The Dissertation Committee for Margaret Heim Christ certifies that this is the approved version of the following dissertation:

Intending to Control: An Experimental Investigation of the Interactions among Intentions, Reciprocity and Control

Committee:

Steven J. Kachelmeier, Supervisor

Urton Anderson

Karen L. Sedatole

Rajagopal Raghunathan

Michael G. Williamson

Intending to Control: An Experimental Investigation of the Interactions among Intentions, Reciprocity and Control

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Margaret Heim Christ, B.S.

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Dedication

For my husband, John Christ, and my parents, Kathleen and William McCook.

In loving memory of my father, Philip Gary Heim, who would have been so proud and with whom I would have shared many discussions about this dissertation during hikes at the Barton Creek Greenbelt and countless cups of coffee.

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Intending to Control: An Experimental Investigation of the Interactions among Intentions, Reciprocity and Control

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Margaret Heim Christ, Ph.D.

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Supervisor: Steven J. Kachelmeier

Formal controls are essential for well-functioning organizations, but research finds that they can negatively impact controlled individuals' (agents) behavior. Specifically, controls can reduce agents' intrinsic motivation to exert effort for employers (principals). In this dissertation, I investigate how agents' beliefs about the intentionality of control influence their response to it. Further, I examine whether principals anticipate agents' responses and adjust their risk-taking behavior accordingly.

Using three interactive experiments, I examine the effects of control intentionality on agents' effort and principals' risk-taking. In the first experiment, I focus on the effects of intentions and control, without permitting principals to transfer resources to agents. In

the second and third experiments, principals take risk by entrusting resources to agents. Further, in the third experiment, I investigate the beliefs that influence participants' actions.

In each experiment, I manipulate agents' beliefs about control intentionality by varying the control source across three conditions. In the first condition, principals endogenously impose control, which can clearly be perceived as a distrusting signal. In the second condition, control is imposed exogenously by a computer and therefore cannot be interpreted negatively. In the third condition, the control source is unclear to the agent, such that it may be imposed by the principal or computer.

I find that intentionality influences agents' response to control. Specifically, in the first experiment, when control is imposed exogenously, agents exert high effort. However, agents' effort diminishes when control can be interpreted as a negative signal, even if the source is ambiguous. Moreover, when the principal unambiguously imposes control, agents exert less effort than if no control is imposed. The second experiment reveals that this dysfunctional effect of intentional control persists when principals entrust resources to agents.

Despite these negative effects, principals prefer to impose control. However, principals appear to accurately predict how control intentionality affects agents and take more risk when they have chosen *not* to impose control or when it is imposed by an exogenous or ambiguous source than when they have intentionally imposed it. Results from the second and third experiments indicate that principals' risk-taking is influenced by their beliefs about agent opportunism.

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Chapter 1: Introduction

Control systems are an integral part of a well-functioning organization, but a growing body of academic research suggests that formal controls often have negative consequences on the behavior of controlled individuals. Research shows that controls can diminish organizational citizenship behavior, intrinsic motivation, effort, and can even lead to employee fraud or theft (Packard 1995). Therefore, it is important to understand the specific aspects of control that compel employees to engage in these dysfunctional behaviors, and whether supervisors anticipate these actions. Prior research generally assumes that the dysfunctional effects of control are caused by the principals' intentions that are signaled through control implementation (Christ et al. 2006; Deci et al. 1999; Tenbrunsel and Messick 1999). Houser et al. (2007) assert that agents respond to their beliefs about the principals' motivation for imposing control. In practice, formal control systems can be imposed for a variety of reasons, including supervisors' beliefs about employees' competence or integrity, in response to regulatory requirements, or simply as mechanisms to improve process efficiency and effectiveness. Employees' reactions to formal control systems will likely depend on why they believe the controls have been imposed.

Two recent experimental studies have considered the effects of the intentionality of control on agent behavior (Falk and Kosfeld 2006; Houser et al. 2007). In these studies, control intentionality is manipulated by varying the source of control, where a control imposed by a principal is considered intentional, while one imposed randomly by a computer is deemed unintentional. However, these studies have several limitations.

First, they do not address the influence of intentionality on principals' behavior. In theory, principals should recognize the extent to which control intentionality changes agent behavior, and should adjust their own risk-taking behavior accordingly. Second, these studies only consider settings where the source of control, and therefore its intentionality, is common knowledge. Yet, agents in organizations are often uncertain of the source or cause of the control implementation and their reaction to the control is likely to be influenced by their beliefs regarding its intentionality. Third, prior studies consider only single interactions, whereas in practice, individuals are likely to have a variety of experiences with controls that might influence their reactions, making it important to understand whether the dysfunctional effects of control persist across multiple periods. Finally, prior studies yield inconsistent findings regarding the effect of intentionality on agent behavior. Specifically, Falk and Kosfeld (2007) find that agents respond to the intentions of the controlling principal, while Houser et al. (2007) conclude that intentions do not matter. A variety of differences between these two studies exist, including the principals' ability to entrust resources to agents in Houser et al. (2007) and the manner in which control is operationalized in each study. Therefore, the results are difficult to compare, such that the effects of intentionality on agent behavior remain to be fully understood.

In this dissertation, I extend prior research by examining how principals' intentions influence both agent effort and principal risk-taking when a control is imposed in a repeated setting. Additionally, I consider a previously unexamined dimension of intentions in which the source of control, and therefore its intentionality, is unclear to the

agent. The primary objectives of my study are to more fully understand how agents' beliefs about the intentionality of control influence their response to it and whether principals anticipate these responses and adjust their risk-taking behavior accordingly. Further, I seek to reconcile the inconsistent findings from prior literature regarding the effects of intentionality. To these ends, I design three interactive experiments (illustrated in Figure 1), in which I manipulate principals' intentions using three control source conditions. In the first condition, control is unambiguously imposed by the principal. In the second, control is imposed by an exogenous source (e.g., a regulatory body). In the third, the source of control is unknown to the agent, but may be imposed by either the principal or by an exogenous source. When a control is imposed endogenously by the principal, agents will recognize that the control is intentional and are likely to perceive it to be a negative signal; however, when it is imposed exogenously, the agent should not perceive it as a purposeful, negative signal from the principal. Thus, while I do not manipulate intentions directly, I am able to influence agents' beliefs about the principals' intentions by varying the source of control.

In the first experiment, I focus on the effects of intentions and control only, without permitting principals to transfer resources to agents. Thus, I first establish that agents' response to control depends upon their beliefs regarding its intentionality. After establishing the effects of intentionality on agent effort in experiment 1, I conduct a second experiment to further examine the effects of intentions and control in a richer setting in which principals can transfer resources to agents before agents have the opportunity to reciprocate by exerting effort. In this experiment, I explore principals'

risk-taking behavior in the presence of a control, as well as agents' reactions to both control and the principals' transfer, which can be interpreted as a trusting action. By introducing principals' ability to take risk by transferring resources to agents, I am able to examine whether the effects of intentionality differ when agents' reciprocity concerns (i.e., their tendency to reciprocate kind actions with kindness) are relevant, thereby helping to reconcile some of the inconsistent results from prior studies. Further, I can observe principals' risk-taking behavior in the presence of controls with varied intentionality. In the third experiment, principals and agents engage in the same interaction as in experiment 2; however the participants do not repeat the interaction. This experiment allows me to examine further the motivational and cognitive factors that influence principal and agent behavior when a control is imposed, while controlling for feedback effects.

In general, I find that the dysfunctional effects of control are driven by agents' beliefs about principals' intentions. Further, principals recognize these consequences and adjust the amount of resources that they entrust to agents accordingly. Results from the first experiment show an interaction between control implementation and control intentionality in which intentionality influences agent behavior when a control is imposed, but does not when there is no control. Specifically, control implementation has a negative effect on agent effort and principal profit when the principal unambiguously imposes the control. However, this negative effect is reduced when the agent is uncertain of the source and is eliminated when control is imposed by an exogenous source. Nonetheless, principals continue to impose control due to their beliefs about the

opportunistic nature of agents, despite receiving feedback that control yields low agent effort.

In experiment 2, when principals have the opportunity to put a portion of their wealth at risk by transferring resources to agents, I find that agent effort is driven primarily by the amount of resources transferred by the principal and, to a lesser extent, by the imposition of control. Again, agent behavior is moderated by the intentionality of control, such that agent effort is sensitive to the presence or absence of control when it is imposed endogenously and therefore perceived as an intentional signal of distrust, but is similar regardless of whether or not a control is imposed in the exogenous and uncertain conditions. I also find that principals anticipate the effects of intentionality and take less risk when a control is imposed endogenously and can be perceived as an intentional signal of distrust by agents. However, principals transfer the same level of resources with or without control when agents cannot clearly attribute the control to the principals.

The third experiment confirms the results of experiment 2, indicating that principals' propensity to control, and subsequent risk-taking, is driven by their beliefs about the opportunistic tendencies of agents. Additionally, the results from this experiment verify that agents' effort level depends upon their beliefs about principals' intentions when a control is imposed.

This study makes several important theoretical and practical contributions. First, it is the first study to examine how the intentionality of control affects the behavior of both the principal and the agent. Prior research focuses on the effects of intentionality with respect to agent behavior only. However, in practice, principals must recognize the

potential consequences of controls when evaluating their effectiveness and determining appropriate courses of action. Therefore, it is important that we understand how principals anticipate the effects of formal controls. In this study, I examine principals' decision to impose control, the factors that drive the control decision, and principals' risk-taking behavior in the presence of a control.

Second, I investigate a previously unexamined condition in which the source of control is unknown to the agent. In organizations, agents are often unsure of the source or impetus of a control and must make attributions about the cause when responding to it. For example, controls implemented during Sarbanes-Oxley compliance reviews could be imposed because managers are unsatisfied with employee performance, or simply in response to regulatory requirements. Employees' reactions to these controls are likely to depend on the attributions they make regarding control intentionality. By varying the agents' knowledge about the source of control, I am able to examine how agents attribute the intentionality of a control and investigate agents' responses. I also consider whether principals accurately anticipate these responses.

Third, from a practical perspective, the results of this study will be important to managers and accountants, who assess risk, implement and evaluate controls, and make risky business decisions. Since the enactment of the Sarbanes-Oxley Act and the release of the COSO Enterprise Risk Management Framework (COSO 2004), organizations have increased their focus on the many risks they face, implementing a variety of controls to mitigate them. However, some controls give rise to new risks, including agents' retaliation against the control, making it necessary for management to anticipate those

new risks as well. The results of this study suggest that agents' negative response to control is primarily driven by their beliefs about control intentionality. As accountants, who are often responsible for implementing and evaluating controls, it is particularly important that we understand agent responses to control and principal risk-taking in the presence of control so that these consequences can be considered during risk assessments and control evaluations.

The remainder of this dissertation is organized as follows: Chapters 2 and 3 provide literature reviews describing the relevant factors that might influence agent and principal behavior, respectively. Chapter 4 provides hypotheses development. Chapters 5, 6 and 7 describe the experiments and experimental results. In Chapter 8, I provide conclusions and suggestions for future research.

Figure 1
Graphical Description of Experiments 1, 2 and 3

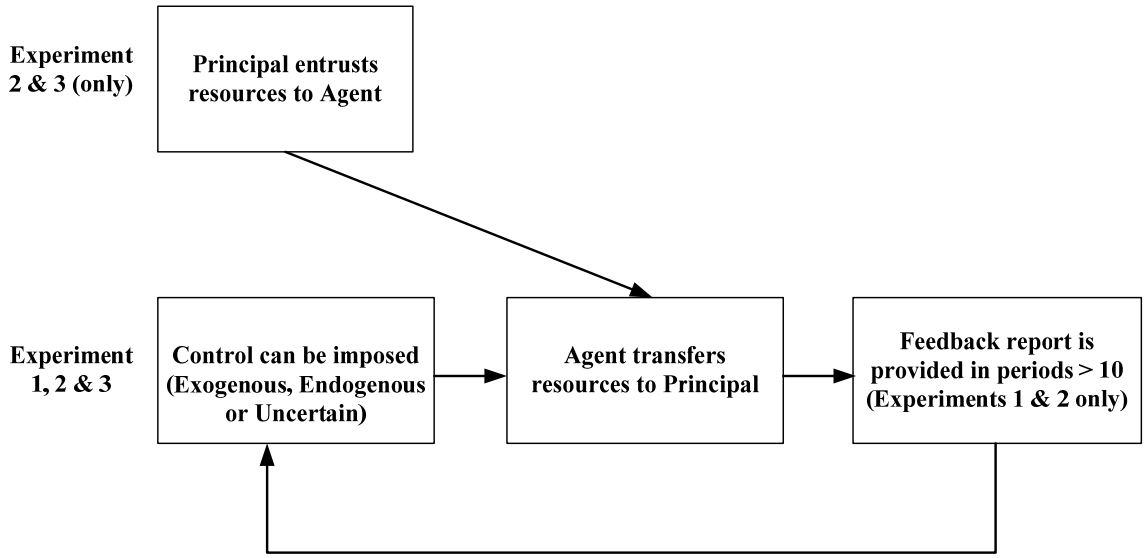


Figure 1 provides a graphical description of experiments 1,2 and 3.

Experiments 1 and 2 employ a 3 X 2 X 2 design with control source varied between subjects at three levels (exogenous, endogenous or uncertain), and control existence (yes v. no) and feedback (yes v. no) varied within subjects. In both experiments, participants interact for 20 periods. Principal and agent participants are anonymously repaired for each round.

In experiment 1, Agents are endowed with 120 points and can transfer any of their endowment to principals. A control, which forces agents to transfer at least 10 points to principals, can be imposed (endogenously by the principal, exogenously by the computer or by an uncertain source). Feedback, indicating the number of points earned in the period, is provided in periods 11 – 20 (only).

In experiment 2, Principals are endowed with 120 points and can entrust any of those resources to Agents. Similar to experiment 1, Agents can return any portion of these entrusted resources to Principals (which are then multiplied by 3) and a control may be imposed (endogenously, exogenously or by an uncertain source) requiring the Agents to return at least 10 points. Feedback is provided in periods 11 – 20 (only).

Experiment 3 employs a 3 X 2 + 1 design with control source varied at three levels (exogenous, endogenous and uncertain) and control existence (yes v. no) varied between subjects and possibility of control (yes v. no) varied within subjects. Contrasting experiment 2, in which participants interact for 20 periods, in experiment 3, participants interact in 1 period in which the control is available and 1 period when no control system is offered.

In experiment 3, similar to experiment 2 principals are endowed with 120 points and can entrust any of those resources to Agents. Agents can return any portion of these entrusted resources to Principals (which are then multiplied by 3) and a control may be imposed (endogenously, exogenously or by an uncertain source) requiring the Agents to return at least 10 points. In experiment 3, participants also interact in a stage where control implementation is not an option.

Chapter 2: Literature Review – Factors Influencing Agent Behavior

2.1 Preferences for Social Norms

Challenging conventional economic assumptions, a growing body of literature suggests that individuals are not driven by self-interest alone. Rather, research shows that people are also motivated by a variety of social norms including trust (Berg et al. 1995), reciprocity (Berg et al. 1995; Fehr et al. 1993; Hannan 2005; Rabin 1993), cooperation (Axelrod 1980b, 1980a), honesty (Evans et al. 2001), altruism (Forsythe et al. 1994; Fox 1974; Kahneman et al. 1986b), equity (Fehr and Schmidt 1999) and fairness (Camerer and Thaler 1995; Luft 1997; Roth 1995). These studies find that even in the absence of formal control mechanisms, individuals often will behave in a manner that is beneficial to others and not solely in their own self-interest.

Scholars have developed a series of economic games commonly used to examine individuals' preferences for social norms (Camerer and Fehr 2004; Charness and Rabin 2002; Fehr and Schmidt 2004). In these games, the economically rational behavior for each player is to maximize his own wealth and to refrain from engaging in exchange with the other player(s). However, these experimental examinations consistently find that individuals sacrifice some personal wealth to adhere to social norms. What is more, these findings are robust across most populations and at various incentive levels (Camerer and Fehr 2004).

For example, in trust games, one player (the trustor) has the opportunity to transfer a portion of his/her wealth to the second player (the trustee) (Berg et al. 1995; Camerer and Fehr 2004). Any amount transferred is typically multiplied by the experimenter and the trustee then has the opportunity to return any amount of the

multiplied transfer back to the trustor. Economic predictions based on the assumption that individuals are self-interested suggest that the trustee will not return any of the transfer to the trustor. Therefore, a prudent trustor should refrain from transferring any funds to the trustee in the first place.

However, examinations of trust games consistently find that trustors will transfer a portion of their endowment to (often unknown) trustees, thus exhibiting trust that the trustee will transfer at least that amount back in return. What is more, trustees often *do* return more than the initial investment to the trustor, displaying both trustworthiness and a preference for positive reciprocity (Berg et al. 1995; Camerer and Fehr 2004).

Similarly, gift exchange games find agents' preferences for reciprocity cause them to reward higher wages with more effort, even when reciprocation is not the repeated-game equilibrium as a result of anonymous repairing of principals and agents (Camerer 2003; Charness 2004; Fehr et al. 1993). In these games, an opportunistic agent should exert the lowest amount of costly effort possible regardless of the wage provided by the firm. Instead, results indicate that agents consistently exert high effort in return for high wages. Charness (2004) finds that these results are due to both distributive concerns and agents' causal attributions. That is, agents respond to both the size of the wage provided, as well as the intentions signaled through the wage level.

In dictator games, one individual (the dictator) is given an endowment and is permitted to divide that endowment between himself and another player (the receiver). Dictators can divide the endowment in any way they see fit and the receivers have no way to retaliate if the division is inequitable. Economic theory predicts that the dictator

will keep his entire endowment for himself; yet numerous studies show that individuals share with their (anonymous) receivers. As the dictator stands to receive no economic benefit from this gesture, and, in fact, is economically worse off by transferring funds to the receiver, this result has been attributed to pure altruism (Camerer and Fehr 2004).[1] Further, when given the option between two divisions of an endowment, one equitable and one providing more money to the dictator, dictators often show a preference for the equitable distribution (Kahneman et al. 1986b). This suggests that individuals' concern for fairness can outweigh their opportunistic tendencies. Ultimately, the experimental studies described previously provide consistent evidence that individuals are not motivated by self-interest alone and often choose to make themselves (economically) worse off in the interest of improving others' situations.

In business settings, this research suggests that, due to their preferences for various social norms, employees can be intrinsically motivated to provide greater effort for their employers than they are explicitly incentivized to provide. Hannan (2005) finds that employees increase effort when wages increase following a decrease in firm profit, concluding that employees are motivated by the perceived generosity of the firm. Similarly, Kahneman, Knetsch and Thaler (1986a) find that participants believe employee wage reductions are acceptable only when the company has been losing profits, regardless of what wages the market might command. Charness and Levine (2002) find similar results in a quasi-experimental setting, examining the effects of employment

[1] Some research challenges the notion that transfers observed in dictator games can be attributed to altruism, instead attributing it to dictators' desire to maintain a good image in front of the experimenter. Using a double-blind procedure, whereby the experimenter has no way to match the participant with his/her actions, Hoffman et al. (1994) find much lower frequencies of equitable or altruistic divisions of the dictator's endowment than generally reported in dictator games that do not use the double-blind procedure.

contracts that are closely aligned with the external labor market. Evans et al. (2001) find that employees have preferences for honesty and will sacrifice wealth to adhere to this social norm. Additionally, Fehr and Falk (2002) find that employees' motivation to be honest leads them to provide high effort when honest employers maintain a fair and respectful work environment.

Employees' intrinsic motivation often manifests itself through organizational citizenship behavior (OCB) (Bateman and Organ 1983). OCB, defined as "constructive or cooperative behavior that are neither mandatory in-role behavior, nor directly or contractually compensated by formal reward systems" (Organ and Konovsky 1989), is influenced by employees' beliefs that the organization treats them fairly. Specifically, Organ and Konovsky (1989) find that OCB is driven by employee job satisfaction. Furthermore, extant research finds a direct link between OCB and firm performance (Koys 2001; Organ 1988; Podsakoff et al. 1997; Podsakoff and MacKenzie 1994, 1997; Podsakoff et al. 2000). OCB has been found to enhance co-worker and managerial productivity, improve the quantity and quality of product output, increase customer satisfaction, thereby contributing to overall operating effectives (Bergeron 2007). Thus, it is clear that employees' preferences for various social norms can influence their intrinsic motivation and subsequently improve firm performance, and therefore are an important element of organizational success.

2.2 The Harmful Effects of Formal Control

Despite evidence that individuals are not wholly self-interested and do have preferences for fairness, altruism, trustworthiness and cooperation, organizations typically employ formal control systems. Control, broadly defined as the "use of

procedures which help ensure that self-interested agents maximize the value of the organization," (Zimmerman, 2000 p. 714) can take many forms. Within organizations, policies and procedures, budgets, effort reports, and surveillance systems are used to direct and control employee activities (Reding et al. 2007). Indeed, management control is a vital function in organizations, such that stakeholders generally expect that control weaknesses will result in large losses and, potentially, lead to organizational failure (Merchant and Van der Stede 2003).

Notwithstanding such expectations, a significant body of research in psychology, economics and business suggests that formal control systems can "crowd out" preferences for social norms (Frey 1993). Therefore, instead of exhibiting preferences for fairness, trust and reciprocity, and engaging in organizational citizenship behavior, controlled individuals often *do* act opportunistically. That is, individuals exhibit the types of behaviors that the formal controls were designed to prevent. This suggests that in certain situations, the implementation of formal controls can be detrimental to the relationship between the principal and the agent, ultimately resulting in lost profit for the principal. In these circumstances, control systems can inadvertently increase the riskiness of the principal/ agent relationship.

In general, this research suggests that the implementation of a control system by a principal sends a signal of distrust to the agent (Das and Teng 1999; Das and Teng 2001b; Enzle and Anderson 1993; Malhotra and Murnighan 2002; Tenbrunsel and Messick 1999). In response to this distrust, the agent tends to distrust the principal in turn. Therefore, trust, or distrust, is reciprocal (Bradach and Eccles 1989; Christ et al.

2006; Gambetta 1988; Johnson et al. 1996; Zand 1972). Ultimately, this distrust leads to a breakdown in cooperation and an increase in agents' opportunistic behavior.

These unintended consequences of control implementation have been examined in a variety of studies. Falk and Kosfeld (2006) study a variation of the dictator game (Kahneman et al. 1986a), in which they allow the responder to set a minimum that the dictator must transfer. The authors find that most agents reduce their contribution to the responder in response to the responder's controlling decision, presumably because they perceive it to be a signal of distrust and a limitation of their choice autonomy. Further, when responders do *not* set a minimum threshold, they are rewarded with greater contributions from the dictator.

Fehr and Gachter (2001) examine the effects of incentive contracts, with a known probability of audit and a penalty, on voluntary cooperation using a gift exchange game. The authors find that incentive contracts are less efficient than contracts without incentives because voluntary cooperation is crowded out. Fehr and Rockenbach (2003) use a setting similar to a trust game with the principal indicating a "desired back transfer" amount, finding that implementing a control system that penalizes agents who transfer less than the desired amount reduces altruistic cooperation.

A recent study in accounting by Coletti et al. (2005) provides some evidence that particularly strong control systems, which induce cooperation, actually increase trust and future cooperation between parties. However, Coletti et al. (2005) uses a public goods game, as does Fehr and Gachter (2001) which also finds that controls do not always have a negative effect on cooperation. Fehr and Rockenbach (2003) suggest that the

conflicting results might be due to the "moral legitimacy" of the sanction in a public goods game context punishing free-riders is seen as an altruistic act and therefore morally legitimate. However, in non-public goods settings, such as a business organization, sanctions are not typically likely to be seen as morally legitimate, but rather are likely to be construed as signals of distrust.

A variety of studies further examine the psychological mechanisms through which formal control crowds out agents' preferences for social norms. Using context-rich psychology based research, Christ et al. (2006) find that perceived distrust, due to the intrusiveness of a control system and the perception that the control limits the agent's autonomy, reduces the agent's willingness to cooperate with the principal. Further, the authors find that these perceptions vary based on the *type* of control system implemented. Specifically, behavioral controls, which restrict agents' actions, are more likely to lead to dysfunctional behavior than are less intrusive control systems such as output controls, which monitor the results of agents' actions.

Taylor and Bloomfield (2007) show that the initial control system presence affects whether the controls lead to self-interested behavior or result in socially-conscious behavior consistent with the best interest of both parties involved. The authors indicate that the existence of a control system at the start of the experiment creates a framing effect, or a general cue that the participants are not operating in a trusting environment. This effect induces participants to engage in strategic behavior. A similar framing effect has been shown in several other experimental studies (Tenbrunsel and Messick 1999). Taylor and Bloomfield (2007) further note that in the absence of control, when principles

of social-interest dominate preferences for personal wealth, individuals tend to look outward to others' behaviors, which increases the pressure for conformity. This ultimately increases socially-beneficial behavior. Indeed, the research examining the dysfunctional effects of control systems includes a wide array of variables and settings and provides a variety of explanations for why controls crowd out cooperative behavior.

Importantly, the harmful effects of control appear to be specific to weak or incomplete controls. As controls become stronger, and it becomes economically rational for agents to comply, controls can create positive results for principals. For example, Falk and Kosfeld (2006) find that controls requiring agents to transfer small amounts of resources diminish agent effort, but principals are better off when they require agents to transfer larger levels of resources. Likewise, Coletti et al. (2005) examine a control involving a high probability of audit and penalty for non-compliance, finding that participants are more likely to cooperate when the control is in place and continue to cooperate even after that control is removed. However, in practice it is often cost-prohibitive to implement controls that are strong enough to ensure agents always act in the best interest of the firm. Instead, weak or incomplete controls, such as incomplete contracts, are implemented routinely (Milgrom and Roberts 1992), therefore, it is necessary to examine how principals and agents respond to them.

2.3 Intentionality of Control

Ultimately, much of the literature examining the behavioral impact of control systems on individuals finds that controls designed to limit the behavior of self-interested agents often do not have the intended effect. What is more, these control systems often prove damaging to the relationship between the principal and agent and diminish the

overall firm profitability. As previously described, these findings are often attributed to the negative signal contained within the imposition of the control. Therefore, individuals do not respond to the control itself, but rather, respond to their beliefs about the intentions, or motivations, of the controlling party.

Prior psychological research examines how perceived intentions influence individuals' beliefs and behavior (Heider 1958; Kelley 1967). For example, perceived intentions influence individuals' beliefs about the fairness and equity of outcomes (Bies and Shapiro 1987; Garrett and Libby 1973; Leventhal 1980). In addition, the intentionality of actions can be modified if one provides adequate causal explanations, or justifications, for the actions (Bies and Shapiro 1987). This research suggests that it is the intentionality of the action, rather than the outcome itself, that influences behavior and leads to reciprocal action (Goranson and Berkowitz 1966).

The effect of intentions on reciprocal behavior has also been examined in laboratory settings in which participants' actions directly influence their earnings (Charness and Levine 2007; Hannan 2005). Charness and Levine (2007) allow participants acting as the firm to select a wage (high, medium or low). An exogenous shock, operationalized using a coin flip, determines whether the firm experiences good luck or bad luck, which directly impacts the employees' wage positively or negatively, but does not affect firm profit. After learning the firms' wage decision and whether the firm has experienced good or bad luck, employees select a costly effort level (high, medium or low) that has varying effects on firm profitability. The authors find that employee participants are much more likely to reward firms with high effort if they

perceive that the firm has good intentions, even if bad luck causes the employee to be paid a low wage. Further, employees punish the firm for bad intentions even if good luck leads to high wages. In this setting, an employer who intentionally chooses a low wage is perceived to have "misbehaved" and violated an established social norm (Charness 2004).

Charness (2004) continues his examination of the interaction of intentions and reciprocity in a labor market in which wages may be set endogenously by the employer or by an exogenous force. He finds that employee effort is based on both distributional concerns (e.g., the wage level) and employees' desire to reciprocate positive (negative) intentions with high (low) effort. While the level of wages has the strongest influence on employee effort, the results also indicate that employees respond to perceived intentions when the wages are low. Specifically, when low wages are set by the employer, employees exert lower effort than when the same low wages are set by an exogenous source.

Extending the literature regarding intentionality to a setting in which an agent is responding to the implementation of a control system, agents who believe a control is intentionally imposed and interpret it as a signal of distrust from the principal are likely to reciprocate that distrusting action with an unkind act in return. Procedural justice theories (e.g., Tyler 1988) suggest that employees will perceive the imposition of an intentional control system to be unfair or disrespectful and, as a result, will punish their employers. In essence, employees believe that the employers have breached the "psychological contract" to maintain mutual respect and fairness (Robinson 1996). Thus,

agents who perceive a control to be intentional are likely to reduce effort levels, shirk, forego organizational citizenship behavior, or in the worst case, exhibit fraudulent or illegal behavior. Ultimately, these dysfunctional behaviors have a negative impact on firm performance.

Drawing from the implications of Charness (2004), it is also important to consider the extent to which any negative intentions signaled through the implementation of a control system might crowd out the positive reciprocity gained from high wages or increased responsibilities entrusted by the principal to the agent. In organizations, employees often receive conflicting signals of trust or distrust from their employers. For example, in decentralized organizations, employees are given increased responsibilities, such as investment authority or budgetary discretion, while at the same time being subject to management's scrutiny or stringent policies and procedures. In these situations, employees are likely to make tradeoffs between rewarding the trusting action (i.e., increased responsibility) and retaliating against the control. Therefore, it is important to understand if and when the perceived intentionality of a control system will crowd out employees' positive reciprocal behaviors.

Importantly, the intentions of the controlling party are not always common knowledge or clearly understood by the individuals being controlled. In business settings, management often implements control mechanisms without clearly communicating their purpose and benefits. In these situations, employees must make attributions regarding the intentionality of the control that are likely to influence their responses to it.

Attribution theory suggests that agents will generally attribute the control implementation to the principal (Gilbert and Malone 1995; Ross 1977). Experimental research examining individuals' abilities to make causal attributions finds that individuals generally over-emphasize the dispositions of others and underestimate the effect of situational factors. Further, the correspondence bias (or fundamental attribution error) suggests that when making attributions about *others*' actions, individuals attribute unexpected outcomes to the dispositions of these others (Green et al. 1985). Thus, when faced with uncertainty, agents prone to the fundamental attribution error would likely attribute the control to the principals' choice to implement it, rather than to the exogenous source compelling the control implementation.

However, when faced with such uncertainty, it is also likely that agents will not fully attribute the implementation of the control to the negative intentions of the principal. The discounting principal of attribution theory suggests that when faced with several, likely alternative sources or catalysts for an action, individuals generally discount the extent to which they attribute the action to any one source (Kelley 1972). Prior experimental investigations provide results consistent with the discounting principal. Using a trust game with a tremble (a 25% chance that a computer will change the first mover's choice), Cox and Deck (2006) make it unclear to the second mover whether or not the first mover chooses an equitable split of his endowment. The authors find that many second movers assume that first movers act fairly and that any unfair distributions are a result of the tremble. These second movers are subsequently less likely to punish first movers even if the distribution shared with the second movers is small.

The discounting principal suggests that when faced with uncertain intentions, employees will not respond to a control as negatively as they would if they believed the implementation to be an unambiguous signal that their employer does not trust them. Nevertheless, employees will not give controlling employers the total benefit of the doubt either. Therefore, controlled employees are likely to respond more negatively to a control with ambiguous intentions than one that clearly cannot be interpreted as a signal of distrust.

In this dissertation, I examine how agents' beliefs about the intentionality of a control system influence their behavior. My main predictions, as set forth in chapter 4, suggest that when a control is unambiguously imposed by the principal, and can therefore be perceived as an intentional signal of distrust, the control will crowd out agents' preferences for various social norms, including positive reciprocity and altruism. However, controls that are imposed by an exogenous or uncertain source, and thus cannot be perceived as intentional signals of distrust will not be as detrimental to agents' behavior.

Chapter 3: Literature Review – Factors Influencing Principal Behavior

While a wide-ranging body of academic literature examining aspects of agents' responses to the implementation of formal control systems has developed, important questions that have not been extensively examined include whether and how principals anticipate the behavioral effects of these control systems. Drawing from the literatures on the illusion of control (Langer 1975; Langer 1983), social projection theory (Robbins and Krueger 2005) and risk perception (Heath 1999; Slovic 1987, 2000; Slovic et al. 2004), I describe principals' propensity to impose control systems that crowd out agents' preferences for positive social norms and principals' ability to anticipate and respond to agents' reactions to these controls.

3.1 Principals' propensity to control

As previously described, control systems can have a variety of unintended consequences that can damage the relationship between principals and agents. That is, formal controls often crowd out preferences for social norms and result in opportunistic behavior by agents that can diminish firm performance. However, it is unclear whether principals effectively recognize these unintended consequences of control and choose to accept the risk of opportunistic behavior, or are lulled into a false sense of security by the existence of control and therefore do not effectively internalize or respond to the risk.

There is some experimental evidence to suggest that principals may choose to rely on control systems despite knowledge of potentially negative consequences. For example, after detecting the dysfunctional effect of control in their primary experiment, Fehr and Rockenbach (2003) conduct a follow-up study in which a new set of principals

is informed of the results of the primary experiment. The authors find that many principals choose to impose control despite knowing that controls were harmful in previous experimental sessions. The authors attribute principals' controlling behavior to their desire to punish deviant agents.

However, in practice, principals might impose dysfunctional controls for a variety of other reasons. For example, principals might not recognize the potentially negative behavioral impact of formal controls. Alternatively, principals might recognize the potentially harmful nature of formal controls, but prefer to have them in place to mitigate the most opportunistic actions of agents. In my experiments, I examine principals' propensity to impose a control, but design the control mechanism such that it cannot be used as a punishment mechanism by principals. Therefore, I am able to rule out the punishment explanation advanced by Fehr and Rockenbach (2003), focusing instead on principals' beliefs about the effectiveness of the control system and their expectations of agents' behavior.

3.1.1 The Extrinsic Incentives Bias

Although principals might recognize the potentially negative influence of formal control on agents' behavior, they are likely to weigh that potential cost against the potential benefits of the control. While this analysis may be formal, such as a formal risk assessment process in an organization, or informal, based on the principals' judgment, the principals' beliefs about the opportunistic tendencies of agents are likely to be important factors for consideration. Recent psychology research finds that individuals often overestimate others' opportunistic tendencies, heightening their perception of this

risk and leading to unnecessary control implementation. Heath (1999) finds that individuals have biased expectations about the effects of extrinsic incentives on others' behavior. In a series of psychology based experiments, Heath (1999) asks individuals to rate the importance of extrinsic incentives (e.g., money, job security, etc.) to other people as compared to themselves. Individuals routinely overestimate the importance of these incentives to other people, while suggesting that they, themselves, are less motivated by extrinsic incentives. Therefore, individuals appear to generalize others as being primarily extrinsically motivated, despite believing that they, themselves, are more intrinsically motivated.

Heath (1999) implies that this *extrinsic incentives bias* can hinder organizational formation by leading principals to offer inappropriate contracts to agents. An additional consequence of this bias, which has not previously been examined in the literature, is that it will lead principals to over-estimate the riskiness of interactions with agents causing them to implement control systems that can prove detrimental to the relationship between principals and agents, ultimately resulting in foregone profits.

Extant research on risk perception finds that individuals do not exclusively engage in formal, methodical risk analysis processes focused on probabilistic factors, but instead incorporate behavioral factors such as experience, feelings, and knowledge to form a more *subjective* perception of risk (Koonce et al. 2005; Slovic 1987; Slovic et al. 2004; Slovic et al. 1983, 2000; Slovic et al. 1982). Specifically, Slovic and colleagues have developed an extensive portfolio of work examining how individuals perceive risk (Slovic 2000). One important finding has been that two behavioral factors in particular,

dread and *unknown*, overwhelmingly influence individuals' perception of and response to risk. Dread encompasses the extent to which individuals fear or worry about the negative outcome of a risk. The "unknown" factor describes the extent to which a risk is unobservable, new or mysterious. While both of these factors influence individuals' perceptions of risk, the dread factor has been shown to be most closely aligned with risk perceptions and attitudes. Furthermore, the dread factor has been found to be positively associated with individuals' desire to reduce risk, such as by using formal control mechanisms or regulations (Slovic 1987).

Recent research in accounting finds these behavioral risk factors can also be important aspects of risk assessment processes in business settings. Specifically, Koonce et al. (2005) finds that investors incorporate both behavioral and probabilistic factors when assessing the risk of financial instruments. Their findings imply that even in organizations, where management performs formal risk assessment processes and control evaluations, subjective factors are likely to play an important role in developing risk responses and designing control systems. Formal hypotheses in chapter 4 stem from the reasoning that extrinsic incentives bias is a subjective factor that can exacerbate the perceived riskiness of the principal/ agent interaction. Furthermore, this bias is likely to increase the propensity of principals to choose to impose a formal control mechanism to mitigate agents' opportunistic actions.

3.2 Principals' risk-taking with control

Importantly, observing principals' propensity to control does not provide sufficient insight into their beliefs about control effectiveness. As previously described,

principals might recognize the potentially harmful nature of formal controls but choose to implement them anyway due to their beliefs about agents' opportunistic tendencies. In this case, it is unlikely that principals would take unwarranted risk when formal controls are imposed. Instead, principals would be likely to reduce their risk-taking in the presence of controls. On the contrary, it is also possible that principals *will* be lulled into a false sense of security when controls are imposed, unwittingly taking greater risk that result in lost profitability.

To further understand principals' abilities to anticipate the effects of formal control and their beliefs about control effectiveness, it is, necessary to examine principals' actions when controls are in place. In the following sections, I provide competing theories to describe whether and how principals anticipate the effects that formal controls have on agents. I first look to social projection theory (Robbins and Krueger 2005) to describe how principals predict agents' aversion to being controlled.

3.2.1 Social Projection Theory

Social psychologists have developed a large literature examining how individuals make judgments about the beliefs, thoughts and feelings of others (Heider 1958; Kelley 1967; Robbins and Krueger 2005). Individuals rely upon several cognitive mechanisms to understand the motivations of others – most notably, projection and stereotyping (Ames 2004a, 2004b).

Social projection theory describes individuals' tendencies to project their own beliefs, thoughts and feelings onto others. In short, individuals tend to expect others to be similar to themselves, leading people to anchor on their own beliefs when predicting what

others will do (Robbins and Krueger 2005). While imperfect, social projection provides a simple heuristic for anticipating others' behavior that often yields relatively accurate predictions (Krueger 1998, 2000).

When principals are considering the level of resources to entrust to agents when a control system is in place, social projection theory predicts that they will first imagine how they, personally, would respond to the implementation of the control system. Furthermore, principals are likely to consider their response to both the existence of the control and its intentionality. If principals believe that they, personally, would be offended by the implementation of the control system and would be less generous because of it, they are likely to project this belief onto agents and engage in less risk-taking when the control is imposed than when it is not. Additionally, if principals further recognize that a control intentionally imposed would be more offensive than a control imposed by an exogenous source they are likely to refine their risk-taking behavior accordingly. Thus, principals are likely to take more risk with a control imposed by an exogenous source than one they impose themselves.

Importantly, recent research finds that individuals can use both stereotyping and projection simultaneously when anticipating others' behaviors (Ames 2004a, 2004b). Therefore, it is possible that principals may engage in both processes when trying to predict how agents will behave. Specifically, principals who exhibit the extrinsic incentives bias (Heath 1999), stereotyping agents as opportunistic, are likely to impose control. However, if principals simultaneously project their own beliefs about the

offensive nature of intentional controls, they would likely take minimal risk when they have chosen to impose the control.

3.2.2 Illusions of control and risk-taking

In contrast to the theory presented in the previous section, it is also possible that principals will *not* recognize the potentially harmful effects of formal control systems. Extant research suggests that individuals have preconceived notions or intuitive theories about what control is and how it will affect a risky situation (Abramson and Alloy 1980). People use a variety of invalid heuristics that can lead to erroneous judgments about control (Alloy and Abramson 1979). These beliefs about the effects of control are likely to lead a principal to believe a series of contingencies, including that if s/he has control, good outcomes will occur more frequently.

Research on perceived control finds that it results in a variety of psychological and cognitive effects, including increased confidence and reduced anxiety (Langer 1975). However, in general this literature has examined individuals' irrational beliefs that they personally control a chance event, such as the outcome of a dice roll or a coin flip. To my knowledge no studies have examined whether individuals also overestimate the effectiveness of an outside control mechanism and whether it leads to similar biased beliefs about residual risk.

A significant body of research on the need for control suggests that perceived control increases individuals' confidence in the likelihood of a successful outcome (Langer 1975; Langer 1977, 1983; Langer and Roth 1975). Confidence focuses an individual's attention towards the potential positive outcomes of a situation, rather than

downside risk. Thus, confident individuals look for the opportunities in a situation (Lopes 1987), and are unlikely to sufficiently internalize the threats or risks that exist (Haleblian et al. 2004). Further, confident individuals believe they will achieve their goals and are more apt to believe that they have the ability to control their environment (Klein and Kunda 1994). In addition, Miyake and Matsuda (2002) find that confident individuals are more likely to commit and pursue specific courses of action despite initial setbacks. In summary, this research finds that controls make a decision maker more confident in either his own abilities or the likelihood of a positive outcome. Thus, s/he will overlook the residual riskiness of the situation, taking on unwarranted risk. Further, this confidence and commitment to a course of action can persist despite evidence to the contrary. In general, the illusion of control literature indicates that a principal will be more risk-seeking when a control is imposed than when there is no control because s/he will not sufficiently internalize the remaining risk.

The illusion of control literature also provides a basis for understanding the effects of control intentionality on principals' risk-taking. Specifically, this literature indicates that principals will be more likely to rely on a control system that they have chosen than one that has been imposed exogenously. Langer (1975) finds that participants who choose their own lottery tickets require greater compensation to exchange the tickets than participants who were not permitted to choose, indicating that the participants who choose have more confidence in the likelihood that they possess winning tickets. Thompson et al. (1998) suggest that choice itself differentiates the *illusion of control* from simple optimism. If participants in these studies were not able to

choose the lottery numbers, they would not have an inflated expectation that they possessed winning numbers. Thus, these authors suggest that it is the *choice* that drives the resulting over-confidence.

An alternative description of the role of choice in the illusion of control is advanced by Van den Steen (2004). The author develops a theoretical model whereby individuals, who are presented with a variety of choices, will overestimate the probability of success of some of the available options, while underestimating the probability of success of others. However, when selecting between available options, individuals are more likely to select the options for which they overestimate the likelihood of success. Thus, individuals are more likely to be overly-optimistic about the likelihood of success of the actions they choose to undertake, relative to impartial observers. Extended to the current setting, when a principal chooses to implement a control system, he is more likely to be confident that it will sufficiently mitigate risk than will an independent observer. If so, principals will be *less* likely to exhibit unwarranted risk-taking when the control system has been implemented by an outside source.

Drawing from social projection theory and the illusion of control literature, this chapter has advanced competing theories describing how principals could adjust their risk-taking behavior in the presence of a control system and how the intentionality of control influences risk-taking. In the following chapter, I integrate these theories to state formal hypotheses regarding principals' propensity to impose formal controls and principals' risk-taking in the presence of a formal control designed to eliminate agents' opportunistic actions.

Chapter 4: Hypotheses Development

4.1 The Effect of Intentions on Agents' Behavior

4.1.1 Known Intentions and Agent Behavior

As described in chapter 2, individuals are not wholly self-interested, motivated instead by a variety of social norms. However, prior research finds that formal controls can crowd out these social preferences and weaken agents' intrinsic motivation to exert effort that would benefit their employer. Specifically, prior research suggests that control sends a signal of distrust to agents, resulting in reciprocal feelings of distrust toward principals and diminished effort (Christ et al. 2006; Falk and Kosfeld 2006; Fehr and Rockenbach 2003; Tenbrunsel and Messick 1999). This research hinges on agents' perception of the principals' intentions signaled by their choice to impose control. Consequently, controls are less likely to have negative behavioral effects if they are imposed by an exogenous source or if the source is unclear to the agent cannot be clearly perceived as an intentional signal of distrust.

Recent research has investigated the role of intentions in driving agents' negative response to control (Falk and Kosfeld 2006; Houser et al. 2007). Falk and Kosfeld (2006) (hereafter FK) compare agents' responses to endogenously and exogenously imposed control. They find evidence consistent with the notion that agents respond negatively to the intentions communicated by an endogenously imposed control. Specifically, agents return more resources to principals when a control is imposed exogenously by an outside source, rather than endogenously by the principal. However, in organizations the intentionality of control implementation is not always common

knowledge, such that FK's examination does not provide a complete picture of the effects of intentionality.

4.1.2 Ambiguous Intentions and Agent Behavior

An important dimension of the effect of intentions that has not been previously explored in the literature is agent uncertainty regarding the principal's intentions. In practice, it is not always possible for agents to determine the source or impetus of a control. For example, when evaluating internal control systems for Sarbanes-Oxley compliance, a manager may implement a new internal control. In this case, employees are often unable to determine conclusively whether the control signals the principal's dissatisfaction with current performance or if the control is simply needed to ensure regulatory compliance. In such cases, employees must make attributions regarding the intentionality of the control that are likely to influence their responses to it.

Attribution theory describes how individuals make causal attributions when faced with uncertainty. When considering the implementation of a control system with uncertain intentionality, attribution theory suggests that agents are more likely to attribute it to the principal rather than an exogenous source (Gilbert and Malone 1995; Ross 1977). Specifically, experimental research finds that individuals generally over-emphasize the role of others' personal characteristics and underestimate the effect of situational factors. This tendency is commonly known as the correspondence bias or fundamental attribution error (Green et al. 1985). Thus, when faced with uncertainty, agents prone to this bias would likely attribute the control to the principals' choice to implement it, rather than to extenuating circumstances, such as a regulatory requirement.

While attribution theory provides a basis for predicting how agents will attribute the implementation of a control system, it does not fully explain how these agents will respond to the control imposed by an unknown source. If agents believe the control is intentional, their behavior should mirror that of the endogenous control condition. That is, agents are likely to respond negatively to control and reduce their effort level as a punishment to the principal. However, there is some experimental evidence suggesting that agents will not respond as negatively to a control imposed by an ambiguous source. Cox and Deck (2006) examine participants' behavior in a trust game setting which incorporates an exogenous probability that the trustors' transfer to the trustee will be changed by a computer (i.e., a tremble). Therefore, when the trustee receives the transfer from the trustor it is unclear whether or not the trustee chose to divide the endowment equitably. Contrary to economic predictions, the authors find that many trustors attribute inequities to the tremble and therefore return a much larger percentage of the proceeds to the trustor than they would if low transfer had been unambiguously intentional.

Cox and Deck's (2006) experimental results are consistent with the discounting principal of attribution theory, which suggests that the "role of a given cause in producing a given effect is discounted if other plausible causes are also present" (Kelley 1972). Thus, trustees discount the extent to which they believe trustors choose the unfair distribution and are hesitant to punish them, transferring more resources to the trustors than they would if they knew the trustors selected the unfair distribution of the endowment.

The discounting principal of attribution theory suggests that agents could be hesitant to punish principals when the source of the control is unclear. Because there is more than one plausible source of control, agents will not be able to fully attribute it to either of those sources. Therefore, agents are likely to exert more effort (or transfer more resources to principals) when a control is imposed by an unknown source than when it is unambiguously imposed by the principal.

However, this principle also suggests that agents will not fully attribute the control to the exogenous source either. Instead, agents will likely exert less effort (or transfer fewer resources) in the unknown condition than when the control is unambiguously imposed exogenously. Therefore, I predict that agents' reaction to a control will vary along a continuum, with an endogenously imposed control yielding the lowest effort, followed by somewhat improved effort when the source is unknown, and highest effort when the control is known to be exogenously imposed. Hypothesis 1 is formally stated below and illustrated in Figure 2:

> H1: Agent effort will be influenced by the intentionality of control, such that effort will be lowest when control is endogenously imposed, followed by control imposed by an unknown source, and highest when control is imposed by an exogenous source.

Prior research finds that individuals respond more strongly to negative intentions than positive intentions (Offerman 2002). Therefore, I do not expect intentionality to affect agent effort when a control is not imposed. That is, I expect that agents will exert the same level of effort when they are not controlled regardless of whether the decision to

not control has been made endogenously by the principal or exogenously by the computer.

4.2 Principals' Propensity to Control

When interacting with other, presumably self-interested, individuals, the most salient risk is that they will behave opportunistically. However, recent psychology research suggests that individuals overestimate others' opportunistic tendencies, heightening perceived risk and leading to unnecessary control implementation. Heath (1999) suggests that individuals have biased expectations about the significance of extrinsic incentives to other people. In a series of experiments, in which individuals rate the importance of extrinsic incentives (e.g., money, success, etc.) to others, individuals routinely overestimate the importance of these incentives. Moreover, individuals hold these biased beliefs about others despite recognizing that they, themselves, are not focused on extrinsic incentives. I expect that principals' tendency to overestimate the effect of incentives on agents will heighten the perceived riskiness of the interaction and, therefore, will induce principals to impose control formal controls.

However, I also expect that the principals' risk perception and propensity to impose control will be influenced by their level of trust in their agents. Trust, often defined as, "an individual's behavioral reliance on another person" (Currall and Judge 1995, p. 151), has been shown to be an important determinant in ones' perception of the riskiness of an interaction with that person (Das and Teng 2004; Das and Teng 1998, 2001a). A high level of trust can lessen one's concerns about another individuals' opportunistic behavior and can reduce the perceived riskiness of the situation. However,

when trust is absent, principals are likely to rely on control mechanisms to reduce the riskiness of the interaction (Das and Teng 2001a). Some scholars have even gone so far as to suggest that trust and control are substitutes (Aulakh et al. 1997; Das and Teng 1998; Leifer and Mills 1996; Madhok 1995; Ring and Van de Ven 1994; Sitkin and Roth 1993; Zaheer et al. 1998).

Trust between participants can arise for a variety of reasons, most notably repeated, positive interactions (Kramer, 1999). In the experiments employed in this dissertation, principals and agents do not know with whom they are paired in each round, and therefore it is impossible to form trust based on history or repeated interaction. However, despite the anonymity, it is possible for principals to feel trust for the agents because trust can be based on the social category or role of other person (Brewer 1981; Kramer 1999; Orbell et al. 1994). Therefore, if participants believe other students (social category) or participants acting as agents (role) to be trustworthy in general, then they are likely to have a higher level of trust in an individual that fits in that social category or role.

Figure 3 describes the expected relationship between principals' beliefs about agents' incentives and their propensity to impose control, including the mediating roles of trust and risk. As shown in Figure 3, I expect that principals' beliefs about agents' incentives will be positively related to their decision to impose a control via their effect on the perceived riskiness of the interaction with the agent. That is, principals who believe that agents are primarily motivated by extrinsic incentives will perceive the interaction to be riskier than principals who do not exhibit this bias. I further expect that

this relationship will be mediated by the extent to which principals trust the agents. Specifically, I expect that these beliefs will be negatively related to principals' trust in agents and low levels of trust will increase the perceived riskiness of the interaction. Finally, perceived riskiness will be positively associated with the extent to which the principals impose the control.

Principals who impose the control will be able to mitigate their downside risk, but doing so likely sacrifice the upside potential of the interaction. That is, while the control system might effectively eliminate agents' most opportunistic behavior, it is likely to crowd out agents' intrinsic motivation to exert high levels of effort. Thus, agents who would have exerted high levels of effort without control may reduce their effort level when the control is imposed, resulting in lower profit for the principals. With experience and feedback, principals have to opportunity to recognize the harmful effects of control, affording an opportunity to modify their reliance on it so that they can capitalize on agents' intrinsic motivations.

However, principals who exhibit the extrinsic incentives bias are likely to impose control, despite feedback suggesting that the control yields low agent effort. In addition to fearing agents' most opportunistic actions in the absence of control, it is likely that principals will expect that the control will be effective. Extant research suggests that individuals have intuitive theories about how control will affect a situation (Abramson and Alloy 1980). Individuals use a variety of heuristics that can lead to erroneous expectations about control, including that if one has control, good outcomes will occur (Abramson and Alloy 1980). Thus, H2 below predicts that principals will continue to

impose control overtime, despite receiving evidence to suggest that it yields low returns. My second hypothesis follows, below:

> H2: Principals will continue to impose the control, despite feedback that the control yields low effort from the agent, due to their beliefs about agents' opportunistic tendencies.

4.3 Effects of Reciprocity, Intentions and Control on Agent Effort

In practice, agents do not respond to control implementation by itself, but instead respond simultaneously to a combination of signals provided by principals – including some that may appear to be inconsistent. For example, in a decentralized organization, managers empower employees to make decisions, while at the same time implementing review procedures to provide assurance that decisions meet company standards (Chenhall 2003). These employees receive both a trusting signal (increased responsibility) and a distrusting signal (control implementation) from their employers. The important question is which signal will most strongly motivate employees.

The theory of reciprocity suggests that individuals repay kind acts with kindness and harmful acts with retribution (Falk and Fischbacher 2006). Consistent with this theory, in gift-exchange games, high wages offered by principals are typically repaid by high agent effort (Fehr et al. 1993). However, negative acts are also repaid in kind. When agents receive conflicting trust signals from principals, such as high wages coupled with an intrusive control, they must make tradeoffs between rewarding the trusting action and retaliating against the control.

Recently, several studies have investigated the interactive effects of control and reciprocity using gift exchange (Falk and Kosfeld 2006; Fehr and Gächter 2001) and trust games (Fehr and Rockenbach 2003; Houser et al. 2007). In general, these studies find

that even with a control, agents still show a preference for reciprocity and reward higher wages by exerting greater effort. Nonetheless, the implementation of a control system has been shown to depress agents' effort, such that agent effort is lower when a control is imposed, despite high wages. Therefore, it appears that controls can still have harmful effects on agent effort despite agents' preferences for reciprocity.

Hypothesis 1 predicts that agents' behavior will be influenced by principals' intentions. However, it is unclear whether the effects of intentionality will be the same when agents react to control coupled with the transfer of resources from the principal (e.g., a wage). Only one prior study, Houser et al. (2007), examines the effects of control intentionality in a setting in which principals entrust resources to the agent, manipulating whether controls are always chosen or always random. In their study, agents do *not* respond to the intentionality of control and perform similarly regardless of whether the control is imposed by the principal or by an exogenous source. In Houser et al. (2007), principals transfer resources (which are multiplied by the experimenter) to agents and indicate a desired back-transfer amount, which is the amount of resources they want agents to return. A control, penalizing the agent if they do not return the desired back-transfer amount, can be implemented. However, compliance with the control is optional. Agents can disobey the request and accept the penalty. The authors find that agents' returns are sensitive to the strength of the control (which varies based upon desired back-transfer amount), but not to the intentionality.

In the current study, I hold the strength of control constant, so that I can examine the interaction of reciprocity and control intentionality more precisely. Therefore, I

expect agents will respond to the intentionality of the control in the same manner as described in H1. I predict that agents' reaction to a control will vary along the same continuum (i.e., as depicted in Figure 2), with the lowest effort occurring under endogenous control, followed by control from an unknown source and the highest effort under exogenous control.

4.4 Effects of Reciprocity, Intentions and Control on Principals' Risk-taking

4.4.1 Effects of Control on Principals' Risk-taking Behavior

As previously described, individuals have preconceived notions about how controls will affect the riskiness of their actions (Abramson and Alloy 1980). Research on perceived control finds that it has a variety of psychological effects, including increased confidence and reduced anxiety (Langer 1975). Specifically, perceived control increases individuals' willingness to take risk (Hammond and Horswill 2002) and confidence in the likelihood of success (Langer 1975). The increased confidence focuses attention towards potential positive outcomes for the situation, and away from inherent riskiness (Lopes 1987). Thus, confident individuals look for the opportunities in situations (Lopes 1987), insufficiently internalizing the risks (Haleblian et al. 2004). In summary, this research suggests that controls are likely to make principals more confident that they will be successful, making it more likely that they will overlook the riskiness of the situation. Therefore, an incomplete control could entice principals to take unwarranted risk.

Importantly, however, prior research on the illusion of control focuses on external risks, and does not examine individuals' behavior when the risk is strategic in nature, arising from interactions with self-interested others. Thus, it is possible that when faced

with strategic risk, principals will not be more risk-seeking when a control is imposed. Instead, principals' propensity to control, predicted in H2, might be driven primarily by their trepidation regarding the riskiness of the interaction with (presumably) self-interested agents rather than signifying that they believe the control will induce agents to put forth high effort.

Specifically, while principals might prefer to have a control in place to protect their downside risk, that agents will exert no effort, they might recognize the potential consequences of the control. Social projection theory suggests that individuals expect others to be similar to themselves, leading people to anchor on their own beliefs when predicting what others will do (Robbins and Krueger 2005). If principals believe that they, personally, would respond negatively to the control, they will likely project this expectation onto the agents. Thus, principals could be less risk-seeking when a control is imposed than when there is no control.

It is unclear *ex ante* whether principals will take more risk when a control is imposed, as suggested by theories of illusion of control and overconfidence, or will take less risk when a control is imposed because they recognize that they, personally, would contribute fewer points if a control were imposed. Accordingly, I present H3 as a two-tailed hypothesis of a difference, which could arise in either direction depending upon which effect is stronger (see Figure 4).

H3: Principals' risk-taking behavior when a control is imposed will differ from principals' risk-taking behavior when a control is not imposed.

4.1.2 The Effect of Intentions on Principals' Risk-taking Behavior

Principals might also be influenced by the intentionality (or source) of control, such that their risk-taking behavior may vary depending upon the source. Houser et al. (2007) examines the effects of the intentionality of a control while allowing principals to take risk by entrusting resources to agents. However, Houser et al. (2007) do not inform principals that a control might be imposed in the exogenous condition. The authors indicate that they do not want the knowledge of a control to influence principals' decisions. However, in practice, principals *do* have the ability to moderate their behavior based on the existence of control. In experiment 2, I incorporate principals' ability to anticipate agents' responses to control implementation so that I can examine the effect of intentionality on the behavior of *both* the principal and the agent.

If the mere existence of a control induces risk-taking by the principal, as described in the previous section, these results should be robust to both endogenously and exogenously imposed control. However, it is possible that *choosing* to impose the control increases the likelihood that principals will rely on it. In her examination of the illusion of control, Langer (1975) finds that participants who choose their own lottery tickets have more confidence in the likelihood that they possess winning tickets than those who do not choose the numbers.

Alternatively, principals could recognize that agents are likely to react negatively to the intentions signaled by an endogenously imposed control, rather than the control itself. Thus, principals could transfer *more* points when the control is imposed exogenously. If principals believe that they, personally, would be insulted by an endogenous control, then social projection theory (Robbins and Krueger 2005) predicts

that they will project this expectation on agents. Consequently, principals might take less risk when they have imposed the control compared to when it is exogenously imposed because they anticipate agents' spitefulness.

Principals' behavior could also be differentially affected when the source of the control is unknown to the agent. As noted, it is unclear whether principals will invest more or fewer resources when they have imposed the control themselves. If, as suggested by social projection theory, principals recognize that agents might be more offended by an endogenous control than an exogenous control, principals might try to capitalize on the uncertainty and transfer more resources when the source of control is unknown than when it is unambiguously imposed endogenously. In this case, principals might expect to hide behind the ambiguity of the control source and deflect the blame and negative reciprocity that can accompany endogenous control.

Alternatively, if principals are more confident in a control that they impose than in one implemented exogenously, as suggested by the illusion of control literature, it is likely they will transfer fewer resources, on average, in the uncertain condition than in the endogenous condition. As it is unclear *ex ante* how principals will anticipate the effects of control intentionality on agents' behavior, I provide a two-tailed hypothesis (see Figure 5):

> H4: When a control is imposed, principals' risk-taking behavior will differ depending on the intentionality of the control.

Hypotheses 3 and 4 are two-tailed hypotheses describing the possible effects of control systems and control intentionality on principals' risk-taking behavior. Both hypotheses are developed comparing the social projection theory to the illusion of control

theory. Figures 4 and 5 provide a graphical comparison of each of the competing predictions.

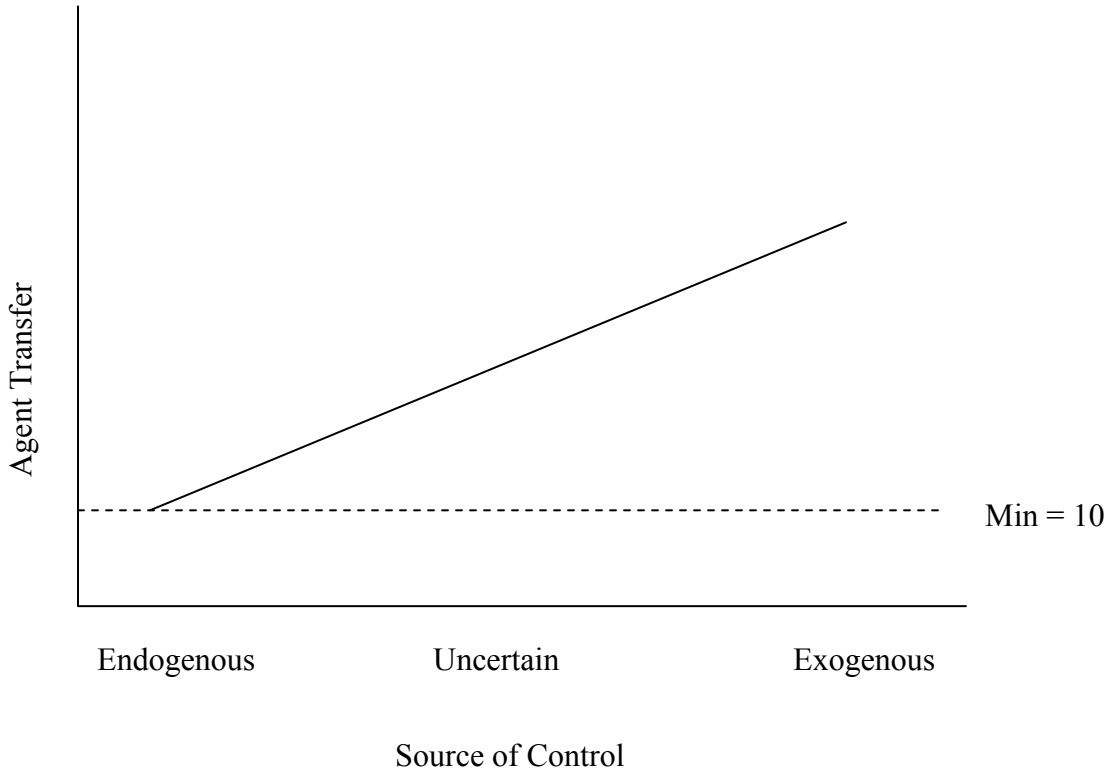
To understand the effects of control intentionality on the behavior of both principals and agents I design three interactive experiments, as described in the following chapters. In the first experiment, I focus only on the effects of control and the principals' intentions as perceived by the agent. This experiment employs a simple design that does not allow principals to entrust any resources to the agents. That is, principals do not engage in any risk-taking behavior.

After I establish the effects of control intentionality on agents' behavior in experiment 1, I conduct a second experiment which employs a richer setting – allowing principals to entrust resources to agents. In this setting, I am able to explore principals' risk-taking behavior in the presence of a control, as well as agents' reactions to both control intentionality and the principals' trusting behavior. By introducing principals' ability to entrust resources to agents, I am able to examine whether the effects of intentionality observed in experiment 1 persist when agents' concerns for reciprocity are relevant. Thus, I investigate when and if the perceived intentionality of a control crowds out agents' preferences to reward trusting actions by the principal. More importantly, experiment 2 also allows me to observe principals' risk-taking behavior under the various control intentionality conditions. Therefore, I am able to determine whether principals are lulled into complacency and take unwarranted risk when a control is imposed, or choose to control to eliminate agents' most opportunistic tendencies while recognizing the potentially negative consequences that might occur.

Finally, in experiment 3, I again explore the interactions among intentions, control and reciprocity, but do so in a setting in which principals and agents do not engage in repeated play. This design allows me to collect data regarding participants' beliefs, risk assessments and motivations for their behavior. Experiment 3 provides further insights into the cognitive processes that direct the actions of principals and agents.

The following chapter describes the research design employed in experiment 1 and describes the results of that experiment. Experiments 2 and 3 are then described in chapters 6 and 7, respectively.

Figure 2
The Predicted Effect of Intentionality of Control Implementation on Agent Effort



H1 predicts that when a control is imposed, agent effort will vary along a continuum with the lowest performance when controls are endogenously imposed, followed by controls imposed by an uncertain source and the highest performance when controls are imposed exogenously. The same pattern of performance is predicted for experiment 1 and experiment 2. When there is no control imposed, I do not expect agent effort to vary based upon intentionality. Agent effort is defined as the number of points agents transfer to principals.

Control intentionality is varied using three control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Figure 3
Proposed Model for Principals' Propensity to Control

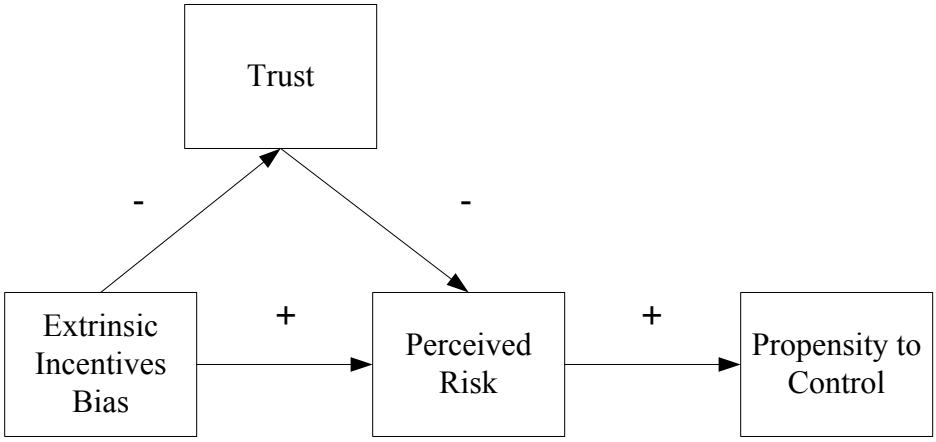
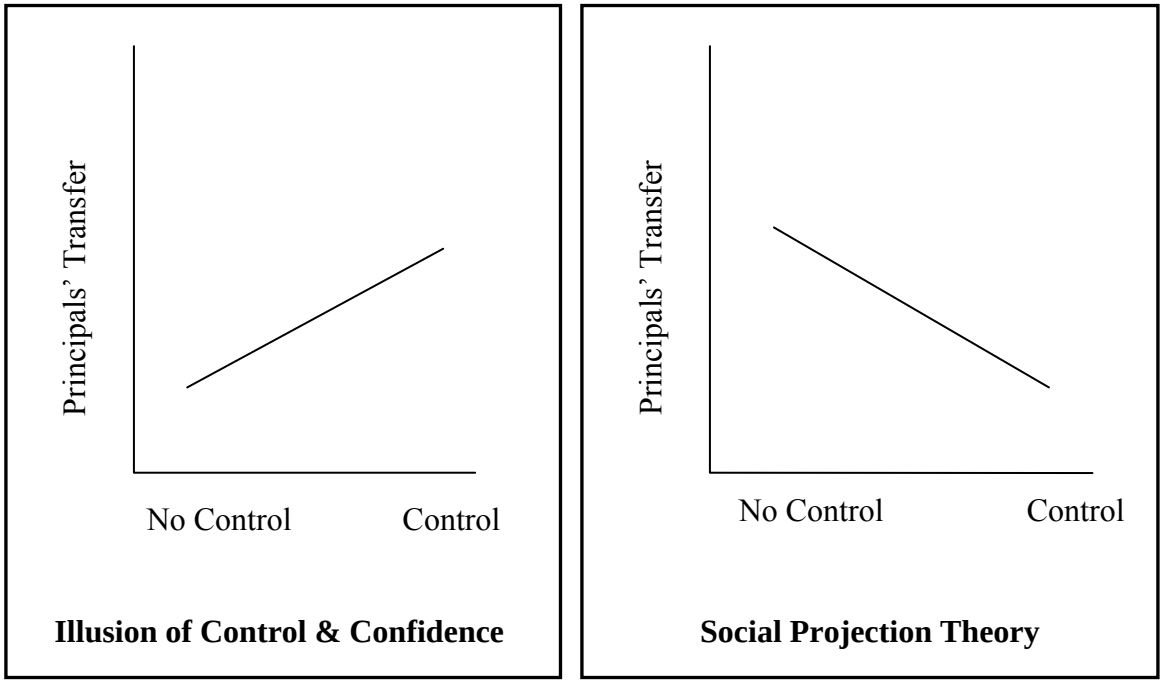


Figure 3 provides a model by which principals' beliefs about agents' opportunistic tendencies will influence principals' decision to impose control. Specifically, I expect that the extent to which principals exhibit the extrinsic incentives bias (i.e., believe agents are wholly self-interested) will increase the perceived riskiness of the interaction with the agent. Further, I expect that this relationship will be mediated by the principals' trust in the agents. Finally I expect that the perceived riskiness of the interaction will increase the likelihood that principals will impose a control system that may have a negative effect on agents' effort level.

Figure 4
Predictions Regarding Principals' Risk-taking Behavior in the Presence of a Formal Control

H3: Principals' risk-taking behavior when a control is imposed will differ from principals' risk-taking behavior when a control is not imposed.

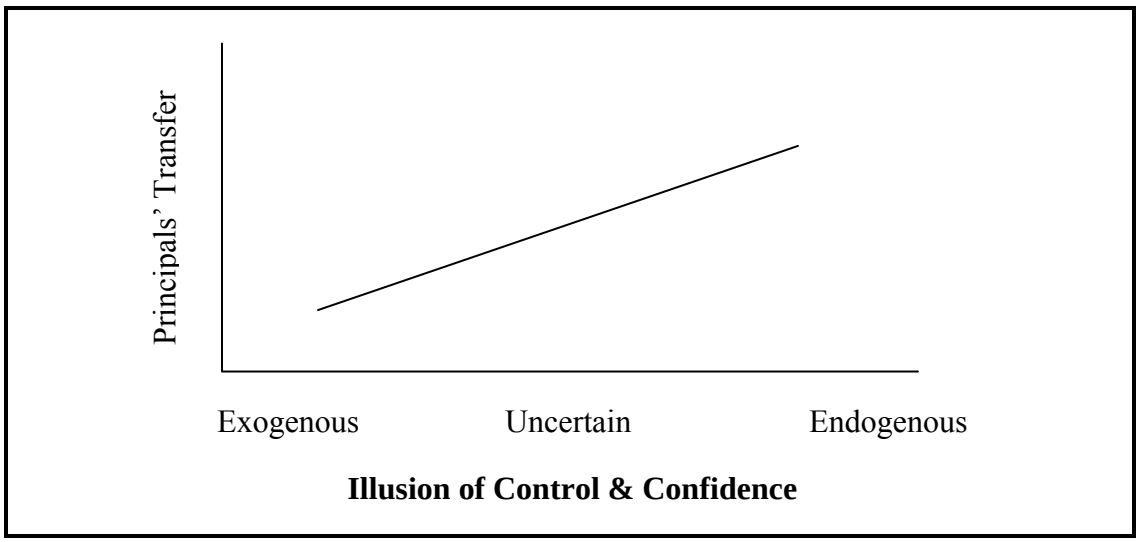


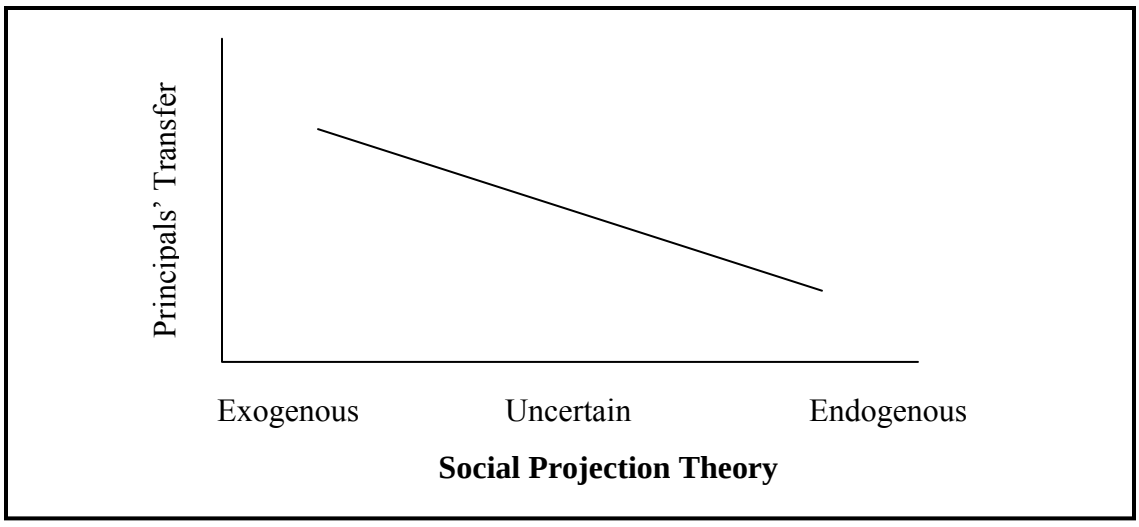
H3 predicts that principals' risk-taking behavior will differ when a control is in place, as compared to when there is no control. Illusion of Control and Social Projection Theories provide competing predictions for principals' behavior. Principal risk-taking is measured as the amount of points principals transfer to agents during each experimental period (of experiment 2).

Figure 5

Predictions Regarding Principals' Risk-taking Behavior Based upon the Intentionality of Control

H4: Principals' risk-taking behavior when control is imposed will differ depending upon the intentionality of the control.





H4 predicts that principals' risk-taking behavior will differ based upon the intentionality of the control system. Illusion of Control and Social Projection Theories provide competing predictions for principals' behavior. Principal risk-taking is measured as the amount of points principals transfer to agents during each experimental period (of experiment 2).

Chapter 5: Experiment 1 - Intentions and Control

The objective of experiment 1 is to determine how control intentionality affects agent effort and influences principals' decision to impose control. Therefore, experiment 1 provides a direct test of H1 and H2 only.

5.1 Experimental Design

As an initial examination of the effects of intentionality on agents' effort and principals' decision to control, I use a 3 X 2 X 2 experimental design and vary the source of control implementation (endogenous, exogenous, or unknown) between subjects. I vary the existence of control (yes or no) and feedback (yes or no) within subjects. Experiment 1 uses a structure similar to the main experiment described in Falk and Kosfeld (2006) (hereafter FK), but differs from their study by incorporating repeated play and a condition in which the control is imposed by an unknown source. I conduct the study using z-Tree software (Fischbacher 2007).

I recruit 108 participants from graduate and undergraduate accounting classes to take part in this study. Participants are randomly assigned to the role of either principal or agent. To ensure that labels do not unnecessarily affect participant behavior, throughout the experiment, principal and agent participants are referred to as Participant B and Participant A, respectively. Principal and agents interact for twenty periods and are randomly and anonymously re-paired with a participant of the opposite type at the beginning of each period. Although during the course of the experiment principal and agent pairings are repeated, participants have no way of knowing with whom they are paired during any particular period. Therefore, there is no ability to form reputations with other participants, such that each period simulates an independent one-shot experiment.

In this experiment, agents begin each round with an endowment that represents the total effort that they may exert. The agents' task is to determine how much of this endowment they would like to designate for work, which creates profit for the principal but at a direct cost for the agent, and how much they would like to keep for themselves. However, a control system that sets a minimum required level of effort can be imposed (see Figure 1 for illustration).

Specifically, at the start of each period, agents are endowed with 120 points and principals are endowed with zero points. Agents can transfer any number of their points (x), including zero points, to principals. However, before agents make their transfer, a control, which requires agents to transfer a minimum of 10 points to principals, can be implemented. Thus, if the control is in place, an agent is permitted to transfer between 10 – 120 points to the principal. All points transferred from the agent to the principal are doubled, such that each transferred point reduces the agent's income by one point and increases the principal's income by two points. Principal and agent payoffs for each period are calculated as follows:

$$\prod_{\text{principal}} = 2x; \text{ and}$$
$$\prod_{\text{agent}} = 120 - x$$

Economic theory would predict that agents are wholly self-interested and only have utility for wealth. Therefore, if left uncontrolled, agents would transfer 0 points to the principal, resulting in agent profit of 120 points and principal profit of 0. Economic theory would also predict that it is in the principal's best interest to impose the control system because the control requires the agent to transfer 10 points. Thus, when controlled, agents would transfer exactly 10 points, resulting in agent profit of 110 points

and principal profit of 20 points, which makes the principal better off. However, as described in the previous chapters, psychology provides a basis for predicting that agents' transfers will deviate from the economic predictions based upon the perceived intentionality of the control system.

To examine the effect of intentionality on agents' transfer, I vary the source of control implementation at three levels: endogenous, exogenous and uncertain. In the endogenous control condition, the principal has complete discretion over whether or not to impose the minimum transfer requirement, and the agent is aware of the principal's authority. In the exogenous control condition, all participants are aware that the control is imposed randomly by the computer, and the principal has no authority. Finally, in the uncertain condition, there is a 50% chance that the principal is able to impose the control and a 50% chance that it is imposed randomly by the computer. Importantly, in the uncertain condition, agents do not know whether or not they are interacting with a principal who has the authority to impose a control.

In the uncertain condition, the computer randomly determines whether each principal (or the computer) will make the control decision before the experiment begins. Once this is established, the principal (or computer) determines whether or not a control is imposed at the start of each period. This allows me to compare principals' behavior in this condition when the control is either endogenously or exogenously assigned for the entire session. An alternative design choice would randomly reassign the principals the ability to make the control decision for each period. However, in experiment 2, I would not be able to compare principals' transfer decisions under exogenous and endogenous

treatments within the uncertain condition. Therefore, my design choice in experiment 1 is consistent with experiment 2.

As described above, I do not directly manipulate the principals' intentions. Instead, I manipulate control intentionality by varying the source of control. When a control is endogenously imposed, agents should recognize that the control is intentional, perceiving it to be a negative signal from principals; however, when the same control is imposed exogenously, the agent has no cause to perceive it as a negative signal from the principal because the principal was not involved with the control decision. Thus, while I do not manipulate intentions directly, I am able to influence agents' *beliefs* about the principals' intentions by varying the source of control. Importantly, it is the agents' beliefs about control intentionality that are expected to influence their response to the control.

During each experimental session, principal and agent participants interact for ten periods without feedback. Beginning with the eleventh period, each participant receives a report indicating the number of points earned during that period. Participants receive this report for each of the subsequent periods. In practice, feedback is often delayed and individuals must continue to make decisions without that information. Therefore, this aspect of the experiment does not detract from institutional realism.[2]

[2] Because feedback provides participants with the opportunity to learn, the feedback periods must always follow the no feedback periods. As a result, any differences in behavior between the feedback and no feedback rounds may be due to the feedback, and/or learning that has taken place. However, I am not interested in the effects of feedback itself, but rather want to examine the robustness of the results in situations where feedback does not exist and learning is minimal to that when feedback is abundant and learning takes place. Therefore, similar results in both situations indicate that my results are not due to the feedback, or lack thereof.

After period 20, participants complete a post experimental questionnaire. For principals, the questionnaire elicits responses regarding their decision to control (if applicable) and their beliefs about agents' incentives. The agents' questionnaire addresses the factors influencing their transfer decisions, their feelings about the principals and, in the uncertain condition, their attributions of the source of control.

Participants earn points each period, which are converted to U.S. dollars at a rate of $0.01 per point. At the end of the experiment, participants receive their cash payment plus a $5.00 show-up fee. The average payment for agents and principals is $24.56 and $13.50, respectively.

In this study, the control mechanism is a behavioral control that provides a lower boundary on the number of points an agent can share with the principal. If implemented, this control eliminates the most extreme form of opportunistic behavior- that of keeping the entire endowment. However, it is clear that this control sets a very low threshold, requiring only that the agent transfers more than 10 points. To be sure, a control system requiring that the agent transfer 50%, or even all, of his points, would be more effective for the principal. Nonetheless, as previously described, organizations often implement weak or incomplete control systems that cannot necessarily guarantee the highest level of effort by the employee, but are effective in eliminating the most egregious forms of opportunistic behavior.

The control system in this experiment provides such a low requirement that, on the surface, it seems unlikely that it would be offensive to the agent. By design, the agent should not perceive the control, itself, to be unfair, as he might if he were required to

transfer a larger portion of his wealth to the principal. Therefore, if, as predicted, agents respond negatively to this seemingly innocuous control, it will be clear that the agent is not responding to the control operationalization, but rather to the principals' intentions that the agent infers from the control implementation.

5.2 Experiment 1 – Results

5.2.1 Agents' Effort

Consistent with prior economics experiments (Falk and Kosfeld 2006; Fischbacher et al. 2001), I utilize the "strategy method" to elicit agent transfers with and without control. The strategy method requires that agents indicate the amount they wish to transfer to the principal if a minimum transfer of 10 points is required and if no minimum is imposed. Falk and Kosfeld (2006) conduct an analysis to ensure that results are not driven by the strategy method. They compare the results of their primary experiment to a condition where agents respond only to the principal's control decision. Results are similar in both conditions. Therefore, the strategy method is an acceptable experimental tool. The earnings for both participants depend upon whether the minimum is imposed during the period or not. The benefit of the strategy method is that it allows me to compare agent effort under both conditions.

Figure 6 illustrates the effects of control intentionality on agent transfers, and consequently, principal profit. Consistent with H1, when control is imposed, agents transfer the fewest points in the endogenous condition, followed by the uncertain condition, and the most in the exogenous condition. I use the Jonckheere – Terpstra test for ordered differences to confirm that this ordering is significant (untabulated, $Z = 3.55$, $p < .01$) (Siegel and Castellan Jr. 1988).

Figure 6 depicts the effect of control intentionality on agents' preferences for generosity and cooperation. Specifically, when a control is imposed by an exogenous source, and therefore cannot be considered as an intentional signal of distrust, agents respond quite well to the control – even exerting more effort with the control system than without it. However, as soon as the agent can begin to perceive the control as an intentional signal of distrust (in the uncertain condition), effort drops significantly. Further, when the control is clearly an intentional, negative signal from the principal, agents' effort diminishes further. Moreover, when the control is clearly intentional, agents exert less effort than they would if no control had been imposed.

Table 1, Panel A provides descriptive statistics, averaged across periods, which provide further evidence that the effect of control implementation on agent transfers and consequently, on principals' profits, depend on the source of the control.[3] Specifically, Table 1 indicates that when control is imposed in the endogenous condition, agents transfer significantly fewer points to principals than if there were no control. Therefore, in the endogenous condition, principals earn less profit when they choose to impose a control than when they refrain from controlling. However, in the uncertain and exogenous conditions, average agent transfers are higher when the control is in place, indicating that in these conditions, there is a benefit to the principal if control is imposed.

In Table 1, Panel B, I provide the results of planned contrasts between the amount transferred by the agent in the control and no control conditions. T-tests reveal that the

[3] Note that in experiment 1, the number of points an agent transfers, agent profit and principal profit are isomorphic. That is, agent profit decreases and principal profit increases in direct relation to an increase in agent transfer.

differences are marginally significant in the endogenous condition (*t=-1.41, p=.08)* and significant in the exogenous condition (*t=2.34, p=.01*), but that transfers do not differ significantly regardless of whether or not a control is imposed in the uncertain condition (*t=1.13, p=.13).*

Importantly, the influence of control on agent effort is not fleeting. Figure 7 illustrates that in the endogenous condition agents transfer more points when there is no control throughout the experiment. Similarly, in the exogenous condition, control consistently yields higher agent transfers than no control.

To further examine the effects of intentionality and control on principal profits I perform analysis of variance (Table 2). Examination of the omnibus ANOVA reveals that when a control is imposed there is a statistically significant main effect of control source condition on the principal profit (*F=3.09, p =.02)*, as well as a significant interactive effect of control implementation and control source condition (*F=4.16, p = .01)*. There is no main effect of control implementation, but given the significant interaction, further analysis of the simple effects of control by control source condition provides important insights. While control results in a significant effect in the endogenous and exogenous conditions (*F = 6.51, p =.01, and F=4.33, p =.03,* respectively*)*, the difference is not significant in the uncertain condition (*F=0.35, p=.28)*. That is, principal profit does not vary significantly depending on whether or not a control is imposed when the agent is uncertain who imposed it.

Examining the uncertain condition in more detail, note that although participants are informed that in this condition there is a 50% chance that individual principals have

the authority to impose the control, this does not necessarily mean that 50% of all controls are imposed by principals. For example, if all principals choose to impose control in every period, then 75% of all periods would be controlled (assuming that the computer randomly imposes the control 50% of the time when the principal is not authorized).

In a post experimental questionnaire, agents respond to questions regarding their beliefs about the source of the control when it was and was not imposed.[4] Agents' responses indicate that agents believe that imposition of the control is more likely to be intentional by the principal ($M = 5.43$). Further, when there was no control imposed, agents believe it is more likely to have been determined by the computer ($M = 4.17$). T-test results (untabulated) indicate that the difference is marginally significant ($t = 1.95$, $p = .06$). Additionally, examining whether agents' attribution of the control system influences their beliefs about principals' intentions, I find that agents who believe the control is more likely imposed by the principal feel less trusted than do agents who believe the control is more likely imposed by the computer (untabulated, $F=2.08$, $p = .08$).

To gain further insights into the beliefs and motivations that influence agents' transfer decisions when the control is and is not imposed, I perform additional analysis

[4] To measure agents' attributions of control in the uncertain condition, agents answer the following questions using an 11 point Likert scale: "When you were forced to transfer at least 10 points to participant B, how likely do you believe it was that the minimum transfer was forced by Participant B rather than the computer?" and "When you were free to transfer any number of points to participant B, how likely do you believe it was that Participant B chose not to force the minimum transfer rather than the computer?" The end points of the scale indicate agreement that Participant B (the computer) definitely imposed (chose not to impose) the minimum transfer requirement. The mid-point indicates that it was equally likely that the control was imposed by either Participant B or the computer.

using information collected from agents in the post experimental questionnaire. I employ structural equation modeling, using AMOS, to investigate the effects of the control source conditions on several factors that could influence agents' transfer decisions. Specifically, I test the assumptions that agents' transfers are driven by the extent to which they feel trusted by the principal. Further, I examine whether agents purposefully reward principals when the control is not imposed or punish principals when the control is in place. I also examine a potential alternative explanation for agents' low transfers when a control is imposed – the possibility that agents believe the principals only expect them to transfer 10 points, and therefore are acting in line with the principals' expectations.

Figure 8 presents the results of the structural-equations analysis describing agents' behavior when the control is imposed. I first conduct a test of the goodness of fit. The Tucker-Lewis Index, a measure of the proportion of improvement of the fit of the model over a null model, is 112 percent, which is well above the generally accepted cutoff value of 90 percent (Kline 1998, p. 131). I confirm the model's goodness of fit with a conventional χ^2 test ($\chi^2 = 2.38$, $p = 0.50$) and an Incremental Fit Index (102 percent). Thus, the overall model describes the relationships in the data well.

The coefficient on the variables associated with *Link 1* indicates that the source of control has a significant effect on the extent to which agents feel trusted by principals (as described using the Force-Trust Factor). I calculate a Force-Trust Factor for each agent based upon their responses to four related questions in the post experimental questionnaire regarding their perceptions of principals' beliefs about their

trustworthiness, generosity, and fairness, as well as principals' level of trust.[5] I perform a factor analysis on these four questions (untabulated), which reveals that these questions describe a single underlying factor. I interpret this factor as the extent to which an agent feels trusted by the principal. Using the Jonckheere-Terpstra Test for ordered differences (untabulated), I confirm that agents' feel least trusted when a control is implemented in the endogenous control condition, followed by the uncertain condition. Agents feel the most trusted in the exogenous control condition ($Z = 1.33, p < .01$).

In this model, I also examine two other factors that potentially influence agents' generosity to principals. *Link 2* examines the relationship between the control source and agents' desire to (intentionally) punish the principal when the control is imposed. *Link 3* examines whether the source of control effects agents' beliefs about principals' expectations. The coefficients on *Links 2* and *3* are not significant, indicating that the source of control does not differentially affect the extent to which agents tried to punish principals for the control system or the agents' beliefs about the number of points principals expected them to transfer. Accordingly, when a control is imposed, only agents' perceptions of being trusted by the principal appear to be differentially influenced by the source of the control.

[5] Using 11 point Likert scales, agent participants answered the following four questions: (1) When you were forced to transfer at least 10 points, to what extent did you feel like Participant B trusted you; (2) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a generous person; (3) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you would be a fair person; (4) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you were trustworthy?

I turn next to the relationships between agents' beliefs and motivations and the number of points agents transfer to principals. The coefficient on *Link 4* is positive and significant. Consistent with expectations, this indicates that the number of points agents transfer is positively associated with the extent to which they feel trusted. Further, *Link 5* shows a significant negative relationship between the extent to which agents tried to punish the principal and the amount transferred. I do not find a significant relationship for the link between agents' beliefs about principals' expectations and the amount transferred (*Link 6*).

Some prior research suggests that boundary controls, such as the one used in this experiment, provide a signal to the agent that the principal has low expectations (Falk and Kosfeld 2006). In experiment 1 the minimum transfer requirement could signal that principals only want or expect agents to transfer 10 points. However, the results of this analysis suggest that any such perceptions do not influence agents' transfer decisions. Rather, agents determine the number of points to transfer based on the extent to which they feel trusted and their desire to punish the principal for imposing the control system.

Figure 9 presents the results of a structural equation analysis of agents' transfer decisions when there was no control imposed. As with the previous model, I confirm the model's goodness of fit with a conventional χ^2 test ($\chi^2 = 4.47$, $p = 0.22$) and an Incremental Fit Index (95 percent).

The coefficient on *Link 1* indicates that the source of control condition does influence the extent to which agents perceive they are trusted by principals, as described by the Free-Trust Factor, which is calculated using factor analysis in the same manner the

Force- Trust Factor has developed. Further, the control source condition has a significant effect on the extent to which agents try to reward principals for *not* imposing the control system. However, the model shows that when not controlled, agents' transfer is only influenced by the agents' perception of trust (*Link 4, $t=2.37$, $p<.05$*). These results again suggest that agents are influenced mainly by their beliefs about principals' trust, and not by their inferences of principals' expectations.

5.2.2 Principals' Controlling Behavior

Examination of the principals in the endogenous condition, and those in the uncertain condition who are permitted to choose whether or not to control indicates that principals control approximately 50 percent of the time (see Table 3) and all principals impose the control to some extent ($\geq$15%). Further, consistent with H2, the propensity to control persists throughout the feedback periods when principals learn that control yields a minimal return. As shown in Table 3, the frequency of control does not vary between the no feedback and feedback periods ($\chi^2=1.21$, $p=.27$). These findings indicate that principals continue to impose the control about half of the time, despite evidence that it results in low payoffs. Further, additional analysis indicates that within the feedback periods, principals impose control to the same extent in the first 5 periods (11 – 15) and the last 5 periods (16 – 20), indicating that principals do not change their controlling behavior after receiving feedback that control yields low agent transfers.

However, the feedback mechanism used in this experiment (and in experiment 2) reports only the points earned during the prior period. The mechanism does not inform principals of the number of points they would have earned had they made a different control decision. Therefore, I cannot conclude that principals ignore information

indicating that higher earnings would be available if they were to make different choices. It is possible that feedback indicating that agents have transferred the minimum allowable points when the control is imposed is consistent with the principals' concerns that agents are opportunistic.

To examine principals' beliefs that influence their propensity to control, I test the model developed in Chapter 4, relating principals' extrinsic incentives bias to their controlling behavior. I perform a structural-equations analysis using AMOS (see Figure 10). I confirm the model's goodness of fit with a conventional χ^2 test ($\chi^2 = 4.83$, $p = 0.184$) and Incremental Fit Index (.957), which indicate that the overall model describes the relationships in the data well (Byrne 2001).

The focus of this analysis is principals' propensity to control. As such, the dependent variable is the percentage of periods in which each principal *chooses* to impose the minimum transfer requirement. Therefore, only principals in the endogenous condition and those in the unknown condition who are randomly assigned at the beginning of the experiment to be able to impose the control themselves are included in this analysis.

To examine the effect of principals' beliefs about agents' incentives, I elicit principals' responses to three questions addressing their beliefs about agents' opportunistic tendencies.[6] Using factor analysis, I find that these three questions load together on one factor (Belief Factor), which describes principals' beliefs about agents'

[6] Principals answered the following three questions using an 11 point Likert scale: (1) To what extent do you believe Participant A is only interested in earning as many points as possible, no matter what; (2) To what extent did you believe that Participant A was concerned with fairness; and (3) When Participant A was not forced to transfer at least ten points, how likely did you believe it was that s/he would keep all of the points for himself/herself?

opportunistic tendencies. Using this factor, I find that principals' beliefs about agent opportunism influence the perceived riskiness of an uncontrolled interaction both directly and indirectly, via the principals' trust in the agents. Specifically, *Link 1* shows a marginally significant positive relationship between principals' beliefs about agents' incentives and the perceived riskiness of the (uncontrolled) interaction (t= 1.69, p = *.09*). *Link 2* shows a significant negative relationship between principals' beliefs about agents' opportunism and trust (t = *-3.85, p <.01*), indicating that principals' trust in agents is negatively associated with the extent to which they believe the agents are motivated primarily by extrinsic incentives. *Link 3* shows a significant, negative relationship between trust and the perceived riskiness of the uncontrolled transfer (t= *-3.17, p <.01*). Importantly, *Link 4* shows that the perceived riskiness of the uncontrolled interaction is positively and significantly related to the principals' propensity to impose control (*t=2.68, p <.05)*. Interestingly, *Link 5* indicates that there is no statistically significant relationship between principals' propensity to control and their perception of the riskiness of a *controlled* transfer (*t=.776, p=.438*), suggesting that principals' propensity to control is not driven by their beliefs about the lack of risk in the controlled transfer, but rather by concern that they will earn no points if they do not protect their downside risk.

These results, coupled with the agents' behavior, suggest that principals' desire to protect their downside risk leads them to forgo upside potential. In experiment 2, I allow principals to transfer funds to agents to further examine their beliefs about control effectiveness.

Table 1

Experiment 1: Effects of Control Implementation on Agents' Transfer & Principals' Profit

Panel A: Descriptive Statistics – Means (Std. Deviations)

	Endogenous N = 16		Uncertain N = 21		Exogenous N=17	
	No Control	Control	No Control	Control	No Control	Control
Agents' Transfer[a]						
Average	18.33	15.04	17.08	19.37	20.72	26.02
St. Dev	(4.30)	(3.29)	(3.70)	(2.83)	(3.19)	(3.18)
Principals' Profit						
Average	37.55	29.21	38.31	40.46	40.09	57.16
St. Dev	(5.05)	(4.62)	(4.19)	(3.92)	(4.71)	(4.45)

Panel B: Planned Contrasts

Comparison of Agents' Transfer with and without Control in each Control Source Condition

	T statistic	*p-value*
Endogenous	-1.41	0.08
Uncertain	1.13	0.13
Exogenous	2.34	0.01

(a) Agent responses are collected using the strategy method. For each period, agents indicate the amount to transfer as if they were required to transfer at least 10 points and if they were not held to a minimum.

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Panel A provides descriptive statistics for agents' transfer of points to the principal (Agents' Transfer) and principals' profit for experiment 1, averaged across periods. Principals' Profit is calculated as: 2 X points transferred by the agent.

Panel B reports the planned contrasts between the amounts of points agents transfer (Agents' Transfer) if a control is and is not imposed in each control source condition.

Table 2

Experiment 1: ANOVA on Profit

Panel A: Analysis of Variance of Principal Profit

Variable	*df*	*F*	*p*
Period	19	1.04	0.21
Control	1	1.29	0.24
Control Source Condition	2	3.09	0.02
Control X Control Source Condition	2	4.16	0.01

Panel B: Analysis of Variance for Principal Profit by Condition

Effect of Control under *Endogenous* Condition	1	6.51	0.01
Effect of Control under *Uncertain* Condition	1	0.35	0.28
Effect of Control under *Exogenous* Condition	1	4.33	0.03

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Principal profit is calculated as 2 X points transferred by the agent.

Panel A provides the results of the analysis of variance of the effects of control (yes/no), control source condition (endogenous/ exogenous/ uncertain) and period (1 – 20) on principal profit in experiment 1.

Panel B provides the simple effects of control on principal profit in each control source condition in experiment 1.

Table 3

Experiment 1: Descriptive Statistics for Principals' Propensity to Control

Table 3 reports the frequency with which principals in the endogenous condition and those in the uncertain condition that have the ability to impose the minimum return requirement choose to impose the minimum. Frequencies in both the first 10 periods, when no feedback is provided and the last 10 periods, when a feedback report is provided after each period, are reported.

	No Feedback	Feedback	Chi-Square
Average Percent Control [a]			
All Endogenous	136	124	0.27
	52.31%	47.69%	
Endogenous Condition	91	84	0.43
	52.00%	48.00%	
Uncertain Condition	45	40	0.43
	52.94%	47.06%	

(a) Average Percent Control is calculated as the percentage of principals who choose to implement the minimum transfer requirement in each period. Periods 1 – 10 do not include feedback; feedback is provided in periods 11 – 20.

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Figure 6
Experiment 1: Hypothesis 1 - Agents' Transfer by Control Source Condition

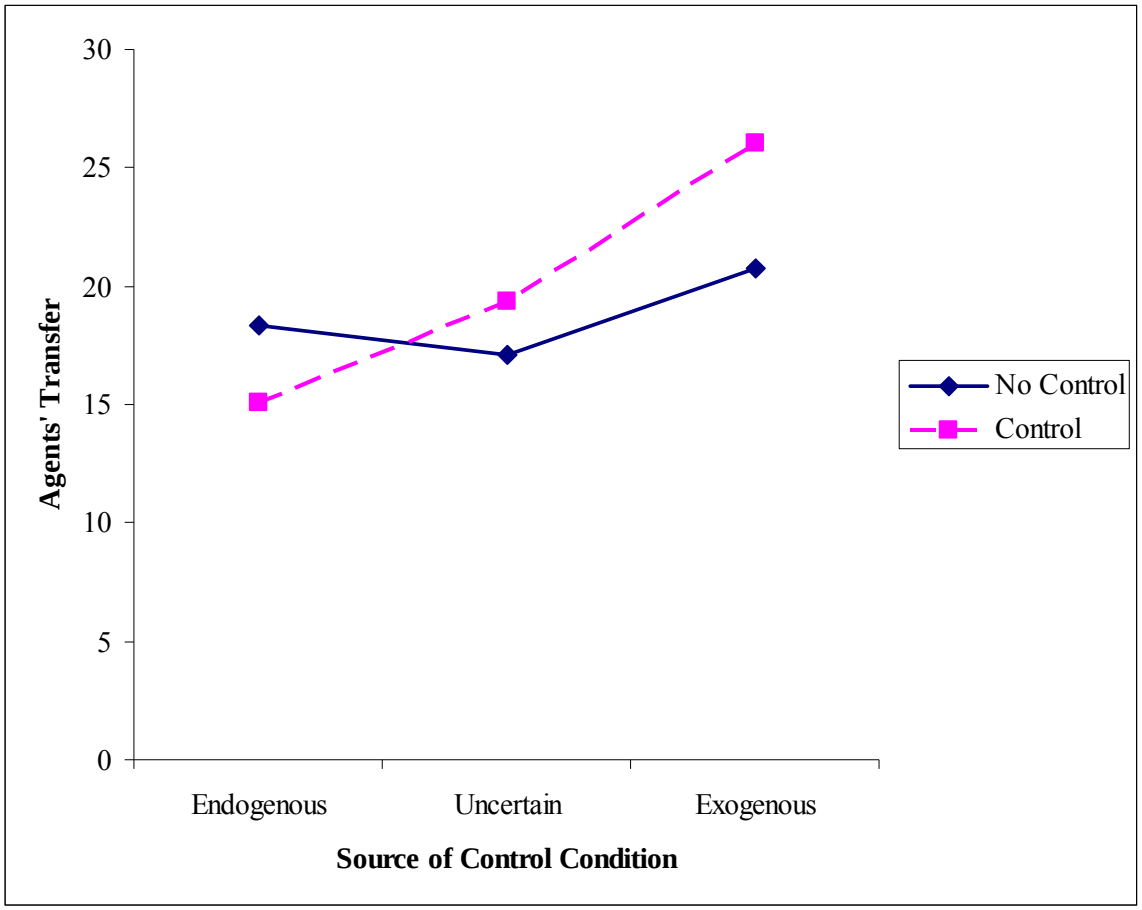
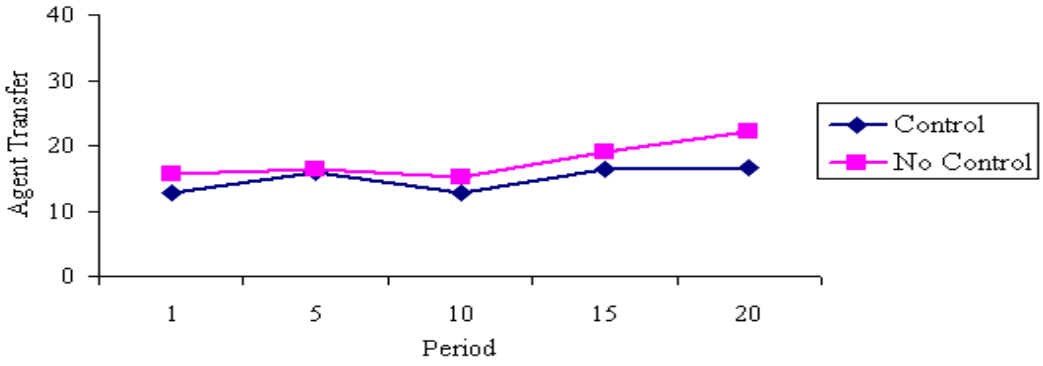


Figure 6 illustrates the effect of control on agent effort in each control source condition. Agent effort is defined as the number of points agents transfer to principals. For each condition, the average agent transfer amount, with and without control, is presented. Consistent with H1, agents' transfers (x) are presented. However, principal profit is a function of agent return ($\prod_{principal} = 2x$) and follows the same pattern as presented in Figure 6, above.

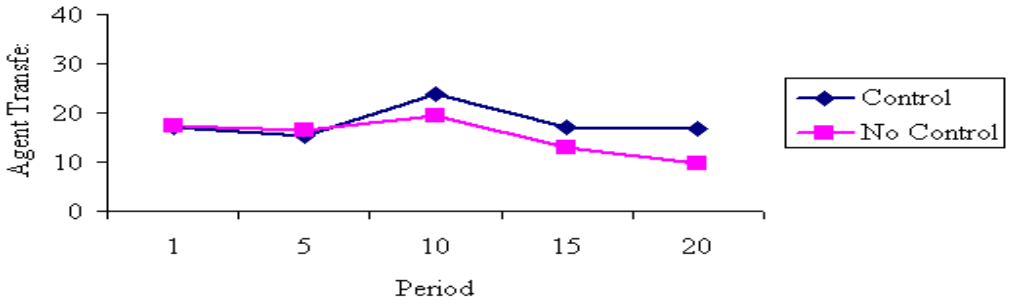
Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Figure 7
Experiment 1: Average Agent Transfer by Period

Panel A: Average Agent Transfer by Period – Endogenous Condition



Panel B: Average Agent Transfer by Period - Uncertain Condition



Panel C: Average Agent Transfer by Period -Exogenous Condition

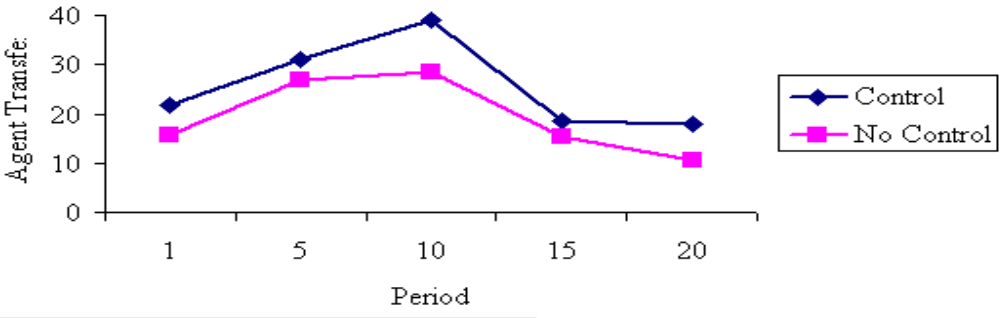


Figure 7 illustrates average Agent Transfer (points transferred from the agent to the principal) by period in each control source condition.

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Figure 8
Factors Influencing Agents' Transfer Amount when the Control is Imposed

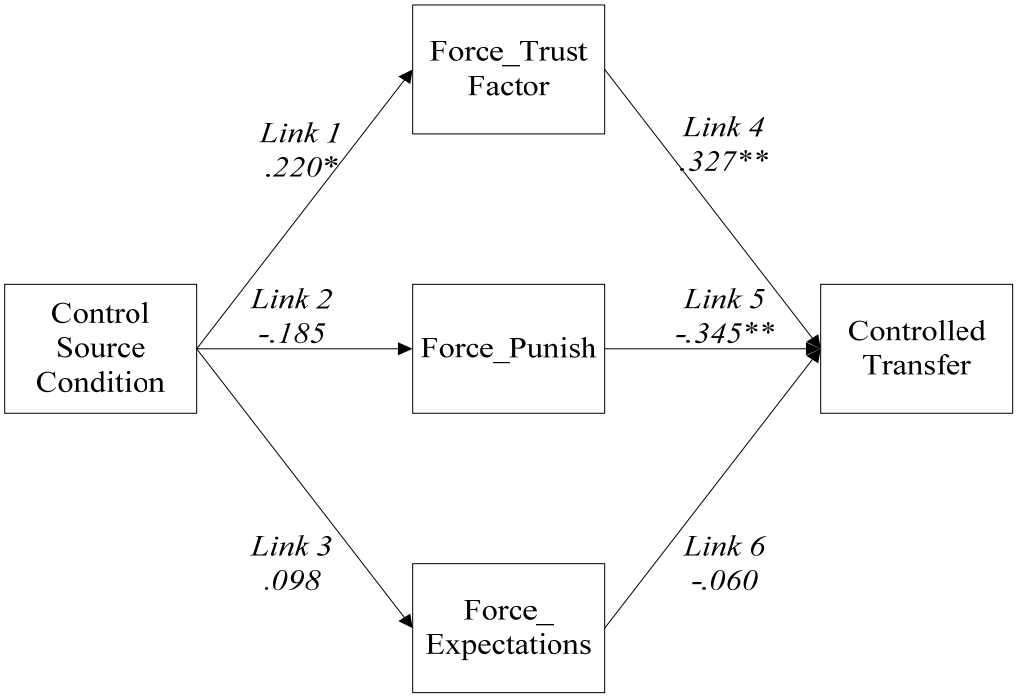


Figure 8 illustrates the results of a path analysis examining the factors that influence agents' transfer to principals when a control is imposed. The standardized path coefficients and corresponding one-tailed significance are shown next to each path. Goodness of fit is measured using the Tucker-Lewis Index (1.12) which is well above the generally accepted cutoff value of 90 percent (Kline 1998, p. 131) and confirmed with a traditional X^2 test (X^2= 2.38, p = .50) and Incremental Fit Index (1.02). ***, **, * indicates significance at the .01, .05, and .10 levels, respectively (one-tailed).

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

The Force-Trust-Factor describes the extent to which agents feel trusted when a control is imposed. I use factor analysis to create the Factor from four questions answered by agents on 11 point Likert Scales. The questions are: (1) When you were forced to transfer at least 10 points, to what extent did you feel like Participant B trusted you; (2) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a generous person; (3) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you would be a fair person; (4) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you were trustworthy?

Force_Punish describes the extent to which agents indicate they tried to punish principals when a control was imposed.
Force_Expectations describes agents' beliefs about the amount of effort principals expect agents to exert.

Controlled Return is the number of points agents indicated they wished to return if a control was imposed.

Figure 9
Factors Influencing Agents' Transfer Amount when the Control is not Imposed

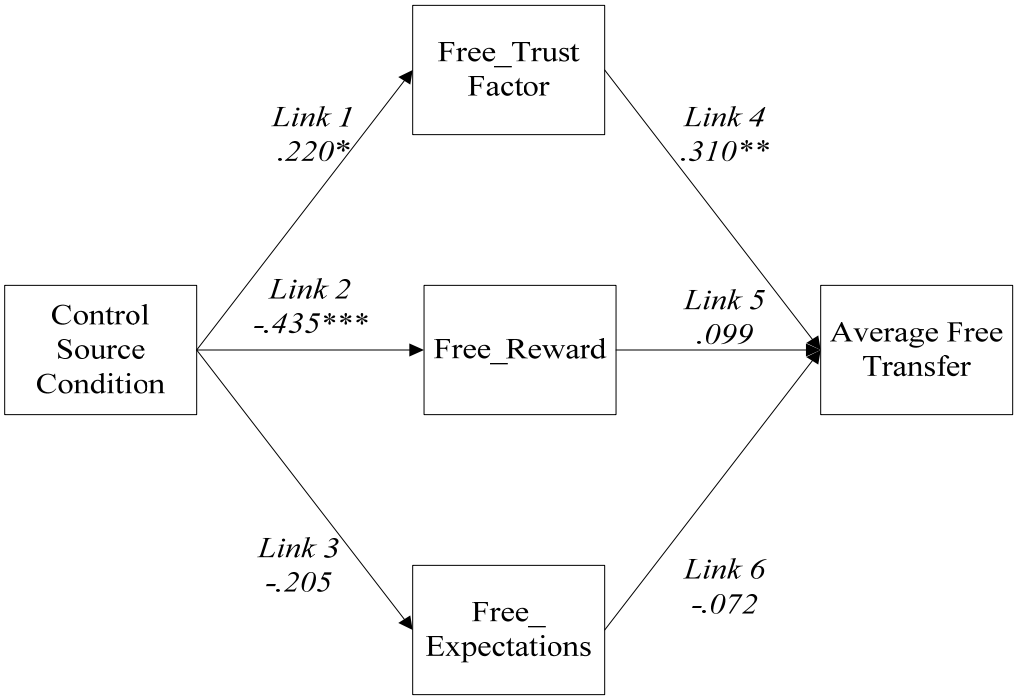


Figure 9 illustrates the results of a path analysis examining the factors that influence agents' transfer to principals when there is no control imposed. The standardized path coefficients and corresponding one-tailed significance are shown next to each path. Goodness of fit is measured using a traditional X^2 test (X^2= 4.47, p = .22) and Incremental Fit Index (.95). ***, **, * indicates significance at the .01, .05, and .10 levels, respectively (one-tailed).

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

The Free-Trust-Factor describes the extent to which agents feel trusted when a control is not imposed. I use factor analysis to create the Factor from four questions answered by agents on 11 point Likert Scales. The questions are: (1) When you were forced to transfer at least 10 points, to what extent did you feel like Participant B trusted you; (2) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a generous person; (3) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you would be a fair person; (4) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you were trustworthy?

Free_Reward describes the extent to which agent participants indicate they tried to reward principals when a control was not imposed.

Free_Expectations describes agents' beliefs about the amount of effort principals expect agents to exert.

Free Return is the raw number of points agents indicated they wished to return if a control was imposed.

Figure 10
Principals' Propensity to Control

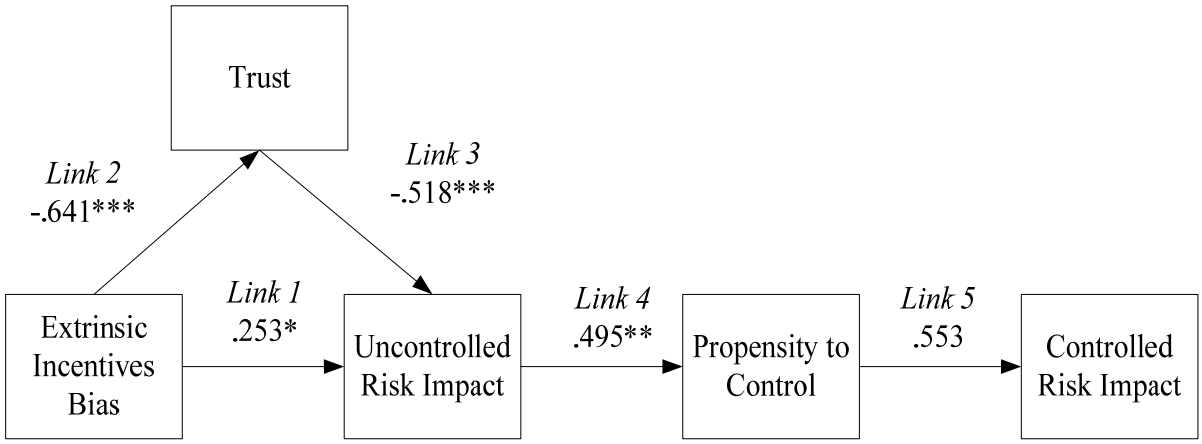


Figure 10 describes the results of the structural equation analysis of principals' propensity to impose control. Only principals in the endogenous condition and those in the uncertain condition who were permitted to choose whether or not to impose control are included in this analysis.

The standardized path coefficients and corresponding one-tailed significance are shown next to each path. Goodness of fit is measured using a traditional X^2 test (X^2= 4.83, p = .184) and Incremental Fit Index (.96). ***, **, * indicates significance at the .01, .05, and .10 levels, respectively (one-tailed).

The Extrinsic Incentive Bias factor describes principals' beliefs about agents' opportunistic tendencies. To obtain this factor I perform factor analysis on three questions related to the extrinsic incentives bias theory developed by Heath (1999). Principals answered the following three questions using an 11 point Likert scale: (1) To what extent do you believe Participant A is only interested in earning as many points as possible, no matter what; (2) To what extent did you believe that Participant A was concerned with fairness; and (3) When Participant A was not forced to transfer at least ten points, how likely did you believe it was that s/he would keep all of the points for himself/herself?

Trust describes the extent to which principals indicate they trust agents to transfer more than 10 points.

The uncontrolled risk impact is calculated as a combination of principals' beliefs regarding the likelihood that agents would transfer more than 10 points and whether agents would return more or fewer points if the control was imposed.

Propensity to control is calculated as the percentage of rounds that each principal chooses to impose control.

The controlled risk impact is calculated in the same manner as the uncontrolled risk impact, but relates to principals belief when a control was imposed.

Chapter 6: Experiment 2 - Intentions, Control and Risk-taking

Evidence from experiment 1 indicates that principals impose control approximately half of the time, despite feedback indicating that it leads to low agent transfers. However, the design of experiment 1 does not allow me to examine the extent to which principals' beliefs about control effectiveness lead them to take risk by entrusting resources to agents. In experiment 2, principals can transfer some of their endowment to agents, thereby putting their own wealth at risk.

Additionally, results from experiment 1 suggest that agents respond to principals' intentions, as signaled by the implementation of a control. While these results are consistent with the intuition provided by FK, a recent study by Houser et al. (2007), which incorporates principals' ability to entrust resources to agents, finds conflicting results. Specifically, Houser et al. (2007) find that intentions do not matter, insofar as agents in their study return similar amounts to principals regardless of whether the control is imposed endogenously or exogenously. A variety of differences exist between Houser et al. (2007) and experiment 1, including principals' ability to transfer points to agents and the type of control implemented, making them difficult to compare. In experiment 2, I seek to disentangle the effects of intentionality by incorporating principals' ability to transfer points, while utilizing the control mechanism from experiment 1 that differentially affects agent effort based upon the principals' intentions in that experiment. In addition, I investigate whether principals anticipate that agents will respond differently to control depending upon its perceived intentionality, adjusting their

risk-taking accordingly. Therefore, experiment 2 specifically addresses H3 and H4 from Chapter 4, as well as provides further tests of H1 and H2.

6.1 Experimental Design

As in experiment 1, I use a 3 X 2 X 2 design, with source of control (endogenous, exogenous, or uncertain) varied between participants and existence of control (yes or no) and feedback (yes or no) varied within subjects (see Figure 1). Participants from graduate and undergraduate accounting classes (n = 106) are randomly assigned to the role of principal or agent at the beginning of the experiment and interact via computer for 20 periods. I conduct the study using z-Tree software.

For all three control source conditions, principals are endowed with 120 points and agents are endowed with 100 points at the beginning of each period. Principals and agents are randomly and anonymously paired. Principals can transfer between 10 and 120 points to agents (in increments of 10) (y). Agents can then return any portion of the points transferred from the principal back to him/her (x). All points returned by the agent to the principal are tripled by the experimenter and agents keep any points not returned.[7] A control requiring agents to return *at least* 10 points can be imposed endogenously by the principal, exogenously by the computer, or by an unknown source (see Figure 1).

Agents have the economic incentive to keep all points transferred by the principal. If a control is imposed, the agent is required to return at least 10 points to the principal. If the control is not imposed, the agent is free to return any number of points to the

[7] The multiplier used in experiment 2 is greater than that in experiment 1 to provide a stronger incentive to the principal to transfer points to the agent and for the agent to return points.

principal, including zero. Profits for principals and agents, respectively, in each period are calculated as follows:

$$\prod_{\text{principal}} = 120 - y + 3x; \text{ and}$$
$$\prod_{\text{agent}} = 100 + y - x,$$

Analogous to experiment 1, economic theory predicts that agents, who are presumed to be wholly self-interested, will return 0 points to the principal if left uncontrolled, and 10 points if the control is imposed. Thus, if no control is imposed, principals should transfer 0 points to the agents, resulting in both participants earning only their respective endowments. Alternatively, if a control is imposed, principals should transfer only 10 points to agents, insuring themselves a profit of 140 pts (120 – 10 + 30) and the agents with their endowment. However, it is clear that both participants can be better off if principals entrust all of their resources to the agents and the agents return an equitable distribution to the principals. For example, if principals transfer their entire endowment (y =120) and agents return enough points so that both participants have the same profit for the period ($x = 55$), both participants will earn 165 points ($\prod_{\text{principal}}$: 120 – 120 + 3 X 55 = 165; $\prod_{\text{agent:}}$ 100 + 120 – 55 = 165).

As in experiment 1, participants receive no feedback during the first 10 periods. Beginning in period 11, the number of points earned is disclosed to participants at the end of each period. After the 20th period, participants complete a post-experimental questionnaire.

After the post-experimental questionnaires are complete, all participants engage in a lottery designed to elicit risk-preferences (Boylan and Sprinkle 2001). Each participant is given a set of instructions and a list of 15 lotteries, of increasing riskiness. Each lottery

offers participants the opportunity to earn $2.50 for certain, or to gamble for the chance to win $5.00. For each lottery, participants indicate whether they would prefer to take the sure thing or participate in the lottery. Once all decisions are made, a pre-numbered ball (1 – 15) is drawn to determine which of the 15 lotteries will be played. Any participant indicating a preference for the sure thing for that particular lottery is paid $2.50. Other participants' earnings are determined by the draw of a second pre-numbered ball (1 – 100). A winning draw is one where the number written on the ball corresponds to the winning probability described for the lottery. Lottery winnings are added to the total earnings for each participant.

At the end of the experiment, participants are paid for the points earned during each period, which are converted to US dollars at an exchange rate of $0.01 per point, a $5.00 show-up fee and their lottery winnings. The average payment for all participants is $31.71.

6.2 Experiment 2 Results

6.2.1 Principals' Propensity to Control and Risk-taking Behavior

An examination of principals' controlling behavior indicates that principals who are permitted to choose whether or not to control implement the control approximately 75% of the time. Recalling that principals controlled approximately 50% of the time in experiment when principals did not have the opportunity to transfer resources to their agents, it appears that the increased riskiness of experiment 2 increases principals' propensity to control. Further, as predicted in H2 and consistent with experiment 1, I find that principals impose control to the same extent with and without receiving feedback (X^2 = 0.041, p=0.84).

The primary goals of experiment 2 are to examine principals' risk-taking behavior in the presence of a control and to determine whether principals effectively anticipate the effects of control intentionality on agents' behavior. In Chapter 4, I develop several hypotheses predicting that the existence and intentionality of control would influence principals' risk-taking behavior. However, extant theories, the illusion of control theory and social projection theory, yield conflicting predictions; therefore, I provide two-tailed hypotheses (see Figures 4 and 5).

The results from experiment 2 are generally consistent with Social Projection Theory (Robbins and Krueger 2005), suggesting that principals are able to anticipate how control implementation and intentionality will influence agents' behavior. Hypothesis 3 predicts that principals will transfer different levels of points to agents when a control is in place as compared to when there is no control. Table 4, Panel C, reveals that, indeed, principals' transfer amount is influenced by the existence of control. Specifically, principals transfer fewer points (on average) when the control is imposed endogenously ($F = 39.05, p<.01$) and similar amounts regardless of the existence of control in the uncertain ($F= .75, p=.20$) and exogenous conditions ($F = .08, p =.38$). Moreover, consistent with H4, Table 4, Panel A, shows that principals anticipate that agents' reactions will vary based upon the perceived intentionality of the control. Specifically, when a control is imposed, the average principal transfer is 18.92 in the endogenous condition, 30.86 when the control source is uncertain and 24.26 when it is exogenously imposed. Planned contrasts, shown in Table 4, Panel D, indicate that the differences are all statistically significant at conventional levels. Further, a comparison of the amount

transferred in the endogenous condition compared to the other two conditions combined is also statistically significant ($F=16.98, p < .01$). Thus, it appears that principals recognize the potentially harmful nature of controls and appropriately believe that it is driven by intentionality. What is more, when they cannot be clearly blamed for imposing the control, principals appear to capitalize on this advantage by transferring more points to the agent (see Figure 11).

However, by examining principals' risk-taking behavior in the first round only, it is evident that principals do not immediately recognize how the intentionality of control systems influences agent behavior. Specifically, as shown in Table 5, principals transfer similar amounts of points both with and without control in each of the three control source conditions in the first round. None of these differences are significant at conventional levels. However, overtime, principals appear to better anticipate how agents might respond to the intentionality of the control system and adjust their transfers accordingly.

One plausible explanation for these results is that principals in the endogenous condition self-select into more or less risky decisions based on their risk preferences. That is, endogenous principals who are risk averse might be more likely to impose control and subsequently take low amounts of risk. Alternatively, risk-seeking principals would be more likely to refrain from controlling agents and take more risk by transferring larger amounts of points. To investigate this possibility, I examine the correlation between principals' risk preference and the frequency with which they impose control. Risk preference is determined by their decision in the risky lottery. Principals' risk

preferences range from 1 – 15, with 15 indicating the highest risk appetite. Control frequency is calculated as the percentage of the 20 experimental periods in which endogenous principals impose control. Correlation analysis reveals that risk preferences and control frequency are not significantly correlated (*untabulated, p=.295*). Therefore, the difference between endogenous principals' risk-taking behavior with and without control is not an artifact of principals' risk preferences.

Further examination of the endogenous principals' risk-taking behavior reveals that approximately 50% of principals (8/17) experiment by imposing control in some rounds, while refraining from controlling in other rounds. Those endogenous principals who experiment with implementing control transfer an average of 45.23 points to agents when they do not control and 23.37 points when they impose control. Paired t-tests reveal that these means are significantly different (untabulated, t=-3.295, p=*.01*).

I use regression techniques to examine the motivations that drive principals' transfer decisions, thereby examining whether principals' transfers to agents is are driven by their beliefs about the riskiness of this interaction with strategic agents and/or by their general risk preferences. I include principals' risk preferences as determined by their decision in the risky lottery in the analysis, principals' beliefs about agents' incentives (Belief Factor),[8] the control source condition, and control frequency, calculated as the

[8] To examine the effect of principals' beliefs about agents' incentives, I elicit principals' responses to three questions addressing their beliefs about agents' opportunistic tendencies. Factor analysis indicates that all three questions load on one factor, which I interpret as principals' beliefs about agents' opportunistic tendencies. Principals answered the following three questions using an 11 point Likert scale: (1) To what extent do you believe Participant A is only interested in earning as many points as possible, no matter what?; (2) To what extent did you believe that Participant A was concerned with fairness?; and (3) When Participant A was not forced to transfer at least ten points, how likely did you believe it was that s/he would keep all of the points for himself/herself?

percentage of the 20 rounds with control, in the model. I estimate the regression as follows:

$$\text{Average Transfer} = \alpha_0 + \alpha_1\text{Control Source Condition} + \alpha_2\text{Risk Preference} + \alpha_3\text{Belief Factor} + \alpha_4\text{Control Frequency} + \varepsilon$$

The results of this regression analysis, shown in Table 6, indicate that the coefficient on the Belief Factor is negative and marginally significant (*p=.06, one- tailed*) and the coefficient on risk preference is *not* significant (*p=.42, two-tailed*). These results suggest that principals' transfers are not driven by general risk preferences, but are instead specifically related to the extent to which they believe that agents are opportunistic. The analysis also reveals a negative and significant coefficient on control frequency, indicating that higher principal transfers occur when no control is imposed, consistent with evidence from Table 4.

6.2.2 Agents' Return Transfers

In experiment 2, agent returns are on average higher when the control is imposed, than when it is not imposed. As shown in Table 7, in all three source conditions, agents return significantly more points, and principals earn more profits, when the control is imposed (*p<.01* in all condition). Interestingly, however, agents' transfers vary between control source conditions. Controlled transfers are the lowest in the endogenous condition (10.93) and are significantly higher in the exogenous and uncertain conditions, (12.75 and 14.18, respectively). These results support the supposition that agents do not punish principals for imposing control in the exogenous and uncertain conditions. These results are somewhat consistent with H1, in that control imposed in the endogenous condition yields significantly lower effort than control imposed by an exogenous or

uncertain source (F=7.43, p<.01); however, contrary to predictions, agents exert more effort in the uncertain condition than when the control is imposed exogenously.

However, given that principals' transfers vary, I next examine the effects of control implementation on agent return relative to principal transfers. To this end, I divide the principal transfers into five transfer levels and examine the effects of control at each level. Transfer 1 includes only principal transfers equal to 10 points (the minimum amount permitted). Transfer 2 includes transfers of 20 – 30 points. Transfer 3 includes transfers of 40 – 60. Transfer 4 includes transfers of 70 – 90, and Transfer 5 includes all transfers above 90.

As expected, agents exhibit positive reciprocity and repay higher principal transfers with higher returns. As shown in Table 8, and illustrated in Figure 12, for all three control source conditions, agent returns increase monotonically under both control and no control conditions as principal transfers increase. However, agent transfers under control and no control conditions differ by condition at various transfer levels.

Specifically, Table 8 shows that in all three source conditions, agents transfer more points on average when a control is imposed when the transfer is between 10 and 30 points (Transfer groups 1 & 2). As transfers increase above 30 points, agents' responses to the control vary based on the perceived intentionality. Specifically, for transfers of 40 – 60 points, agents return similar amounts to principals in the endogenous condition, although there is still a benefit to control in the uncertain and exogenous conditions. Beginning with transfers greater than 60 (Transfer group 4), agents respond negatively to control in the endogenous condition. In the uncertain and exogenous conditions, control

continues to improve agent effort until the highest level of principal transfer (Transfer group 5), when agent effort is similar with and without control. The differences in agent behavior are further illustrated in Figure 12, panels A – C, which shows a negative effect of control only in the endogenous condition when principals transfer a large number of points (i.e., at least 50%). Thus, it appears that controls partially crowd out agent's preferences for positive reciprocity when the control is clearly imposed intentionally and the agent can perceive it to be a signal of distrust.

Interestingly, beginning with principal transfers of 20 points, the average agent return with control is always higher under the exogenous and uncertain conditions than in the endogenous condition. This provides further evidence that agents do not punish the principals for imposition of the control in these conditions. However, as transfers increase (above 60), I find that agents transfer more points when there is no control imposed by the principal in the endogenous control condition (as compared to when no control is imposed in the other two conditions). Thus, while principals may not be punished for the implementation of a control in the uncertain and exogenous conditions, they are also not rewarded for the decision *not* to control.

Table 4

Experiment 2: Principals' Transfer Decisions

Panel A: Descriptive Statistics - Means (Std. Deviations) for Principals' Transfer

	Total	No Control	Control
Endogenous	33.62	50.04	18.92
N=16	(20.98)	(36.79)	(15.89)
Uncertain	29.99	29.33	30.86
N=21	(28.94)	(28.20)	(29.74)
Exogenous	24.94	25.16	24.26
N=17	(26.18)	(29.31)	(23.05)

Panel B: ANOVA of Principals' Transfer by Control Source Condition

Variable	*df*	*F*	*p*
Period	19	1.19	0.13
Control	1	47.87	<.01
Control Source Condition	2	3.79	0.01
Control X Control Source Condition	2	9.46	<.01

Panel C: Planned Contrasts
Comparison of Principals' Transfer with and without Control in each Control Source Condition

	df	*F*	*p*
Endogenous	1	39.05	<.01
Uncertain	1	0.75	0.20
Exogenous	1	0.08	0.38

Panel D: Planned Contrasts
Comparison of Principals' Transfer with Control among Control Source Conditions

	df	*F*	*p*
Endogenous v. Uncertain	1	23.67	<.01
Endogenous v. Exogenous	1	4.80	0.02
Uncertain v. Exogenous	1	6.86	0.01
Endogenous v. Other Conditions	1	16.98	<.01

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Principals' Transfer is the amount of points principals transfer to agents in experiment 2.

Panel A provides descriptive statistics (means and standard deviations) for principals' transfer of points to the agents (Principals' Transfer) in each control source condition.

Panel B reports the analysis of variance reports the ANOVA results for the effects of control (yes/no), control source condition (endogenous/exogenous/uncertain) and period on the amount principals transfer.

Panel C compares the amounts principals transfer with and without control in each control source condition.

Panel D compares the amount principals transfer with control in each control source condition to the amount transferred with control in the other control source conditions.

Table 5

Panel A: Descriptive Statistics - Means (Std. Deviations) for Principals' Transfer in First Round Only

	Total	No Control	Control
Endogenous	18.82	20	18.75
N=16	(9.93)	(0.00)	(10.25)
Uncertain	25.00	23.33	25.83
N=21	(17.90)	(19.66)	(17.82)
Exogenous	25.00	18.75	30.00
N=17	(26.84)	(13.56)	(33.99)

Panel B: Planned Contrasts
Comparison of Principals' Transfer with and without Control in each Control Source Condition (First Period Only)

	Df	*F*	*p*
Endogenous	1	0.01	0.45
Uncertain	1	0.07	0.39
Exogenous	1	0.77	0.20

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Principals' Transfer is the amount of points principals transfer to agents in experiment 2.

Panel A provides descriptive statistics (means and standard deviations) for principals' transfer of points to the agents (Principals' Transfer) in each control source condition in the first period (only)

Panel B compares the amounts principals transfer with and without control in each control source condition in the first period (only).

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Table 6
Experiment 2: Factors Influencing Principals' Transfer Decision

Regression analysis examines the factors that influence the amount of resources principals transfer to agents. The dependent variable is Average Transfer for each principal. Risk Preference is determined based upon participants' decision in risky gamble conducted after the main experiment. Belief Factor calculated based on factor analysis of three questions regarding principals' beliefs about agents' interest in earning points, concerns for fairness and the likelihood agents would keep all transferred points. Control Frequency is calculated as the percentage of the 20 rounds of play that were controlled. *p values* are two-tailed unless a directional prediction is provided.

Variable	Prediction	T stat.	*p* value
Control Source Condition	?	-1.11	.27
Risk Preference	?	0.82	.42
Belief Factor	-	-1.6	.06
Control Freq	?	-2.06	.05

Table 7

Experiment 2: Agents' (Return) Transfers & Profit

Panel A: Descriptive Statistics

	Endogenous N=17		Uncertain N=18		Exogenous N=18	
	No Control	Control	No Control	Control	No Control	Control
Agents' Transfer	4.74	10.93	8.53	14.18	6.04	12.75
(St. Dev)	(9.17)	(4.80)	(14.46)	(11.78)	(12.61)	(10.14)
Agents' Profit	137.61	108.30	118.21	116.4	118.78	112.70
(St. Dev)	(24.85)	(14.71)	(22.20)	(24.98)	(23.75)	(19.97)
Principals' Profit	117.84	132.30	124.28	132.08	113.38	132.06
(St Dev)	(38.53)	(13.39)	(30.46)	(32.08)	(36.25)	(21.01)

Panel B: Analysis of Variance of Agents' Forced Transfer by Condition

Variable	*Df*	*F*	*P*
Period	19	0.64	0.44
Control Source Condition	2	13.12	<.01
Principals' Transfer	11	52.33	<.01
Control Source Condition*Transfer	20	3.57	<.01

Panel C: Analysis of Variance of Agents' Free Transfer by Condition

Variable	*df*	*F*	*P*
Period	19	0.56	0.47
Control Source Condition	2	0.63	0.27
Principals' Transfer	11	93.66	<.01
Control Source Condition*Transfer	20	2.52	<.01

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Principal profit = 120 – y + 3x; and Agent profit = 100 +y- x; where y = the number of points the principal transfers to the agent, and x = the number of points the agent returns to the principal.

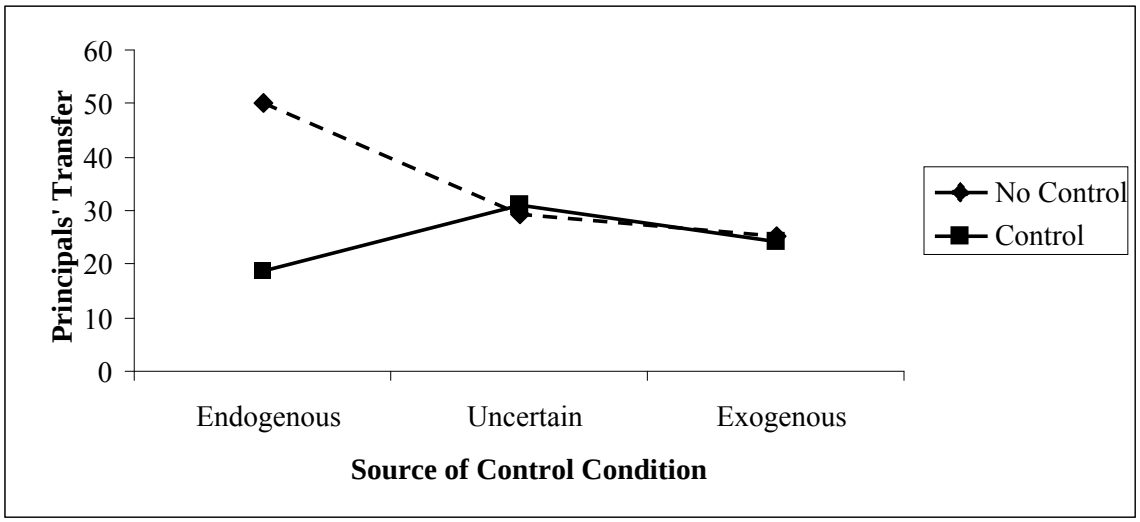
Panel A provides descriptive statistics for agents' transfer of points to the principals (Agents' Transfer) and agents' profit, and principals' profit.
Panel B provides analysis of the variance of agents' transfer of points if a minimum of 10 point transfer is required.
Panel C provides ANOVA of agents' transfer of points if a minimum of 10 point transfer is not required.

Table 8
Experiment 2: Agents' (Return) Transfer by Principal Transfer

Table 8 reports the amounts agents return to principals partitioned by the number of points principals transferred to the agents (Transfer groups). Agents' returns are reported for each condition, with and without control. Transfer groups are determined as follows: Transfer group 1 = 10 point transfer; Transfer group 2 = 20 - 30 pts, Transfer group 3 = 40 - 60 points, Transfer group 4 = 70 - 90 points, Transfer group 5 = 100 - 120 points. Associated p-values are two-tailed and indicate the differences between the controlled and uncontrolled return amounts.

	Endogenous N=17			Uncertain N=18			Exogenous N=18		
	No Control	Control	*p value*	No Control	Control	*p value*	No Control	Control	*p value*
Transfer 1	1.22	10.01	<.01	2.15	10.00	<.01	1.44	10.15	<.01
	(2.57)	(0.00)		(3.14)	(0.00)		2.40	(0.00)	
Transfer 2	5.81	10.61	<.01	6.14	11.73	<.01	5.49	10.83	<.01
	(6.00)	(2.30)		(6.63)	(4.32)		(5.82)	(3.60)	
Transfer 3	10.45	11.77	0.06	15.69	18.19	0.02	13.88	17.38	<.01
	(8.74)	(3.77)		(13.18)	(11.80)		(14.66)	(11.62)	
Transfer 4	23.60	12.94	<.01	20.24	24.29	<.01	22.29	24.52	0.01
	(22.52)	(5.77)		(20.87)	(19.16)		(21.85)	(19.67)	
Transfer 5	44.32	31.30	<.01	38.11	37.78	0.42	31.77	32.89	0.16
	(20.13)	(21.15)		(30.40)	(26.36)		(33.08)	(30.35)	

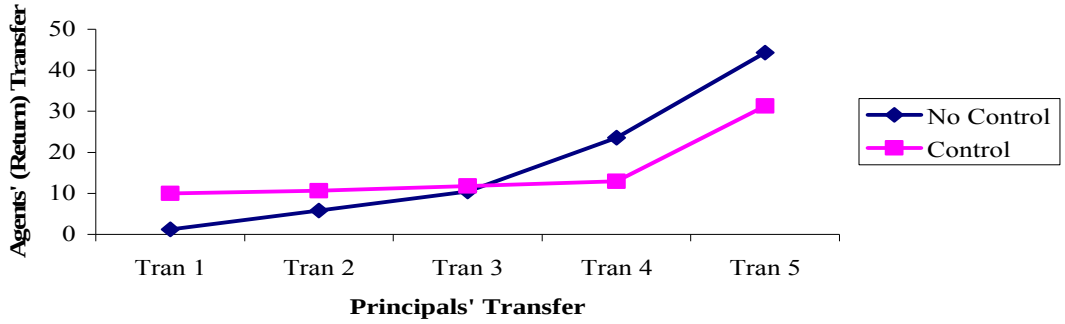
Figure 11
Experiment 2: Average Principal Transfer by Control Source Condition



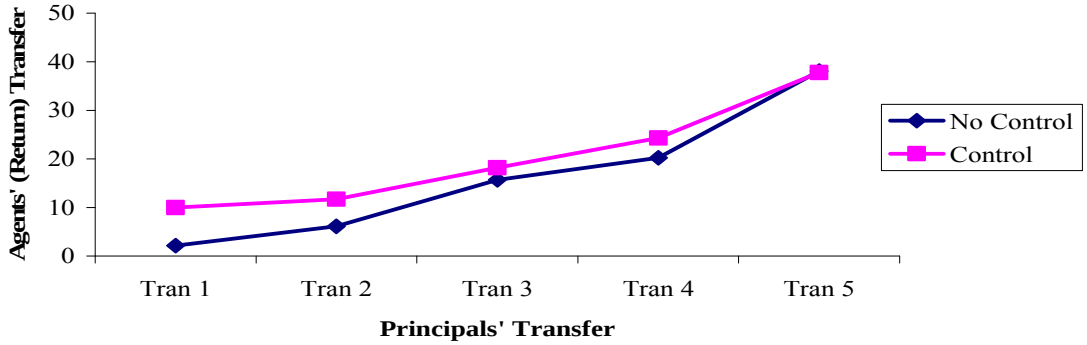
Control source conditions are defined as follows: In the Endogenous Condition principals impose the control. In the Uncertain Condition the agent does not know if the principal or computer imposed the control. In the Exogenous condition the control is imposed by the computer.

Figure 12
Experiment 2: Average Agent (Return) Transfer by Principal Transfer

Panel A: Average Agent (Return) Transfer by Principal Transfer - Endogenous Condition



Panel A: Average Agent (Return) Transfer by Principal Transfer - Uncertain Condition



Panel A: Average Agent (Return) Transfer by Principal Transfer - Exogenous Condition

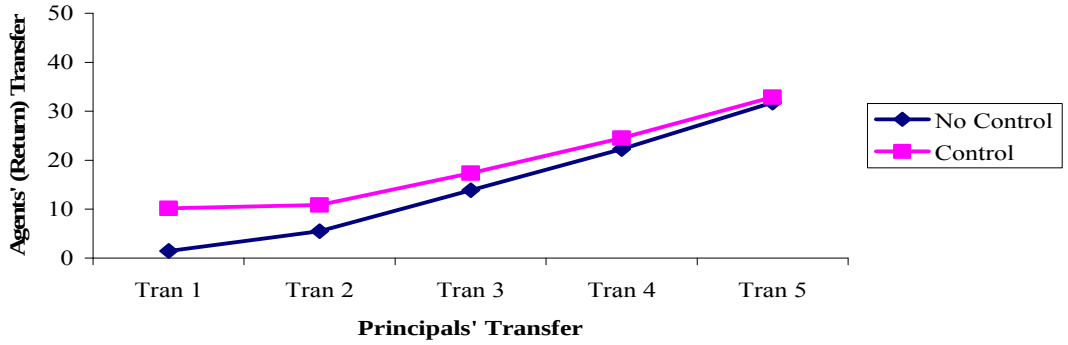


Figure 12 illustrates Agents' (Return) Transfer, the points transferred back from the agent to the principal, for each level of Principal Transfer. Principal Transfer is divided into 5 groups: Tran1 = 10 pts, Tran 2 = 20-30 pts, Tran3 = 40 – 60 pts., Tran 4 = 70 – 90 pts., Tran 5 = 100 – 120 pts.

Control source conditions are defined as follows: In the Endogenous Condition principals impose the control. In the Uncertain Condition the agent does not know if the principal or computer imposed the control. In the Exogenous condition the control is imposed by the computer.

Chapter 7: Experiment 3 - Intentions, Control and Risk-taking in a Single Period

7.1 Experiment 3 Design

The goal of experiment 3 is to provide a more careful examination of the beliefs and motivations that influence agent effort and principal risk-taking behavior in the presence of control. To this end, I conduct a two-stage game designed to replicate the interactions of experiment 2, but without providing feedback to the participants before I collect process data using psychological questionnaires. Specifically, I employ a 3 X 2 +1 experimental design with source of control (endogenous, exogenous or uncertain) and existence of control (yes or no) varied between subjects and the possibility of control (yes or no) varied within subjects.

As in experiment 2, participants are randomly assigned to the role of either principal or agent and are randomly and anonymously paired. Experiment 3 consists of two stages, in which participants interact in a trust game, similar to that employed in experiment 2 (see Figure 1). Principals, endowed with 120 points, are able to transfer a portion of their endowment (10 – 120 points) to agents and the agents can return any portion of these points back to the principal. Points returned by the agent to the principal are tripled by the experimenter. An important departure from experiment 2 is that in one stage there is no control system available to the principal. However, in the other stage a control system may be imposed endogenously by the principal, exogenously by the computer, or by an uncertain source, either the principal or the computer. This design allows me to examine principals' perception of the riskiness of the interaction when it is uncontrolled and to determine whether the implementation of the control, and its intentionality, changes principals' risk-taking behavior. Further, I am able to investigate

whether the existence of the control system in all periods in experiments 1 and 2 creates a framing effect, causing principals and agents to behave more strategically than they would if control were not introduced immediately, as suggested by Taylor and Bloomfield (2007).

Between stage one and stage two, participants complete an experimental questionnaire. Agents respond to questions regarding the extent to which they feel trusted by their partner and regarding their decision to transfer points to their partner. Principal participants are asked questions regarding the trustworthiness of their partner and their decision to entrust resources to their partner. Following the second stage, participants answer similar questionnaires; however, these questionnaires also address participants' beliefs about the implementation of the control system (if applicable). Finally, participants participate in lottery phase similar to that conducted in experiment 2 so that I can measure risk preferences.

I conduct 9 experimental sessions – 3 for each control source condition. The order of the stages is counter-balanced between sessions such that approximately two-thirds (one-third) of participants interact in the stage without the possibility of control first (second), followed (preceded) by the stage when control is introduced.

In experiment 3, the interactions between the principal and agents are the same as those undertaken during experiment 2. However, by collecting measures of participants' beliefs before any feedback is provided, I am able to corroborate the results of experiments 1 and 2, which suggest that principals' impose controls due to their beliefs about agents' tendencies to be opportunistic.

7.2 Experiment 3 - Results

Participants (N = 106) were recruited from the same population as those involved in experiments 1 and 2. A comparison of demographic statistics reveals no statistically significant differences between the participants from experiments 1, 2 or 3.

7.2.1 Principals' Risk-taking

I first examine principals' risk-taking in the stage in which the control system is available (for comparison with experiment 2). Results reveal that on average principals take more risk, in all conditions, when there is no control imposed as compared to when a control is imposed. These differences are all statistically significant at conventional levels (see Table 9). At first, these results appear inconsistent with the results from experiment 2, in which I find that principals take greater risk when the have *chosen not* to impose a control in the endogenous condition, but take similar amounts of risk regardless of whether or not a control is imposed in the uncertain and exogenous conditions. However, further examination of principals' risk-taking behavior in experiment 3 reveals that the significant differences in the uncertain and exogenous conditions are driven by the behavior of those principals who interacted in the first stage without control available (or introduced). That is, principals in the uncertain and exogenous conditions transferred significantly more resources to agents if the control system was not introduced in the first stage than did those principals who had a control available immediately.

These results are consistent with the notion that controls can create an initial framing effect (Taylor and Bloomfield 2007). That is, when principals are aware that a control is available, it is likely that the control acts as a cue that they are not participating

in a cooperative environment and therefore are more skeptical about entrusting resources to the agents.

A primary goal of experiment 3 is to confirm the psychological processes that influence principals' control decisions and their risk-taking behavior. In the previous experiments, I examine principals' propensity to control over the course of 20 periods, while receiving feedback about the effect of the control decision on agents' responses. Alternatively, in experiment 3, I examine the decision to impose a control system in a single period, without any feedback. This design allows me to clarify the factors that motivate principals' initial control decisions.

As described in chapter 3, I expect principals' beliefs about the opportunistic tendencies of agents to influence the perceived riskiness of the principal/ agent interaction, which in turn is likely to influence the decision of whether or not to impose the control. Further, I expect that the relationship between principals biased beliefs about agents' opportunism and their implementation of the control to be mediated by the principals' trust in agents' behavior (see Figure 3).

I use logistic regression analysis to test these predictions. Logistic regression is appropriate because the dependent variable, control, is categorical – coded 1 if a control is imposed and 0 if there is no control. Because I am examining the principals' propensity to impose control, only principals from the endogenous condition and those in the uncertain condition who are allowed to select control are included in the analysis. I estimate the logistic regression as follows:

$$\text{Control} = \alpha_0 + \alpha_1 \text{Belief Factor} + \alpha_2 \text{Trust} + \alpha 3 \text{RiskImpact} + \varepsilon$$

The results of this regression are consistent with the results of the path analysis performed for experiment 1 (see Table 10). That is, principals' propensity to control is positively associated with principals' beliefs that agents are primarily motivated by extrinsic incentives (*p=.07*) and by the perceived riskiness of the interaction (*p=.03*). Further, the extent to which principals believe agents are trustworthy is negatively related to principals' controlling behavior (*p=.04*).[9]

Next I use regression analysis to determine the factors that influence the number of points principals transfer to agents. Consistent with experiment 2, the regression includes principals' risk preferences, as measured by their decisions during the lottery, as well as the Belief Factor, calculated as described previoulsy, perceived risk, a dummy variable indicating whether or not a control is imposed, and the control source condition. I also include the amount principals' transfer in the stage in which control is not available, as I expect that each principal's risk-taking will be correlated across stages. Thus, I estimate the following model:

$$\text{ControlTransfer} = \alpha_0 + \alpha_1\text{Belief Factor} + \alpha_2\text{RiskPerception} + \alpha_3\text{RiskPreference} + \alpha_4\text{Condition} + \alpha_5\text{Control} + {}_6\text{NoControlTransfer} + \varepsilon$$

Results, shown in Table 11, are consistent with experiment 2 and indicate that principals' risk-taking is influenced primarily by their beliefs regarding agents'

[9] I also test the following logistic regression model omitting the trust variable to determine whether the current model provides the best fit.: Control = $\alpha_0 + \alpha_1$Belief Factor + α_2RiskImpact + ε. Comparison of AIC, SC and -2 Log L statistics for the two models suggests that the model including trust is a better fit and therefore describes the results more accurately. Importantly, when Trust is omitted from the model, the Belief Factor and Risk Impact no longer have a significant effect on the principals' propensity to control. This further confirms the results of the path analysis in experiment 1, which indicates that trust (partially) mediates the relationship between principals' beliefs about agents' incentives and the perceived riskiness of the encounter. However, it appears that when principals are only interacting with agents 1 time, trust becomes even more important to their control decision.

opportunism (*t=-2.00, p =.03)* and the riskiness of the interaction (*t=-2.23, p=.02*). Not surprisingly, I also find that the existence of the control and principals' level of transfer in the stage without control are significantly related to their transfer in the control stage.

In sum, tests of beliefs and motivations that influence principals' behavior in experiment 3 generally confirm the results from experiments 1 and 2. Principals impose controls because they believe agents to be primarily motivated by extrinsic incentives. Further, these beliefs and the perceived riskiness of the interaction influence principals' level of risk-taking when the control is imposed. However, although principals overwhelmingly impose control, they (generally) take less risk when a control is imposed than when there is no control. Thus, principals appear to impose control to mitigate the downside risk that agents will be entirely opportunistic, but knowingly sacrifice some of the upside potential that might be gained if they refrained from controlling.

Next, I examine agents' behavior in this single shot experiment.

7.2.2 Agents' Return Transfers

In experiment 3, average agent returns are higher when a control is imposed than when it is not (see Table 12, Panel A), but these differences are not statistically significant at conventional levels. Further, on average, agent returns do not vary across the three control source conditions (see Table 12, Panel B). However, because principals transfer points to agents in experiment 3, agents are influenced by both the amount transferred from the principal and whether or not a control is imposed, simultaneously. Therefore, it is necessary to examine the interactive effects of control intentionality and the amount transferred by the principal. To this end, I divide observations into groups

based on the amount transferred by the principals. "Transfer 1" includes only principal transfers equal to 10 points (the minimum amount permitted). "Transfer 2" includes transfers of 20 – 60 points. "Transfer 3" includes all transfers greater than 60 points (greater than 50% of the principals' endowment).[10]

As expected, agents generally exhibit positive reciprocity and repay higher principal transfers with higher returns. As shown in Table 13, for all three control source conditions, agent returns increase monotonically under both control and no control conditions as principal transfers increase. However, agent transfers under control and no control conditions differ by condition at various transfer levels. Specifically, Table13 shows that in all three source conditions, agents return, on average, more points when a control is imposed when the transfer is between 10 and 60 points (Transfer groups 1 & 2). As transfers increase above 60 points, agents' responses to the control vary based on the perceived intentionality. Specifically, in the endogenous condition, agents return significantly more points to principals who do not impose control than to principals who do ($t = -2.61$, $p = .08$). However, in the uncertain and exogenous control condition, agents' returns do not significantly differ between principals who have control imposed and those who do not. (See Figure 13 for graphical representation)

I employ structural equation modeling using AMOS to investigate the underlying mechanisms that influence agents' behavior when controls are imposed. Drawing from

[10] Because each principal makes only 1 transfer in experiment 3, as compared to 20 transfers in experiment 2, I partition the sample into slightly larger transfer groups than used in experiment 2. Using the finer transfer group divisions from experiment 2 yields several groups containing only 1 observation which results in insufficient power for statistical analysis.

the results of experiment 1, I incorporate agents' perceptions about principals' trust and agents' intentions to punish principals who do not trust them (see Figure 14).

I first conduct a test of the goodness of fit. The Tucker-Lewis Index, a measure of the proportion of improvement of the fit of the model over a null model, is 119 percent, which is above the generally accepted cutoff value of 90 percent (Kline 1998, p. 131). I confirm the model's goodness of fit with a conventional χ^2 test ($\chi^2 = .251$, $p = 0.62$) and an Incremental Fit Index (102 percent). Thus, the overall model describes the relationships in the data well.

The coefficient on the variables associated with *Link 1* indicates that the source of control condition does not directly influence agents' beliefs about being trusted by the principal (as described using the Force-Trust Factor). I calculate a Force-Trust Factor for each agent based upon their responses to four, related questions in the post experimental questionnaire, regarding their perceptions of principals' beliefs about their trustworthiness, generosity, and fairness, as well as principals' level of trust.[11] I perform a factor analysis on these four questions (untabulated), which reveals that these questions describe a single underlying factor. I interpret this factor as the extent to which an agent feels trusted by the principal.

[11] Using 11-point Likert scales, agent participants answered the following four questions: (1) When you were forced to transfer at least 10 points, to what extent did you feel like Participant B trusted you; (2) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a generous person; (3) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you would be a fair person; (4) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you were trustworthy?

The coefficient on *Link 2* indicates that the source of control condition has a significant negative effect on agents' desire to punish controlling principals. This suggests that agents are *more* likely to try to intentionally punish principals who have chosen to impose control, and are less likely to punish principals who are subject to an exogenous control mechanism, or for whom the source of control is uncertain. Further, *Link 3* indicates that there is a negative relationship between the extent to which agents feel trusted and their desire to punish controlling principals. *Link 4* indicates that the amount that agents return to principals is, significantly influenced by the extent to which they feel trusted by the principal (irrespective of the control condition). Finally, *Link 5* indicates that there is no significant relationship between agents' intention to punish controlling principals and the actual amount they return.

In summary, results from this analysis indicate that agents' behavior when controlled is determined by the extent to which they feel trusted by the principal – such that those agents who believe principals find them to be trustworthy return higher amounts of resources to those principals. The effect of trust appears to be unintentional, as I find no significant relationship between agents' intent to punish controlling principals and the amount returned, and the effect is robust across all conditions. Therefore, consistent with the results of the previous experiments, I conclude that agents' behavior in the presence of control results from agents' beliefs about being trusted by the principal.

In sum, experiment 3 confirms the underlying psychological mechanisms that influence principal and agent behavior when a control is imposed. That is, principals choose to impose control due to their beliefs about opportunistic tendencies, but expect

that agents might be offended by the control. Therefore, principals take less risk when a control is imposed than when agents are not controlled. This suggests that principals are most concerned with mitigating their downside risk, and are willing to forego the upside potential that might be available if agents are left to adhere to their own social principals. However, experiment 3 adds some insights regarding principals' ability to anticipate agents' differential responses to the intentionality of control. Specifically, it appears that principals do not immediately recognize that agents will not respond as negatively to a control that is not perceived to be an intentional signal of distrust.

Experiment 3 also confirms that formal controls can crowd out agents' intrinsic motivation to exhibit positive reciprocity when the control can be clearly perceived as an intentional signal of the principals' distrust. Further, agents respond differently to control based primarily upon their beliefs about principals' trust.

Table 9

Panel A: Descriptive Statistics - Means (Std. Dev) for Principals' Transfer

	Total	No Control	Control
Endogenous	40.00	71.67	22.73
	(31.62)	(18.41)	(21.95)
	n=17	n=6	n=11
Uncertain	48.89	63.00	31.25
	(36.60)	(42.70)	(16.42)
	n=18	n=10	n=8
Exogenous	53.89	63.33	35.00
	(42.99)	(48.49)	(21.67)
	n=18	n=12	n=6

Panel B: Analysis of Variance of Principals' Transfer by Condition

Variable	*df*	*MS*	*F*	*p*
Control	1	5491.39	5.04	0.01
Condition	1	215.38	0.20	0.33
Control X Condition	1	811.71	0.75	0.19
Error	49	1089.19		

Control source conditions are defined as follows: In the Endogenous condition, principals impose the control. In the Uncertain condition, the agent does not know if the control was imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

Table 10
Experiment 3: Factors Influencing Principals' Propensity to Control

Logistic regression analysis is used to examine the factors influencing principals' decision to impose the control system. Only principals from the endogenous condition and those in the uncertain condition who are permitted to choose whether or not to impose control are included in the analysis. The dependent variable is Control, which is dummy coded where 1 indicates that the principal chose to imposed control when it was available and 0 indicates the principal refrained from controlling. The Belief Factor is calculated based on a factor analysis of three questions regarding principals' beliefs about agents' interest in earning points, concerns for fairness and the likelihood agents would keep all transferred points. Trust is measured using principals' responses on an 11 point Liker scale regarding their trust that the agent would return more than 10 points. Risk Impact is calculated by multiplying principals' expectations about the likelihood that agents would return more than 10 points and the amount of points they expected agents to return if a control was imposed (as compared to when there was no control).

Variable	Prediction	Wald Stat	*p value*
Risk Impact	+	3.66	.03
Belief Factor	+	2.68	.07
Trust	-	-3.19	.04

Table 11
Experiment 3: Factors Influencing Principals' Transfer Decision

Regression analysis examines the factors that influence the amount of resources principals transfer to agents. The dependent variable is the number of points transferred by each principal during the stage when control was available. The control source conditions are endogenous, exogenous and uncertain. Risk Preference is determined based upon participants' decision in risky gamble conducted after the main experiment. Risk perception is based upon principals' response on an 11 point Likert scale regarding their beliefs about the riskiness of the transfer, and is intended to capture principals' subjective risk perception. Belief Factor calculated based on factor analysis of three questions regarding principals' beliefs about agents' interest in earning points, concerns for fairness and the likelihood agents would keep all transferred points. Control is a dummy variable coded as 1 if control was imposed and 0 if not. Transfer in the no control stage is the amount of points the principal transferred in the stage when control was not available. *p values* are two-tailed, unless a directional prediction is provided.

Variable	Prediction	T stat	*p value*
Control Source Condition	?	.584	.56
Risk Preference	?	1.08	.29
Risk Perception	-	-2.23	.02
Belief Factor	-	-2.00	.03
Control	?	-1.57	.06
Transfer in No Control Stage	+	3.20	.00

Table 12

Panel A: Descriptive Statistics – Means (Std. Deviations)

	Endogenous N=17			Uncertain N=18			Exogenous N=18		
	No Control	Control	Baseline	No Control	Control	Baseline	No Control	Control	Baseline
Agents Transfer	12.82	15.47	14.71	19.33	20.56	17.39	16.61	18.89	17.11
(St. Dev)	(16.18)	(11.72)	(13.23)	(22.97)	(21.89)	(17.33)	(21.94)	(17.54)	(27.18)
Agent Profit	143.33	111.82	139.41	134.00	117.60	125.94	142.00	123.25	131.78
(St. Dev)	(8.76)	(19.40)	(26.99)	(26.79)	(15.06)	(24.70)	(42.44)	(14.00)	(26.27)
Principal Profit	133.33	130.00	110.00	140.00	126.25	128.83	117.50	140.00	122.44
(St. Dev)	(28.93)	(14.83)	(35.83)	(64.47)	(15.06)	(35.10)	(27.51)	(49.57)	(63.70)

Panel B: Analysis of Variance of Agents' Transfer by Condition

Variable	*F Stat*	*P value*
No Control Return	0.44	0.65
Control Return	0.38	0.69

Table 12, Panel A provides descriptive statistics (means and standard deviations) for agents' transfers, and agent and principal profit, when control is and is not imposed by control source condition. Further, descriptive statistics from the "Baseline" condition are also provided. The Baseline condition is the stage of the experiment where principals and agents interact without a control being available. The Baseline stage was counterbalanced across experimental sessions. 66% of participants engaged in the Baseline stage first, while 34% engaged in the Baseline condition second.

Table 12, Panel B provides the results of two omnibus ANOVA analyses. In the first, the dependent variable, "No Control Return" is the number of points the agent indicates s/he will return if no control is imposed. In the second analysis, the dependent variable, "Control Return" is the number of points the agent indicates s/he will return if a control is imposed. Both analyses indicate that the average amount agents return when control is (or is not) imposed does not differ significantly across control source condition.

Control source conditions are defined as follows: In the Endogenous condition, principals imposed the control. In the Uncertain condition, the agent does not know if the control is imposed by the principal or the computer. In the Exogenous condition, the control is imposed by the computer.

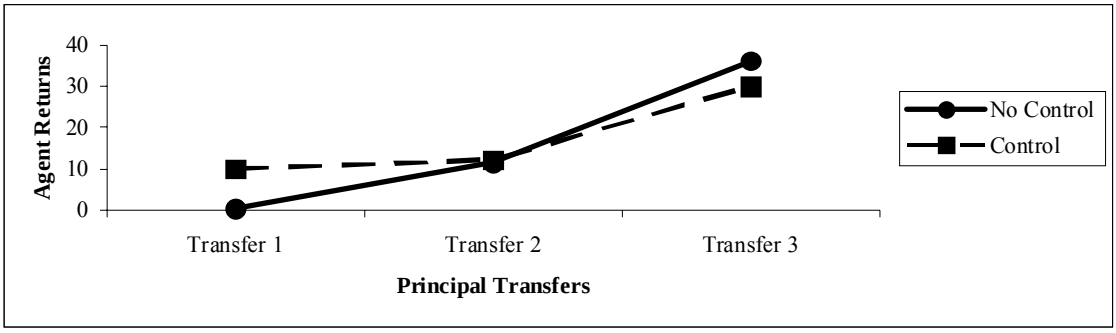
Table 13
Experiment 3: Agents' (Return) Transfer by Principal Transfer

Agents' return by transfer amount in each condition with and without control. Transfer groups are determined as follows: Transfer group 1 = 10 point transfer; Transfer group 2 = 20 - 50 pts, Transfer group 3 > 60 points. Associated p-values are two-tailed and indicate the differences between the controlled and uncontrolled return amounts.

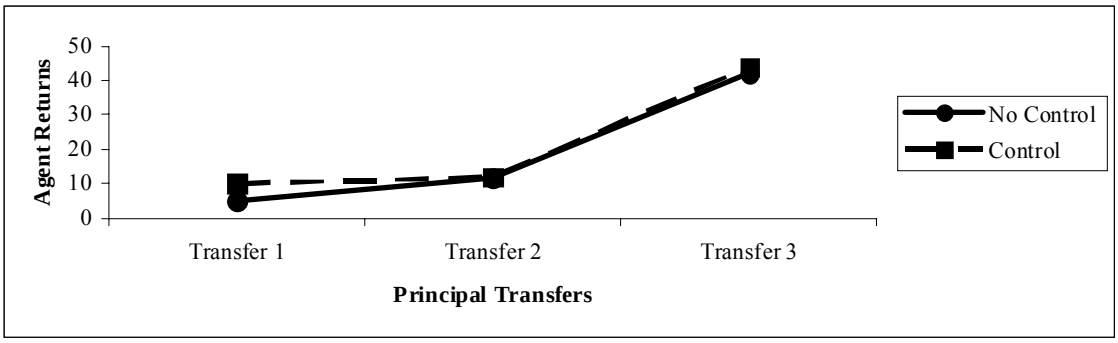
	Endogenous			Uncertain			Exogenous		
	No Control	Control	*p value*	No Control	Control	*p value*	No Control	Control	*p value*
Transfer 1	0.43	10.00	<.01	5.00	10.00	0.50	0.34	10.00	<.01
	(1.13)	(0.00)		(7.07)	(0.00)		(0.58)	(0.00)	
	n=17			n=2			n=3		
Transfer 2	11.67	12.17	0.86	11.55	11.82	0.85	6.30	11.50	<.01
	(8.16)	(3.92)		(7.62)	(6.03)		(3.37)	(6.90)	
	n=6			n=11			n=10		
Transfer 3	36.25	30.00	0.08	42.20	44.00	0.37	47.00	39.00	0.37
	(13.76)	(18.25)		(34.08)	(31.50)		(17.88)	(24.083)	
	n=4			n=5			n=5		

Figure 13

Panel A: Average Agent Return by Transfer Group - Endogenous Condition



Panel B: Average Agent Return by Transfer Group - Uncertain Condition



Panel C: Average Return Transfer by Transfer Group - Exogenous Condition

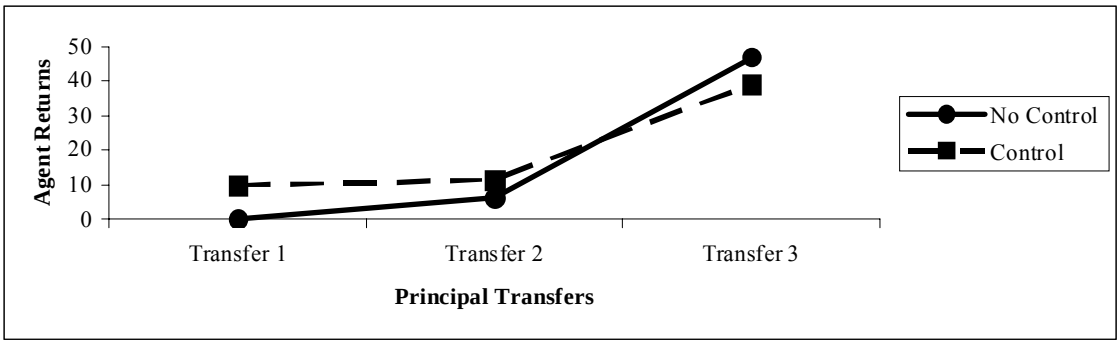


Figure 13 illustrates Agents' (Return) Transfer, the points transferred back from the agent to the principal, for each level of Principal Transfer. Principal Transfer is divided into 3groups: Transfer1 = 10 pts, Transfer 2 = 20-50 pts, Transfer3 >60 points.

Control source conditions are defined as follows: In the Endogenous Condition principals impose the control. In the Uncertain Condition the agent does not know if the principal or computer imposed the control. In the Exogenous condition the control is imposed by the computer.

Figure 14

Factors Influencing Agents' Return Decision when Control is Imposed

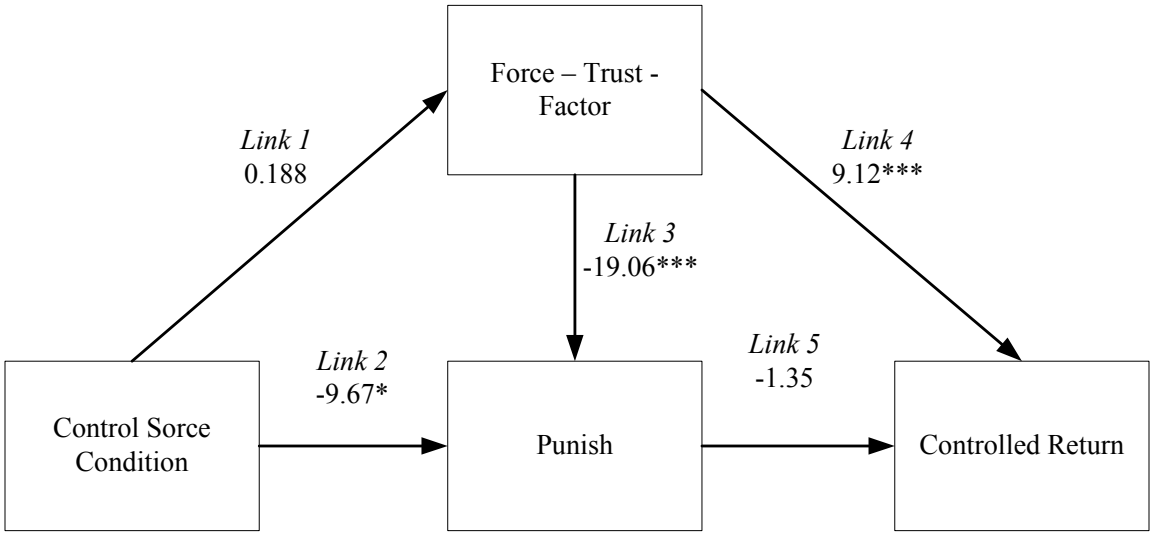


Figure 14 illustrates the factors that influence the amount that agents return to principals when a control is imposed. The standardized path coefficients and corresponding one-tailed significance are shown next to each path. Goodness of fit is measured using the Tucker-Lewis Index (1.19) which is well above the generally accepted cutoff value of 90 percent (Kline 1998, p. 131) and confirmed with an Incremental Fit Index (1.02). ***, **, * indicates significance at the .01, .05, and .10 levels, respectively (one-tailed).

Control source conditions are defined as follows: In the Endogenous Condition principals impose the control. In the Uncertain Condition the agent does not know if the principal or computer imposed the control. In the Exogenous condition the control is imposed by the computer.

I use factor analysis techniques to create the Force-Trust-Factor from four questions answered by agents on 11 point Likert Scales. The questions are: (1) When you were forced to transfer at least 10 points, to what extent did you feel like Participant B trusted you; (2) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a generous person; (3) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you would be a fair person; (4) When you were forced to transfer at least 10 points, to what extent do you feel Participant B believed you were trustworthy?

Punish describes the extent to which agent participants indicate they tried to punish principals when a control was imposed.

Controlled Return is the raw number of points agents indicated they wished to return if a control was imposed.

Chapter 8: Conclusion

This dissertation provides evidence from three experiments regarding the interactions among control implementation, the intentionality of control and reciprocity on agent effort, and principal risk-taking. In general, my results show that agents respond to their beliefs about principals' intentions when a control is imposed. In addition, principals choose to impose controls to eliminate agents' most opportunistic actions, but appear to anticipate how control intentionality will influence agent behavior and adjust their risk-taking accordingly.

Specifically, I find that when principals cannot transfer resources to agents, agents' effort varies along a continuum based upon the intentionality of control. When the control is known to be imposed by an exogenous source, and thus, agents cannot interpret the control as a negative signal from principals, agents exert the highest level of effort, as proxied by the amount of an initial endowment that agents transfer to principals. When the control source is unknown, and agents cannot clearly interpret the control as a negative signal, but also cannot rule out the possibility that it is intentional, agents' effort level is somewhat diminished. Finally, when controlled, agent effort is the weakest when the agent knows with certainty that the principal has imposed the control and can clearly perceive the control to be a signal of distrust from the principal. Further, when a control is imposed unambiguously by the principal, it leads to dysfunctional behavior by the agent. That is, agents' effort is lower than if the principal refrains from controlling. Therefore, principals who choose to control earn lower profits than those who leave agents' uncontrolled. Importantly, when controls are imposed by an exogenous source or

the source is unknown to the agent, control benefits the principal because agents' effort is higher with control than without. Yet, despite evidence of low agent effort when *principals* impose control, my results reveal that principals are often inclined to impose the control anyway, and that the propensity to control persists over time.

When principals are able to put their own wealth at risk in experiments 2 and 3, I find that principals recognize the potentially harmful nature of incomplete control systems. Further, over time, principals appear to understand how agents' beliefs about intentionality will influence their response to a control. Specifically, when controls are clearly imposed by the principal, principals exhibit lower risk-taking in the presence of a control than when agents' behavior is unrestricted. However, when the control is imposed exogenously or the control source is unknown, principals exhibit the same level of risk-taking with or without the control. Further, risk-taking in both of these conditions exceeds that taken in the presence of a control that is endogenously imposed.

This study makes several important theoretical and practical contributions. First, it is the first study to consider the effects of intentionality of control implementation on the behavior of *both* the principal and the agent. Second, this study examines a previously unexplored condition in which the control is implemented by an unknown source to determine how agents make attributions about the intentionality of the control implementation. Third, it extends prior literature examining the harmful effects of control to a multi-period setting in which principals receive feedback revealing that endogenous control yields sustained low effort.

From a practical perspective, the results of this study will be useful to accountants and managers who are responsible for designing and evaluating control systems. I identify specific conditions in which controls contribute to dysfunctional employee behavior and describe how management should respond to controls in these settings. These insights can be used by management and accountants as they perform risk assessments and control evaluations. The results of this study suggest that the perceived intentionality of a control system should be carefully considered when evaluating its effectiveness.

8.1 Limitations and areas for future research

The current study examines principal and agent reactions to a very specific control system, a required minimum transfer from the agent. While this type of behavioral control mechanism is common in practice (for example, budgetary constraints, mandatory work hours, etc.), the specific parameters of the control in this study may have influenced participants' behavior. A different type of control, such as an audit mechanism or a larger minimum requirement might differentially influence agent effort. For example, if the minimum requirement was considerably higher (requiring 50% or more of agents' endowment) agents might perceive the control itself to be unfair and may retaliate by taking advantage of any uncontrolled opportunities, as opposed to rewarding those principals who do not control, as agents do in my study.

Additionally, it is possible that principals are better able to anticipate agents' responses to a control that provides a clear benchmark for the agent than they would be for a different type of control mechanism. For example, principals might be more likely

to over-estimate the effectiveness of a control that incorporates a probability of audit and a penalty for non-compliance. If principals believe that type of control would have a strong deterrent effect, it is possible that they would exhibit unwarranted risk-taking, unlike the principals in the current study.

Further, the results from this study suggest that agents respond to their beliefs about the intentionality of a control system. Importantly, agents react *positively* to controls if they do not believe that the control contains a negative signal from the principal. Accordingly, proper communication regarding the purpose and benefits of the control could improve agents' responses to formal control systems and reduce the likelihood that control systems will crowd out agents' preferences for social norms. Since the enactment of the Sarbanes Oxley Act, many organizations have transferred control responsibilities to operational managers and operating-unit personnel. As a result, it is likely that individuals who are subjected to control systems have a greater appreciation of the purpose and need for these controls. The results from the current study imply that these employees should not be offended by the implementation of the control system because they will not view them as intentional signals of distrust. Further research should explore this possibility and determine whether agents' negative reactions to endogenously imposed control can be diminished if agents understand the purpose of the control system. That is, if agents understand the riskiness of the situation, perhaps they will not punish the principal for an endogenously imposed control.

Finally, in this study, principal/ agent pairings are anonymous and reassigned every period to eliminate participants' opportunity to form reputations during the

experiment or for outside relationships to influence behavior. However, clearly, the personal relationship between an employee and the employer will influence agents' beliefs about control intentionality, trust and effort. Therefore, future studies should incorporate features that allow the relationship between principals and agents to develop and affect their behavior.

Appendix A – Experimental Materials for Experiment 1

How will you be compensated?

In today's experiment, you will have the opportunity to earn points based on the choices you and others make. Points will be converted to cash and each point you earn will increase your cash payment.

The formula I will use to convert points to cash has the following structure:

US $ Payment = (Points earned X .01) + 5.00

The amount of points and money you earn will be based on the decisions you make and the decisions made by others. Therefore, the exact amount of money you will be paid cannot be precisely estimated beforehand. However, I can tell you that you will be paid a minimum of $5 for sure with maximum possible earnings exceeding $40. You will receive your payment, in cash, today before you leave.

The choices you will make during today's experiment are described in more detail below.

Overview of session

This is a computerized decision making study. I expect the entire session to last approximately 60 minutes. The session will consist of 20 periods.

In this experiment, you will assume the role of either Participant A or Participant B. You will remain in the same role throughout the entire experiment.

At the start of each period, the computer will randomly match participants by type (one Participant A with one Participant B). Points will be earned based on decisions made participants and by outcomes determined randomly by the computer.

The pairings are anonymous and will be reassigned each period. You will not be told who you are paired with either during or after the experiment.

Detailed information about the specific decisions made each period and how points are allocated to each participant as a result of his/her decisions is provided on the pages that follow. At the end, there will be a short quiz on these instructions to ensure your understanding.

Instructions

You are Participant A (B).

At the beginning each period, every Participant A will receive 120 points.

Participant B will not receive any points.

Decision of Participant A:

During the period, Participant A can choose any number of points to transfer to Participant B (up to 120). Every point transferred from Participant A to Participant B will be doubled by the experimenter.

Every point transferred from Participant A to Participant B therefore decreases Participant A's income by one (1) point and increases Participant B's income by two (2) points.

The formulas for the each participant's earnings in each period are below:

Earnings of Participant A = 120 – transfer

Earnings of Participant B = 0 + (2 X transfer)

The following examples will clarify the formulas for earnings:

		Earnings for A	Earnings for B
Example 1	A transfers **0** points to B	120	0
Example 2	A transfers **20** points to B	100	40
Example 3	A transfers **80** points to B	40	160

{ PAGE APPLIES TO PARTICIPANTS IN ENDOGENOUS CONDITION ONLY}

Decision of Participant B:

In each period, Participant B can determine a minimum transfer before Participant A has chosen how many points s/he wants to transfer to Participant B.

In particular, Participant B can force Participant A to transfer at least 10 points to Participant B.

However, Participant B can also choose not to force Participant A to any minimum transfer and thus to leave the decision completely free to Participant A.

In summary, there are two (2) possible cases:

Case 1: Participant B forces Participant A to transfer at least 10 points to Participant B. In this case, Participant A may transfer any whole numbered amount **between 10 and 120** to Participant. B.

Case 2: Participant B leaves Participant A completely free to decide the number of points to transfer and does not force him/her to transfer a minimum of 10 points to Participant B. In this case, Participant A may transfer any amount **between 0 and 120** to Participant B.

{ PAGE APPLIES TO PARTICIPANTS IN THE UNCERTAIN CONDITION ONLY}

Decision of Participant B:

At the beginning of the **experiment** the computer will randomly determine if:
(1) Participant B makes the following decision in each period, or
(2) The decision is made by the computer for each period.

If Participant B makes the decision:

In each period, Participant B can determine a minimum transfer, before Participant A has chosen how many points s/he wants to transfer to Participant B.

In particular, Participant B can force Participant A to transfer at least 10 of his/her points to Participant B.

However, Participant B can also choose not to force Participant A to any minimum transfer and thus to leave the decision completely free to Participant A.

In summary, there are two (2) possible cases:

Case 1: Participant B forces Participant A to transfer at least 10 points to Participant B. In this case, Participant A may transfer any whole numbered amount **between 10 and 120** to Participant. B.

Case 2: Participant B leaves Participant A completely free to decide the number of points to transfer and does not force him/her to transfer a minimum of 10 points to Participant B. In this case, Participant A may transfer any amount **between 0 and 120** to Participant B.

If the computer makes the decision:

In each period, the computer will randomly determine whether a minimum transfer is forced, before Participant A has chosen how many points s/he wants to transfer to Participant B.

Case 1 & Case 2 are the same regardless of whether Participant B or the computer makes the decision.

{ PAGE APPLIES TO PARTICIPANTS IN THE UNCERTAIN CONDITION ONLY}

Each period therefore consists of two steps:

Step 1:
In the first step:

- If Participant B makes the decision, s/he decides either to force Participant A to a minimum transfer of 10 points or to leave him/her free to decide the number of points to be transferred.

- If the computer makes the decision, the computer randomly determines whether or not to force Participant A to a minimum transfer of 10 points or to leave him/her free to decide the number of points to be transferred.

Step 2:
In the second step, Participant A decides on the amount which s/he wants to transfer to Participant B. This may be an amount:

- Between 10 and 120, if s/he is forced to transfer at least 10 points to Participant B, or
- Between 0 and 120, if Participant A is free to decide the number of points to be transferred.

{PAGE APPLIES TO PARTICIPANTS IN THE EXOGENOUS CONDITION ONLY}

Role of Participant B:

In each period, the computer will randomly determine whether there is a minimum transfer requirement imposed on Participant A, before Participant A has chosen how many points s/he wants to transfer to Participant B.

In particular, the computer can force Participant A to transfer at least 10 of his/her points to Participant B.

However, the computer may not force Participant A to any minimum transfer and thus will leave the decision completely free to Participant A.

Each period therefore consists of two steps:

Case 1: The computer forces Participant A to transfer at least 10 points to Participant B. In this case, Participant A may transfer any whole numbered amount **between 10 and 120** to Participant. B.

Case 2: The computer leaves Participant A completely free to decide the number of points to transfer and does not force him/her to transfer a minimum of 10 points to Participant B. In this case, Participant A may transfer any amount **between 0 and 120** to Participant B.

Each period therefore consists of two steps:

Step 1:
In the first step:

- The computer determines whether Participant A is forced to transfer a minimum of 10 points or is left free to decide the number of points to be transferred.

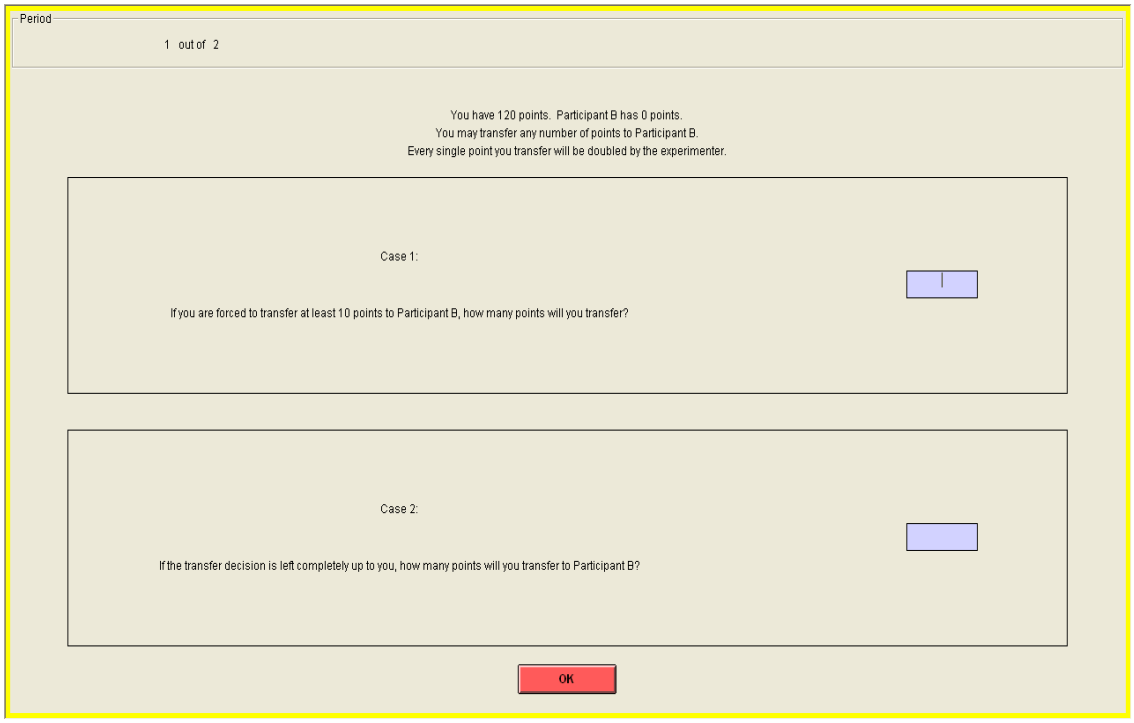
Step 2:
In the second step, Participant A decides on the amount which s/he wants to transfer to Participant B. This may be an amount:

- Between 10 and 120, if s/he is forced to transfer at least 10 points to Participant B, or
- Between 0 and 120, if Participant A is free to decide the number of points to be transferred.

After Participant A has decided how many points to transfer to Participant B, the period is over.

{PAGE APPLIES TO AGENT PARTICIPANTS ONLY – ALL CONDITIONS}

Please take notice: As Participant A you have to decide on the amount to be transferred to Participant B **before you know whether or not you are forced to transfer 10 points to Participant B.** This means you have to make two decisions. You will submit your decision through the following screen:



So, you will specify how many points you will transfer to Participant B if:

- You are forced to transfer at least 10 points (case 1), and
- The decision is left to your free choice (case 2).

Which of the two decisions is relevant for the actual transfer for that period will be determined by Participant's B decision. If you are forced to transfer at least 10 points to him/her, your decision specified for case 1 will count. If you are free to choose, the amount of points specified in case 2 will count.

Feedback:

- During the first 10 periods, there will be no feedback.
- Beginning with the 11th period, participants will learn the number of points they have earned for that period. Participants will receive this feedback after each period for the remainder of the session.

Completing today's Study:

Once all 20 periods are complete you will complete a questionnaire.

When you are finished, please raise your hand and sit quietly.

Quiz

Please solve the following questions. The answers have no consequences on your earnings. Their only purpose is to check that every participant understands the instructions. When you are finished, the experimenter will go over the questions with you.

1. Assume Participant A is left free to transfer any amount. Participant A transfers 22 points to Participant B. What each participant's earnings?

   Participant A: _____ Participant B: _____

2. Assume Participant A is forced to transfer at least 10 points to Participant B. Participant A transfers 14 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

3. Assume Participant A is left free to transfer any amount. Participant A transfers 6 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

4. You will be paired with the same Participant A/B for each period:

   TRUE _____ FALSE _____

5. For every 1 point Participant A transfers to Participant B, Participant B earns 2 points.

   TRUE _____ FALSE _____

   {FOR PARTICIPANTS IN THE UNCERTAIN CONDITION ONLY}

6. At the beginning of the experiment it will be randomly determined whether Participant B or the computer makes the minimum transfer decision each period.

   TRUE _____ FALSE _____

7. If it is Participant B's decision, s/he will choose whether or not to force a minimum transfer each period.

   TRUE _____ FALSE _____

EXPERIMENT 1:
POST EXPERIMENTAL QUESTIONNAIRE FOR AGENTS

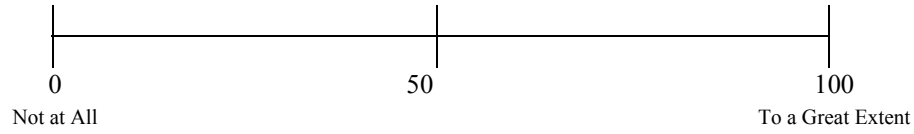
When scales are provided, please place a slash mark (/) on the point of the scale that corresponds to your judgment.

Answer the questions in the order they appear. After you have answered a question, please do **not** go back and change your response.

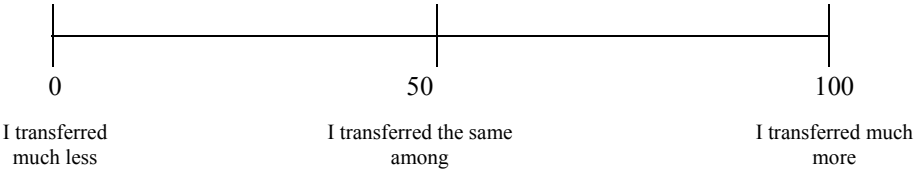
When answering the following questions, please try to think about the beliefs, expectations and feelings you had when you were making your decisions – that is, **BEFORE** you knew the outcome of these decisions.

Please answer the following questions based on your beliefs/actions when you were forced to transfer at least 10 points to participant B.

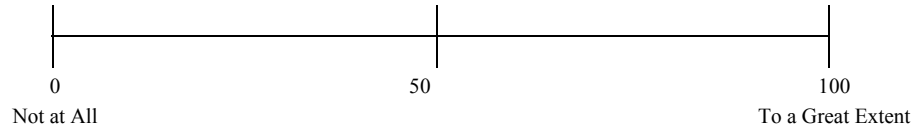
1) When you were forced to transfer at least 10 points, to what extent did it affect the amount you transferred to Participant B?



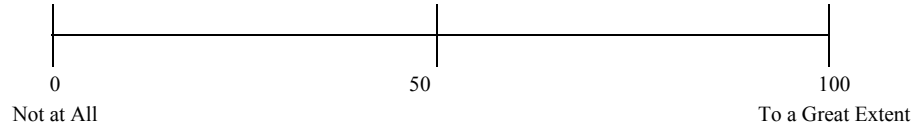
2) When you were forced to transfer at least 10 points, did it cause you to transfer more, less or the same amount to Participant B as when you were free to transfer any amount?



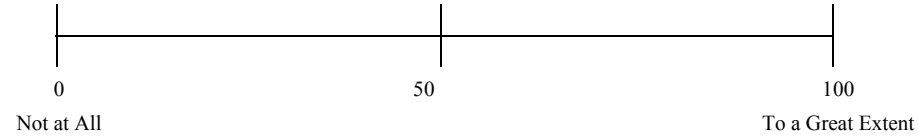
3) When you were forced to transfer at least 10 points, to what extent did you feel like Participant B trusted you?



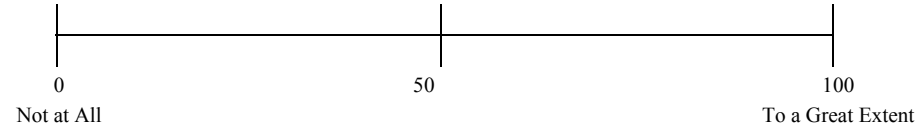
4) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a generous person?



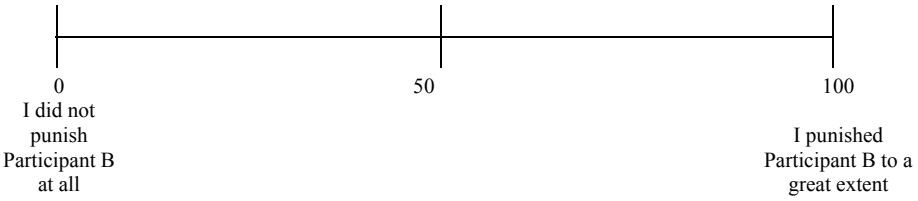
5) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a fair person?



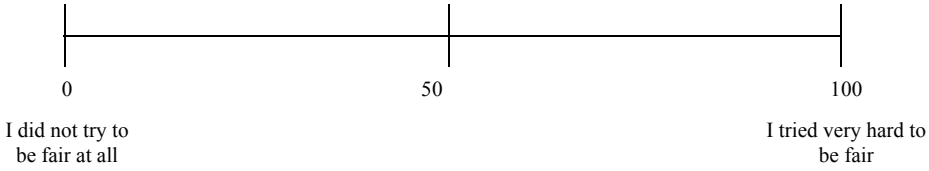
6) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you were trustworthy?



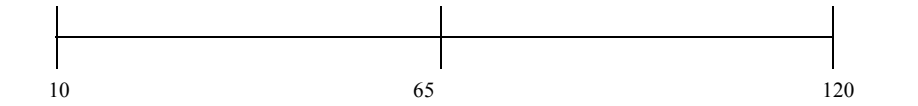
7) When determining the number of points to transfer (when you were forced to transfer at least 10 points), to what extent did you punish Participant B because your decision was limited?



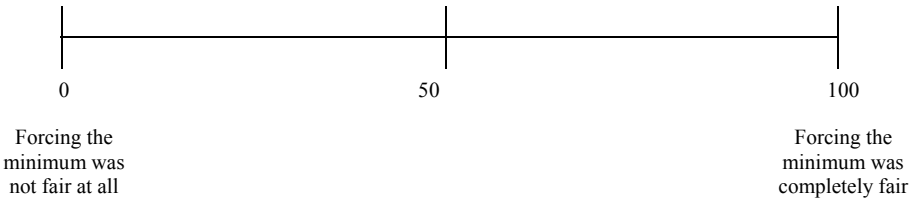
8) When you were forced to transfer at leapt 10 points to Participant B, to what extent did you try to be fair when choosing the number of points to transfer?



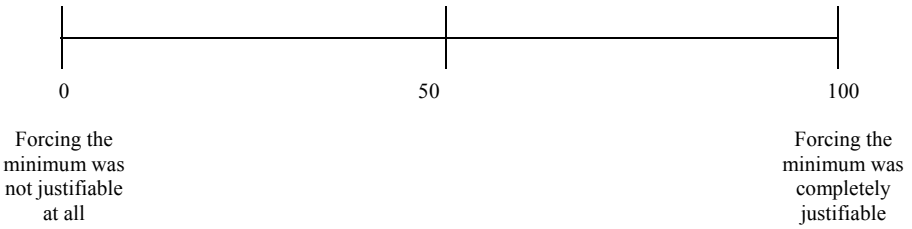
9) When you were forced to transfer at leapt 10 points to Participant B, how many points do you think Participant B expected you to transfer?



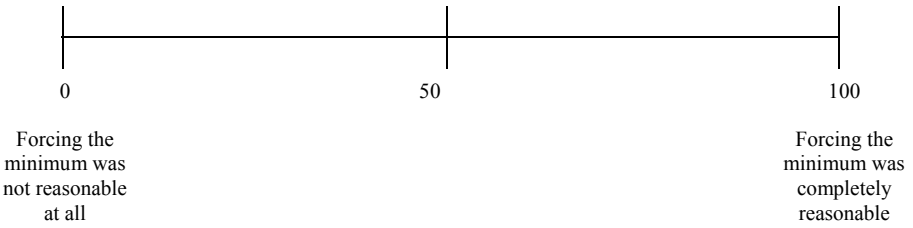
10) When you were forced to transfer at leapt 10 points to Participant B, to what extent did you believe that forcing the minimum requirement was fair?



11) When you were forced to transfer at leapt 10 points to Participant B, to what extent did you believe that imposing the minimum requirement was justifiable?



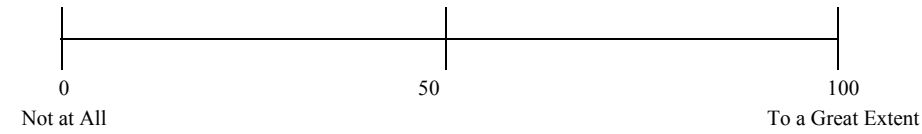
12) When you were forced to transfer at leapt 10 points to Participant B, to what extent did you believe that imposing the minimum requirement was reasonable?



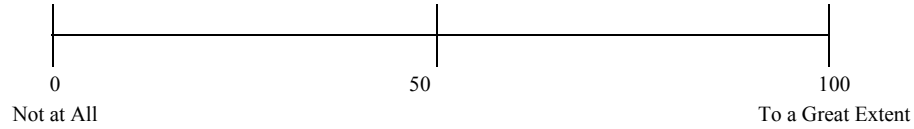
13) When you were forced to transfer at least 10 points to Participant B, describe how you determined the number of points to transfer:

Please answer the following questions based on your beliefs/actions when you were NOT forced to transfer at least 10 points to Participant B (i.e., when you were free to transfer any number of points).

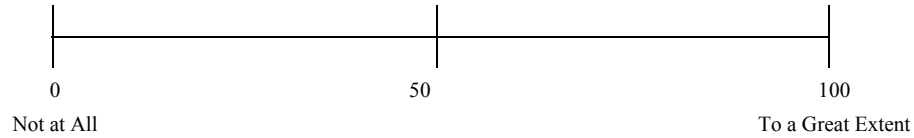
1) When you were free to transfer any number of points, to what extent did you feel like Participant B trusted you?



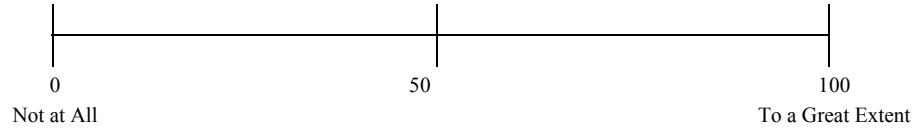
2) When you were free to transfer any number of points, to what extent did you feel Participant B believed you would be a generous person?



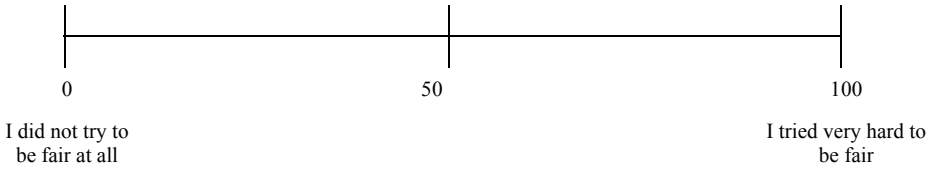
3) When you were free to transfer any number of points, to what extent did you feel Participant B believed you would be a fair person?



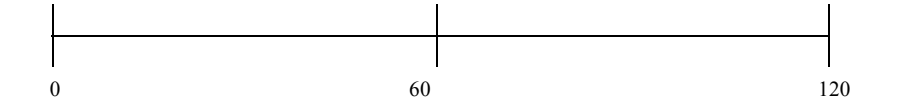
4) When you were free to transfer any number of points, to what extent did you feel Participant B believed you were trustworthy?



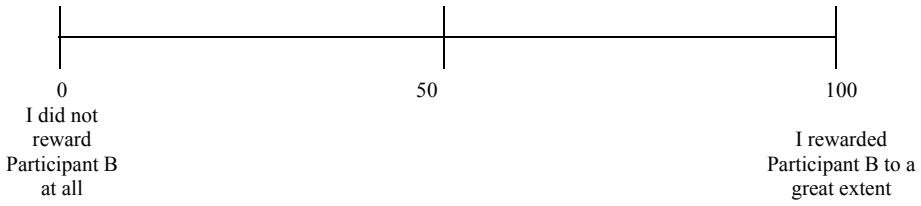
5) When you were free to transfer any number of points, to what extent did you try to be fair when choosing the number of points to transfer?



6) When you were free to transfer any number of points, how many points do you think Participant B expected you to transfer?



7) When you were free to transfer any number of points, to what extent did you try to reward Participant B because your decision was not limited?



8) When you were free to transfer any number of points to Participant B, describe how you determined the number of points to transfer:

EXPERIMENT 1:
POST EXPERIMENTAL QUESTIONNAIRE FOR PRINCIPALS

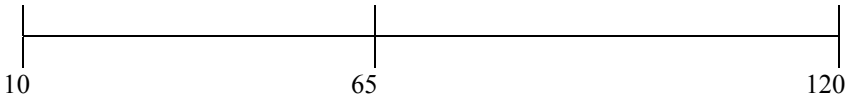
When scales are provided, please place a slash mark (/) on the point of the scale that corresponds to your judgment.

Answer the questions in the order they appear. After you have answered a question, please do **not** go back and change your response.

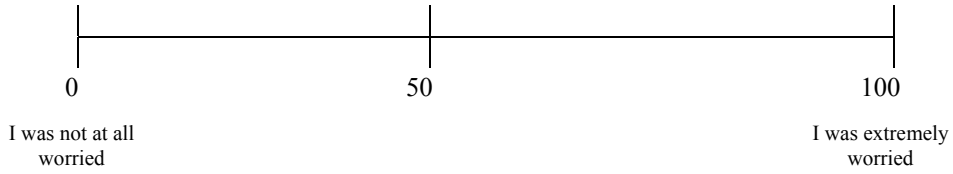
When answering the following questions, please try to think about the beliefs, expectations and feelings you had when you were making your decisions – that is, **BEFORE** you knew the outcome of these decisions.

Please answer the following questions based on your beliefs/actions when Participant A was forced to transfer at least 10 points to you

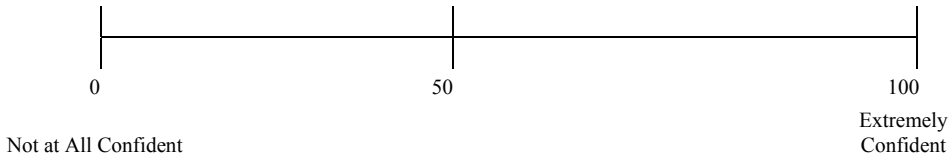
1) When Participant A was forced to transfer at least 10 points, how many points did you expect him/her to transfer to you?



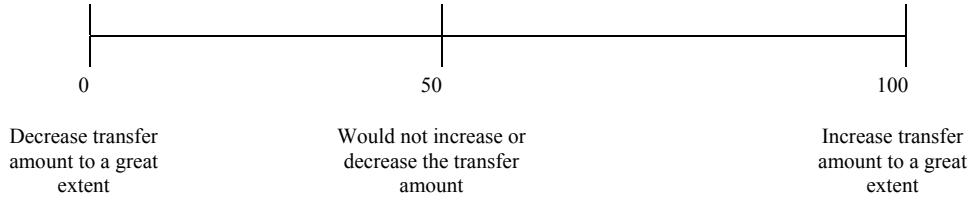
2) When Participant A was forced to transfer at least 10 points to you, how much did you worry that s/he would not transfer *more than 10 points* to you?



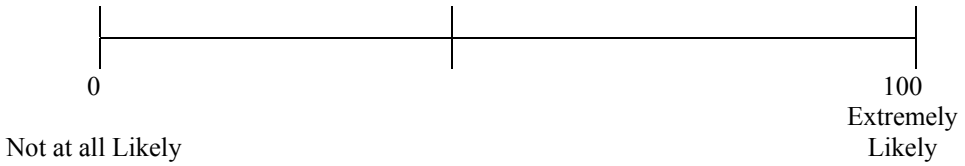
3) When Participant A was forced to transfer at least 10 points to you, how confident were you that s/he would transfer more than 10 points to you?



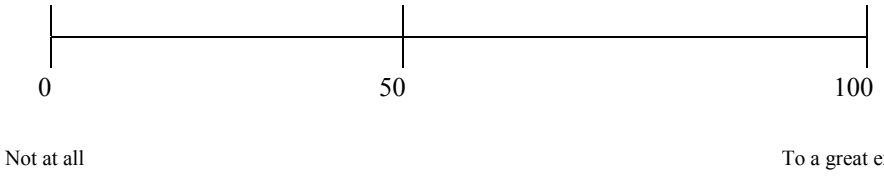
4) When Participant A was forced to transfer at least 10 points to you, to what extent did you believe it would affect the **amount** s/he would transfer (as compared to if s/he was not forced)?



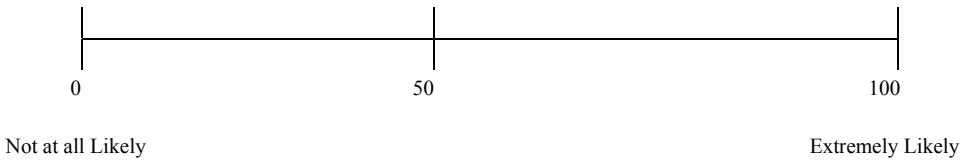
5) When Participant A was forced to transfer at least 10 points, how likely did you believe it was that s/he would transfer more than 10 points to you?



6) When Participant A was forced to transfer at least 10 points to you, to what extent did you believe it would increase the **likelihood** that s/he would transfer more than 10 points to you?

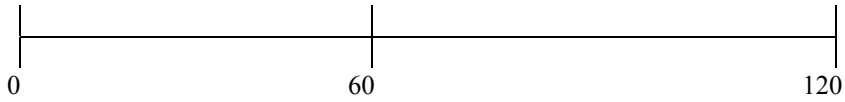


7) How likely is it that Participant A perceived that you did not trust him/her when s/he was forced to transfer at least 10 points?

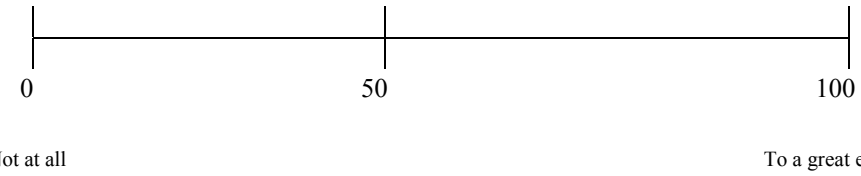


Please answer the following questions based on your beliefs/actions when Participant A was NOT forced to transfer at least 10 points to you

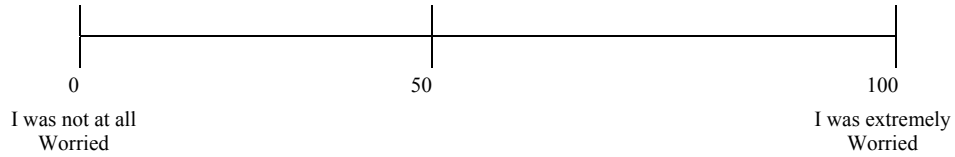
1) When Participant A was NOT forced to transfer at least 10 points, how many points did you expect him/ her to transfer to you?



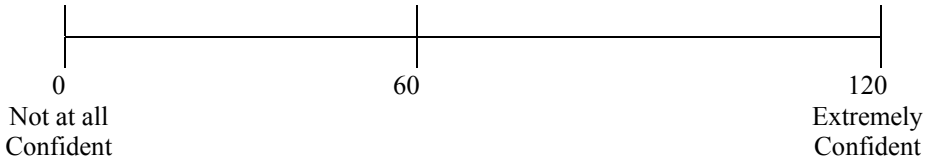
2) When Participant A was NOT forced to transfer at least 10 points, to what extent did you trust him/her to transfer at least 10 points to you?



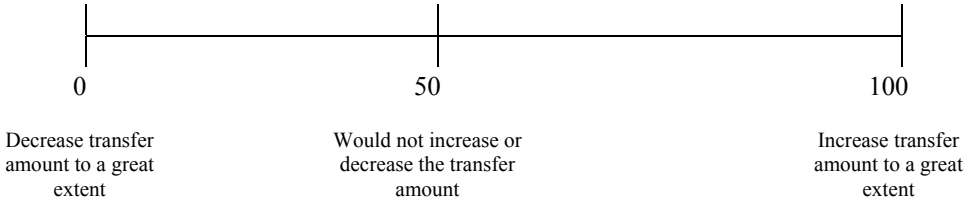
3) When Participant A was NOT forced to transfer at least 10 points, how much did you worry that s/he would not transfer more than 10 points to you?



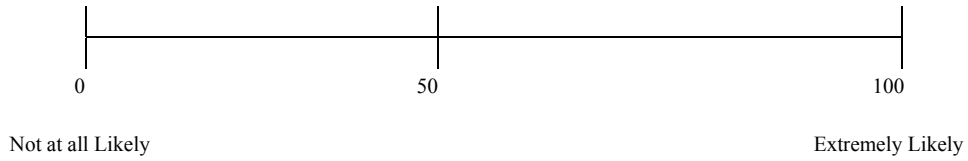
4) When Participant A was NOT forced to transfer at least 10 points, how confident were you that s/he would transfer *more* than 10 points to you?



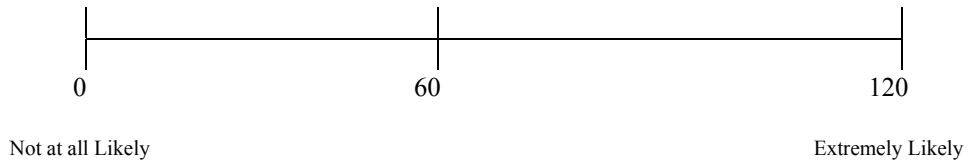
5) When Participant A was NOT forced to transfer at least 10 points, to what extent did you believe it would affect the **amount** s/he would transfer to you?



6) When Participant A was NOT forced to transfer at least 10 points, how likely did you believe it was that s/he would transfer more than 10 points to you?

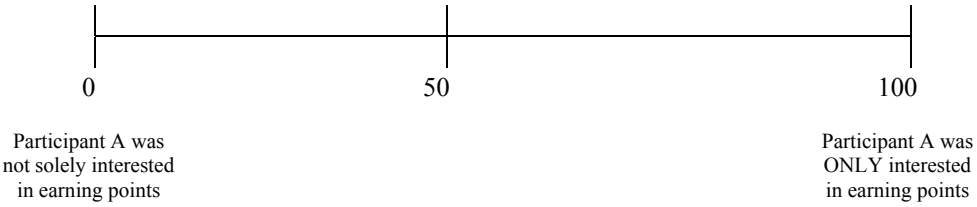


7) When Participant A was NOT forced to transfer at least 10 points, how likely did you believe it was that s/he would keep all of the points for himself/herself?

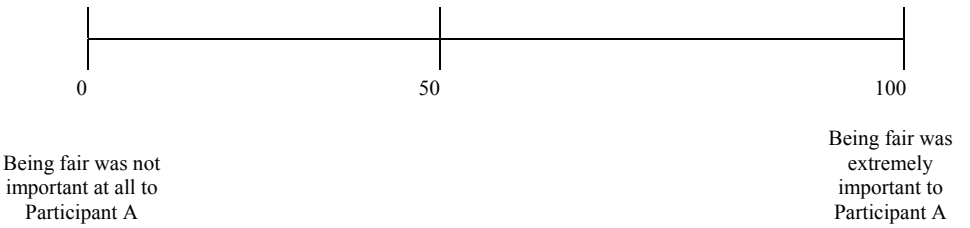


The following questions relate to the entire experiment:

1) To what extent did you believe that Participant A was only interested in earning as many points as possible, no matter what?



2) To what extent did you believe that Participant A was concerned with fairness (i.e., wanted to give you a fair share of the points)?



3) Please describe any other factors that impacted you decision-making during the experiment

Appendix B – Experimental Materials for Experiment 2

How will you be compensated?

In today's experiment, you will have the opportunity to earn points based on the choices you and others make. Points will be converted to cash and each point you earn will increase your cash payment.

The formula I will use to convert points to cash has the following structure:

US $ Payment = (Points earned X .01) + 5.00

The amount of points and money you earn will be based on the decisions you make and the decisions made by others. Therefore, the exact amount of money you will be paid cannot be precisely estimated beforehand. However, I can tell you that you will be paid a minimum of $5 for sure with maximum possible earnings exceeding $40. You will receive your payment, in cash, today before you leave.

The choices you will make during today's experiment are described in more detail below.

Overview of session

This is a computerized decision making study. I expect the entire session to last approximately 60 minutes. The session will consist of 20 periods.

In this experiment, you will assume the role of either Participant A or Participant B. You will remain in the same role throughout the entire experiment.

At the start of each period, the computer will randomly match participants by type (one Participant A with one Participant B). Both participants will make decisions and these decisions will determine the number of points earned by each participant during that period.

The pairings are anonymous and will be reassigned each period. You will not be told who you are paired with either during or after the experiment.

Detailed information about the specific decisions made each period and how points are allocated to each participant as a result of his/her decisions is provided on the pages that follow. At the end, there will be a short quiz on these instructions to ensure your understanding.

{PAGE APPLIES TO PARTICIPANTS IN ENDOGENOUS CONDITION ONLY}

Instructions

You are Participant A (B).

At the beginning each period, every Participant A will receive 100 points.

Participant B will receive 120 points.

Decisions of Participant B:

In each period, Participant B has two decisions:

(1) Participant B can transfer any amount of his points (0 – 120) to Participant A (in increments of 10).
(2) Participant B can require that Participant A return a minimum number of those points to him/her. Each point returned to Participant B is tripled by the experimenter.

More specifically, Participant B can transfer any of his/her 120 points to Participant A in 10 point increments. Participant A will then have the opportunity to return any number of those points to Participant B. Each point returned to Participant B will be tripled by the experimenter.

In addition, Participant B can force Participant A to return *at least* 10 points to him/her.

However, Participant B can also choose not to force Participant A to any minimum return and thus, leave the decision completely free to Participant A.

In summary, there are two (2) possible cases:

Case 1: Participant B forces Participant A to return at least 10 points to Participant B. In this case, Participant A may return any whole numbered amount **between 10 and the total number of points transferred by Participant B.**

Case 2: Participant B leaves Participant A completely free to decide the number of points to return and does not force him/her to return a minimum of 10 points to Participant B. In this case, Participant A may return any amount **between 0 and the total number of points transferred by Participant B.**

{PAGE APPLIES TO PARTICIPANTS IN ENDOGENOUS CONDITION ONLY}

Decision of Participant A:

During the period, Participant A can choose any number of the points transferred from Participant B to return to him/her (up to the total transferred from Participant B). Every point returned from Participant A to Participant B will be tripled by the experimenter. Every point *not* returned to Participant B is kept by Participant A and increases Participant A's income.

Every point returned from Participant A to Participant B therefore decreases Participant A's income by one (1) point and increases Participant B's income by three (3) points.

The formulas for the each participant's earnings in each period are below:

Earnings of Participant A = 100 + B's transfer – return

Earnings of Participant B = 120 – B's transfer + (3 X return)

The experiment therefore consists of three steps:

Step 1:
In the first step, Participant B decides either to force Participant A to a minimum return of 10 points or to leave him/her free to decide the number of points to be returned.

Step 2:
In the second step, Participant B decides how many of his points (0 – 120) to
Transfer to Participant A. Participant B can transfer points to Participant A in increments of 10.

Step 3:
In the third step, Participant A decides on the number of points which s/he wants to return to B. This may be an amount:

- Between 10 and the total transferred by Participant B, if Participant B has forced Participant A to return at least 10 points, or
- Between 0 and the total transferred by Participant B, if Participant B has not forced Participant A to return at least 10 points.

After Participant A has decided how many points to return to Participant B, the period is over.

{PAGE APPLIES TO PARTICIPANTS IN UNCERTAIN CONDITION ONLY}

Decision(s) of Participant B:

In each period, Participant B makes the following decision:

- Participant B can transfer any amount of his points (0 – 120) to Participant A (in increments of 10).

More specifically, Participant B can transfer any of his/her 120 points to Participant A in 10 point increments. Participant A will then have the opportunity to return any number of those points to Participant B. Each point returned to Participant B will be tripled by the experimenter.

As described below, Participant A may be forced to return a minimum number of points to Participant B:

Minimum return requirement

Importantly, at the beginning of the **experiment** the computer will randomly determine if:
(1) Participant B makes the following decision in each period, or
(2) The decision is made by the computer for each period.

If Participant B makes the decision:

In each period, Participant B can determine a minimum transfer, before Participant A has chosen how many points s/he wants to transfer to Participant B.

In particular, Participant B can force Participant A to transfer at least 10 of his/her points to Participant B.

However, Participant B can also choose not to force Participant A to any minimum transfer and thus to leave the decision completely free to Participant A.

In summary, there are two (2) possible cases:

Case 1: Participant A is forced to return at least 10 points to Participant B. In this case, Participant A may transfer any whole numbered amount **between 10 and 120** to Participant. B.

Case 2: Participant A is completely free to decide the number of points to return to Participant B and is not forced to return a minimum of 10 points to Participant B. In this case, Participant A may transfer any amount **between 0 and 120** to Participant B.

If the computer makes the decision:

In each period, the computer will randomly determine whether a minimum transfer is forced, before Participant A has chosen how many points s/he wants to transfer to Participant B.

Case 1 & Case 2 are the same regardless of whether Participant B or the computer makes the decision.

{PAGE APPLIES TO PARTICIPANTS IN EXOGENOUS CONDITION ONLY}

Decision of Participant B:

In each period, Participant B has one decision:

- Participant B can transfer any amount of his points (0 – 120) to Participant A (in increments of 10).

More specifically, Participant B can transfer any of his/her 120 points to Participant A in 10 point increments. Participant A will then have the opportunity to return any number of those points to Participant B. Each point returned to Participant B will be tripled by the experimenter.

Minimum return requirement:
In each round the computer will randomly determine whether Participant A is required to return a minimum number of the points transferred from Participant B back to him/her. Each point returned to Participant B is tripled by the experimenter.

Specifically, the computer will randomly determine whether Participant A is forced to return *at least* 10 points to Participant B.

However, the computer may also *not* force Participant A to return a minimum of 10 points and thus, leave the return decision completely free to Participant A.

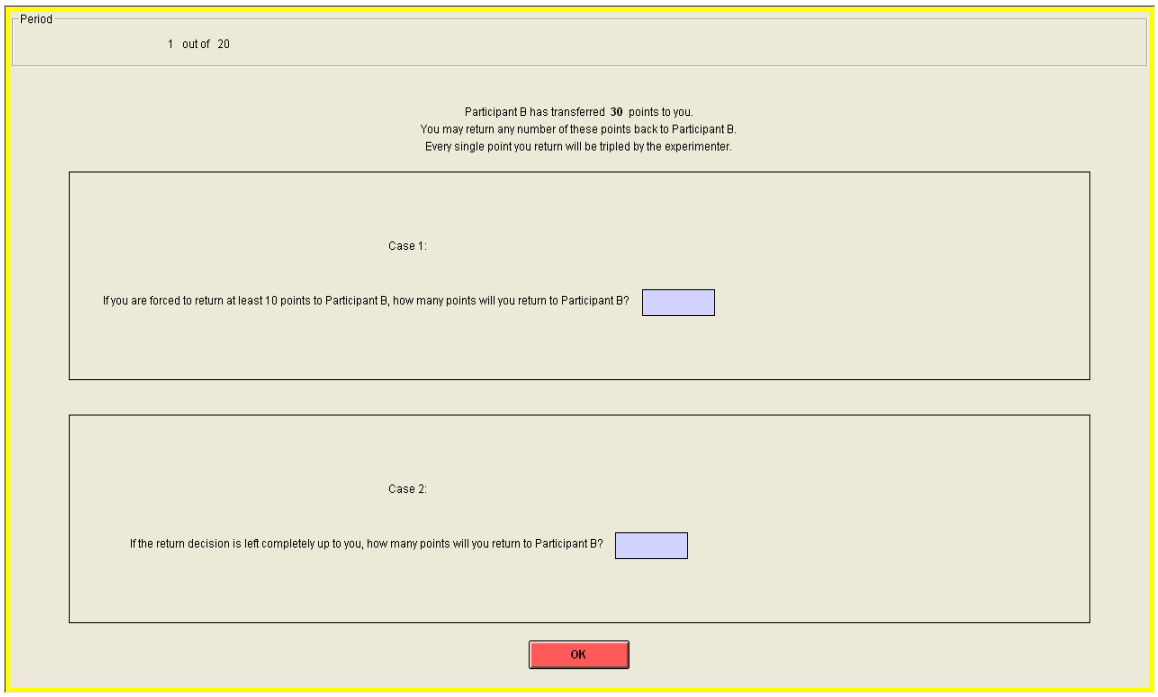
In summary, there are two (2) possible cases:

Case 1: The computer forces Participant A to return at least 10 points to Participant B. In this case, Participant A may return any whole numbered amount **between 10 and the total number of points transferred by Participant B.**

Case 2: The computer leaves Participant A completely free to decide the number of points to return and does not force him/her to return a minimum of 10 points to Participant B. In this case, Participant A may return any amount **between 0 and the total number of points transferred by Participant B.**

{PAGE APPLIES TO AGENT PARTICIPANTS ONLY}

Please take notice: As Participant A you have to decide on the amount to be returned to Participant B **before you know whether Participant B does or does not force you to return at least 10 points.** This means you have to make two decisions. You will submit your decision through the following screen:



So, you will specify how many points you will return to Participant B if:

- Participant B forces you to return at least 10 points (case 1), and
- Participant B leaves the decision to your free choice (case 2).

Which of the two decisions is relevant for the actual return for that period will be determined by Participant's B decision. If Participant B forces you to return at least 10 points to him/her, your decision specified for case 1 will count. If Participant B leaves the decision to your free choice the amount of points specified in case 2 will count.

Feedback:

- During the first 10 periods, there will be no feedback.
- Beginning with the 11th period, participants will learn the number of points they have earned for that period. Participants will receive this feedback after each period for the remainder of the session.

Completing today's Study:

Once all 20 periods are complete you will complete a questionnaire.

When you are finished, please raise your hand and sit quietly.

Quiz

Please solve the following questions. The answers have no consequences on your earnings. Their only purpose is to check that every participant understands the instructions. When you are finished, raise your hand and the experimenter will go over the questions with you.

1. Assume Participant B transfers 100 points to Participant A and leaves the return decision entirely to participant A. Participant A returns 22 points to Participant B. What each participant's earnings?

   Participant A: _____ Participant B: _____

2. Assume Participant B transfers 50 points to Participant A and forces Participant A to return at least 10 points to Participant B. Participant A returns 12 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

3. Assume Participant B transfers 20 points to Participant A and leaves the decisions to Participant A. Participant A returns 6 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

4. You will be paired with the same Participant A/B for each period:

   True: _____ False: _____

5. For every 1 point Participant A returns to Participant B, Participant B earns 3 points.

   True: _____ False: _____

EXPERIMENT 2:
POST EXPERIMENTAL QUESTIONNAIRE FOR AGENTS

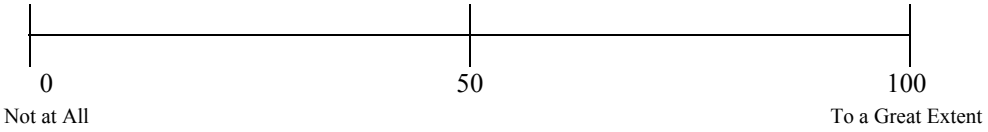
When scales are provided, please place a slash mark (/) on the point of the scale that corresponds to your judgment.

Answer the questions in the order they appear. After you have answered a question, please do **not** go back and change your response.

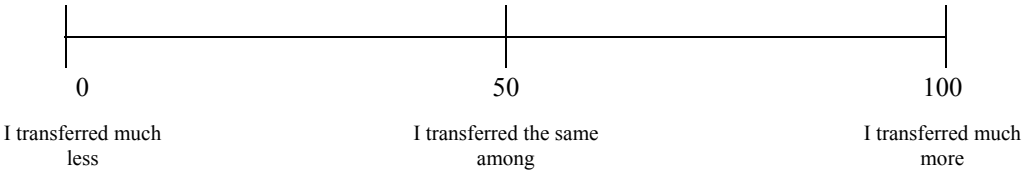
When answering the following questions, please try to think about the beliefs, expectations and feelings you had when you were making your decisions – that is, **BEFORE** you knew the outcome of these decisions.

Please answer the following questions based on your beliefs/actions when you were forced to transfer at least 10 points to participant B.

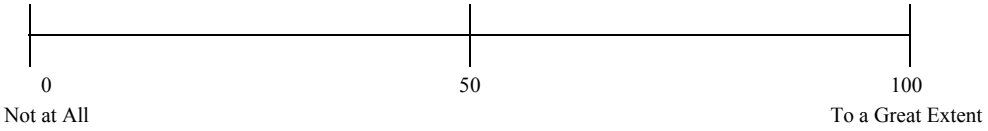
1) When you were forced to transfer at least 10 points, to what extent did it affect the amount you transferred to Participant B?



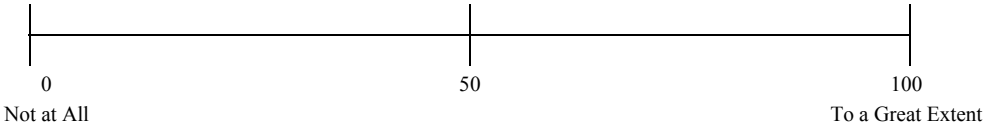
2) When you were forced to transfer at least 10 points, did it cause you to transfer more, less or the same amount to Participant B as when you were free to transfer any amount?



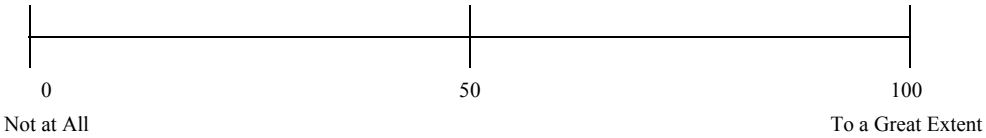
3) When you were forced to transfer at least 10 points, to what extent did you feel like Participant B trusted you?



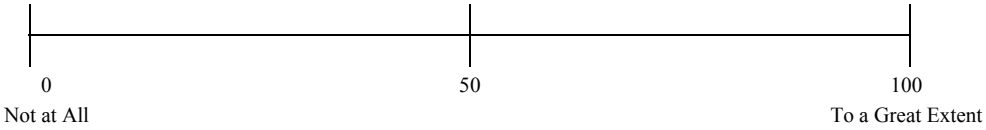
4) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a generous person?



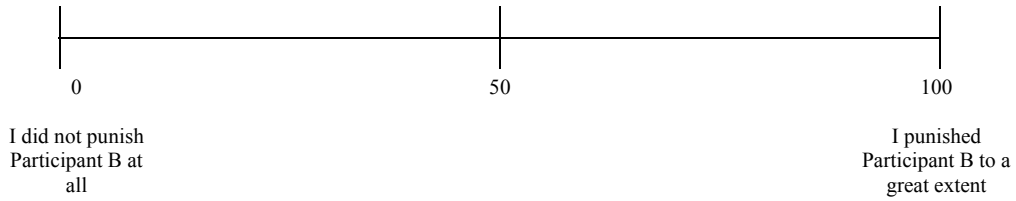
5) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you would be a fair person?



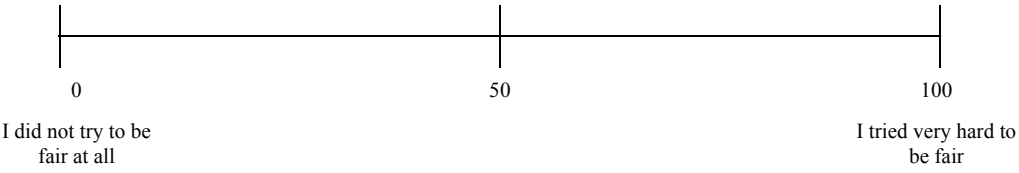
6) When you were forced to transfer at least 10 points, to what extent did you feel Participant B believed you were trustworthy?



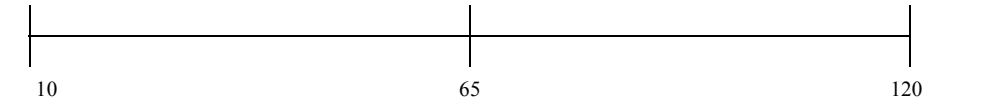
7) When determining the number of points to transfer (when you were forced to transfer at least 10 points), to what extent did you punish Participant B because your decision was limited?



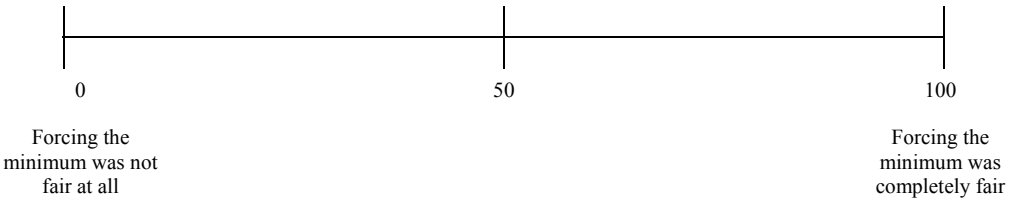
8) When you were forced to transfer at leapt 10 points to Participant B, to what extent did you try to be fair when choosing the number of points to transfer?



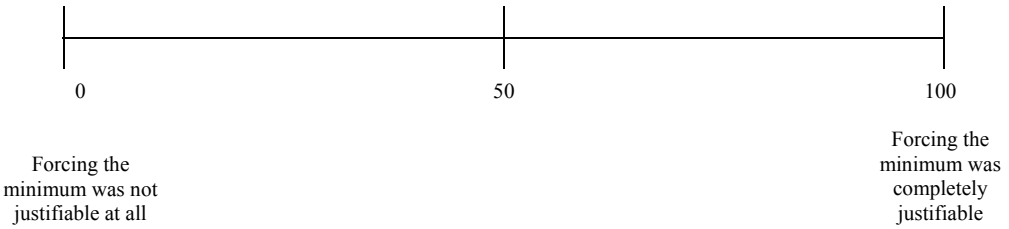
9) When you were forced to transfer at leapt 10 points to Participant B, how many points do you think Participant B expected you to transfer?



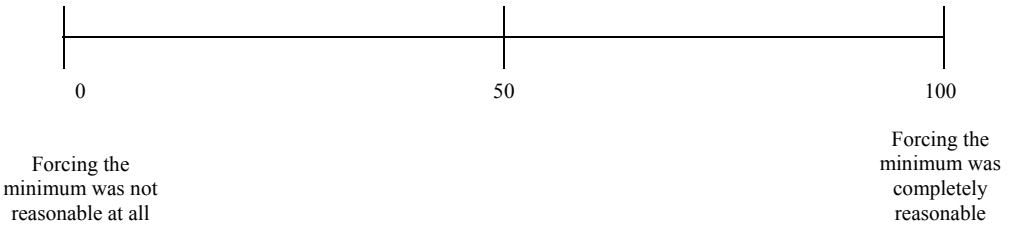
10) When you were forced to transfer at leapt 10 points to Participant B, to what extent did you believe that forcing the minimum requirement was fair?



11) When you were forced to transfer at leapt 10 points to Participant B, to what extent did you believe that imposing the minimum requirement was justifiable?



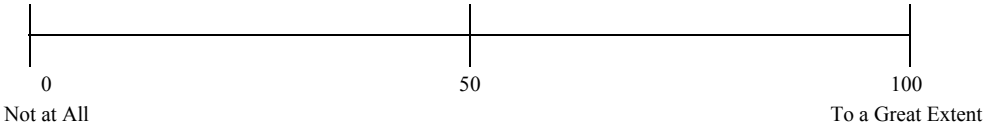
12) When you were forced to transfer at leapt 10 points to Participant B, to what extent did you believe that imposing the minimum requirement was reasonable?



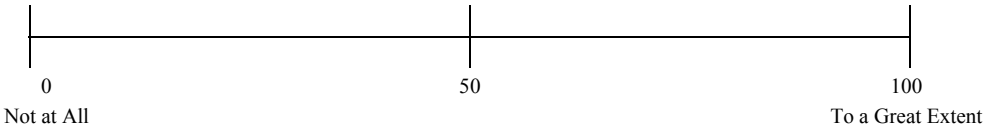
13) When you were forced to transfer at least 10 points to Participant B, describe how you determined the number of points to transfer:

Please answer the following questions based on your beliefs/actions when you were NOT forced to transfer at least 10 points to Participant B (i.e., when you were free to transfer any number of points).

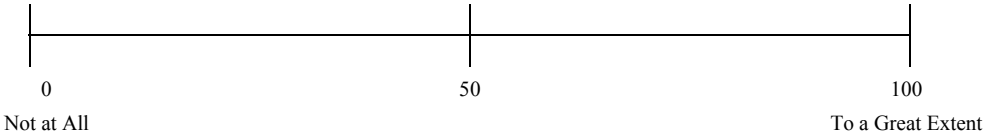
1) When you were free to transfer any number of points, to what extent did you feel like Participant B trusted you?



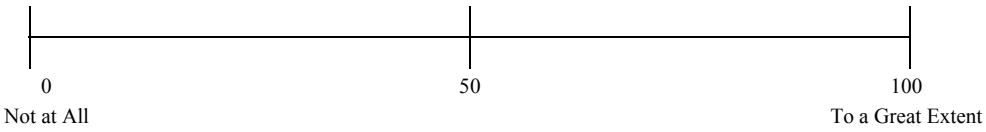
2) When you were free to transfer any number of points, to what extent did you feel Participant B believed you would be a generous person?



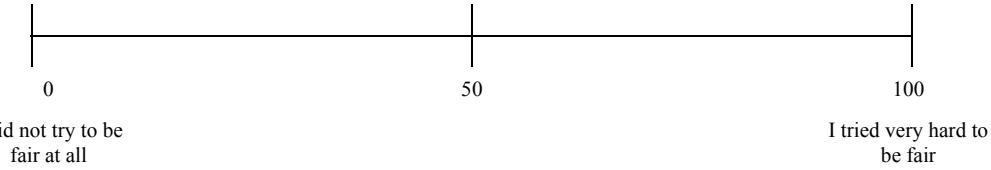
3) When you were free to transfer any number of points, to what extent did you feel Participant B believed you would be a fair person?



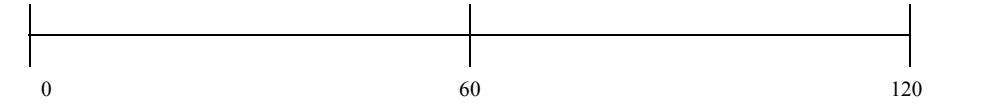
4) When you were free to transfer any number of points, to what extent did you feel Participant B believed you were trustworthy?



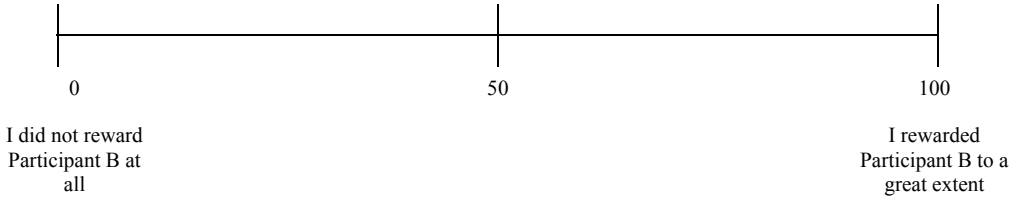
5) When you were free to transfer any number of points, to what extent did you try to be fair when choosing the number of points to transfer?



6) When you were free to transfer any number of points, how many points do you think Participant B expected you to transfer?



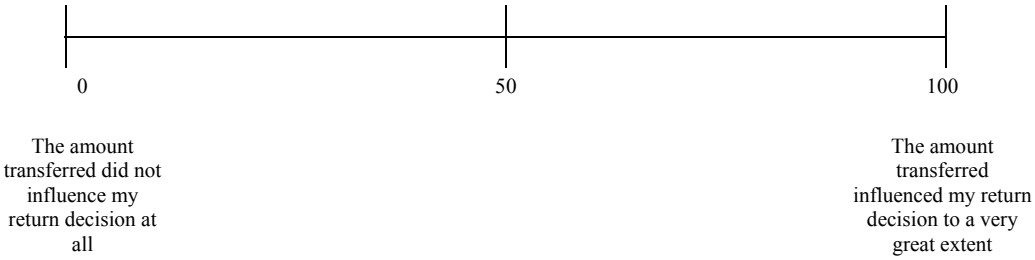
7) When you were free to transfer any number of points, to what extent did you try to reward Participant B because your decision was not limited?



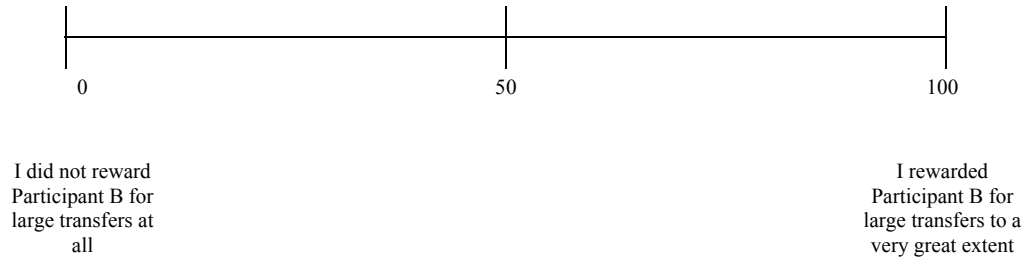
8) When you were free to transfer any number of points to Participant B, describe how you determined the number of points to transfer:

The following questions relate to the experiment as a whole:

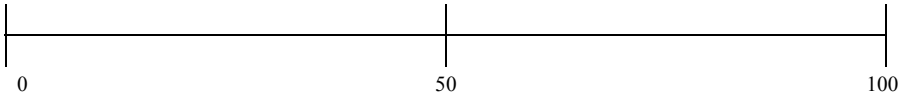
1) To what extent did the amount of points that Participant B transferred to you affect the number of points you returned to him/her?



2) To what extent did you try to reward Participant B for transferring a high number of points to you?



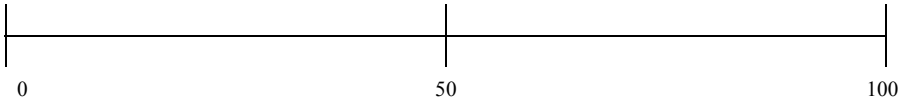
3) To what extent did you try to punish Participant B for transferring a low number of points to you?



I did not punish Participant B for low transfers at all

I punished Participant B for low transfers to a very great extent

4) Did the number of points transferred by Participant B or the imposition of the minimum transfer requirement influence your return decision to a greater extent?



I was ONLY influenced by the amount of the transfer

I was equally influenced by both the amount transferred and the forced minimum

I was ONLY influenced by the imposition of the minimum

5) Please describe any other factors that influenced your decision making during the experiment:

EXPERIMENT 2:
POST EXPERIMENTAL QUESTIONNAIRE FOR PRINCIPALS

When scales are provided, please place a slash mark (/) on the point of the scale that corresponds to your judgment.

Answer the questions in the order they appear. After you have answered a question, please do **not** go back and change your response.

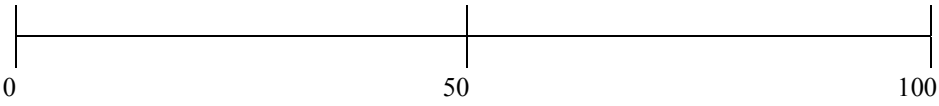
When answering the following questions, please try to think about the beliefs, expectations and feelings you had when you were making your decisions – that is, **BEFORE** you knew the outcome of these decisions.

Please answer the following questions based on your beliefs/actions when Participant A was forced to return at least 10 points to you

1) When Participant A was forced to return at least 10 points, how many points did you expect him/her to return to you? (Place an "X" next to the best answer.)

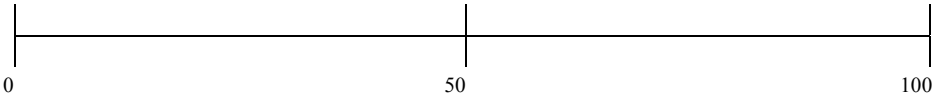
Exactly 10 points
More than 10, but less that 1/3 of the points I transferred _____
Exactly 1/3 of the points I transferred _____
More than 1/3 of the points I transferred _____
Exactly enough points so that we would earn an equal number _____
All of the points that I had transferred to him/her _____

2) When Participant A was forced to return at least 10 points to you, how much did you worry that s/he would not return *more than 10 points* to you?



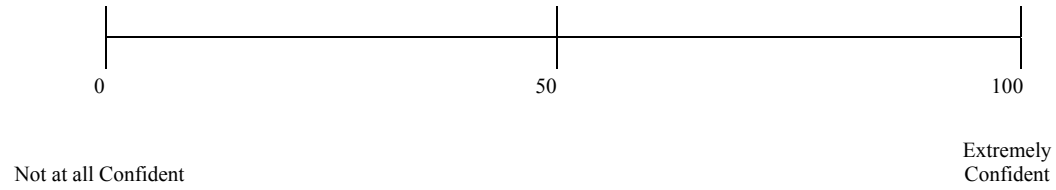
I was not at all worried — I was extremely worried

3) When Participant A was forced to return at least 10 points to you, to what extent did you trust him/her to return *more* than 10 points to you

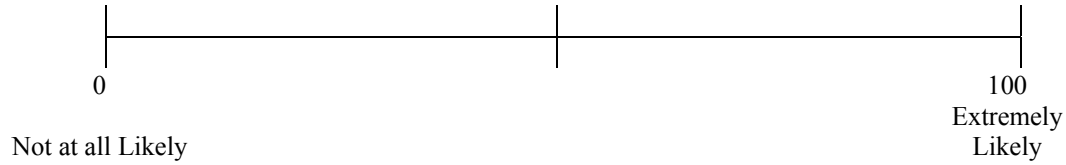


I did not trust Participant A at all — I was extremely trusting of Participant A

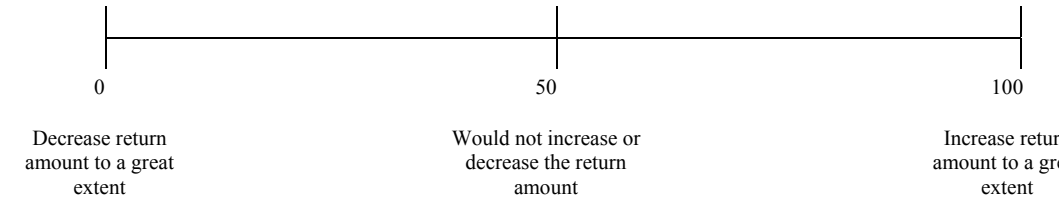
4) When Participant A was forced to return at least 10 points to you, how confident were you that s/he would return *more* than 10 points to you?



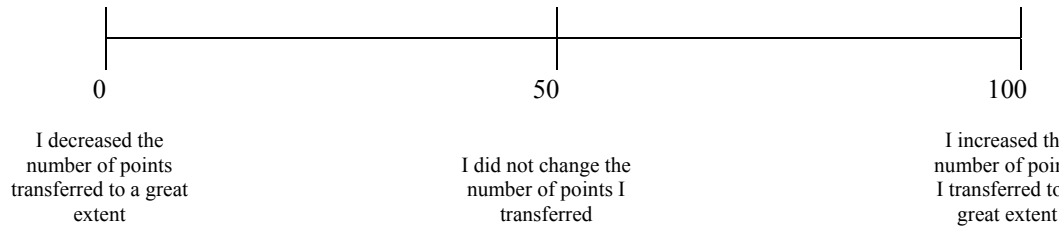
5) When Participant A was forced to return at least 10 points, how likely did you believe it was that s/he would return more than 10 points to you?



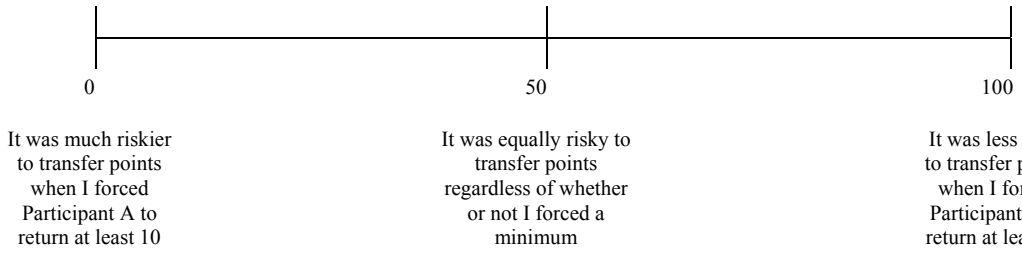
6) When Participant A was forced to return at least 10 points to you, to what extent did you believe it would affect the amount s/he would return (as compared to if s/he was not forced)?



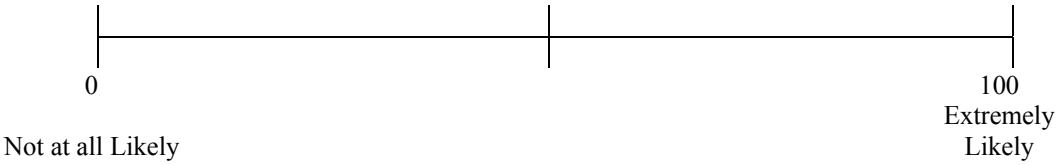
7) To what extent did you increase (or decrease) the number of points you transferred to Participant A when you forced him/her to return at least 10 points to you?



8) When Participant A was forced to return at least 10 points to you, to what extent did you feel it was more (or less) risky to transfer a large number of points (i.e., more than 30 points) than when no minimum return was required?



9) How likely is it that Participant A perceived that you did not trust him/ her when you forced him/her to return at least 10 points?

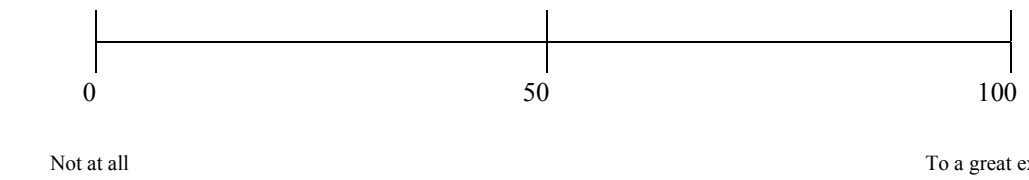


Please answer the following questions based on your beliefs/actions when Participant A was NOT forced to return at least 10 points to you

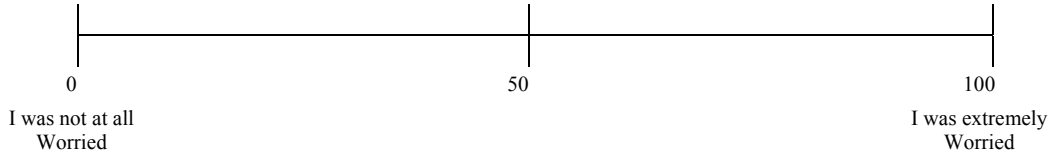
1) When Participant A was forced to return at least 10 points, how many points did you expect him/her to return to you? (Place an "X" next to the best answer.)

Zero points	_____
Exactly 10 points	_____
More than 10, but less that 1/3 of the points I transferred	_____
Exactly 1/3 of the points I transferred	_____
More than 1/3 of the points I transferred	_____
Exactly enough points so that we would earn an equal number	_____
All of the points that I had transferred to him/her	_____

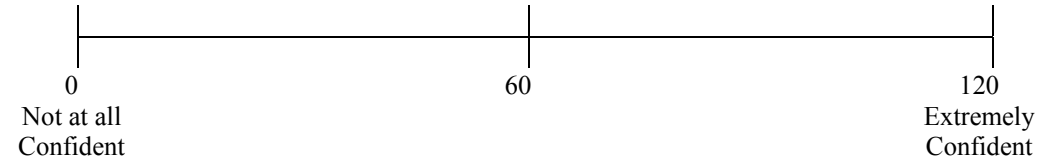
2) When Participant A was NOT forced to return at least 10 points, to what extent did you trust him/her to return at least 10 points to you?



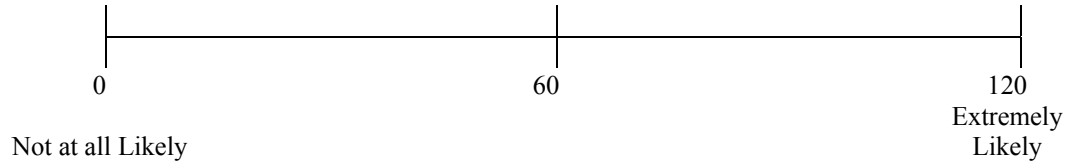
3) When Participant A was NOT forced to return at least 10 points, how much did you worry that s/he would not return more than 10 points to you?



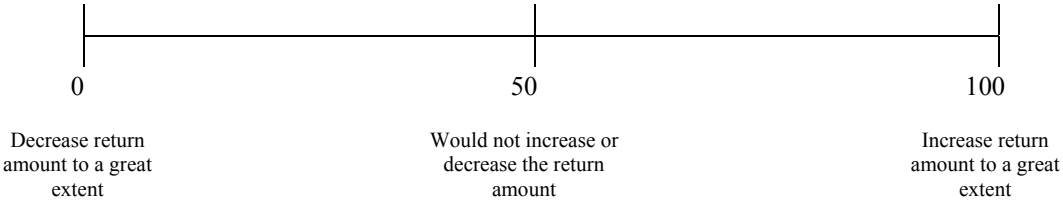
4) When Participant A was NOT forced to return at least 10 points, how confident were you that s/he would return more than 10 points to you?



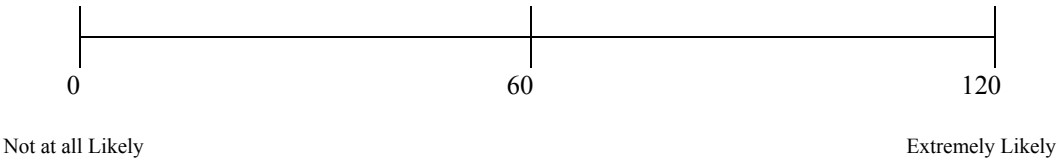
5) When Participant A was NOT forced to return at least 10 points, how likely did you believe it was that s/he would return more than 10 points to you?



6) When Participant A was NOT forced to return at least 10 points, to what extent did you believe it would affect the amount s/he would return to you?

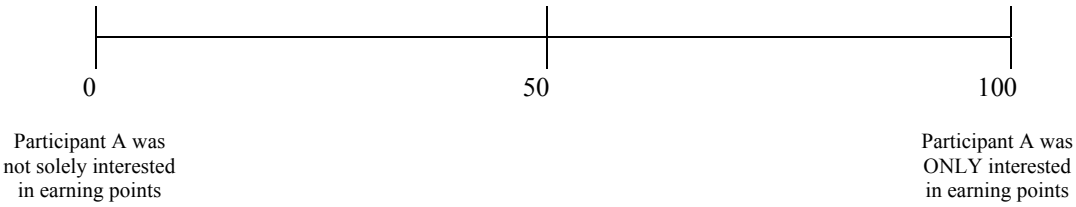


7) When Participant A was NOT forced to return at least 10 points, how likely did you believe it was that s/he would keep all of the points for himself/herself?

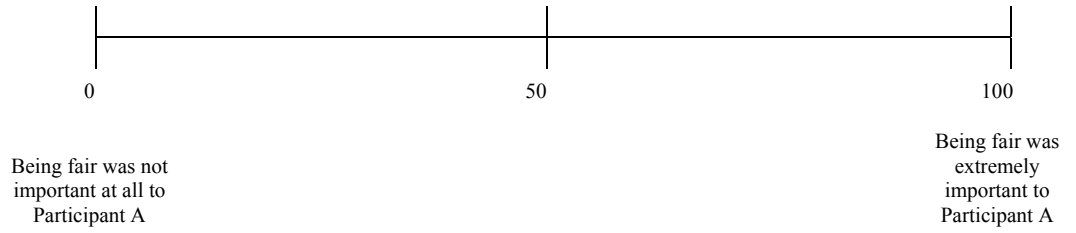


The following questions relate to the entire experiment:

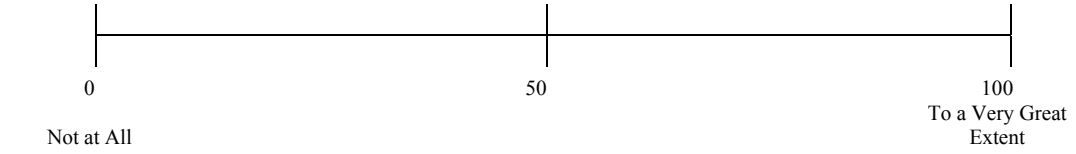
1) To what extent did you believe that Participant A was only interested in earning as many points as possible, no matter what?



2) To what extent did you believe that Participant A was concerned with fairness (i.e., wanted to give you a fair share of the points)?



3) To what extent did you believe that the number of points you transferred to Participant A would affect the number of points s/he returned to you?



4) Did your decision to impose the minimum transfer amount change over the course of the experimental session? How? What factors influenced any changes or caused you to continue your strategy?

5) Describe how you determined the number of points to transfer to Participant A:

6) Describe any other factors that impacted your decision making during the experiment:

Appendix C – Experimental Materials for Experiment 3

{NO CONTROL STAGE}

How will you be compensated?

In today's experiment, you will have the opportunity to earn points based on the choices you and others make. Points will be converted to cash and each point you earn will increase your cash payment.

The formula I will use to convert points to cash has the following structure:

US $ Payment = (Points earned X .06) + 5.00

The amount of points and money you earn will be based on the decisions you make and the decisions made by others. Therefore, the exact amount of money you will be paid cannot be precisely estimated beforehand. However, I can tell you that you will be paid a minimum of $5 for sure with maximum possible earnings exceeding $40. You will receive your payment, in cash, today before you leave.

The choices you will make during today's experiment are described in more detail on the following pages.

Overview of session

This is a computerized decision making study. In this experiment, you will assume the role of either Participant A or Participant B. You will remain in the same role throughout the entire experiment.

Before you begin, the computer will randomly match participants by type (one Participant A with one Participant B). Both participants will make decisions and these decisions will determine the number of points earned by each participant.

The pairings are anonymous. You will not be told who you are paired with either during or after the experiment.

Detailed information about the specific decisions made and how points are allocated to each participant as a result of these decisions is provided on the pages that follow. At the end, there will be a short quiz on these instructions to ensure your understanding.

Instructions

You are Participant A (B).

At the beginning of the experiment, every Participant A will receive 100 points.

Participant B will receive 120 points.

Decision of Participant B:

Participant B has one decision:

- Participant B can transfer any amount of his points (from 10 – 120) to Participant A (in increments of 10).

Decision of Participant A:

Once Participant B has chosen the number of his/her points to transfer:

- Participant A chooses any number of these points transferred from Participant B to return to him/her (up to the total transferred from Participant B).

Every point returned from Participant A to Participant B will be tripled by the experimenter. Every point *not* returned to Participant B is kept by Participant A and increases Participant A's income.

Every point returned from Participant A to Participant B therefore decreases Participant A's income by one (1) point and increases Participant B's income by three (3) points.

The formulas for the each participant's earnings are below:

Earnings of Participant A = 100 + B's transfer – return

Earnings of Participant B = 120 – B's transfer + (3 X return)

The experiment therefore consists of two steps:

Step 1:
In the first step, Participant B decides how many of his points (up to 120) to transfer to Participant A. Participant B can transfer points to Participant A in increments of 10.

Step 2:
In the second step, Participant A decides on the number of points which s/he wants to return to B. This may be an amount between 0 and the total transferred by Participant B.

After Participant A has decided how many points to return to Participant B, all participants will complete a short questionnaire.

Quiz

Please solve the following questions. The answers have no consequences on your earnings. Their only purpose is to check that every participant understands the instructions. When you are finished, raise your hand and the experimenter will go over the questions with you.

1. Assume Participant B transfers 100 points to Participant A. Participant A returns 22 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

2. Assume Participant B transfers 50 points to Participant A. Participant A returns 12 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

3. Assume Participant B transfers 20 points to Participant A. Participant A returns 6 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

4. For every 1 point Participant A returns to Participant B, Participant B earns 3 points.

   TRUE _____ FALSE _____

5. Participant A will know the number of points transferred by Participant B before s/he makes the return decision.

   TRUE _____ FALSE _____

{CONTROL STAGE – ENDOGENOUS CONDITION}

Instructions

You are Participant A (B).

At the beginning of the experiment, every Participant A will receive 100 points.

Participant B will receive 120 points.

Decisions of Participant B:

Participant B has two decisions:

(1) Participant B can transfer any amount of his/her points (from 10 – 120) to Participant A (in increments of 10).
(2) Participant B can require that Participant A return a minimum number of those points to him/her. Each point returned to Participant B is tripled by the experimenter.

More specifically, Participant B can transfer any of his/her 120 points to Participant A in 10 point increments. Participant A will then have the opportunity to return any number of those points to Participant B. Each point returned to Participant B will be tripled by the experimenter.

In addition, Participant B can force Participant A to return *at least* 10 points to him/her.

However, Participant B can also choose not to force Participant A to any minimum return and thus, leave the decision completely free to Participant A.

In summary, there are two (2) possible cases:

Case 1: Participant B forces Participant A to return at least 10 points to Participant B. In this case, Participant A may return any whole numbered amount **between 10 and the total number of points transferred by Participant B.**

Case 2: Participant B leaves Participant A completely free to decide the number of points to return and does not force him/her to return a minimum of 10 points to Participant B. In this case, Participant A may return any amount **between 0 and the total number of points transferred by Participant B.**

Decision of Participant A:

Participant A chooses the number of the points transferred from Participant B to return to him/her (up to the total transferred from Participant B). Every point returned from Participant A to Participant B will be tripled by the experimenter. Every point *not* returned to Participant B is kept by Participant A and increases Participant A's income.

Every point returned from Participant A to Participant B therefore decreases Participant A's income by one (1) point and increases Participant B's income by three (3) points.

The formulas for each participant's earnings are below:

Earnings of Participant A = 100 + B's transfer – return

Earnings of Participant B = 120 – B's transfer + (3 X return)

The experiment therefore consists of three steps:

Step 1:
In the first step, Participant B decides either to force Participant A to a minimum return of 10 points or to leave him/her free to decide the number of points to be returned.

Step 2:
In the second step, Participant B decides how many of his points (10 – 120) to transfer to Participant A. Participant B can transfer points to Participant A in increments of 10.

Step 3:
In the third step, Participant A decides on the number of points which s/he wants to return to B. This may be an amount:

- Between 10 and the total transferred by Participant B, if Participant B has forced Participant A to return at least 10 points, or
- Between 0 and the total transferred by Participant B, if Participant B has not forced Participant A to return at least 10 points.

After Participant A has decided how many points to return to Participant B, all participants will complete a questionnaire.

{CONTROL STAGE – UNCERTAIN CONDITION}

Instructions

You are Participant A (B)

At the beginning of the experiment, every Participant A will receive 100 points.

Participant B will receive 120 points.

Decision(s) of Participant B:

Participant B makes the following decision:

- Participant B can transfer any amount of his/her points (10 – 120) to Participant A (in increments of 10).

More specifically, Participant B can transfer any of his/her 120 points to Participant A in 10 point increments. Participant A will then have the opportunity to return any number of those points to Participant B. Each point returned to Participant B will be tripled by the experimenter.

As described below, Participant A may be forced to return a minimum number of points to Participant B:

Minimum return requirement

Importantly, at the beginning of Part II the computer will randomly determine if:
(1) Participant B makes the following decision, or
(2) The decision is made by the computer.

If Participant B makes the decision:

Participant B can require that Participant A return a minimum number of points to him/her.

In particular, Participant B can force Participant A to return at least 10 of his/her points to Participant B.

However, Participant B can also choose not to force Participant A to any minimum transfer and thus to leave the decision completely free to Participant A.

In summary, there are two (2) possible cases:

Case 1: Participant A is forced to return at least 10 points to Participant B. In this case, Participant A may transfer any whole numbered amount **between 10 and 120** to Participant B.

Case 2: Participant A is completely free to decide the number of points to return to Participant B and is not forced to return a minimum of 10 points to Participant B. In this case, Participant A may transfer any amount **between 0 and 120** to Participant B.

If the computer makes the decision:

The computer will randomly determine whether a minimum transfer of 10 points is forced.

Case 1 & Case 2 are the same regardless of whether Participant B or the computer makes the decision.

Decision of Participant A:

Participant A chooses the number of the points transferred from Participant B to return to him/her (up to the total transferred from Participant B). Every point returned from Participant A to Participant B will be tripled by the experimenter. Every point *not* returned to Participant B is kept by Participant A and increases Participant A's income.

Every point returned from Participant A to Participant B therefore decreases Participant A's income by one (1) point and increases Participant B's income by three (3) points.

The formulas for each participant's earnings are below:

Earnings of Participant A = 100 + B's transfer – return

Earnings of Participant B = 120 – B's transfer + (3 X return)

The experiment therefore consists of three steps:

Step 1:
In the first step, Participant A is either forced to return a minimum return of 10 points or is left free to decide the number of points to be returned.

Step 2:
In the second step, Participant B decides how many of his points (10 – 120) to transfer to Participant A. Participant B can transfer points to Participant A in increments of 10.

Step 3:
In the third step, Participant A decides on the number of points which s/he wants to return to B. This may be an amount:

- Between 10 and the total transferred by Participant B, if s/he is forced to return at least 10 points, or
- Between 0 and the total transferred by Participant B, if s/he is not forced to return at least 10 points.

After Participant A has decided how many points to return to Participant B, all participants will complete a questionnaire.

{CONTROL STAGE – EXOGENOUS CONDITION}

Instructions

You are Participant A (B).

At the beginning of the experiment, every Participant A will receive 100 points.

Participant B will receive 120 points.

Decision of Participant B:

In Part II, Participant B has one decision:

- Participant B can transfer any amount of his points (10 – 120) to Participant A (in increments of 10).

More specifically, Participant B can transfer any of his/her 120 points to Participant A in 10 point increments. Participant A will then have the opportunity to return any number of those points to Participant B. Each point returned to Participant B will be tripled by the experimenter.

Minimum return requirement:
In Part II, the computer will randomly determine whether Participant A is required to return a minimum number of the points transferred from Participant B back to him/her. Each point returned to Participant B is tripled by the experimenter.

Specifically, the computer will randomly determine whether Participant A is forced to return *at least* 10 points to Participant B.

However, the computer may also *not* force Participant A to return a minimum of 10 points and thus, leave the return decision completely free to Participant A.

In summary, there are two (2) possible cases:

Case 1: The computer forces Participant A to return at least 10 points to Participant B. In this case, Participant A may return any whole numbered amount **between 10 and the total number of points transferred by Participant B.**

Case 2: The computer leaves Participant A completely free to decide the number of points to return and does not force him/her to return a minimum of 10 points to Participant B. In this case, Participant A may return any amount **between 0 and the total number of points transferred by Participant B.**

Decision of Participant A:

Participant A chooses the number of the points transferred from Participant B to return to him/her (up to the total transferred from Participant B). Every point returned from Participant A to Participant B will be tripled by the experimenter. Every point *not* returned to Participant B is kept by Participant A and increases Participant A's income.

Every point returned from Participant A to Participant B therefore decreases Participant A's income by one (1) point and increases Participant B's income by three (3) points.

The formulas for the each participant's earnings are below:

Earnings of Participant A = 100 + B's transfer – return

Earnings of Participant B = 120 – B's transfer + (3 X return)

The experiment therefore consists of three steps:

Step 1:
In the first step, the computer randomly determines whether Participant A is forced to return a minimum of 10 points to Participant B or to leave him/her free to decide the number of points to be returned.

Step 2:
In the second step, Participant B decides how many of his points (10 – 120) to transfer to Participant A. Participant B can transfer points to Participant A in increments of 10.

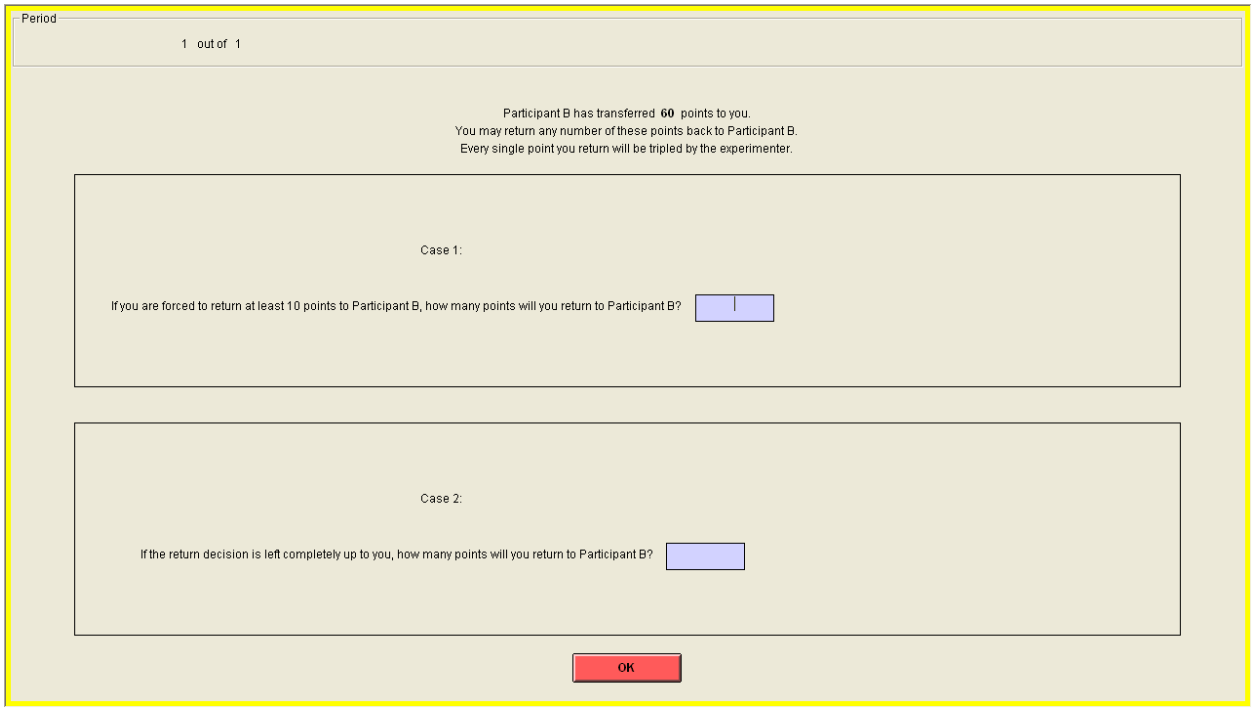
Step 3:
In the third step, Participant A decides on the number of points which s/he wants to return to B. This may be an amount:

- Between 10 and the total transferred by Participant B, if Participant A is forced to return at least 10 points, or
- Between 0 and the total transferred by Participant B, if Participant A is not forced to return at least 10 points.

After Participant A has decided how many points to return to Participant B, all participants will complete a questionnaire.

{ PAGE APPLIES TO AGENT PARTICIPANTS ONLY – ALL CONDITIONS}

Please take notice: As Participant A you have to decide on the amount to be returned to Participant B **before you know whether the computer does or does not force you to return at least 10 points.** This means you have to make two decisions. You will submit your decision through the following screen:



So, you will specify how many points you will return to Participant B if:

- The computer forces you to return at least 10 points (case 1), and
- The computer leaves the decision to your free choice (case 2).

Which of the two decisions is relevant for the actual return will be determined randomly by the computer. If the computer forces you to return at least 10 points to Participant B, your decision specified for case 1 will count. If the computer leaves the decision to your free choice the amount of points specified in case 2 will count.

QUIZ: Please solve the following questions. The answers have no consequences on your earnings. Their only purpose is to check that every participant understands the instructions. When you are finished, raise your hand and the experimenter will go over the questions with you.

1. Assume Participant B transfers 100 points to Participant A and the return decision is left entirely to Participant A. Participant A returns 22 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

2. Assume Participant B transfers 50 points to Participant A and Participant A is forced to return at least 10 points to Participant B. Participant A returns 12 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

3. Assume Participant B transfers 20 points to Participant A and the return decision is left entirely to Participant A. Participant A returns 6 points to Participant B. What are each participant's earnings?

   Participant A: _____ Participant B: _____

4. For every 1 point Participant A returns to Participant B, Participant B earns 3 points.
   TRUE _____ FALSE _____

5. Participant A will know the number of points transferred by Participant B before s/he makes the return decision.

   TRUE _____ FALSE _____

   {For Uncertain Condition Only}

6. Before you begin, it will be randomly determined whether Participant B or the computer will make the minimum transfer requirement decision.

   TRUE _____ FALSE _____

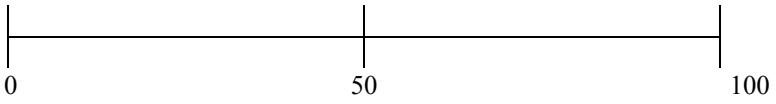
EXPERIMENT 3:
POST EXPERIMENTAL QUESTIONNAIRE FOR AGENTS

When scales are provided, please place a slash mark (/) on the point of the scale that corresponds to your judgment.

Answer the questions in the order they appear. After you have answered a question, please do **not** go back and change your response.

The following questions relate to the no control stage only.

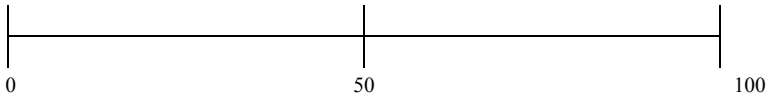
1) To what extent did you feel like Participant B trusted you?



Participant B did not trust me at all

Participant B trusted me to a very great extent

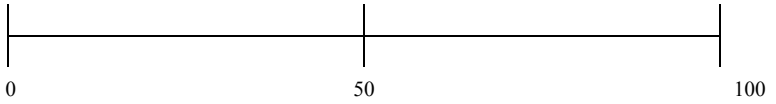
2) To what extent did you feel Participant B believed you would be a generous person?



Participant B did not believe I would be generous at all

Participant B strongly believed that I would be generous

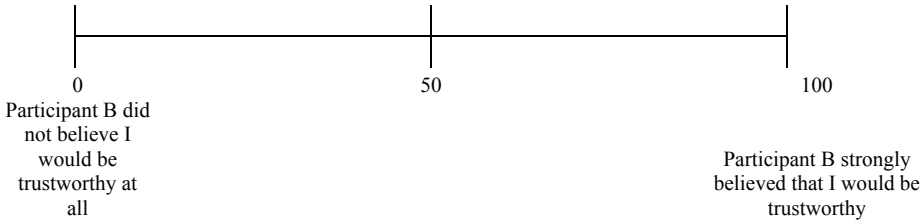
3) To what extent did you feel Participant B believed you would be a fair person?



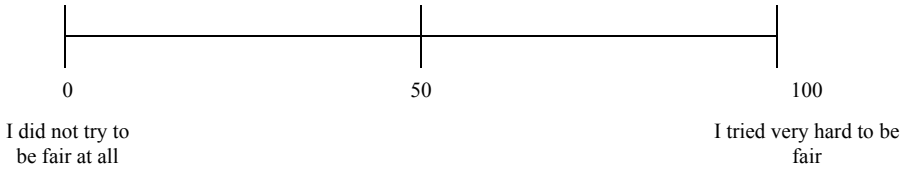
Participant B did not believe I would be fair at all

Participant B strongly believed that I would be fair

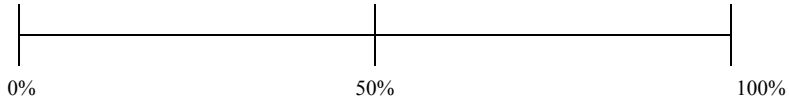
4) To what extent did you feel Participant B believed you were trustworthy?



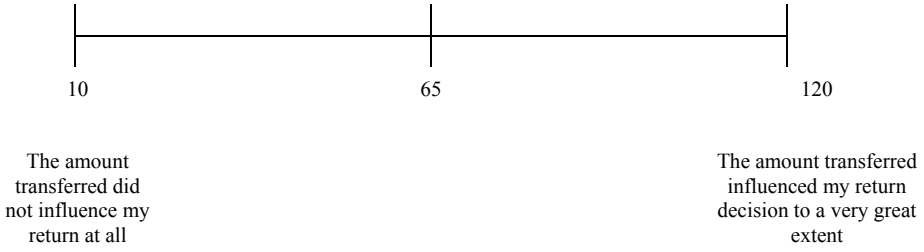
5) To what extent did you try to be fair when choosing the number of points to transfer?



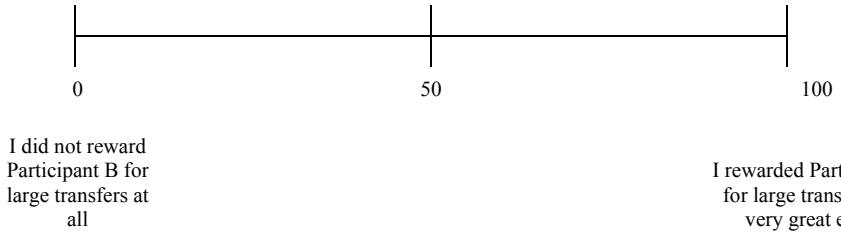
6) What percentage of the points transferred do you think Participant B expected you to return?



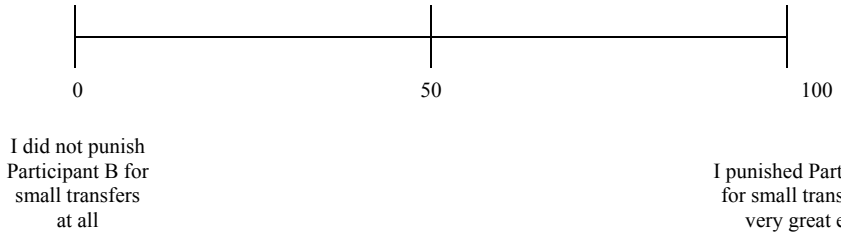
7) To what extent did the *amount* of points that Participant B transferred to you affect the number of points your returned to him/her



8) To what extent did you try to reward Participant B for transferring a large number of points to you?



9) To what extent did you try to punish Participant B for transferring a small number of points to you?



{FOR THE CONTROL STAGE, AGENT PARTICIPANTS ANSWERED THE SAME QUESTIONS AS PROVIDED AFTER EXPERIMENT 2}

EXPERIMENT 3:
POST EXPERIMENTAL QUESTIONNAIRE FOR PRINCIPALS

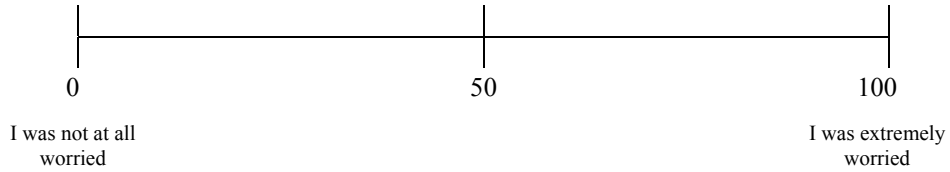
When scales are provided, please place a slash mark (/) on the point of the scale that corresponds to your judgment.

Answer the questions in the order they appear. After you have answered a question, please do **not** go back and change your response.

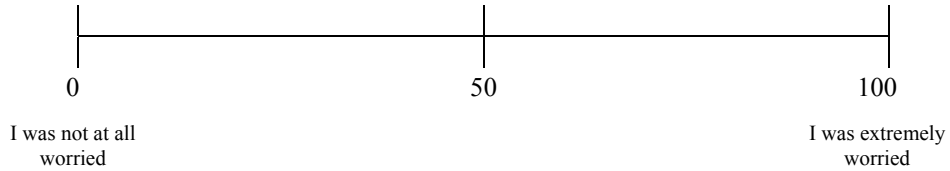
1) How many points did you expect him/her to return to you? (Place an "X" next to the best answer.)

Zero points _____
Exactly 10 points _____
More than 10, but less that 1/3 of the points I transferred _____
Exactly 1/3 of the points I transferred _____
More than 1/3 of the points I transferred _____
Exactly enough points so that we would earn an equal number _____
All of the points that I had transferred to him/her _____

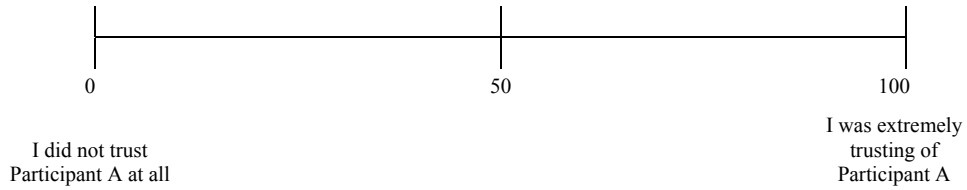
2) To what extent did you worry that s/he would not return any points to you?



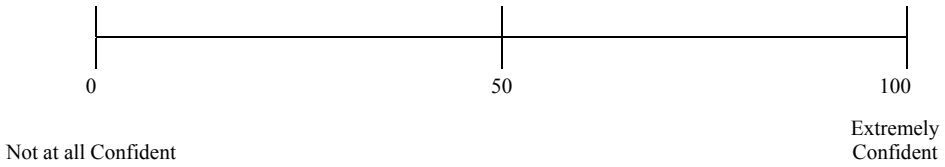
3) To what extent did you worry that s/he would not return *more than 10 points* to you?



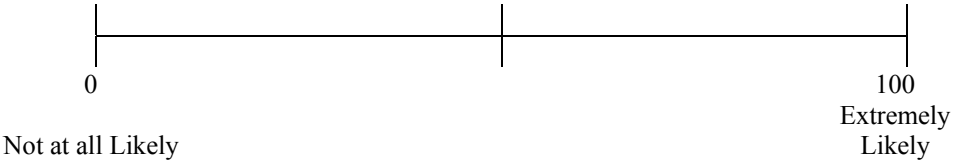
4) To what extent did you trust him/her to return *more* than 10 points to you?



5) How confident were you that s/he would return *more* than 10 points to you?



6) How likely did you believe it was that s/he would return more than 10 points to you?



7) Describe how you determined the number of points to transfer to Participant A:

{FOR THE CONTROL STAGE, PRINCIPAL PARTICIPANTS ANSWERED THE SAME QUESTIONS AS PROVIDED AFTER EXPERIMENT 2}

Appendix D: Instructions for Risk Preferences Lottery

The next page contains 15 items representing choices between a sure thing and a lottery. For each item, please indicate whether you prefer the $2.50 for sure or the specified lottery by placing a mark next to your choice. Be sure to make a choice for each of the 15 items.

After you have made your choices, we will randomly select one of the 15 items for payment by drawing a numbered ball from a container holding balls numbered 1 through 15. For example, if item 1 was selected for payment (i.e., the ball with the number 1 was drawn) the lottery has an 85% chance of paying $5.00 and a 15% chance of paying nothing; participants who chose the sure thing will receive $2.50. Similarly, if item 12 was selected for payment (i.e., the ball with the number 12 was drawn) the lottery has a 30% chance of paying $5.00 and a 70% chance of paying nothing; again, participants who chose the sure thing receive $2.50.

We will then conduct the lottery for the selected item by drawing a numbered ball from the container holding 100 balls numbered 1 through 100. For example, if item 12 was selected for payment, participants who chose the lottery for item 12 would win $5.00 if the number on the ball drawn is between 1 and 30 (i.e., 30% chance of winning). Alternatively, if the ball drawn for item 12 is between 31 and 100 (a 70% chance), participants choosing the lottery would win nothing. Participants who chose the sure thing instead of the lottery would receive $2.50.

These extra payments are in addition to anything you have already earned from the earlier part of the experiment.

PLEASE MAKE ONE CHOICE FOR EACH ITEM

	Sure Thing		Lottery
1.	_____ $2.50 for sure	OR	_____ 85% chance for $5.00 15% chance for $0.00
2.	_____ $2.50 for sure	OR	_____ 80% chance for $5.00 20% chance for $0.00
3.	_____ $2.50 for sure	OR	_____ 75% chance for $5.00 25% chance for $0.00
4.	_____ $2.50 for sure	OR	_____ 70% chance for $5.00 30% chance for $0.00
5.	_____ $2.50 for sure	OR	_____ 65% chance for $5.00 35% chance for $0.00
6.	_____ $2.50 for sure	OR	_____ 60% chance for $5.00 40% chance for $0.00
7.	_____ $2.50 for sure	OR	_____ 55% chance for $5.00 45% chance for $0.00
8.	_____ $2.50 for sure	OR	_____ 50% chance for $5.00 50% chance for $0.00
9.	_____ $2.50 for sure	OR	_____ 45% chance for $5.00 55% chance for $0.00
10.	_____ $2.50 for sure	OR	_____ 40% chance for $5.00 60% chance for $0.00
11.	_____ $2.50 for sure	OR	_____ 35% chance for $5.00 65% chance for $0.00
12.	_____ $2.50 for sure	OR	_____ 30% chance for $5.00 70% chance for $0.00
13.	_____ $2.50 for sure	OR	_____ 25% chance for $5.00 75% chance for $0.00
14	_____ $2.50 for sure	OR	_____ 20% chance for $5.00 80% chance for $0.00
15	_____ $2.50 for sure	OR	_____ 15% chance for $5.00 85% chance for $0.00

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Vita

Margaret Heim Christ is the daughter of Philip Heim and Kathleen de la Peña McCook and the step-daughter of William McCook. She is married to John Walter Christ. She was born on March 10, 1978 in Madison, Wisconsin. After graduating from University High School in Baton Rouge, Louisiana, in 1996, she attended Louisiana State University. While at LSU, Margaret was a student in the Honors College and studied accounting, with a concentration in internal audit. In December 1999, she received a Bachelor of Science degree in Accounting, cum laude. After graduation, Margaret worked as a risk consultant for Andersen, LLP in New Orleans, Louisiana and a senior risk consultant for Protiviti in Houston, Texas. In July of 2003, Margaret entered the Graduate School at the University of Texas at Austin. Margaret's research examines the effects of control systems on employees and management, the use of control systems in strategic partnerships, and the structure of internal audit departments. Recently her work has been published in the *Internal Auditor*, *Strategic Finance,* and by the IIA Research Foundation.

Permanent Address: 602 4th Ave SW, Ruskin, FL 33570

This dissertation was typed by the author.