account for the discrepancies between economic-rationality and actual human behavior. For example, the theory of Self-Concept Maintenance (Ariely et al. 2008) posits that individuals are practically always in a win-lose situation where every decision is a trade-off between being honest and receiving an intrinsic reward or gaining from deception. However, instead of making a decision to be honest or dishonest, individuals usually look for a compromise. Individuals are often dishonest, but they limit their dishonest activity to a point where they do not have to change their own self-perception. The theory posits that the changing of one’s self-perception is undesirable, or costly; but being partially honest offers the individual the “best of both worlds,” gaining from dishonesty but still perceiving themself to be an honest and ethical person. The theory of Self-Concept Maintenance is pertinent to the study of “monitoring

and honesty" because the type of monitoring may affect the internal threshold of dishonest behavior one can engage in and not have to update their self-identity.

Honesty and Agency Theory

Agency theory is the most comprehensive and widely accepted theory in managerial research and organizational design. Agency theory is useful in research, and practice, because it makes explicit predictions about how individuals are likely to behave under different contractual designs. To arrive at such predictions, agency theorists make assumptions about the people involved in the contracts, the entities offering and accepting the contracts, and the informational environment (Eisenhardt 1989). One of the main assumptions that agency theorist make about individuals is that they are rationally self-interested, similar to *homo economicus*. Accordingly, a great deal of research has looked at relaxing this strict assumption (see Cuevas-Rodriguez et al. [2012] for a recent review). For example, researchers have found that the inclusion of trust (Beccerra and Gupta 1999), reciprocity (Kuang and Moser 2009), and social norms (Fehr and Falk 2002) into agency theory can dramatically alter the predicted outcomes of contracts.

Interestingly, experimental managerial accounting research has been a fruitful area for the study of behavioral agency theory models. Participative budget experiments, in particular, offer a unique setting where the information environment and/or the incentive structure of contracts, in the principal-agent relationship, can be manipulated and the effects of the manipulation on the agent's reporting and production decisions can be measured (Brown et al. 2009). This research is unique in the business literature because it allows researchers to empirically examine some determinants of

honesty in an organizational setting. While more than two dozen published participative budget experiments in the managerial accounting literature over the past twenty years have addressed managerial reporting,[7] here, we review a few papers from a widely cited line of work that deals explicitly with honesty.

Evans et al. (2001) specifically examined how agents' preferences for honesty and wealth affect their reporting of private information. In their experiment the managers (participants) privately observe the cost of production and report it to the principal, who provides the amount requested. The agent keeps any surplus from over reporting and cannot be auditing or monitored. Interestingly, they found that, of the available surplus that the agent could have kept with impunity, the agents actually returned 47.6% through full or partial honesty. Evans et al. (2001) compare their results to the average of several dictator game experiments, where a participant simply decides how much of total sum to share with a person they have never met but has entrusted them with gains. In the dictator games the participants give back, on average, 18% of their gains. They attribute the difference, between budget experiment (47.6%) and dictator experiment (18%), to the fact that in the budget experiment the participant had to tell a lie to receive the surplus, in which case their preference for honesty, or partial honesty, affected their gain[8].

[7] See Brown et al. (2009) for a review of participative budget experiments in the managerial accounting literature.

[8] Fredrickson and Cloyd (1998) had similar findings and concluded, from agents' self-reported motivations, that personal integrity is the most important factor limiting slack in their experimental budgetary setting.

Hannan et al. (2006) examine honesty in the participative budget setting under different levels of information asymmetry, while maintaining the trust setting from Evans et al. (2001). In their experiment the main variable was the precision of an information system (coarse or precise) that signaled the actual costs to the principal, although the principal has no power to deter dishonesty. They show that agents' reporting decisions are affected by how they trade off the psychological benefits of appearing honest against the economic benefits of misrepresentation. The precision of the information system affects the agent's trade-off by changing the ability of the principal to infer the agent's level of honesty. They find that honesty is lower under a precise information system than under a coarse information system because the incremental cost of appearing honest is higher with a precise system.

Rankin et al. (2008) extend the findings of Evans et al. (2001) and Hannan et al. (2006) by distinguishing more clearly whether agents' tendency to report private information more truthfully, despite an economic incentive to be dishonest, is due to honesty or to other non-pecuniary motivations such as fairness or reciprocity. They manipulate whether the agent's budget report does or does not require a factual assertion, noting that while fairness preferences could come into play in both conditions, honesty should come into play only when agents are required to make a factual assertion. They find more honest reporting when a factual assertion is required, indicating an incremental effect of honesty beyond other non-pecuniary preferences. In addition, Rankin et al. (2008) examine whether their finding holds when the principal rather than the agent has final budget authority. They find that the incremental effect of honesty is no longer significant when the principal has final budget authority. They also

provide evidence suggesting that this may be because agents frame the situation as an ethical dilemma when the agent has final authority, but as a negotiation in which each party acts in his or her self-interest when the principal has final authority.

Overall, the evidence from the managerial accounting literature suggests that, all else equal, agents have a preference for partial honesty when there is a reward for lying. Agents will limit their dishonesty because they also have a preference for non-pecuniary benefits such as fairness, reciprocity, and honesty. The results of these experiments show the complexity of human decision making by suggesting that people "want their cake and they want to eat it too."

A common element of many of the participative budget experiments is the use of low monitoring to measure innate honesty. The study presented in this paper is unique because it attempts to measure how different monitoring environments affect honesty. We posit that monitoring makes it easier for agents to rationalize dishonesty when the opportunity arises, which may lead to an increase in dishonest behavior in environments where monitoring intensity is higher.

Honesty, Fraud, and Internal Controls

Fraud prevention and internal controls are concerned with preventing financial crimes, deterring misreporting, and safeguarding firm assets. Fraud involves intentional acts and is perpetrated by human beings using deception, trickery, and cunning (Ramamoorti 2008). Since fraud involves people's capacity to deceive, and be deceived, it is important to understand the psychological factors that might influence these types of behavior. Therefore, most work related to honesty and fraud prevention,

or internal controls, is concerned with how and why individuals commit acts of fraud and deceit in the workplace or financial markets.

Despite increases in regulation and ethical training in the post Sarbanes-Oxley era**,** fraud and misreporting continue to be a pertinent threat to capital markets and internal controls (Hogan et al. 2008). Behavioral research, which exposes some short-comings of theories based on economic rationality*,* suggests regulation and punishment may not affect decision making as much as previously thought. Further, ethical training may not be as effective if individuals delude themselves of their moral identity as the theory of Self-Concept Maintenance suggests. In light of the increases in reported fraud and financial crime, regulators have called for more research on the how to prevent or detect fraud (Hogan et al. 2008).

In their 2009 Global Economic Survey, PricewaterhouseCoopers described fraud and misreporting as pervasive, persistent, and pernicious.[9] Thirty percent of the 3,037 respondents reported dealing with either fraud or misreporting, at some level, over the past year. They also report that the amount of misreporting caught by internal controls in trending down over time. Also, only 7% of misreporting and fraud cases were initially discovered by whistleblowing-related activity. In addition to the uptick in financial fraud reported in the PWC survey, the SEC Enforcement Division announced that in 2011 it filed the most enforcement actions ever in a single year. [10] The evidence suggests that,

[9]The PWC report can be seen at http://www.pwc.com/us/en/forensic-services/publications/2009-global-economic-crime-survey.jhtml .

[10]The SEC press release is found at http://www.sec.gov/news/press/2011/2011-234.htm .

despite the massive amount of resources spent on fraud prevention in the past ten years, fraud and misreporting are no less pervasive than they were before.

Statement on Auditing Standards 99, issued by the Auditing Standards Board of the American Institute of Certified Public Accountants (AICPA) in October 2002, describes the fraud triangle. The fraud triangle is used by auditors to assess fraud risk because, generally, the three fraud triangle conditions (incentive, opportunity, and rationalization) are present when fraud occurs. First, there is an incentive or pressure that provides a reason to commit fraud. Second, there is an opportunity, and ability, for fraud to be perpetrated (e.g., absence of controls, ineffective controls, or the ability of management to override controls.) Third, the individuals committing the fraud possess an attitude that enables them to rationalize the fraud.

Hogan et al. (2008) suggest that, unlike incentive and opportunity, rationalization has received little attention from researchers. Our research posits that monitoring affects an individual's attitude toward misreporting. Attitude is highly correlated with intent (Ajzen and Fishbein 2005), which triggers action and rationalization. Rationalization is described by Tsang (2002) as the cognitive process that individuals use to convince themselves that their behavior does not violate their moral standards. The way we conceptualize the fraud triangle may need to be re-evaluated if it is shown that increased monitoring makes it easier to rationalize misreporting.

The standard assumption of the fraud triangle is that incentives and pressure motivate misreporting while lax controls facilitate misreporting (Hogan et al. 2008). Individuals are generally viewed as being predisposed to character traits that partially determine the extent to which they rationalize their deviant behavior (Murphy 2012).

However, the theory proposed in this paper is that not only do incentives promote misreporting but strong controls may also promote deviant behavior by crowding out the intrinsic motivation to be honest, making it easier to rationalize dishonest behavior. A similar line of thought was explored by Belot and Schröder (2013). In their research experiment participants were hired for a job which had several options for deviant behavior (poor performance, tardiness, or theft). They found that increasing monitoring on one measure (performance) led to increased deviance in another measure (tardiness). They concluded that workers do “retaliate” in some way for being monitored.

The findings in this line of research have implications for the study, not only of managerial misreporting, but also whistleblowing, collusion, and worker satisfaction. As the recent wave of public accountants involved in insider trading scandals has shown, most fraud involves several collaborators—inside the firm, and sometimes outside the firm—who turn a blind eye to the unethical behavior (Burns and Kedia 2008). Often the collaborators and potential whistleblowers have different incentives, attitudes, and personality traits, but are subject to the same monitoring mechanisms. Their attitudes toward the monitoring systems may be a driver in their decisions to coalesce for or against the monitors.

III. HYPOTHESIS DEVELOPMENT

The fraud triangle suggests that the three conditions of incentive, opportunity, and rationalization are present when an individual commits a fraudulent act. The incentive is generally monetary in nature, while opportunity is generally conceptualized as the perception that one can perpetrate the fraud while not getting caught (Murphy

and Dacin 2011). Agency theory assumes that all individuals have a natural predisposition toward fraud, and once an individual has the incentive and the opportunity to commit fraud, the rationalization is as simple as a cost-benefit calculation. However, and as psychology theories suggest, prior accounting literature has shown that individuals act more honestly than agency theory would predict (e.g., Evans et al. 2001; Hannan et al. 2006), suggesting that other influences, such as past experience and the environment, impact individuals' ability to commit and rationalize fraudulent behavior.

Researchers have identified several categories of rationalization that are often employed by perpetrators, such as moral justification, advantageous comparison, euphemistic labeling, minimization of the act, denial of the victim, and diffusion of responsibility (Murphy and Dacin 2011). However, understanding how individuals rationalize fraudulent behavior does not fully explain what characteristics of the environment, or situation, prompted the individuals to act out the deviant behavior. After all, most individuals in a position to commit fraud have a good reputation (Anand et al. 2004) which facilitates their ability to deceive others. In this study we posit that monitoring can affect an individual's attitude toward dishonesty by crowding their intrinsic motivation to be honest and increasing their ability to rationalize deviant behavior, as shown in Figure 1.

[Insert Figure 1]

On any particular task, misreporting is directly influenced by the level of monitoring on the person reporting. For example, individuals may be inclined to cheat

under 100% monitoring, but one is unlikely to cheat, misreport, or be dishonest if they know for certain they will be caught. However, not misreporting does not mean that one does not have an inclination to misreport. This inclination may be an important factor in the decision making process when the opportunity to cheat arises.

Trust and reciprocity have been widely studied in the economics literature (see Fehr and Gächter 1998). One robust conclusion from this research is that when individuals are trusted they reciprocate with trustworthy behavior (for example, Fehr et al. 1993; Berg et al. 1995; McCabe et al. 2003). Conversely, research on monitoring and surveillance has shown that individuals view monitoring, under certain conditions, as a signal of distrust[11] (Cialdini 1996; Falk and Kosfeld 2006). This signal of distrust may lower the agent's internal motivation to treat the principal fairly and increase the agent's ability to rationalize dishonest behavior. Based on this logic we derive the following hypothesis:

Hypothesis: When controls are removed or weakened, dishonest behavior will be higher in an environment where monitoring intensity is higher.

IV. RESEARCH DESIGN

This experiment was carried out in a computer lab at a large public university. Using a 3X2 experimental design, where each cell included 19 participants, each of the 114 participants was subjected to one of three monitoring treatments and one of two

[11] The signaling of trust and distrust is important in many domains. For example, Mahar (2003) discusses how many people do not show interest in prenuptial agreements because they do not want to signal distrust in the pre-marital relationship.

reporting regimes. Each of the six treatment combinations included two sessions, for a total of 12 research sessions, with each session including either 9 or 10 participants. The session dates and times were pre-assigned, and participants self-registered online for the session they preferred.

Participants were recruited through the university email newsletter, flyers, and word of mouth. A diverse group 114 adult volunteers participated. Table 1 shows the demographics collected from the participants with a short demographics questionnaire (see Appendix 1) given upon arrival.

[Insert Table 1]

After administering the demographic questionnaire, the researcher explained the work schedule and compensation for the participants. The participants in this experiment had just spent an hour performing two distractor tasks in other experiments not related to the honesty test. These tasks served to accustom the participants to the environment, induce the monitoring treatment, and conceal the fact that their honesty was being tested. In the first distractor task, participants spent about 27 minutes performing a clerical task where they corrected data in a spreadsheet, for a flat $10 wage. In the second distractor task the participants spent about 24 minutes solving logic puzzles for a piecewise wage up to $3. The task that tested their honesty in the current study is explained in detail below.

The monitoring treatments were the same ones to which the participants had become accustomed. Individuals in the electronic monitoring treatment had one small

webcam facing their workstation keyboard and papers when they arrived (see Appendix 2). The electronically monitored group received all the same task instructions as the other two groups, except they were told that "you are being monitored with webcams so we can observe your work and make sure you follow the instructions as given."[12] Unbeknownst to the participants, the webcams were not activated. However, the experimenter and research assistant sat prominently at a corner workstation, which the subjects believed was the "monitoring station," while all the tasks were completed.

Participants in the human monitored group were subjected to traditional human monitoring and received all the same task instructions as the other two groups, except they were told that "I will walk around the room so I can observe your work and make sure you follow the instructions as given." The researcher and the research assistant wandered around the room and passively observed the participants during all the tasks.

Individuals in the trust treatment received all the same task instructions as the other groups. However, they were told that "you will not be watched and we believe you will follow instructions as given." All research personnel then left the room and returned when time was up for each task.

The task for this experiment was a short math puzzle. Following Ariely et al. (2009), participants were given a sheet of paper with 20 numeric matrices (see Appendix 3). Each matrix contained 12 three-digit numbers (e.g., 4.29, 3.23). Participants had 5 minutes to find the unique two numbers that add to 10.00 in as many

[12] This wording used in the instructions is based on the wording used in a similar study by Enzle and Anderson (1993). Their study looked at the effects of controlling versus non-controlling electronic monitoring on intrinsic motivation.

matrices as possible. Participants were told, truthfully, that all the matrices had the unique combination and that they could work the sheet in any manner or order they like. Also, It was explained that they could earn anywhere from $0 to $5 on this task, depending upon their performance.

Half the participants in each monitoring treatment were told that writing or marking on the paper during the work was optional, and no indication or proof that the combination was actually found would be required. This half of the participants self-reported the number of matrices solved and their work was not verified. Thus, cheating without detection was possible. The other half of the participants in each monitoring treatment had to mark their papers to indicate the correct combination, and their work was verified. Dishonesty was operationalized as the difference in the mean scores between the self-score and non-self-score participants within a monitoring treatment group.

V. RESULTS

Table 2 shows the number of matrices reported as solved across monitoring treatment and reporting regimes. In the trust treatment, the participants who self-reported their results reported solving fewer matrixes (8.26) than the participants who knew their work would be verified (9.68). In the human monitoring treatment, the participants who self-reported their results reported solving more matrixes (11.58) than the participants who knew their work would be verified (8.47). Similarly, in the electronic monitoring treatment, participants who self-reported their results reported solving more matrixes (8.95) than the participants who knew their work would be verified (8.11).

[Insert Table 2]

Before proceeding to the formal testing of the hypothesis it is important to note that there were three extraneous individual differences, from the demographic survey (shown in Appendix 1), which were found to significantly affect the number of matrices reported as solved ($\alpha = .10$, untabulated). On average, males, those who said that they were good at mental math, and those who said that they were not tired, reported that they solved more matrices than females, those who said they were not good with mental math, and those who said they were tired. Past research suggests that these individual differences may have a direct effect on task performance, or interact with the treatments to alter performance (or reported performance). For example, some research suggests that, on average, males are slightly better at mental math (Hyde and Mertz. 2009), but some research also suggests that males are more likely to be dishonest about their performance (Dreber and Johannesson 2008). Being tired may affect performance, but past research also has shown that individual may be more dishonest about their performance when they are tired (Ariely et al. 2009). Moreover, tired individuals may feel more pressure to perform in the presence of monitoring, causing an interaction with the monitoring treatment. Lastly, past research has shown that monitoring intensity (through work-related stress) may interact with mental ability to affect performance on tasks (Schultz and Searleman 1998).

These extraneous individual differences (mental math ability, tiredness, and gender) should be included in the analysis to reduce error variance. As a result of the quasi-randomization of participants, cell sizes, after inclusion of the controls, are

sufficient to calculate the main effects and all 2- and 3-way interaction terms.[13] Levene's test indicates that the assumption of equality of error variance is not violated (p = .17), reducing concerns about differences in cell sizes (Neter et al. 1990).

Table 3 shows that, consistent with the hypothesis, after accounting for all the control variables and interactions, the monitoring treatment and reporting regime interact to affect the number of matrices individuals reportedly solved (p = .027). Further, this interaction is not affected by the other control variables (none of the three-way interactions including it are significant), so that we can examine this relationship without qualification. The other significant effects and interactions in the ANOVA do not relate to our hypothesis, and are included only to control for extraneous variance in the factorial design.

[Insert Table 3]

Figure 2 shows the adjusted means graph for each of the treatment groups. The slope of each line indicates the effect of verification on reported scores, which is our proxy for cheating. The slopes of the lines indicate that cheating may have been present in the human-monitored treatment, and to a lesser extent in the electronically monitored treatment. No cheating is apparent in the trust monitored treatment.

[Insert Figure 2]

[13] "Higher-order interactions occur rarely" and are difficult to interpret (van Belle 2002, 135).

As shown in Table 4, a comparisons of the adjusted means (shown in Figure 2) reveals that the reporting regime treatments are not significantly different in the trust monitoring treatment (p = .593). However, the reporting regime treatment means are significantly different in the human monitored treatment (p = .035), and, while the graph does seem to indicate that cheating may have been present in the electronic monitoring treatment, the means are not significantly different at a high level of confidence (p = .275). [14] Overall, these results support our hypothesis that, given an opportunity to cheat, dishonesty will be higher in an environment where monitoring intensity is higher.

[Insert Table 4]

VI. SUMMARY AND CONCLUSION

In this study, we theorized that monitoring could crowd-out an individual's intrinsic motivation to be honest. We further theorized that this loss of intrinsic motivation would change the individual's attitude toward dishonesty and increase their ability to rationalize deviant behavior—all leading to a higher propensity toward dishonest behavior. This led to our hypothesis that, given an opportunity to cheat, dishonesty will be higher in an environment where monitoring intensity is higher.

[14] All of the measured outcomes were related to a planned, specific hypothesis rather than a result of post hoc comparisons. For this reasons, we did not adjust the significance level of the *p* values for the planned comparisons. This approach is consistent with guidelines for planned multiple comparisons (Fisher 1947; Rothman 1990).

To test our hypothesis, we assigned each participant in our experiment to one of three monitoring environments: trust monitoring, human monitoring, or electronic monitoring. With this treatment induced, we gave the participants a simple mental math task with a monetary reward based on performance. Half the participants in each treatment self-reported their results; while the other half had their results verified (groups were segregated and unaware of each other). The spread between the average reported performance of verified and non-verified groups was used a proxy for the incidence of cheating in each monitoring-treatment group (Ariely et al. 2009).

Dishonesty was not detected in the trust treatment, but cheating was detected in the human monitored treatment and—to a lesser extent—in the electronically monitored treatment. Therefore it appears that monitoring does affect the agent's preference for honesty. Thus, we find evidence to support of our hypothesis, although questions still remain as to why cheating was detected in the human monitored treatment at a statistically significant level, but cheating was not detected at a significant level in the electronically monitored treatment.

We offer three explanations for why cheating was higher in the human monitored treatment than the electronically monitored treatment. First, it is possible that there was a strong propensity to be dishonest in the electronically monitored treatment, but the electronic monitoring convinced the participants that the risk of exposure was still present in this situation. Perhaps they feared they were being recorded, or their movements on the mental math task were being scrutinized. If so, then it is probable that, even though they had a high propensity to be dishonest, they thought it better to be honest and not risk detection. Second, it is possible that the individuals saw the

electronic monitoring as a cue that the task was very important to the monitor, or that the monitor was very concerned with their work. If individuals viewed the task as being important to someone then that may have decreased their propensity to be dishonest, even if they disliked the monitoring. Third, it is possible that the participants did not dislike the electronic monitoring as much as they disliked the human monitoring, leading to lower propensity to be dishonest. This explanation would not be consistent with past research and anecdotal evidence which shows electronic monitoring is more stressful than traditional human monitoring (Stanton 2000). Future research should be done in this area to determine the how individuals view different monitoring regimes, and how their views shape their attitudes towards different work behaviors.

In conclusion, the agency theory literature and fraud prevention literature rarely consider the negative effects of monitoring on the individual psyche. Usually, only the principal's explicit monetary costs are considered when searching for the optimal amount of monitoring. This study, and others, suggest that there are significant "hidden costs" (Falk and Kosfeld 2006), and unanticipated effects, of monitoring and control that have yet to be fully explored in the business literature. Since these costs and effects are mostly unknown, business researchers currently lack the ability to predict the effects of controls, or regulation, on behavior. In contrast, much more is known about other environmental effects on behavior, such as the effects of incentives on work performance (Bonner et al. 2000), than is known about how individuals react to different types of internal controls. Following Christ et al. (2012), we believe that future research should further develop our understanding of the potential consequences of formal controls.

Further developing this line of research may yield important clues to long-standing questions, such as why financial fraud is still persistent despite increases in regulation and ethics training (Rezaee 2005), why individuals display trustworthy behavior in certain situations and contractual arrangements but selfish behavior in others (Rankin et al. 2008), why individuals collude against control systems (Zhang 2008), and finally, why whistleblowing may be more likely in some environments or situations than others (Seifert et al. 2013). Using empirical evidence to address the questions will aid in the design of more effective internal controls (Sprinkle 2003), the development of more efficient contracts (Brown et al. 2009), and more comprehensive theoretical models for business researchers (e.g., Tirole 2009).

APPENDIX 1: Demographic questionnaire

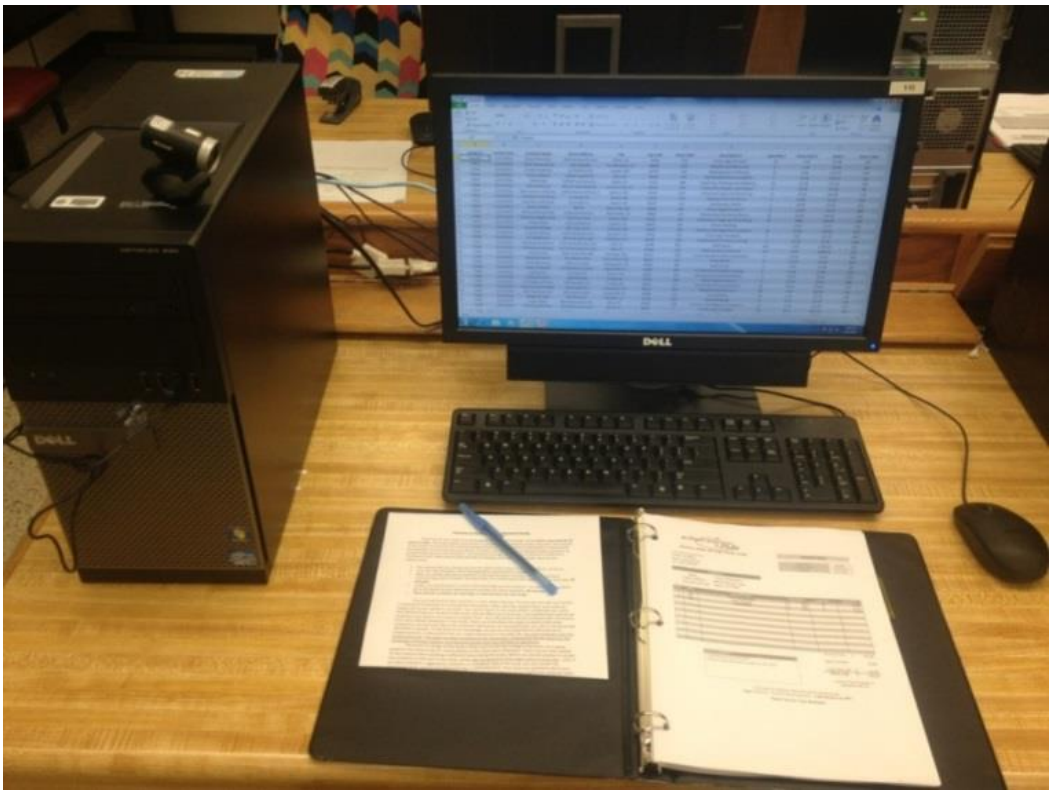
Short Demographics Questionnaire

Circle all that apply to you

1) I am: **Male Female**
2) My age is : **Under 18 18 -24 Over 24**
3) I consider myself mostly an: **International Student American Student Not a student**
4) I consider myself mostly: **A business student Not a business student Not a student**
5) I am a: **Freshman/Sophomore Junior/Senior Graduate Student Other**
6) I like to play sports or enjoy watching sports: **Yes No**
7) I consider myself good with numbers and mental math: **Yes No**
8) I am in a good mood (happy) today: **Yes No**
9) I am tired today: **Yes No**

Your answers on this form and your performance on the assigned tasks will remain anonymous and will not be matched to your name, image, person, or consent form

APPENDIX 2: Electronic monitoring workstation with camera on computer tower



Appendix 3: Matrix task for testing honesty

9.50	4.92	6.47
9.37	6.09	8.15
3.11	0.50	7.54
4.41	8.11	9.35

6.84	8.99	7.24
2.38	7.68	6.65
9.60	8.56	5.47
1.01	1.76	3.92

6.00	6.23	4.94
8.83	9.01	7.96
0.86	4.04	0.99
4.25	1.42	6.06

0.12	8.07	2.02
1.71	2.20	3.44
8.88	9.96	8.29
9.18	8.92	1.17

6.79	4.15	8.95
4.06	5.82	4.34
4.93	4.18	5.18
3.23	8.56	1.80

3.36	4.20	0.06
1.57	8.39	3.35
0.61	1.43	5.29
8.43	6.97	6.75

0.48	6.40	8.36
2.42	9.72	6.92
5.21	2.57	7.65
9.81	1.64	3.58

1.82	2.44	7.36
1.10	8.87	3.37
8.02	1.93	9.16
2.49	1.97	2.64

6.46	0.89	6.92
2.02	0.52	0.37
0.07	3.54	0.45
3.39	4.80	7.46

7.46	0.78	1.08
9.97	3.02	1.89
5.21	0.64	7.27
9.22	7.87	2.29

1.51	3.64	1.86
7.19	7.13	4.56
1.48	7.09	2.96
2.30	8.18	8.14

1.09	5.74	3.45
8.82	6.53	6.44
5.12	7.01	4.31
6.55	5.63	8.83

0.28	1.71	7.31
0.14	1.93	9.72
8.27	9.39	2.48
8.66	1.12	2.34

7.21	3.24	3.31
1.10	8.12	9.00
7.10	7.12	7.75
5.13	8.90	3.80

7.80	3.12	3.59
1.34	9.81	2.96
2.86	4.42	9.31
6.88	6.44	5.67

4.95	2.10	7.65
9.02	8.33	2.97
9.61	5.61	9.61
2.12	5.52	5.05

2.08	0.28	8.60
5.02	5.00	3.93
3.40	4.98	7.44
6.98	8.61	0.94

7.48	4.98	5.32
7.11	2.94	6.92
2.52	9.49	8.57
2.69	3.86	6.01

3.84	8.22	1.97
5.48	6.98	5.77
8.03	1.31	0.92
6.37	6.59	0.28

9.44	6.71	4.29
6.93	9.34	1.28
8.36	6.85	9.28
0.56	8.89	4.92

REFERENCES

Aiello, J. and K. Kolb. 1995. Electronic performance monitoring and social context: Impact on productivity and stress. *Journal of Applied Psychology* 80 (3): 339–353

Anand, V., B. Ashforth, and M. Joshi. 2004. Business as usual: The acceptance and perpetuation of corruption in organizations. *Academy of Management Executive* 18 (2): 39–53.

Ariely, D., N. Mazar, and O. Amir. 2008. The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research* 45 (6): 633–644.

Ariely, D., N. Mead, L. Baumeister, F. Gino, and M. Schweitzer. 2009. Too tired to tell the truth: Self-control resource depletion and dishonesty. *Journal of Experimental Social Psychology* 45 (3): 594–597.

Ajzen, I., and M. Fishbein. 2005. The influence of attitudes on behavior. *The Handbook of Attitudes*: 173–222. Lawrence Erlbaum Associates Publishers.

Baiman, S., and B. Lewis. 1989. An experiment testing the behavioral equivalence of strategically equivalent employment contracts. *Journal of Accounting Research* 27 (1): 1–20.

Beccerra, M., and A. Gupta. 1999. Trust within the organization: Integrating the trust literature with Agency theory and transaction costs economics. *Public Administration Quarterly* 23 (2): 177–203.

Belot, M., and M. Schröder. 2013. Does monitoring work? A field experiment with multiple forms of counterproductive behavior. Working Paper Series University of Magdeburg.

Berg, J., J. Dickhaut, and K. McCabe. 1995. Trust, reciprocity, and social history. *Games and Economic Behavior* 10 (1): 122–142.

Bonner, S., R. Hastie, G. Sprinkle, and S. Young. *2000*. A Review of the Effects of Financial Incentives on Performance in Laboratory Tasks: Implications for Management Accounting. *Journal of Management Accounting Research* 12 (1): 19–64.

Brown, J., J. Evans III, and D. Moser. 2009. Agency theory and participative budgeting experiments. *Journal of Management Accounting Research* 21 (1): 317–345.

Burns, N., and S. Kedia. 2008. Executive option exercises and financial misreporting. *Journal of Banking & Finance* 32 (5): 845–857.

Christ, M. H., S. A. Emett, S. L. Summers, and D. A. Wood. 2012. The effects of preventive and detective controls on employee performance and motivation. *Contemporary Accounting Research* 29 (2): 432–452.

Cialdini, R. B. 1996. The triple tumor structure of organizational behavior. In D. M. Messick & A. E.Tenbrunsel (Eds.), *Codes of conduct* 44–58. New York: Sage.

Cressey, D. R. 1973. *Other People's Money*. Montclair: Patterson Smith.

Crutchley, C. E., M. R. H. Jensen, and B. B. Marshall. 2007. Climate for scandal: Corporate environments that contribute to accounting fraud. *Financial Review* 42 (1): 53–73.

Cuevas-Rodríguez, G., L. R. Gomez-Mejia, and R. M. Wiseman. 2012. Has Agency Theory Run its Course?: Making the Theory more Flexible to Inform the Management of Reward Systems. *Corporate Governance: An International Review* 20 (6): 526–546.

Deci, E. L., R. Koestner, and R. M. Ryan. 1999. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin* 125 (6): 627–668.

Deci, E. L., R. J. Vallerand, L. G. Pelletier, and R. M. Ryan. 1991. Motivation and education: The self-determination perspective. *Educational Psychologist* 26 (3-4): 325–346.

Dreber, A., and M. Johannesson. 2008. Gender differences in deception. *Economics Letters* 99 (1): 197–199.

Eisenhardt, K. M. 1989. Agency theory: An assessment and review. *Academy of Management Review* 14 (1): 57–74.

Enzle, M. E., and S. C. Anderson. 1993. Surveillant intentions and intrinsic motivation. *Journal of Personality and Social Psychology* 64 (2): 257–266.

Evans III, J. H., R. L. Hannan, R. Krishnan, and D. V. Moser. 2001. Honesty in managerial reporting. *The Accounting Review* 76 (4): 537–559.

Falk, A., and M. Kosfeld. 2006. The hidden costs of control. *The American Economic Review* 96 (5): 1611–1630.

Fehr, E., and S. Gächter. 1998. Reciprocity and economics: The economic implications of homo Reciprocans. *European Economic Review* 42, (3-5): 845–859.

Fehr, E., and A. Falk. 2002. Psychological foundations of incentives. *European Economic Review* 46 (4): 687–724.

Fehr, E., G. Kirchsteiger, and A. Riedl. 1993. Does fairness prevent market clearing? An experimental investigation. *The Quarterly Journal of Economics* 108 (2): 437–59.

Fisher, R.A. 1947. *The Design of Experiments*. Fourth Edition. Edinburgh: Oliver and Boyd.

Frederickson, J.R., and C.B. Cloyd. 1998. The effects of performance cues, subordinate susceptibility to social influences, and the nature of the subordinate's private information on budgetary slack. *Advances in Accounting* 16 (1): 89–115.

Frey, B. S. 1993. Does monitoring increase work effort? The rivalry with trust and loyalty. *Economic Inquiry* 31 (4): 663–670.

Frey, B. S., and F. Oberholzer-Gee. 1997. The cost of price incentives: An empirical analysis of motivation crowding-out. *The American Economic Review* 87 (4): 746–755.

Fulmer, I. S., B. Barry, and D. A. Long. 2009. Lying and smiling: Informational and emotional deception in negotiation. *Journal of Business Ethics* 88 (4): 691–709.

Gibson, R., C. Tanner, and A. Wagner. 2012. Preferences for truthfulness: Heterogeneity among and within individuals. *American Economic Review* 103 (1): 532–548.

Gneezy, U. 2005. Deception: The role of consequences. *The American Economic Review* 95 (1): 384–394.

Hannan, R. L., F. W. Rankin, and K. L. Towry. 2006. The effect of information systems on honesty in managerial reporting: A behavioral perspective. *Contemporary Accounting Research* 23 (4): 885–918.

Hansen, S. C. (1997). Designing internal controls: The interaction between efficiency wages and monitoring. *Contemporary Accounting Research* 14(1): 129–163.

Henrich, J., R. Boyd, S. Bowles, C. Camerer, E. Fehr, H. Gintis, and R. McElreath. 2001. In search of homo economicus: Behavioral experiments in 15 small-scale societies. *American Economic Review* 91 (2): 73–78.

Hogan, C. E., Z. Rezaee, R. A. Riley, Jr., and U. K. Velury. 2008. Financial statement fraud: Insights from the academic literature. *Auditing: A Journal of Practice & Theory 27 (2*): 231–252.

Hölmstrom, B. 1979. Moral hazard and observability. *The Bell Journal of Economics* 10 (1): 74–91.

Hyde, J. S., and J.E. Mertz (2009). Gender, culture, and mathematics performance. *Proceedings of the National Academy of Sciences* 106 (22): 8801–8807.

Jensen, M. C., and W. H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3 (4): 305–360.

Kuang, X., and D. V. Moser. 2009. Reciprocity and the effectiveness of optimal agency contracts. *The Accounting Review* 84 (5): 1671–1694.

Lund, J. 1992. Electronic performance monitoring: A review of research issues. *Applied Ergonomics 23 (1): 54–58* .

Lundquist, T., T. Ellingsen, E. Gribbe, and M. Johannesson. 2007. The cost of lying. *Working Paper Series in Economics and Finance*, Stockholm School of Economics, No. 666.

Mahar, H. 2003. Why are there so few prenuptial agreements? *Harvard Law School John M.Olin Center for Law, Economics and Business Discussion Paper Series*: 436.

Matuszewski, L. J. 2010. Honesty in managerial reporting: Is it affected by perceptions of horizontal equity? *Journal of Management Accounting Research* 22 (1): 233–250.

McCabe, K. A., M. L. Rigdon, and V. L. Smith. 2003. Positive reciprocity and intentions in trust games. *Journal of Economic Behavior & Organization* 52 (2): 267–275.

Murphy, P. R. 2012. Attitude, Machiavellianism and the rationalization of misreporting. *Accounting, Organizations and Society* 37 (4): 242–259.

Murphy, P. R., and M. T. Dacin. 2011. Psychological pathways to fraud: Understanding and preventing fraud in organizations. *Journal of Business Ethics* 101 (4): 601–618.

Neter, J., W. Wasserman, and M. H. Kutner. 1990. *Applied Linear Statistical Models*, 3rd ed., Irwin.

Public Company Accounting Oversight Board (PCAOB) (2005). Consideration of fraud in a financial statement audit. AU Section 316.

Ramamoorti, S. 2008. The psychology and sociology of fraud: Integrating the behavioral sciences component into fraud and forensic accounting curricula. *Issues in Accounting Education* 23 (4): 521–533.

Rankin, F. W., S. T. Schwartz, and R. A. Young. 2008. The effect of honesty and superior authority on budget proposals. *The Accounting Review* 83 (4): 1083–1099.

Rezaee, Z. 2005. Causes, consequences, and deterrence of financial statement fraud. *Critical Perspectives on Accounting* 16 (3): 277–298.

Rothman, K. J. 1990. No adjustments are needed for multiple comparisons. *Epidemiology* 1 (1): 43–46.

Rousseau, D., S.B. Sitkin, R.S. Burt, and C. Camerer. 1998. Not So Different After All: A Cross-Discipline View of Trust*. Academy of Management Review* 23 (3): 393–404.

Ryan, R. M., and E. L. Deci. 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist* 55, (1): 68–78.

Salterio, S. E., and A. Webb. 2006. Honesty in accounting and control: A discussion of "The effect of information systems on honesty in managerial reporting: A behavioral perspective." *Contemporary Accounting Research* 23 (4): 919–932.

Schultz, P., and A. Searleman. 1998. Personal need for structure, the einstellung task, and the effects of stress. *Personality and Individual Differences* 24 (3): 305–310.

Seifert D.L., W. Stammerjohan, and R. B. Martin. 2013. Trust, Organizational Justice, and Whistleblowing: A Research Note. *Behavioral Research in Accounting* (forthcoming).

Spector, P.E. 1986. Perceived control by employees: A meta-analysis of studies concerning autonomy and participation at work. *Human Relations* 39 (11): 1005–1016.

Sprinkle, G. B. 2003. Perspectives in experimental research in managerial accounting. *Accounting, Organizations and Society* 28 (2–3): 287–318.

Stanton, J. M. 2000. Reactions to employee performance monitoring: Framework, review, and research directions. *Human Performance* 13 (1): 85-113.

Tayler, W. B., and R. J. Bloomfield. 2011. Norms, conformity, and controls. *Journal of Accounting Research* 49 (3): 753–790.

Tirole, J. 2009. Cognition and Incomplete Contracts. *American Economic Review* 99 (1): 265–294.

Tsang, J. A. 2002. Moral rationalization and the integration of situational factors and psychological processes in immoral behavior. *Review of General Psychology* 6 (1): 25–50.

van Belle, G. 2002. *Statistical Rules of Thumb.* Wiley-Interscience.

Zajac, E. and J. Westphal. 1994. The costs and benefits of managerial incentives and monitoring in large U.S. corporations: When is more not better? *Strategic Management Journal* 15 (S-1): 121–142.

Zhang, Y. 2008. The effects of perceived fairness and communication on honesty and collusion in a multi-agent setting. *The Accounting Review* 83 (4): 1125–1146.

Figure 1: Theoretical model

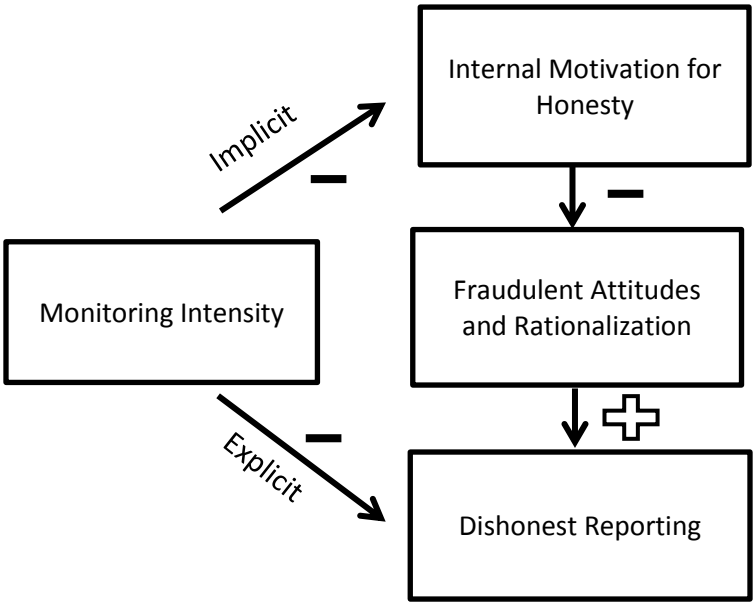
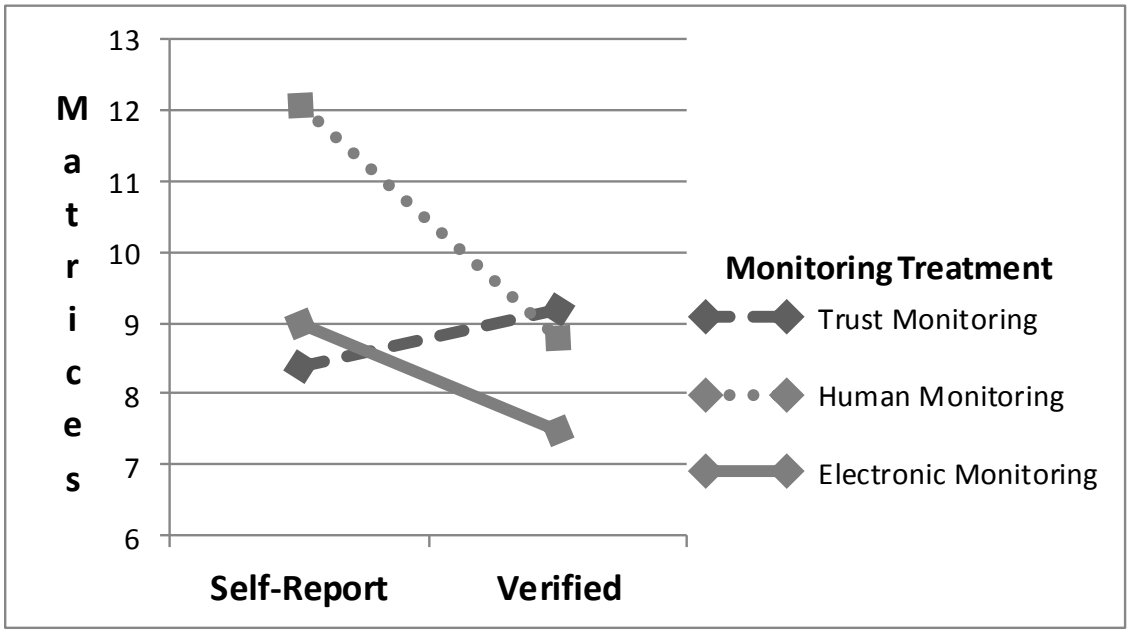


Figure 2: Matrices Reported as Solved: Results by Reporting Regime and Monitoring Treatment



Note: Participants either were allowed to self-report without verification, or their reports were documented and verified. Means are adjusted for Tired, Gender, and Mental Math, as reported in Table 4.

Table 1: Demographics of Research Sample by Treatment Group and Reporting Regime

Treatment	Trust Monitored		Human Monitored		Electronically Monitored			
Reporting Regime	Self	Verified	Self	Verified	Self	Verified	**Total**	**Percent**
Gender								
Male	9	10	9	8	8	10	54	47%
Female	10	9	10	11	11	9	60	53%
							114	100%
Age								
18-24	12	11	11	15	7	11	67	59%
Over 24	7	8	8	4	12	8	47	41%
							114	100%
Student Nationality								
Domestic	8	15	13	11	9	12	68	60%
International	11	3	3	7	8	4	36	32%
Not a Student	0	1	3	1	2	3	10	9%
							114	100%
Business Student								
Business Student	9	5	6	5	8	3	36	32%
Non-Business Student	10	13	10	13	8	13	67	59%
Not a Student	0	1	3	1	3	3	11	10%
							114	100%
College Level								
Fresh/Soph	9	10	6	12	3	5	45	39%
Junior/Senior	7	6	6	2	7	5	33	29%
Graduate	3	2	4	4	6	4	23	20%
Non Student	0	1	3	1	3	5	13	11%
							114	100%
Mental Math								
Yes	9	14	15	14	10	10	72	63%
No	10	5	4	5	9	9	42	37%
							114	100%
Tired								
Yes	7	9	5	8	8	6	43	38%
No	12	10	14	11	11	13	71	62%
							114	100%

Note: Each of the 6 combinations of monitoring treatment and reporting regime had 19 participants. The Mental Math category shows the answer to the question, I consider myself good with mental math and numbers. While the Tired category shows the answer to the question, I feel tired today.

Table 2: Matrices Reported Solved by Treatment and Reporting Regime

Treatment	Trust Monitored			Human Monitored			Electronically Monitored			
Reporting Regime	Self	Verified	Combined	Self	Verified	Combined	Self	Verified	Combined	**ALL**
Average Matrices	8.26	9.68	8.97	11.58	8.47	10.02	8.95	8.11	8.53	9.18
Std Dev	4.87	4.73	4.79	4.07	4.88	4.70	3.91	5.13	4.52	4.67
Min	0	2	0	3	1	1	4	2	2	0
Max	20	18	20	20	17	20	20	20	10	20
Obs	19	19	38	19	19	38	19	19	38	114

Note: This table shows the number of matrices solved for each combination of monitoring treatment and reporting regime.

Table 3: ANOVA Results

Number of Observations	114	**R- squared**	0.53
		Adj R-squared	0.27

Source	Partial SS	df	MS	F	Prob > F
Model	1318.71	41	32.16	2.01	**0.005**
Monitoring	91.38	2	45.65	2.86	*0.064*
Reporting	0.06	1	0.06	0.00	0.953
Tired	95.25	2	95.25	5.97	**0.017**
Gender	121.01	2	121.01	7.58	**0.007**
Mental Math	14.80	2	14.80	0.93	0.339
Monitoring*Reporting	121.41	2	60.70	3.80	**0.027**
Monitoring*Tired	93.10	2	46.55	2.92	*0.061*
Monitoring*Gender	57.10	2	28.55	1.79	0.175
Monitoring*Mental Math	187.67	2	93.84	5.88	**0.004**
Reporting*Tired	3.72	1	3.72	0.23	0.631
Reporting*Gender	0.12	1	0.12	0.01	0.933
Reporting*Mental Math	8.03	1	8.03	0.50	0.481
Tired*Gender	6.88	1	6.88	0.43	0.514
Tired*Mental Math	12.86	1	12.86	0.81	0.373
Gender *Mental Math	20.99	1	20.99	1.31	0.255
Monitoring*Reporting*Tired	5.76	2	2.88	0.18	0.835
Monitoring*Reporting*Gender	18.19	2	9.10	0.57	0.568
Monitoring*Reporting*Mental Math	36.07	2	18.04	1.13	0.329
Monitoring*Tired*Gender	3.31	2	1.66	0.10	0.902
Monitoring*Tired*Mental Math	2.64	1	2.64	0.17	0.686
Monitoring*Gender*Mental Math	85.61	2	42.80	2.68	*0.075*
Reporting*Tired*Gender	0.12	1	0.12	0.01	0.930
Reporting*Tired*Mental Math	74.67	1	74.67	4.68	**0.034**
Reporting*Gender*Mental Math	0.06	1	0.06	0.00	0.953
Tired *Gender* Mental Math	4.42	1	4.42	0.28	0.601
Residual	1149.78	72	15.97		
Total	2468.49	113			

Note: This table shows the five-way ANOVA results for the effects of **Monitoring** treatment (Trust, Human Monitoring, or Electronic Monitoring), **Reporting** regime (self-report or verified), and the dichotomous control variables self-assessed **Tiredness**, **Gender**, and self-assessed **Mental Math** ability on the number of **Matrices** the participants reported as solved. The **Monitoring*Reporting** interaction is the key effect of interest, and is unaffected by the control variables, as shown by the nonsignificant 3-way interactions. P-values < .05 are **bolded**; those < .10 are *italicized.*

Table 4: Pairwise Comparison of Adjusted Means

	Reporting Regime					95% Confidence Level for Difference	
Monitoring Treatment	**Self-Report**	**Verified**	**Difference**	**Std. Error**	**Sig.**	**Lower**	**Upper**
Trust Monitoring	8.38	9.14	-0.76	1.42	0.593	-3.59	2.06
Human Monitoring	12.04	8.71	3.33	1.55	**0.035**	0.239	6.42
Electronic Monitoring	9.04	7.40	1.64	1.50	0.275	-1.34	4.63

Note: This table shows the pairwise comparison of the adjusted means for each reporting regime in each monitoring treatment. All of the comparisons were related to a planned, specific hypothesis rather than a result of post hoc comparisons. Consequently, the alpha level was not adjusted for the multiple comparisons. P-values < .05 are ***bolded.***