Framing Sticks as Carrots:
An Experimental Investigation of Contract Frame and Effort in Agency Relationships

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Abstract

In this study we examine the effect of incentive contract framing on agent effort in an incomplete contract setting. Prior research suggests that when governed by complete incentive contracts, agents exert greater effort under penalty contracts relative to bonus contracts. However, in an incomplete contract setting (when the agent's trust in the principal is relevant), we predict that agents exert greater effort under bonus contracts. To this end we develop and experimentally validate a theoretical model of the effects of contract frame on trust and effort. The main intuition behind the model is that in an incomplete contract setting, the framing of an incentive contract affects the degree to which it is interpreted by the agent as a signal of mistrust. More specifically, penalty contracts engender greater distrust than do bonus contracts, and therefore, when contracts are incomplete, penalty contracts lead to lower effort than do bonus contracts.

Keywords: framing, incomplete contracts, control systems, trust, formal control, informal control, bonus, penalty

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1. Introduction

Incentive contracts are ubiquitous as a means of motivating agent effort and improving firm performance. An incentive contract can be framed as either a bonus, offering an agent a monetary reward if performance goals are met, or as a penalty that reduces monetary payouts if performance goals are not met. Historically, bonus contracts have been more common in practice than penalty contracts.[1] Accounting research provides initial insights into agent *preferences* for bonus contracts (i.e., positively framed contracts) relative to penalty contracts (i.e., negatively framed contracts). Luft (1994) finds that agents prefer bonus contracts to economically equivalent penalty contracts. A potential explanation for this preference is loss aversion (Kahneman & Tversky 1979), the notion that the disutility experienced from a loss is greater than the utility experienced from a gain of the same magnitude. While agent preferences for bonus contracts are consistent with the predominance of bonus contracts observed in practice, agent preferences are not the sole criteria by which incentive contracts are chosen. Rather, the ability of the contract to induce *effort* is an important determinant of contract choice.

While a large literature in psychology, economics, and accounting examines the effort-inducing effects of bonus contracts, few studies examine the effort-inducing effects of penalty contracts. One exception is Hannan *et al.* (2005) who find that despite stated preferences for bonuses, agents exert greater effort under penalty contracts so they can avoid paying the penalty. Thus, the same loss aversion that induces a preference for bonus contracts induces higher effort

[1] While the use of bonus contracts has historically dominated that of penalty contracts, interest in and the use of contracts that combine elements of both bonuses and penalties, so-called "bonus-malus" contracts, is on the rise. For example, UBS AG executives and board members have been working under a bonus-malus contract since 2009 (Associated Press 2008). Use of bonus-malus contracts in the US is also increasing as a result of US legislators' promotion of "clawback provisions" aimed at excessive CEO compensation (e.g., Hosking 2008; Lublin 2010).

under penalty contracts. Therefore, prior research does not provide a consistent explanation for why most organizations employ bonus contracts instead of penalty contracts. The purpose of this study is to provide insight into the ubiquitous nature of bonus contracts by further examining the differential effects on effort of bonus and penalty contracts. Indeed, Hannan *et al.* (2005) call for additional research to further understand the costs and benefits of each type of incentive contract.

Importantly, prior literature examining the effects of incentive contracts on agent effort (and agency theory, in general) assumes a complete contract setting. A complete contract is one that fully specifies the obligations of the principal to provide monetary rewards to the agent for each potential future performance outcome. Moreover, these contractual terms can be enforced in a court of law (Baiman 1982). In such a setting, there is no discretion and, hence, no role for trust between the principal and agent (Casadesus-Masanell and Al-Najjar 2001). However, in practice, many incentive contracts are incomplete, allowing the principal some degree of discretion over the agents' monetary rewards. Discretion allows for opportunism on the part of the principal (e.g., Fisher *et al*. 2005), and thus introduces the possibility that the agent's trust in the principal will affect agent effort. Therefore, to the extent that contract frame – either bonus or penalty – affects the trust environment, the prior literature examining the effect of contract frame on employee effort is incomplete.

In this paper, we extend prior research on the effect of incentive contract framing to an incomplete contract setting in which employee trust is relevant. We examine the effect of contract frame on effort using a laboratory experiment involving two distinct tasks. The agent performs an initial task for which performance-based payouts are enumerated by an incentive contract. We manipulate the incentive contract frame – either a bonus contract or a penalty contract – while maintaining economic equivalence between these contract types. We then

introduce a second task for which the principal has full discretion over the agent's compensation. With such discretion, trust becomes a potentially important determinant of agent effort. In this incomplete contract setting, we find that the contract frame (manipulated in the first task) affects effort (measured in the second task) in the opposite direction as that found in prior literature (e.g., Hannan *et al.* 2005), and this effect can be attributed to the effect of contract frame on the trust environment. Specifically, both trust and agent effort are lower in the penalty contract condition as compared to the bonus contract condition.

This study contributes to the framing literature by documenting that the effect of contract frame on employee effort depends on the nature of the contractual setting. This study also contributes to a second, separate stream of literature that examines the effect of formal controls, such as incentive contracts, on trust, an important informal control. In general, this literature documents the unintended negative effects of formal controls on trust (e.g., Das and Teng 1998; Das and Teng 2001; Enzle and Anderson 1993; Malhotra and Murnighan 2002). However, this literature is also incomplete in that it generally focuses on negatively framed formal controls (e.g., penalty contracts). By contrast, our results show that the effect of formal controls on trust will depend on the way in which the formal controls are *framed* (i.e., positively vs. negatively) and that positively framed controls (e.g., bonus contracts) can actually increase agents' trust relative to no control.

The remainder of the paper is organized as follows: In Section 2, we review relevant literature and develop the hypotheses. In Section 3, we describe the experimental method. Results are provided in Section 4. Section 5 discusses implications of the study and provides areas for further research.

2. Background and theory development

A large body of literature examines how individuals' decisions are influenced by the way in which information is framed (e.g., Tversky and Kahneman 1981 and Levin *et al.* 1998). Framing can occur on many dimensions. For example, Tenbrunsel and Messick (1999) examine the tendency for decision makers to frame an investment decision (i.e., investment in technology to reduce pollutants) as a business decision or an ethical decision. They demonstrate that a formal sanction for undesirable behavior (i.e., failing to follow pollutant regulations) results in the investment decision (i.e., invest in technology to reduce pollutants) being framed as a business decision rather than an ethical decision, with the result being more undesirable behavior.[2]

Accounting research focuses primarily on the framing of incentive contracts, providing insights into agent preferences for, and responses to, bonus contracts (i.e., positively framed contracts) relative to penalty contracts (i.e., negatively framed contracts).[3,4] Luft (1994) shows that experimental participants have a propensity to choose a bonus contract over a monetarily equivalent penalty contract. She offers several interpretations of this result. First, participants may prefer a bonus over a penalty contract because of loss aversion (Kahneman & Tversky 1979), the notion that the disutility experienced from a loss is greater than the utility experienced from a gain of the same magnitude. Thus, participants have preferences for bonus contracts because subjective valuations of the monetary payoffs are greater under the gain frame induced

[2] For a thorough discussion of framing effects see Levin *et al.* 1998.
[3] See Bonner 2008 for a discussion describing accounting research focused on framing effects.
[4] The importance of framing as a characteristic of formal controls, more generally, is evident in the extant management control frameworks. For example, Jensen and Meckling (1992) include both positively framed outcome controls (i.e., "rewards") and negatively framed outcome controls (i.e., "punishments") as important control tools that organizations use to align incentives of managers with owners. Similarly, Ouchi and Maguire's (1975) outcome controls may be framed either positively (a bonus for goal achievement) or negatively (a penalty for lack of achievement). From these, and other extant frameworks (e.g., Merchant and Van der Stede 2003; Simons 1995), it is apparent that control framing is an important characteristic of formal control.

by the wording of the bonus contract. Second, Luft posits that there are different *nonmonetary* benefits associated with bonus and penalty wording that affect agent preferences. Bonuses are associated with praise and reward while penalties are associated with condemnation and disapproval, the former being preferred over the latter.

Hannan *et al.* (2005) extend Luft (1994) by examining the effects of bonus versus penalty contracts on agent effort. The authors find that, despite stated preferences for bonuses (i.e., because of an aversion to potential losses), agents exert greater effort under penalty contracts. Hossain and List (2009) similarly find field evidence that workers in a Chinese high-tech manufacturing facility exert greater effort under a penalty contract relative to a bonus contract. In both studies, the authors interpret their results as evidence of greater effort to avoid paying a penalty as compared to effort aimed at receiving a bonus. While this interpretation is consistent with the loss aversion explanation of agent preferences for bonus contracts offered by Luft (1994), it is inconsistent with the preponderance of use of bonus contracts observed in practice. That is, why are bonus contracts used more frequently than penalty contracts, given that effort is greater under penalty contracts?

Importantly, the studies by Luft (1994), Hannan *et al.* (2005), and Hossain and List (2009) are all conducted in a complete contract setting such that the contracts fully specify the agent payouts for each potential outcome; that is, the principal has no discretion over payouts. Yet, as Kreps (1990) notes, it is more characteristic of firms to have incomplete contracts in which agents take actions without completely specified payouts from the principal. Luft (1994) uses the concept of incomplete contracts to offer a third interpretation for her finding of agent preferences for bonus contracts. Consistent with Kreps (1990), she acknowledges that contracts are typically incomplete, and that agents take actions, in part, based on potential monetary

rewards (e.g., discretionary bonus) for increased effort and performance beyond the contracted monetary rewards.

When contracts are complete, there is no discretion on the part of the principal, and hence, no effort-inducing role for trust between the principal and agent (Casadesus-Masanell and Al-Najjar 2001). However, when contracts are incomplete, as they are in most firms (Kreps 1990), the principal has some degree of discretion over the agents' monetary rewards, which allows for opportunism on the part of the principal (e.g., Fisher *et al*. 2005). In this setting – and in contrast to the complete contract setting of Hannan *et al*. (2005) – the agent's trust in the principal becomes paramount in the agent's effort choice.[5] The question then becomes whether bonus and penalty contracts differentially affect the agent's trust in the principal. In the following paragraphs we develop a theoretical model that describes the mechanisms by which contract frame is expected to affect the trust environment and, ultimately, agent effort (see Figure 1).

Prior research on formal controls and trust has generally examined the effects of negatively-framed formal controls. This research indicates that the implementation of a negatively-framed formal control damages the trust environment (e.g., Das and Teng 1998; Enzle and Anderson 1993; Inkpen and Currall 1998; Malhotra and Murnighan 2002). Negatively-framed controls damage the trust environment because they are perceived as being intrusive and as reducing the autonomy of the agent (Christ *et al.* 2008). Negatively-framed controls often involve close observation or significant oversight, both of which may interfere with the agent's normal processes and activities and cause him/her to feel intruded upon.

[5] While our primary construct of interest is trust, we acknowledge that this construct is highly related to other affect-based constructs such as fairness, perceived justice, or "liking" (Huang and Murninghan, 2010). For example, accounting research (Kadous et al. 2011) demonstrates that auditors are more likely to trust advisors with whom they feel a strong personal affiliation. Therefore, it would be difficult, if not impossible, to fully separate trust from these other related constructs.

Further, negatively-framed controls may limit the agent's decision rights, either directly by curtailing certain behaviors or indirectly by attaching incentives to the outcomes of those decisions, leading to a perceived loss of autonomy.

Based on these general results, we likewise predict that the implementation of a penalty contract (a specific type of negatively-framed control) will lead to perceived intrusion and a loss of autonomy by the agent. However, we posit that framing an incentive contract positively (as a bonus contract) instead of negatively (as a penalty contract) will reduce (and perhaps even reverse) these adverse effects. Specifically, we expect that the agent's perception of intrusion (Figure 1, Path 1) and loss of autonomy (Path 2) will be lower under a bonus contract than under a penalty contract. In fact, the agent may interpret the implementation of a bonus contract as a signal of the principal's intent to reward the agent for increased effort by sharing the resulting gains.

To the degree that an agent feels that controls intrude upon his/her actions and restrict his/her autonomy, these controls convey information about the principal's beliefs regarding the agent. Specifically, the principal's control choices signal the degree to which s/he questions the agent's integrity (Paths 4 and 6) and/or competence (Paths 3 and 5). First, by implementing controls that are more intrusive or more constraining on the agent's autonomy, a principal signals the expectation that the agent will intentionally engage in opportunistic behavior, such as shirking, cheating, stealing, etc. In this manner, the principal is sending a signal to the agent that s/he is questioning the agent's integrity. Second, more intrusive and more constraining controls may also indicate that the principal questions whether the agent is able to sufficiently complete the task or meet the required standards because of potential deficiencies in the necessary skill, aptitude, or tools (e.g., decision aids), despite the agent's best intent and sufficient effort. Thus,

the effect of contract frame will flow through, such that under a bonus contract, the agent will be less inclined to believe that the principal is questioning his/her competence and integrity than under a penalty contract.

To the degree that the agent believes his/her competence and/or integrity are being questioned, he will perceive distrust on the part of the principal (Paths 7 and 8) (Das and Teng 2001). Further, because trust is reciprocal (Bradach and Eccles 1989; Gambetta 1988; Zand 1981), we expect the agent's trust in the principal to be higher under a bonus contract as compared to a penalty contract. Specifically, social projection theory suggests that individuals have a tendency to expect that others will behave similarly to themselves (Krueger 1998). Therefore, by implementing a penalty contract that signals mistrust in the agent, the principal signals that s/he is likewise not trustworthy. In contrast, by implementing a bonus contract that signals less distrust, the principal provides less of a signal that s/he is untrustworthy. Thus, agents working under a penalty contract will be less likely to trust the principal than will agents working under a bonus contract. That is, trust will be reciprocal (Path 9).

This reciprocity effect has been described in prior research that suggests that when one party feels (mis)trusted, it is likely to feel (mis)trust in return (e.g., Bradach and Eccles 1989; Gambetta 1988). For example, Christ *et al.* (2008) use an inter-organizational strategic alliance scenario to experimentally examine the effects of formal controls on trust. They show that formal controls have a negative effect on the controlled party's perceived trust (i.e., the extent to which the controlled party feels trusted by the controlling party) and a reciprocal negative effect on the controlled party's reciprocal trust in the controlling party. We extend this finding to the single firm, principal-agent setting, and predict that, relative to those working under a bonus contract, agents working under a penalty contract, because they will perceive greater mistrust,

will also reciprocate greater mistrust.

In an incomplete contract setting – and in contrast to the complete contract setting of Hannan *et al*. (2005) – the principal has some degree of discretion over the agents' monetary rewards, allowing for opportunism on the part of the principal (e.g., Fisher *et al*. 2005). As a result, the agent's trust in the principal to reward the agent for effort becomes paramount in the agent's effort choice (Path 10). Because mutual trust is damaged when the principal implements a penalty contract, the agent will have a pessimistic expectation of the extent to which effort will be rewarded by the principal's discretionary payout to the agent. By contrast, because mutual trust is less damaged (and preserved or even enhanced) when the principal implements a bonus contract, the agent will have a more positive expectation of the extent to which effort will be rewarded by the principal's discretionary payout.

Taken together (see Figure 1), we predict that agents working under a bonus contract will exert greater effort than those working under a penalty contract.[6] This leads to our primary research hypothesis:

> H1: In an incomplete contract setting, agent effort will be greater under a bonus contract as compared to a penalty contract.

3. **Experimental method**

3.1. Experimental design

We test our hypothesis and theoretical model using a computer-based experiment consisting of two tasks in an incomplete contract setting. Performance-based pay on the first task is defined by an incentive contract framed as either a bonus or penalty, depending on the experimental condition. Performance-based pay on the second task is at the complete discretion

[6] Lazear (1991) also suggests that bonus wording conveys an expectation of effort beyond a desired level, while penalty wording conveys an expectation for effort only up to a certain level. The differential expectations conveyed by the bonus contract will further serve to motivate greater effort on the part of the agent.

of the principal. The objective of the first task is to examine the effects of contract frame on the agent's perceived trust from the principal and reciprocal trust in the principal (i.e., paths 1-9 in the theoretical model depicted in Figure 1). The objective of the second task is to examine how this trust affects the agent's effort when his/her monetary payouts are at the complete discretion of the principal. Our two-task operationalization of the incomplete contract setting allows us to isolate the effects of trust on effort (in the second task) while ensuring economic equivalence of the rewards/penalties provided under the two contract frames (in the first task).

We recruited 220 participants from graduate and undergraduate accounting classes of a highly ranked US business school to participate in this study. Fifty-two percent of participants were female and 48% were male and the average age was 20.4 years.

We use a 2 (Contract Frame) X 2 (Contract Implementation) plus 1 (Baseline) between-subjects experimental design to test our hypotheses. For our first variable – Contract Frame – we manipulate the type of contract that may be employed by the principal – a positively framed contract that rewards agents for meeting performance targets with a bonus payment (hereafter, *bonus contract*), and a negatively framed contract that penalizes agents for missing the target (hereafter, *penalty contract*). We maintain monetary equivalence across contract frame conditions so that we can isolate the hypothesized framing effects from our model. The Contract Frame conditions are described in detail in Section 3.2 below. The second variable – Contract Implementation – is measured rather than manipulated and represents the principal's decision to implement the incentive contract (as opposed to a fixed-wage contract). As will be described, our primary analysis relates only to the conditions in which the principal chose to implement the incentive contract. As a result, those observations for which the principal decided to offer only a fixed-wage contract are unused. However, it was important that the contract implementation not

be hypothetical because the trust signal communicated is dependent upon the control being endogenously implemented by the principal (Christ 2011).

Finally, the "plus 1" condition is a Baseline condition in which principals are not given the opportunity to implement an incentive contract (hereafter, *no contract*) and no bonuses or penalties are mentioned to the participants. The growing stream of literature examining the effects on trust of formal controls, including incentive contracts, compares agent behavior with and without formal control, taking as given a negatively framed formal control. To better reconcile our contract frame findings to this stream of literature, we include this baseline condition so that we can compare the effects on trust of the two contract frames to a condition in which no incentive contract is imposed.

At the beginning of the study, each participant was randomly assigned to the role of either principal or agent, and remained in the same role throughout the entire study.[7] Before beginning, the computer randomly matched participants into pairs (of one principal and one agent). The pairings were anonymous and participants were not told with whom they were paired either during or after the study.

Participants earned points based on the decisions that they and their partners made (described below). The points were converted to cash and paid to the participants at the end of the study according to the following formula: US $ Payment = (Points earned X .025). At the beginning of the study, each principal was endowed with 250 points, and each agent with 850 points in the *bonus contract* condition and 1000 points in the other conditions. These differential endowments reflect that over the course of the experiment, the principals had the opportunity to gain more net points than did the agents. Further, as will be described below, they are designed

[7] To ensure that labels did not unnecessarily influence the behavior of participants, agent and principal participants were referred to as Participant A and Participant B, respectively, throughout the experiment.

to ensure that the *bonus contract* and *penalty contract* conditions are monetarily equivalent from the agent's perspective.

3.2. Task 1 of the experiment

In Task 1, the agent selected a portfolio of investments for the principal. That is, the principal earned the returns from the portfolio, but the agent chose the specific investments to be included in the portfolio and paid for the chosen investments from his/her endowment. While we acknowledge that in a real-world investment setting, the agent would not normally pay the cost of investments, this setting provides a useful laboratory scenario for testing our theory.[8] Specifically, we follow prior literature (e.g., Fehr *et al.* 1993) and use the cost of the investment to operationalize the agent's effort, which also allows us to vary that cost across the various investment opportunities.

Each agent was presented with 30 possible investments. From these 30 investment choices, the agent's task was to select and pay for one share each of ten of these investments (i.e., the agent selected ten different investments), each of which earned points for the principal. The principal's expected returns were thus maximized if the agent selected shares of the ten investments with the highest expected returns in the next period.

There were two types of investments from which the agent could choose, "Bell" investments and "Whistle" investments.[9] The cost per share depended on the investment type,

[8] The contextualized economic games used to examine our research question are not intended as a literal representation of how firms do (or should) organize investment decisions. While the experimental task is an abstraction from reality, it is the theory that we wish to generalize. The design of this task is important in that it provides evidence about the theoretical constructs of interest despite any shortcomings it has in its reflection of mundane realism. For further discussion, see Friedman and Sunder (1994, p 10- 12), and Kachelmeier and King (2002).

[9] An alternative approach would have been to have the agent select between one Whistle and one Bell investment. We chose to have agents select 10 investments (from a total of 30 investments) because we wanted the task to be intellectually stimulating to the agents. Specifically, in order to examine agents' beliefs about the intrusiveness and autonomy-limiting nature of the contract, it was necessary for them to be actively engaged in the task. Therefore, the task itself needed to be a significant undertaking and (cognitively) difficult.

with each selected Bell share costing the agent ten points and each selected Whistle share costing the agent 25 points. Agents were provided with a graphical representation of the previous 19 periods of returns (points per share) for each of the 30 possible investments. For example, the history of points per share returned for one representative Bell (Panel A) and one representative Whistle (Panel B) investment is depicted in Figure 2.[10]

Whistle shares, while more expensive, had a higher average expected return. This was the basis of the control problem in the scenario. Specifically, the principals preferred that shares with higher returns, the Whistle shares, be selected, but the agents, who paid for the investments, preferred to select the cheaper Bell shares. The expected return for the next period for Bell shares was, on average, 20 points per share (across all Bell investments), whereas the expected return for the next period for Whistle shares was, on average, 50 points per share (across all Whistle investments). Importantly, this was only an average, and any individual investment could earn considerably more or less than the average. Specifically, the expected return for the 15 Bell investments ranged from -8 to 48 and the expected return for Whistle investments ranged from -6 to 106.

In the two Contract Frame conditions principals had the opportunity to implement an incentive contract prior to the agents' investment decision. Implementation of the incentive contract cost the principal 50 points. The incentive contract, if implemented, either established a bonus for the agent if total returns met or exceeded a minimum return (*bonus contract* condition), or established a penalty for the agent if total returns failed to meet a minimum return (*negative contract* condition). In the baseline (*no contract*) condition, the principal was not given the opportunity to implement an incentive contract. Rather, the agent was paid a fixed

[10] Each investment's return history was constructed using either a long-term trend or a cyclical pattern, plus a noise parameter. Thus, the expected return for the next period was calculated as the next point in the pre-programmed series.

wage, and neither a bonus nor a penalty was mentioned to the participants.

In the *bonus contract* condition, the agent received an extra 150 points if the total return of all ten shares selected met or exceeded 500 points. No bonus points were paid to the agent if the total return was less than 500 points. The bonus was paid from the administrator's fund, not deducted from the principal's endowment.[11] Likewise, for the *penalty contract* condition, the agent was required to pay 150 points if the total return of all ten shares selected was less than 500. No penalty points were paid if the total return equaled or exceeded 500 points.[12] The penalty was paid to the administrator's fund, not added to the principal's earnings. The *bonus* and *penalty contracts* provided monetarily equivalent incentives for the agents so that any differences in reported trust perceptions following Task 1 or observed effort on Task 2 were due to the signaling effects of the contracts.[13] The summary of points that could be earned by each participant for Part I is presented in the experimental materials provided in the Appendix.

After the principal decided whether or not to implement an incentive contract, the agent was notified of this decision. At this point, the agent made the investment choices, and the investment payoff was determined by the administrator. Note, however, that actual returns were not revealed to participants until the end of the second task of the experiment. We withheld this information from all participants so that the agent's behavior on Task 2 would be influenced only

[11] This design choice ensured that the principal's cost of implementing the contract was held constant (at 50 points) across all conditions. An alternative approach would have been to have the principal pay from his/her account all costs, including the agent's total compensation (including wages, bonuses, and penalties) and to increase the principal's pay level to cover these costs. We chose to not take this approach, because it would have complicated the experimental task considerably, and, as long as the included costs were held constant across conditions, we are aware of no theories to suggest that this approach would affect our results.

[12] Under either of the contracts, an agent could reach the threshold 500 points if s/he selected as few as six whistle investments and 4 bell investments, assuming that the specific bells and whistles were optimally chosen. The six whistle investments would cost the agent an extra 90 points (relative to picking bell investments). This would maximize net payout, as it would result in incentive pay (either bonus or avoidance of penalty) of 150 points.

[13] Note that the incentive contracts were designed to be fairly weak controls. This design choice, along with the absence of mutually observable actions, allows us to isolate the signaling effect of the contracts as distinct from the economic benefit documented in Coletti *et al.* (2005) and, thus, to investigate the difference between the signals engendered by the penalty contract as compared to the bonus contract.

by the framing of the contract imposed by the principal and not affected by his/her earnings from Task 1.

For Task 1 of the experiment, we designed a cognitively challenging and engaging task for the agents, instead of using an abstract task as in the previous contract framing literature (e.g., Hannan *et al* 2005). We chose this task because of the prior finding that formal controls (such as incentive contracts) influence employee trust because they are perceived to be intrusive and to limit the agent's autonomy. It is unlikely that these effects would manifest if agents were subjected to an abstract effort choice. One drawback to this approach is that we do not have a precise measure of effort for Task 1.[14] However, the focus of our study is on the effect of contract framing on effort as measured in Task 2. Task 1 is intended to provide a setting in which trust can be built (or destroyed) while maintaining economic equivalence across the two contract types. As will be described below, we use Task 2 to isolate the trust effect on effort when performance-based payouts are at the discretion of the principal. Thus, Task 2 provides our primary dependent measure of effort.

Following Task 1 of the study we solicited information using a post-experimental questionnaire. Participants responded to several questions intended to capture additional variables included in our formal model. Specifically, each agent indicated, on a 100-point Likert scale ranging from "not at all" to "a great deal," the extent to which s/he (1) felt that the principal questioned his/her integrity (integrity), (2) felt that the principal questioned his/her competence (competence), (3) felt that the principal trusted him/her (perceived trust),[15] (4)

[14] Using the number of bell vs. whistle investments as a measure of effort is incomplete, because with (unobserved) cognitive effort, agents could discern which particular bell or whistle investments were more likely to provide higher returns. Similarly, investment performance is not a precise measure of effort, because returns have a random component outside the agent's control.

[15] We follow prior literature and measure perceived and reciprocal trust using single item Likert scale questions. However, we acknowledge that trust is a complex and difficult to measure construct and therefore this variable may capture other related factors such as the perceived fairness of the principal, general affect, perceived justice, etc. To

trusted the principal (reciprocal trust), (5) felt the principal intruded upon his/her decisions (intrusion), and (6) felt s/he had decision-making autonomy (autonomy).[16]

3.3. Task 2 of the experiment

While the focus of Task 1 was on the effects of contract framing on perceived and reciprocal trust (Figure 1, Links 1-9, 11), Task 2 of the experiment allows us to examine agent effort choice on a task for which pay is discretionary, and under the trust environment created in Task 1. It is the principal's discretion that makes the agent's trust relevant (Figure 1, Link 10). In Task 2, participants retained the same partners and roles, and continued with the same contextual setting (i.e., agents made investments on behalf of principals). Each participant began Task 2 with the total number of points s/he had at the end of Task 1 following the investment decisions made by the agent. Although the participants did not know the exact number of points they had earned up to this point (because they had not yet been told the returns from the shares selected by the agent), they were told that each agent had a minimum of 600 points with which to make an additional investment (which was guaranteed to be the case, by design).

Task 2 of the experiment was a contextualized version of the standard two person "trust game" as defined by McCabe *et al.* (2003), with the agent playing the role of the first mover, and the principal the second mover in the game. In Task 2 of this study, the agent had the task of making one additional investment for the principal. This investment decision was different from the prior investment decisions in several important ways. First, there was only one type of investment, a "Horn" investment, which cost the agent ten points per share (whereas in Task 1,

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partially capture these constructs, we also include in our empirical model a direct path from Contract Frame to Perceived Trust (Figure 1, Link 11) that does not go through our theoretically-motivated paths related to trust signaling (i.e., perceptions of intrusion, autonomy, questioning competence, and questioning integrity).

[16] Several recent studies have examined whether eliciting participants' beliefs about trust prior to a traditional trust game affect subsequent trusting behavior (Guerra and Zizzo 2004, Zizzo 2008). Results of these studies indicate that participants' trusting behavior exhibited in the trust game does not differ significantly when beliefs are elicited as compared to conditions when there is no belief elicitation.

some investments cost ten points and some cost 25 points per share). Second, the return per Horn share investment was known to be 30 points (whereas in Task 1, the return per share was uncertain with expected returns based on the history of past returns). Third, the agent could purchase from zero to 50 shares of the Horn investment (whereas in Task 1, the agent could only select one share each of ten different investments). Note that the guaranteed bank of 600 points for each agent is enough to invest in the full 50 Horn shares, should s/he choose to do so (i.e., 50 X 10 = 500 < 600).

The agent's choice of the number of Horn investments to make is our measure of costly agent effort. We follow a large literature that operationalizes agent effort using a costly choice (e.g., Fehr *et al*. 1993) based on the simplifying assumptions of analytical models that individuals have utility for wealth and leisure (see Baiman 1982).[17] Importantly, investing in Horn shares is a choice that is controlled by the agent, results in disutility (because the cost of the shares is borne by the agent), and is correlated positively with output (which in this case is the principal's return). Thus, the investment in Horn shares meets the definition of effort used in the agency theory literature, as outlined by Baiman (1982).

As in Task 1, the principal earned the returns from the portfolio (i.e., 30 points X the number of shares of the Horn investment purchased by the agent). However, as in the standard trust game, after learning how many shares the agent purchased, the principal was given the opportunity to pay any amount of the return back to agent; that is, monetary payouts for agent

[17] The first mover investment in a trust game is a widely used measure of behavior within a trust environment (see Camerer 2003, 85 – 100). We, accordingly, employ the first mover investment as a simple and straightforward measure of effort. Alternative design choices for this experiment would require less reliable measures of effort (e.g., time spent on the task, etc.) that are likely to be affected by other factors outside of the experiment (e.g., a preference for completing the experiment quickly). Recent research in accounting has compared the operationalizations of effort as cost with real-effort tasks (using an experiment on reciprocity) and finds that people react similarly to both operationalizations of effort (Bruggen and Stobel 2007). Although prior literature consistently operationalizes effort as a linearly increasing cost to the agent, we acknowledge that in the real world, the cost of effort is not necessarily linear and that this is a limitation of this research design.

effort are at the complete discretion of the principal. Importantly, the principal could choose to keep all of the returns for himself and pay nothing to the agent. Thus, the principal had the opportunity to behave opportunistically making the agent's trust in the principal an important determinant of the agent's chosen effort.

Without obligation to return anything, standard economic theory predicts that the principal would pay none of the Horn investment returns to the agent. Anticipating this, the agent would not invest in any Horn shares (i.e., exert no effort). Thus, any investment by the agent in costly Horn shares (i.e., any positive level of effort) critically depends on the level of trust in the principal to return at least the amount of the Horn share cost (McCabe *et al.* 2003).

Following completion of Task 2 participants were given a questionnaire that included manipulation checks regarding the extent to which they understood the tasks completed. Demographic information was also collected. Participants received their respective payoffs resulting from decisions made in both parts of the experiment and were dismissed. Descriptive statistics (means and standard deviations) for variables defined above are provided in Table 1.

4. Results

4.1. Hypothesis Test

Our primary interest is in examining the effect of contract frame on effort in an incomplete contract setting. To this end, our primary test of H1 compares our measure of agent effort (from Task 2) when the principal chose to implement the bonus contract to that when the principal chose to implement the penalty contract. Thus for the primary analysis we ignore the baseline condition. Using these conditions, we compare the number of horn shares that agents purchased in Task 2 (i.e., our operationalization of effort) under the *bonus* vs. *penalty* contracts. Consistent with H1, and in contrast to prior research, results reveal that agents exert greater

effort under bonus contracts than under penalty contracts (see Table 1, *means = 33.92 and 21.44, respectively*). This difference is statistically significant (untabulated, $t = 12.48$, $p < 0.01$). Thus, in this incomplete contract setting, we find that the contract frame affects agent effort in the opposite direction as that found in prior literature (Hannan *et al.* 2005). This suggests that when trust is relevant, a bonus contract is more likely to induce desired effort from agents than a penalty contract. To assess whether the effort difference between the bonus and penalty contract conditions can be attributed to the hypothesized effect of contract frame on the trust environment, in the following section we test the complete theoretical model depicted in Figure 1.

4.2. Test of Complete Theoretical Model

We use structural equations-based path analysis to estimate our theoretical model depicted in Figure 1. Note that in addition to the ten model paths described in the theoretical development of our hypotheses H1 (Section 2), we also include in the model an additional path via which bonus and penalty contracts differentially affect the trust environment, separate from the posited signaling path that is our primary focus (Figure 1, Link 11). This additional general path captures other affect-based constructs, by which contract framing may affect the trust environment.[18] We acknowledge, however, that this path will likely only partially capture these constructs, as their influence might also be embedded in the signaling path.

To assess the model we conduct a test of goodness of fit. The Comparative Fit Index (CFI), a measure of the proportion of improvement of the fit of our model to the null model, is 1.00, which is above the generally accepted minimum value of 0.95 (Byrne 2001). We further

[18] Affect is a response to a stimulus that presents as either a positive or negative mood or emotional reaction (Fiske and Taylor 1991). While to our knowledge prior research does not examine an affective reaction to control system implementation, research in accounting does document that affective reactions can have significant effects on capital budgeting (Kida *et al*. 2001; Moreno *et al*. 2002; Sawers 2005) and inventory valuation decisions (Chung *et al*. 2008).

confirm the model's goodness of fit with a traditional $\chi 2$ test ($\chi 2 = 10.76, p = 0.71$), and an Incremental Fit Index (1.02) that is above the recommended minimum of 0.95 (Byrne 2001). Thus, the model provides a good fit for describing the relations in the data.

The standardized path coefficients and statistical significance are presented for the estimated model in Figure 3. As expected, results indicate that participants perceive a greater sense of intrusion ($30.12, p < 0.01$) and less autonomy ($-15.06, p < 0.05$) when the penalty contract is imposed as compared to when the bonus contract is imposed. Greater perceived intrusion is positively associated with signals that the principal is questioning the agent's competence ($0.42, p < 0.01$) and integrity ($0.37, p < 0.01$). In addition, when the agent feels that his/her integrity is being questioned, this leads to a reduction in perceived trust ($-0.52, p < 0.01$).

The results also show that trust is reciprocal; that is, as the agent's perception of being trusted (perceived trust) increases (decreases), his/her reciprocal trust for the principal also increases (decreases) ($0.72, p < 0.01$). Finally, we test the link between the agent's reciprocal trust and the agent's effort. As expected, we find a positive relation between the agent's reciprocal rust and the agent's effort ($0.28, p < 0.01$). Finally, the general path from contract frame to perceived trust is negative and significant ($-42.07, p < 0.01$), documenting a negative effect on trust of a penalty contract as compared to a bonus contract , separate from the signaling effect we hypothesize. While not the primary focus of our study, we expect that this path may reflect a more negative affective reaction to the implementation of the penalty contract as compared to the bonus contract.

In sum, consistent with our expectations the penalty contract has a negative effect on the trust environment, which subsequently reduces agent effort (relative to a bonus contract) in an incomplete contract setting. This effect occurs both through the signaling effect we posit, as well

as through an additional link that captures other mechanisms, such as perceived unfairness or negative affect. Thus, contrary to prior research on contract framing, we document that in an incomplete contract setting when the agent is vulnerable to the principal's decisions and therefore must exhibit trust when determining his/her effort level, penalty contracts lead to diminished effort.

4.3. Supplementary Tests

4.3.1. Comparison to Baseline Condition

Recall that we include as our baseline condition a setting in which no incentive contract is available for implementation. The average perceived trust in this condition of 52.83 (measured on a 100 point Likert scale) is represented in Figure 4 by the horizontal dashed line (labeled "Baseline Condition"). The other two lines on the graph represent the perceived trust reported by agent participants in the *penalty contract* and *bonus contract* conditions. The positively sloped line represents agents' perceived trust when principals chose to implement an incentive contract, and the negatively sloped line represents agents' perceived trust when principals chose not to do so.

Our primary interest is in examining the effects of contract frame on trust and effort, thus our main analysis compares the two points on the upward sloping line. That is, we compare the situation in which the principal has chosen to implement a bonus contract to the situation in which s/he has chosen to implement a penalty contract. We include the baseline condition for benchmarking purposes. For all of our analysis, however, we again ignore the points on the downward sloping line (the points reflecting the principal's choice to not implement an incentive contract). We do so for three main reasons. First, in business settings, employees would not normally be aware of any explicit choice to not implement an incentive contract. Second, these

results almost perfectly mirror those of the upward sloping line; choosing to implement a bonus (vs. a penalty) contract has a positive effect on trust, while choosing not to implement a bonus (vs. a penalty) contract has a negative effect. Finally, a practical reason for ignoring the downward sloping line is that the number of observations is quite low. Recall that these observations are the by-product of the principal's endogenous choice of whether or not to implement an incentive contract. (This endogenous choice was crucial to the experimental design (cf. Christ 2011).) In the *bonus contract* condition, only seven principals chose to not implement the contract, therefore any conclusions drawn from these observations would be unreliable.

By including the *no contract* (Baseline) condition we are able to compare our results to prior studies examining the effects of formal control on trust (e.g., Das and Teng 1998; Das and Teng 2001; Enzle and Anderson 1993; Malhotra and Murnighan 2002). As previously described, this literature generally finds a negative relation between formal control and trust suggesting that there are unintended consequences to implementing a formal control, namely the degradation of the trust environment, which ultimately diminishes firm performance. However, this literature focuses on negatively framed formal controls, such as a penalty contract or audits of performance, and has not considered the effects of positively framed formal controls, such as a bonus contract.

Consistent with the prior literature, we find that, relative to no contract, a penalty contract does diminish agents' perceived trust, reciprocal trust and effort (see Table 1) and all contrasts are statistically significant at $p < 0.01$ (untabulated). Thus, we confirm that penalty contracts (i.e., negatively framed formal controls) do have unintended consequences and diminish trust and agent effort. However, when we compare agents' perceived trust, reciprocal trust and effort

in the *bonus contract* condition to those in the *no contract* condition we find higher levels of trust and effort with the contract than without (see Table 1). Comparisons between conditions of perceived trust and agent effort are statistically significant at $p < 0.05$. There is no statistically significant difference between conditions for reciprocal trust. The results of these comparisons indicate that, contrary to prior research that did not differentiate between control frames, when *positively* framed formal controls are imposed, there is no degradation of the trust environment and agent effort is greater than when there is no control imposed.

4.3.2. Effect of Contract Frame on Task 1 Effort

In this section, we discuss briefly the effect of contract frame on Task 1 effort. Note that we did not hypothesize an effect of contract framing on Task 1 effort. There are two reasons for this. First, theory does not allow us to make an unambiguous prediction. On the one hand, payment for this task does not depend on the superior's discretion, thus trust may not play a role. Therefore, effort on this task may follow the pattern of prior research (Hannan *et al.* 2005) such that effort will be higher under the penalty contract. However, these prior studies use an abstract task in which there is no real principal implementing the incentive contract. In contrast, in the current study actual principal participants choose to implement (or not) the incentive contracts. This is likely to induce affective reactions from agents even on Task 1, which may offset the effect of loss aversion demonstrated in prior research. Thus, we are unable to unequivocally predict a direction for the effect of contract frame on Task 1 effort. Second, and more practically, our design does not provide a precise measure of Task 1 effort. Specifically, Task 1 effort cannot be effectively measured by the returns on the portfolio of investments s/he chose because investment returns in Task 1 are also dependent on the performance of the investments, which is outside of the agent's control. Nonetheless, we note here that regardless of what

measure of effort we use (number of the more expensive Whistle shares that were purchased, or overall performance of the investments made in Part 1), we find no statistically significant effect of contract framing (*lowest p-value = 0.24, untabulated*). While the lack of significant results may be due to imprecision in measurement, it is also possible that other affect-based constructs are influencing effort on Task 1, and offsetting the loss aversion noted by Hannan *et al.* (2005).[19]

4.3.3. Principal Implementation Decisions

While our main goal is to examine the effects of contract frame on the trust environment and agent effort, our data also provides interesting insight into the contract implementation decisions of the principals. Specifically, principals appear to be reasonably adept at strategically anticipating the effect of their contract choice on agent behavior. This adeptness is demonstrated by the fact that principals in the *bonus contract* condition are much more likely to choose to implement the contract than are those in the *penalty contract* condition (untabulated, $F = 6.34$, $p < .05$). Specifically, 78% (25 of 32) of principals in the *bonus contract* condition chose to implement the contract compared to 49% (24 of 49) in the *penalty contract* condition. That is, principals choose to implement the incentive contract most often in the exact condition under which doing so will lead to higher effort.

5. Discussion and suggestions for future research

Organizations often implement incentive contracts to induce desirable employee effort. While incentive contracts framed as bonuses and penalties are found in practice, bonus contracts are much more prevalent. Accounting research examining the effects of contract frame finds that despite stated preferences for bonus contracts, employees exert greater effort under penalty contracts, resulting in greater firm profitability when penalty contracts are employed (Hannan *et*

[19] Importantly, Hannan et al. (2005) also do not make a directional prediction, acknowledging that the net effect of contract framing on effort (in their complete contract setting) will depend on the relative strength of offsetting effects.

al. 2005). Thus, there has been a disconnect between what research finds to be the more effective contract and the type typically used in practice. Importantly, we note that prior literature on contract framing assumes a complete contract setting. In practice, employment contracts are often incomplete, leaving employee pay to the discretion of the principal (to some extent). In incomplete contract settings, an agent's trust in his/her principal is an important determinant of effort.

In this study, we examine the effect of contract framing on effort in an incomplete contract setting and thus consider the effect of contract frame on trust as a mediating variable. We find that contrary to prior research, agents exert greater effort under bonus contracts relative to penalty contracts. Analysis of a comprehensive theoretical model we developed based on the formal control/trust literature, reveals that the relation between contract frame and effort does depend on trust induced (or diminished) by the implementation of a bonus or penalty contract.

The results of this study contribute to the incentive contract framing literature and help explain why bonus contracts are more frequently observed in practice than are penalty contracts, despite prior research findings that penalty contracts elicit greater effort. Our findings suggest that it is important to consider both the contract frame (e.g., bonus versus penalty) and the extent to which the contract is complete (e.g., complete vs. incomplete) when designing incentive compensation plans.

The results of this study also contribute to a second stream of literature examining the effects of formal controls (such as incentive contracts) on trust. The most often stated conclusion of this literature is that formal controls can have unanticipated consequences of deteriorating the trust environment resulting in lower effort. However, this literature is incomplete in that it focuses on negatively framed formal controls (e.g., penalty contracts) and does not consider the

effects of positively framed formal controls (e.g., bonus contracts). Our results reveal that the frame of the formal control influences whether the control is perceived by the agent to be a signal of distrust and effects agent behavior. Specifically, positively framed formal controls are not perceived as distrusting signals and do not diminish agent's effort.

The results of this study suggest several avenues for future research. First, this study, along with several prior studies on the effects of incentive contract framing (e.g., Luft 1994, Hannan *et al.* 2005), describes the various mechanisms through which framing may influence agent behavior. However, each paper focuses on a different mechanism (e.g., we focus on trust, while Hannan *et al.* (2005) focus on fairness concerns, etc.) and does not address when the effect of one mechanism might outweigh the others. Thus, it is unclear precisely when managers should implement a bonus versus a penalty contract. Future research should explore these mechanisms further to determine in which settings the effect of each mechanism is stronger.

Second, although the principals in our study choose whether or not to impose an incentive contract, the framing of the contract available to the principal in each condition is determined exogenously by the experimenters. However, in reality, the choice to frame an incentive contract as a bonus or penalty is an endogenous decision made by the principal; that is, in addition to deciding whether to use an incentive contract, the principal also chooses the contract frame. It is possible that the endogeneity of the framing decision might moderate agents' response to it, resulting in more positive (negative) reactions to an endogenously chosen bonus (penalty) plan. This should not pose a threat to the validity of our study, because it works against our finding results. However, future research should consider both the agent's response to the contract frame chosen by management, as well as the factors that the principal considers when choosing the contract frame. Similarly, research examining the characteristics of principals

who choose bonus versus penalty contracts may be fruitful. For example, are certain principals trusting (or distrusting) and do they therefore exhibit a consistent preference for bonuses or penalties? Or, are principals more likely to be controlling types such that they will implement either a bonus or a penalty contract depending on which is presented as a possibility.

Third, we document a somewhat surprising result that the implementation of a bonus contract positively influences perceptions of being trusted, separate and distinct from the signaling effect we hypothesize. While not the focus of this study, the reasons for this result are worthy of additional study. One possibility is that agents' preference for fairness results in a favorable reaction to the bonus contract. A second possibility is that agents have a general affective reaction to this type of formal control. Managers often rely on information from a self-assessment of feelings as a basis for making judgments, which, in our setting is an assessment of feeling trusted (Schwartz 2002). This "affect heuristic" will have either positive or negative effects on the trust judgment, depending on the information gleaned from the self inquiry as to what is felt about the formal control implementation. Our results suggest that, incremental to the negative signaling effect we posit, a penalty contract (i.e., a negatively framed formal control) induces negative feelings leading to lower trust, possibly related to perceptions of being punished or perceived inequities. Positively framed controls, on the other hand, appear to induce favorable feelings leading to greater trust, possibly associated with perceived generosity of the principal or earned positive recognition from the principal. The investigation of this result is a promising area for future research.

Fourth, our experiment constitutes a one-shot trust game. Although the results show that effort is highest when a bonus contract is implemented, it is unclear whether this benefit would remain if the principal/agent pairs engaged in repeated trust games. Future research could

investigate whether contract frame continues to influence effort even after the principal has had the opportunity to take advantage of the agent's trust.

Finally, our model is based on agents' beliefs regarding principals' motivation for implementing the incentive contract. However, prior research suggests that if agents do not interpret the implementation of the formal control as a signal of distrust they will not respond negatively (Christ 2011). Therefore, future research should consider whether the effects of the bonus and penalty contracts found in the current paper hold if the principal is able to credibly signal that s/he trusts the agent.

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Figure 1
Theoretical Model for the Effect of Contract Frame on Effort

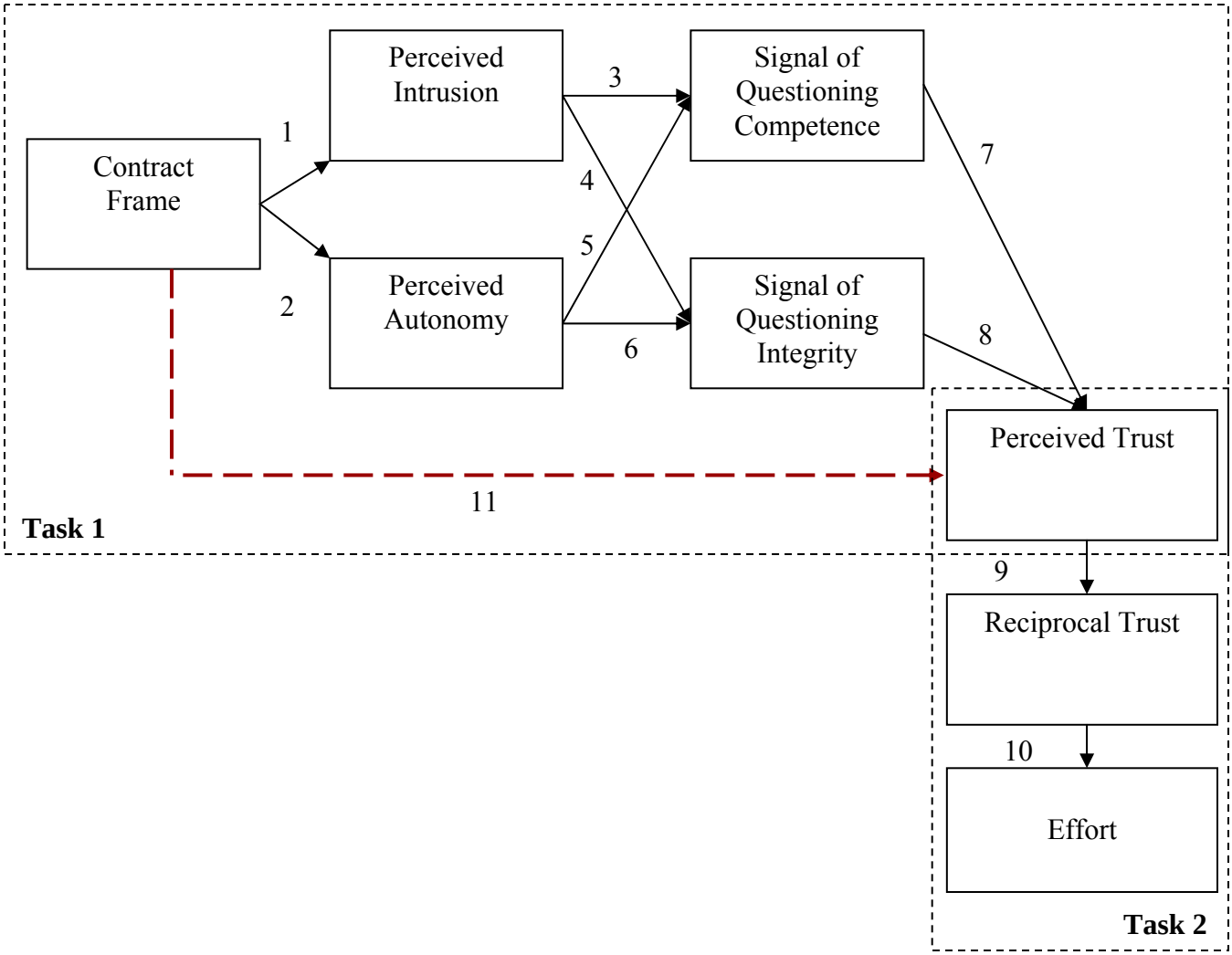
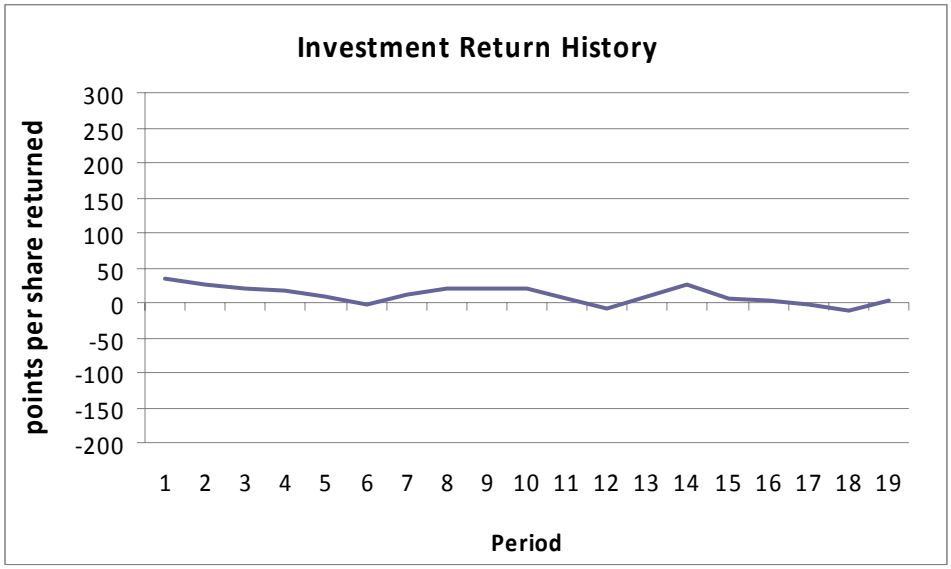


Figure 2
Sample Investment Graphs

Panel A: Sample Bell investment



Panel B: Sample Whistle investment

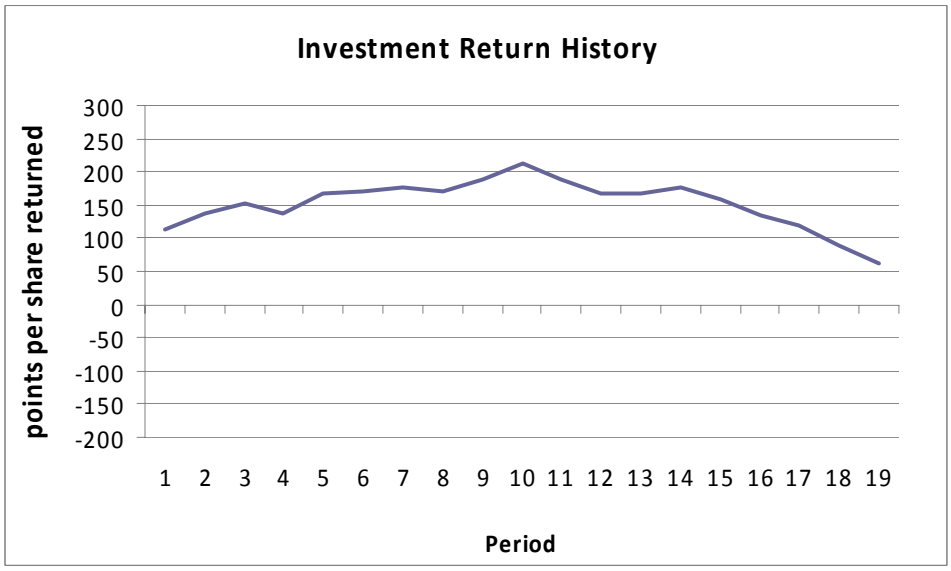
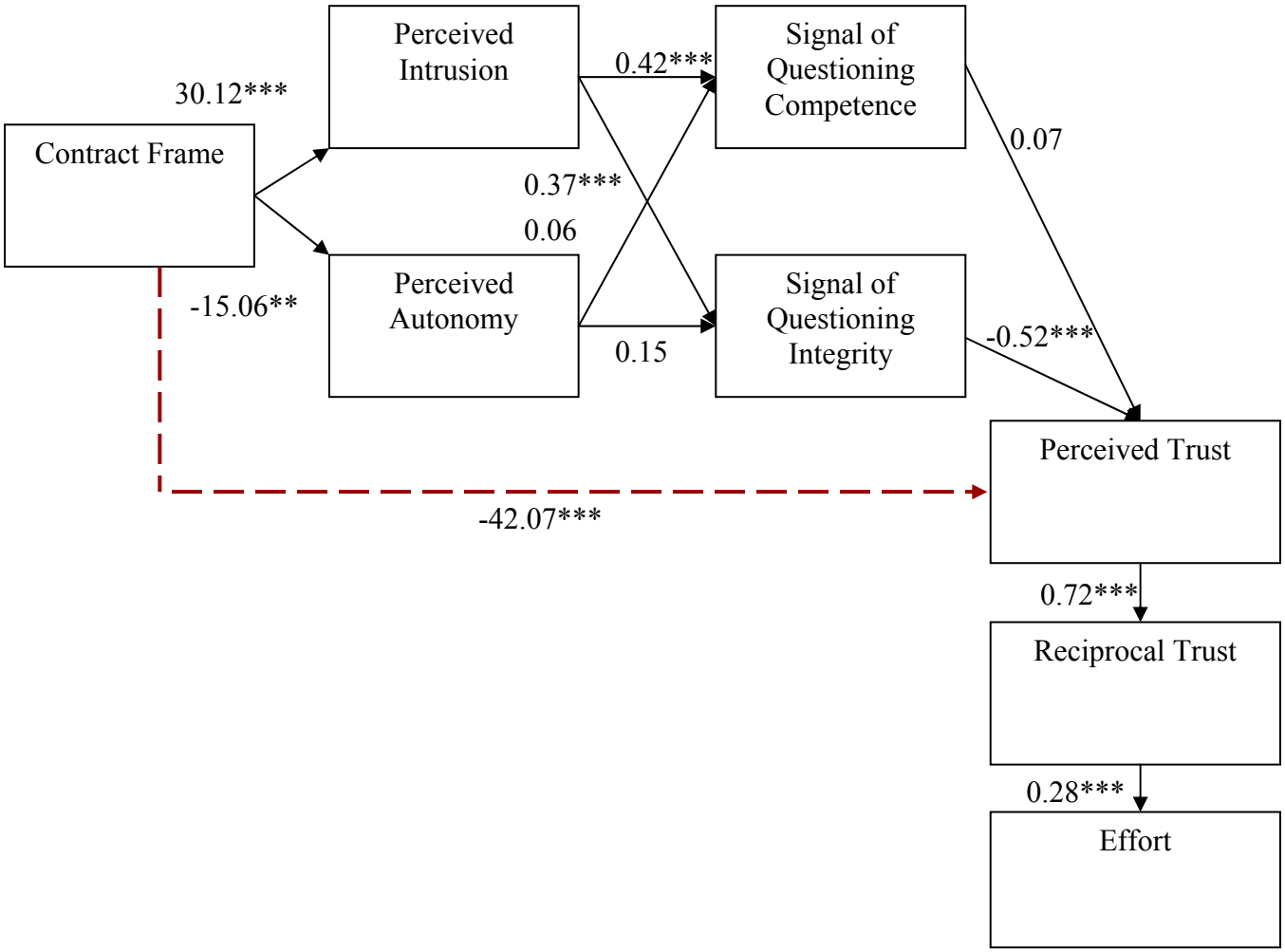


Figure 3
Test of Full Model

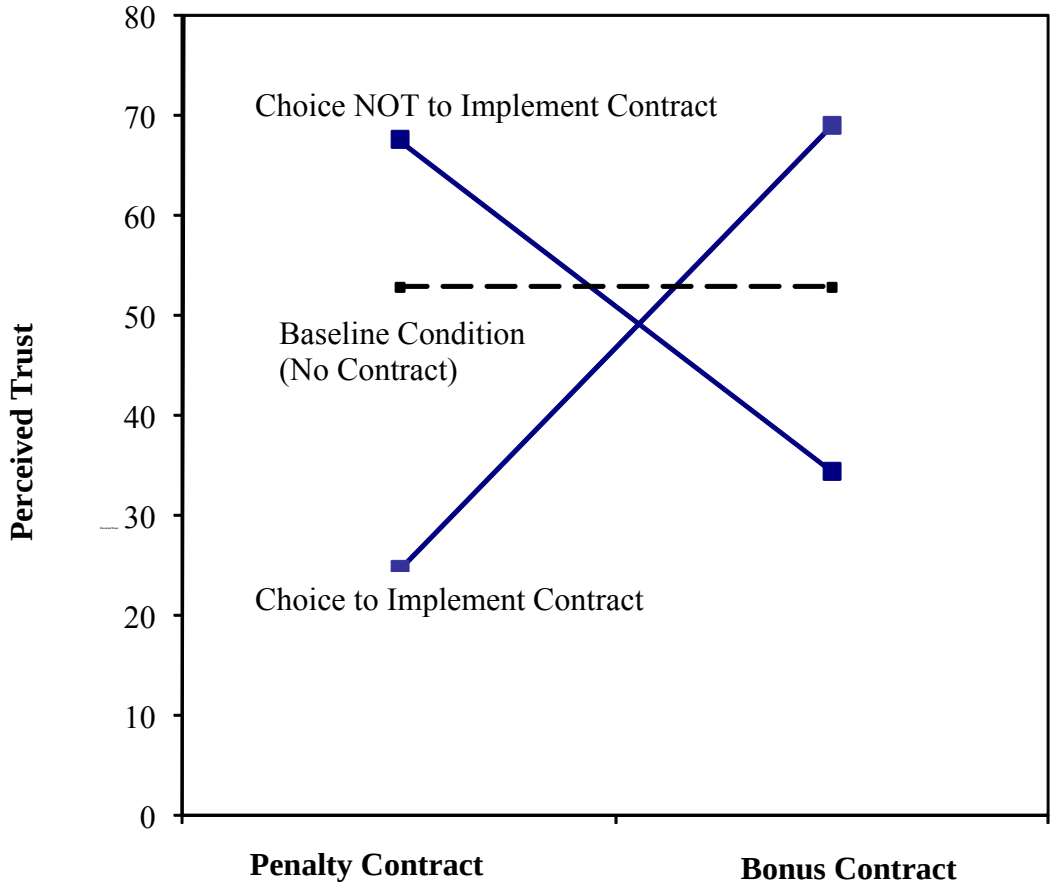


This figure shows the results of the path analysis. The standardized path coefficient and corresponding one-tailed significance are shown next to each path. Goodness of fit is measured through the comparative fit index (0.965), which is above the generally accepted minimum value of 0.95 (Byrne 2001) and confirmed with a traditional χ^2 test (χ^2 = 10.76, p = 0.71), an Incremental Fit Index (1.02), a Comparative Fit Index (1.00) and a Root Mean Square Error of Approximation (0.00).

For this analysis, we compare observations from dyads in which the principal chose to impose the negative-outcome control to those in the No Control condition.

***, **, * indicates significance at the .01, .05, and .10 levels, respectively (one-tailed).

Figure 4
Supplemental Test – Comparison to Baseline Condition



This figure shows the average perceived trust across conditions and across the decisions of principals to implement or not implement the incentive contract. The average perceived trust in the baseline condition (in which no contract was possible) is represented by the horizontal dashed line (labeled "Baseline Condition"). The other two lines on the graph represent the perceived trust reported by agent participants in the *penalty* and *bonus contracts* conditions. Specifically, the positively sloped line represents agents' perceived trust when principals chose to implement the contract, and the negatively sloped line represents agents' perceived trust when principals chose not to do so.

Table 1
Descriptive Statistics

Means and *standard deviations*

	No Contract n=30[c]	**Bonus Contract** n=25[d]	**Penalty Contract** n=24
Intrusion [a]	32.50	31.04	60.00
	26.71	*32.64*	*31.98*
Autonomy [a]	74.83	74.58	57.20
	25.31	*23.95*	*31.46*
Questioning Competence [a]	52.50	46.46	58.80
	23.22	*30.20*	*25.51*
Questioning Integrity [a]	54.67	49.79	56.40
	29.39	*32.01*	*27.41*
Perceived trust [a]	52.83	68.96	24.48
	24.41	*24.09*	*23.52*
Reciprocal trust [a]	56.67	65.42	32.00
	28.39	*21.41*	*26.34*
Effort [b]	24.80	33.92	21.44
	17.98	*17.22*	*15.80*

[a] Participants responded to the following questions using a 100 point Likert scale:
- To what extent do you feel that Participant B has intruded on your decisions? (Intrusion)
- To what extent do you feel that you have the autonomy to make decisions? (Autonomy)
- To what extent do you feel that Participant B questions your competence? (Questioning Competence)
- To what extent do you feel that Participant B questions your integrity? (Questioning Integrity)
- To what extent do you feel that Participant B trusts you? (Perceived Trust)
- To what extent do you trust Participant B? (Reciprocal Trust)

[b] Effort is measured using the number of Horn shares A Participants purchased during Part II of the experiment.

[c] One observation requires two participants, and so the number of participants is twice the number of observations reported here.

[d] For both contract frame conditions, we report the descriptive statistics from those dyads in which the principals chose to impose the formal control only. These observations form the basis of our hypotheses and analyses.

APPENDIX
Experimental instrument

BACKGROUND

INSTRUCTIONS

Participant #: _____

GENERAL

You are about to participate in a study on decision making. Please read these instructions carefully, because the amount of money you earn will depend in part on your decisions. Also, there will be several short quizzes on these instructions to ensure your understanding, and you will not be able to continue until you accurately complete the quizzes, so please pay close attention.

If you have any questions, you should first read back through the instructions. If you continue to have questions after all the instructions are read, please raise your hand and the Administrator will answer you in private.

Unless you are asking a question to the Administrator in private, **please do not talk** at all, during this experiment**.**

OVERVIEW OF THE STUDY

This is a computerized decision making study. We expect the entire session to last approximately 60 minutes, during which time you will be required to answer questions and make decisions.

In this study, you will assume the role of either Participant A or Participant B. You will remain in the same role throughout the entire study. We will tell you which role you will assume after you read the first set of instructions.

Before you begin, the computer will randomly match participants into pairs (of one Participant A and one Participant B). The pairings are anonymous. You will not be told who you are paired with either during or after the study.

You will earn points, which can be affected by decisions made by you and/or the person with whom you are paired. These points will be converted to cash and you will be paid the cash amount before you leave today. Points will be converted to cash using the following formula:

US $ Payment = (Points earned X .025)

Initial Decisions

Overview

As a first step, Participant A will have the task of selecting a portfolio of investments for Participant B. That is, Participant B will earn the returns from the portfolio, but Participant A will choose the specific investments to be included in the portfolio. Participant A will also pay for the investments, but will be given a fund from which to pay. More specifically, at the start of the study,

- **Participant A** will be given 850 [1,000][a] points, and
- **Participant B** will be given 250 points.

Participant A's initial fund is larger, because Participant A must pay for the investments and Participant B will receive the returns from the investments.

The following instructions will describe in detail the decisions made by Participant A and Participant B. Because you do not yet know to which role you will be assigned, it is important for you to pay close attention to both sets of instructions.

[a] Participant A's endowment is 850 in the Bonus condition and 1,000 in all other conditions.

PART A

Participant A

Participant A has the task of selecting the portfolio of investments. Participant A will be presented with 30 possible investments. From these 30 investment choices, Participant A ***must select and pay for 1 share each of 10*** of these investments, which will earn points for Participant B. Participant B will hold the shares for one period only, and so Participant B's returns will be maximized if Participant A selects the 10 shares that are expected to make the highest returns in the next period.

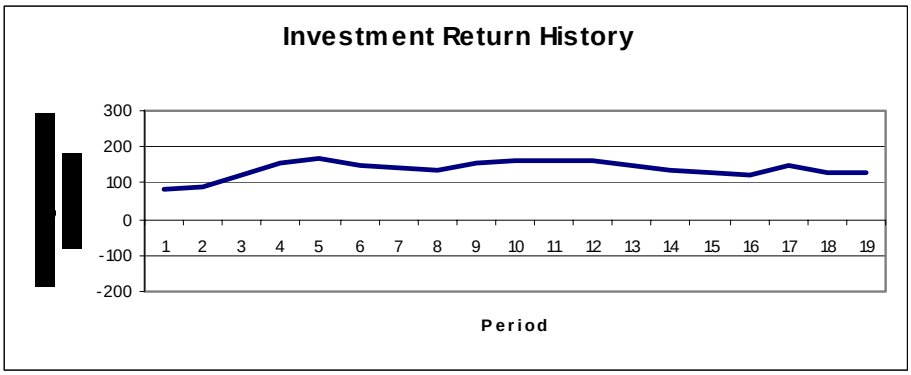
NOTE: Participant A must select 10 *different* investments, and buy exactly *one share* of each of these investments.

There are two types of investments, 🔔 (bell) investments and 🎺 (whistle) investments. The cost per share depends on the investment type:

- Each 🔔 (bell) share selected will cost Participant A 10 points.
- Each 🎺 (whistle) share selected will cost Participant A 25 points.

🎺 (whistle) shares are more expensive, because on average they are expected to return more per share in the next period. Specifically, 🔔 (bell) shares will earn an average return of 20 points per share, whereas 🎺 (whistle) shares will earn an average return of 50 points per share. Importantly, this is only an average, and any individual investment can earn considerably more or less than the average (as you can see by looking at the graphical representations of the investment return history, which are provided to you on the large, folded documents enclosed, and described below).

Both participants will be provided with a graphical representation of the previous 19 periods of returns (points per share) for each of the 30 possible investments. For example, the history of points per share returned for one investment available for selection might look like this:



All conditions other than Baseline (No Control):
Participant B will have the opportunity to implement a control system prior to Participant A's investment decision. The control system, if implemented,

> Positively (Negatively) Framed Outcome Control: establishes a bonus] [penalty] system for Participant A in which Participant A will [receive an extra 150 points if the total return of all shares chosen by Participant A meets or exceeds 500 points] [be required to pay 150 points if the total return of all shares chosen by Participant A is less than 500]. [No bonus points would be paid to Participant A if total return is less than 500 points.] [No penalty points would be paid if total return equals or exceeds 500 points.] The [bonus] [penalty] will be paid from [to] the administrator's fund. That is, the [bonus] [penalty] will not be [deducted from] [added to] Participant B's fund.

After Participant B decides whether or not to implement a control system, Participant A will be notified of this decision.

Bonus Contract condition:

Summary of Points – Participant A

Participant A will receive an initial fund of 850 points. From this fund, Participant A will pay for the 10 shares selected (10 points for each 🔔 (bell) share and 25 points for each 🎺 (whistle) share). Further, the points will depend on whether or not Participant B chose to implement a control system and, if a control system has been implemented, the total return of the shares chosen by Participant A. Thus, the payoffs to Participant A for this initial decision are as follows:

	No control system	**Control system**
Total Share Returns < 500	850 points - Cost of Shares	850 points - Cost of Shares
Total Share Returns >= 500	850 points - Cost of Shares	850 points - Cost of Shares + 150 bonus points

For example, suppose Participant B implements the control system and Participant A chooses 6 🔔 (bell) shares and 4 🎺 (whistle) shares. Also assume that the returns for these investments exceed 500 points. Participant A's payoff will equal 850 – (6 X10) – (4 X 25) + 150 = 840 points.

If Participant B does not implement the control system, or the returns for the investments are less than 500, Participant A's payoff will equal 850-(6X10) – (4 X 25) = 690.

Penalty Contract condition:

Summary of Points – Participant A

Participant A will receive an initial fund of 1000 points. From this fund, Participant A will pay for the 10 shares selected (10 points for each 🔔 (bell) share and 25 points for each 🎺 (whistle) share). Further, the points will depend on whether or not Participant B chose to implement a control system and, if a control system has been implemented, the total return of the shares chosen by Participant A. Thus, the payoffs to Participant A for this initial decision are as follows:

	No control system	**Control system**
Total Share Returns < 500	1000 points - Cost of Shares	1000 points - Cost of Shares - 150 penalty points
Total Share Returns >= 500	1000 points - Cost of Shares	1000 points - Cost of Shares

For example, suppose Participant B implements the control system and Participant A chooses 6 🔔 (bell) shares and 4 🎺 (whistle) shares. Also assume that returns for these investments are less than 500 points. Participant A's payoff will equal 1000 – (6 X10) – (4 X 25) - 150 = 690 points.

If Participant B does not implement the control system, or the returns for the investments exceed 500, Participant A's payoff will equal 1000-(6X10) – (4 X 25) = 840.

Baseline (No Contract) condition:

Summary of Points – Participant A

Participant A will receive an initial fund of 1000 points. From this fund, Participant A will pay for the 10 shares selected (10 points for each 🔔 (bell) share and 25 points for each 🎺 (whistle) share). Thus, the payoffs to Participant A for this initial decision are as follows:

No control system
1000 points - Cost of Shares

For example, suppose Participant A chooses 6 🔔 (bell) shares and 4 🎺 (whistle) shares. Participant A's payoffs will equal: 1000 – (6 X10) – (4 X 25) = 840 points.

All conditions:

Participant B

Participant B will receive the total return from the 10 (ten) shares chosen by Participant A.

As described in the instructions for Participant A, Participant B will have the opportunity to implement a control system prior to Participant A's investment decision. The control system, if implemented, establishes a [bonus] [penalty] system for Participant A.

If Participant B chooses to implement a control system, the cost to Participant B is 50 points.

Summary of Points – Participant B

The total number of points that **Participant B** earns will depend on the total return of the shares chosen by Participant A, and whether or not Participant B chose to implement the control system. Thus, the payoffs to Participant B are as follows:

	No control system	Control system
Total Share Returns< 500	250 points + total share returns	250 points + total share returns - 50 points for cost of control system
Total Share Returns >= 500	250 points + total share returns	250 points + total share returns - 50 points for cost of control system

PART B

CONTINUING DECISIONS

Overview

You are still in the same role as before – either Participant A or Participant B.

In addition, you are paired with the same person. The identification of participants will continue to be anonymous throughout the study.

You will start this part with whatever points you have in your fund following the prior set of decisions. (Note that you don't know the amount exactly, because we have not told you the returns from the shares selected by Participant A. However, each Participant A still has a minimum of 600 points with which to make investments.)

You will now have the opportunity to earn more points based on the choices made by you and the person with whom you are paired.

Participant A

Participant A now has the task of deciding on one additional investment for Participant B. This investment decision is different from the prior investment decisions in several important ways:

1. There is only one type of investment: a (horn) investment.
2. Each  (horn) share costs 10 points (whereas in prior decisions, some investments cost 10 points and some cost 25 points).
3. The return per share in the next period is known to be 30 points (whereas in the prior decisions, the return per share in the next period was unknown, and had to be predicted based on the history of past returns).
4. Participant A can purchase anywhere from 0 to 50 shares of the (horn) investment (whereas in the prior decisions, Participant A could only select one share each of 10 different investments).
5. Participant B will earn the returns from the portfolio. ***However, Participant B will have the opportunity to share the return from the investment with Participant A (whereas in the prior decisions, Participant B kept the total return).***

Participant B

After learning how many shares Participant A purchased, **Participant B** will be given the opportunity to pay any amount of the return to Participant A. The return will equal 30 points X the number of shares of the  (horn) investment purchased by Participant A, and Participant B can share (i.e., give back) anything from 0 to the total return with Participant A.