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The Use of Rewards to Increase and Decrease Trust: Mediating Processes and Differential Effects

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Abstract

We test hypotheses asserting that reward structures - an omnipresent element of the work context - have a strong influence on interpersonal trust, and we explore the cognitive and behavioral routes through which the effects may occur. Specifically, we use attribution theory to identify several core processes including social perception (causal schemas), self-perception, and attributional biases (correspondence bias, suspicion effects, and pre-existing expectations) that may explain trust development. A 3 (cooperative/competitive/mixed rewards) X 2 (high/low initial trust) experimental design in a problem-solving task was used to examine the hypotheses. The results suggest that reward structures have a strong influence on trust, and that the effect is mediated by causal schemas, suspicion effects, and self-perception. We also found some support for the prediction that the impact of mixed reward structures on trust is biased by individuals' pre-existing expectations about their partner's trustworthiness. The theory and results suggest that attribution theory provides a useful framework for understanding the complex, diverse, and multiple routes through which trust may develop.

The degree of trust an individual has in a work partner has been shown to directly or indirectly affect a number of work outcomes such as individuals' work performance, organizational citizenship behaviors, organizational commitment, turnover intentions, satisfaction, and group performance (Dirks and Ferrin, 2001; In Press; Kramer, 1999). Perhaps as a consequence, researchers have demonstrated significant interest in the development of interpersonal trust. Several theoretical articles have focused principally or entirely on the antecedents of interpersonal trust (e.g., McKnight, Cummings, and Chervany, 1998; Whitener, Brodt, Korsgaard, and Werner, 1998). And while empirical research has lagged behind theory, empirical work has been conducted for some antecedents. In particular, interpersonal trust can be predicted by various leadership (e.g., Podsakoff, MacKenzie, Moorman, and Fetter, 1990) and communication (e.g., Butler and Cantrell, 1994) behaviors performed by trustees, trustors' perceptions of procedural justice (e.g., Korsgaard, Schweiger, and Sapienza, 1995), and organizational trust-building interventions (e.g., Zand, Steele, and Zalking, 1969). Although this research is an excellent beginning, a more complete understanding of trust development requires identifying other factors that may influence trust, and developing theoretical frameworks to understand the processes through which the factors operate.

In this article we will develop and test hypotheses asserting that reward structures have a strong influence on interpersonal trust, and we will explore the cognitive and behavioral routes through which the effects may occur. In doing so, we will attempt to develop insight into the complex process of trust development by investigating several attributional processes that may be simultaneously set in motion by a contextual variable such as rewards. We also note that, from a practical standpoint, reward structures may have more potential as a tool for intervention than most of the variables that have been previously examined as antecedents of interpersonal trust. Reward structures are omnipresent in work organizations, and are a crucial and often flexible means through which employees are motivated and resources are allocated. In contrast, trust-building activities and related interventions such as team-building are expensive

to implement organization-wide and have been found to have mixed effectiveness (Woodman and Sherwood, 1980). Similarly, initiatives aimed at changing individuals' communication and leadership behaviors can be expensive and can meet with mixed results because long-term behavior changes are difficult to achieve, and efforts are frequently thwarted by structural or contextual variables (e.g., reward systems). Hence, for practical as well as theoretical reasons, it is important for organizational researchers to develop a fuller understanding of the effects of rewards on interpersonal trust.

Theoretical Foundations

We will focus on trust development in dyadic relationships in which the primary task is joint problem solving. Joint problem-solving activities are central to many organizational phenomena and theories (e.g., participative leadership, negotiation, decision making). Individuals engaged in joint problem solving are interdependent because they must share and integrate information. Yet they are also at risk because as one contributes information and effort to the problem-solving task, one's partner may not reciprocate. Since interdependence and risk are recognized as the two necessary preconditions of trust (Rousseau, Sitkin, Burt, and Camerer, 1998), this is a context in which trust is likely to be relevant.

We will use Cummings and Bromiley's (1996) conceptual and operational definition of interpersonal trust: an individual's belief that another individual makes efforts to uphold commitments, is honest, and does not take advantage given the opportunity.¹ This definition was designed to assess trust perceptions in contexts involving potential competition and cooperation between two parties, and therefore seems appropriate for capturing trust-related phenomena in the present study.

Reward structures refer to the basis upon which rewards are distributed to two or more individuals. Following Deutsch's (1949b) work, researchers (e.g., Johnson and Johnson, 1989; Tjosvold, 1984) have examined reward and goal structures of two "pure" types: Rewards based solely on joint performance are "cooperative," and provide an incentive for individuals to work together because it is in

their common interest to perform well; rewards based solely on the performance of one individual relative to another are “competitive,” individuals are rewarded for outperforming their partner, hence it is in their interest to behave competitively. These two types can be combined to form a “mixed” structure that includes both cooperative and competitive rewards.

Attribution Theory

The primary objective of our study is to examine whether rewards have a direct effect on trust or whether, as we suspect, they represent a catalyst that may set in motion other processes that influence trust. Fundamental to our analysis is the use of attribution theory to model and examine the behavioral and perceptual processes through which rewards may influence trust. Our hypotheses will draw on three core attributional processes identified in attribution theory research (e.g., Kelley, 1967): social perception, self-perception, and attributional biases.

Attribution theory attempts to understand individuals’ causal explanations for events and occurrences, and individuals’ perceptions and judgments of others. Jones and Davis (1965) and Kelley (1967) formalized and extended many of Heider’s (1958) ideas in the form of their correspondent inference and covariance approaches, respectively. These two approaches assume that an individual evaluates a relatively large amount of information, for example about multiple persons in multiple situations at multiple points in time, to make a single attribution. But researchers soon realized that in many or most cases individuals have insufficient time, motivation, or information to engage in this level of information processing, and therefore take attributional shortcuts. Specifically, they use their causal schemas – their preconceptions about cause-and-effect knowledge (Kelley, 1973) – to make attributions based on limited information about person and situation. At about the same time, researchers began to realize that the processes of social perception outlined in attribution theory research could also describe self-perception, i.e., the processes through which individuals come to know *their own* internal states (Bem, 1972). Finally,

¹ Consistent with other recent research (e.g., Rousseau et al., 1998), we have defined trust as a psychological state

in more recent years, attribution researchers have directed a great deal of effort toward examining the effects of systematic biases, such as the correspondence bias (Gilbert and Malone, 1995), on attributional processes.

Trust development can be viewed as an attributional process. For example, an individual may develop beliefs about another person's trustworthiness based on whether the person's behavior is judged to be caused by internal vs. situational factors (e.g., see Korsgaard, Brodt, and Whitener, 2002). We suggest that attribution theory is useful for understanding several important aspects of the trust development process. As discussed above, attribution theory describes two distinct but related processes: social perception (developing inferences about another person's internal characteristics, including their traits, dispositions, beliefs, states and attitudes, and the reasons for their behavior), and self-perception (understanding one's own internal characteristics, including one's beliefs and attitudes). These two processes are relevant to two fundamental elements of interpersonal trust. Note that trust researchers have most often defined and operationalized trust as an individual's beliefs about another person's characteristics (e.g., Dirks and Ferrin, In Press); this definition assumes that an individual processes information and draws inferences about the other person (social perception) *and also* develops and can report an internal belief about his or her level of trust in the person (self-perception). Attribution theory is also helpful for understanding another aspect of trust development that researchers have discussed, but rarely studied: biases in trust development (e.g., McKnight et al., 1998). Given that a great deal of attribution research has focused on the effects of systematic biases on attributional processes, attribution theory may also provide insight into biases that occur in trust development. In sum, viewing trust development as an attributional process will enable us to draw on very relevant insights from three core areas of attribution theory: social perception, self-perception, and attributional biases.

that is distinct from cooperative or competitive behavior.

In this article we will describe how each of these three sets of attributional processes may mediate the effect of reward structures on interpersonal trust. The first two hypotheses will draw on two attributional biases that may affect trust development: correspondence bias (e.g., Gilbert and Jones, 1986), which is one of the most commonly documented attributional biases, and suspicion effects (e.g., Fein, 1996), which seem particularly relevant to trust development. Hypothesis 3 will draw on Bem's (1972) seminal work to examine how self-perception processes may influence trust development. Hypothesis 4 will examine social perception processes of trust development, focusing on the causal schema approach (Kelley, 1973). Our final hypothesis will examine the biasing effects of pre-existing expectations (i.e., schemas) on trust development (Jones, 1990).

We are not the first researchers to use attribution theory to study trust development (see Kruglanski, 1970; Strickland, 1958). However, these studies are few in number, and tend to draw more narrowly on attribution theory. One contribution of our article is that we will show how multiple perspectives from attribution theory can be used to theoretically model and empirically examine the behavioral and perceptual processes of interpersonal trust development. We believe it is important to examine these multiple processes simultaneously in order to more fully understand the complex, diverse, and multiple routes through which trust may develop.

Effects of Cooperative and Competitive Reward Structures on Interpersonal Trust

Prior research suggests that cooperative and competitive reward structures have the potential to influence interpersonal trust. Specifically, Tjosvold found that participants performing complex and simple tasks (1982) and engaging in participative decision-making (1985) under a cooperative reward structure developed a higher level of trust in one another than participants under a competitive reward structure. Yet the processes through which these effects occur have not been articulated or examined empirically. Thus, we will present and test a theoretical framework that describes the attributional processes through which rewards may influence trust, and also identifies some elements of attribution theory that suggest that

rewards may not influence trust. Our objective is to develop a framework that provides insight into the specific processes through which rewards may influence trust, and also provides insight into trust formation processes more generally.

Cognitive and Behavioral Routes through which Reward Structures May Influence Trust

Correspondence Bias. At the core of attribution theory is the idea that a person's actions can be caused by "personal forces" (those characteristic of the individual, such as the individual's beliefs, attitudes, and dispositions) and/or "environmental forces" (those factors residing outside the individual) (Heider, 1958). Heider's original formulation of attribution theory, and extensions of the theory such as the correspondent inference and covariation approaches, all state that if an individual attributes another person's behavior to internal forces, the individual is likely to use the behavior as a source of information for making inferences about the person's internal characteristics. But if the individual attributes the person's behavior to external forces, the information is unlikely to be used to make an inference about the person's internal characteristics. These approaches also suggest that individuals often consider *both* internal and external forces to draw inferences.

Yet, research on the correspondence bias (e.g., Gilbert and Jones, 1986) suggests that individuals' inferences about other persons' characteristics and behaviors are frequently and systematically biased. The correspondence bias is the tendency of an individual to draw inferences about a person's internal characteristics from behaviors that can be entirely explained by the situations in which they occur (Gilbert and Malone, 1995). Several explanations have been offered for this effect. For example, individuals may be insufficiently aware of situational constraints on a person's behavior. And individuals appear to conserve cognitive resources by making dispositional inferences first, and then considering situational factors only if time and cognitive resources are available to do so (Gilbert and Malone, 1995). While there is still some uncertainty about the causes of the bias, there is more agreement about its prominence: The bias has been recognized as a particularly robust and repeatable finding in attribution research (Jones, 1990).

In the present study, reward structures represent a situational determinant of behavior. Researchers have shown that cooperative and competitive rewards have a strong impact on interpersonal

behaviors (Johnson and Johnson, 1989). We will focus on interpersonal behaviors that are likely to be important in problem-solving interactions as well as relevant to the formation of trusting beliefs: the extent to which individuals share critical information, and share information accurately as opposed to being deceitful. Cooperative reward structures should motivate individuals to engage in cooperative behaviors such as sharing information because doing so is key to joint success and hence the acquisition of rewards. In contrast, competitive rewards should motivate individuals to engage in an opposite set of behaviors such as withholding information and sharing information inaccurately because these maximize one individual's performance at the expense of the partner.

Kelley's (1967) correspondent inference approach suggests that, absent the correspondence bias, an individual who observes a partner withholding and distorting information wholly in response to external competitive rewards should conclude that the behavior was caused by external rewards rather than the partner's internal trustworthiness (e.g., Jones, Davis, and Gergen, 1961). Thus, reward structures should *not* influence trust via the partner's behavior. In contrast, research on the correspondence bias suggests that the individual may conclude that the partner's situationally-induced behaviors are indicative of the partner's internal trustworthiness. Thus we predict that a partner's information-sharing and lying behaviors that are wholly caused by external factors will nevertheless influence the individual's trust in the partner.

Hypothesis 1. The effect of reward structures on an individual's trust in a partner is mediated by the partner's completeness and truthfulness in sharing of information.

Suspicion effects. Recent attribution research by Fein and colleagues (e.g., Fein, 1996) suggests an alternative to hypothesis 1. Their work has found that when an individual doubts the motives or genuineness of another person's behavior, the correspondence bias is reduced or eliminated. This occurs because individuals who are suspicious engage in more sophisticated attributional processing about the person's behavior. Specifically, they are more likely to devote cognitive resources to the task of correcting their initial inferences that behavior reflects the person's internal factors, and thus they give more consideration to situational influences on the person's behavior. According to these findings, individuals

interacting with a partner performing competitive behaviors induced by a competitive or mixed reward structure might avoid arriving at negative inferences about the partner's trustworthiness due to improved information processing. Accordingly, hypothesis 1 is less likely to be supported.

As a complement to the above effect, Fein and Hilton (1994) found that while suspicion may help individuals avoid the correspondence bias, suspicion also negatively affects the appraisals that an individual makes about the person, and this effect can occur regardless of the person's behavior. That is, the experience of suspicion helps an individual avoid incorrectly attributing a person's behavior to internal rather than situational factors, yet the experience also causes the individual to see the person in a more negative light *independent* of the person's behavior. This suggests that suspicion about another's motives should cause the individual to develop lower trust in the partner as a direct consequence of the suspicion, not the partner's behavior. We expect that in the joint problem-solving context, suspicion is likely to appear in the form of perceptions about the competitive motives that are present in the interaction. Importantly, reward structures provide only a stimulus for the development of suspicion; it is the extent to which one perceives that competitive motives are present in the interaction that may negatively influence trust.

Hypothesis 2. The effect of reward structures on an individual's trust in a partner is mediated by the individual's perception of competitive vs. cooperative motives in the interaction.

Self-Perception. Bem's (1972) fundamental insight was that many of the processes of social perception outlined in attribution theory research could also be used to explain self-perception. According to Bem, individuals' internal states (attitudes, beliefs, dispositions) may correspond with their behaviors because individuals use their own past behaviors as a source of information to understand their own internal states. That is, "individuals come to 'know' their own attitudes, emotions, and other internal states partially by inferring them from observations of their own overt behavior..." (1972, p. 2). Koller's (1988) field experiment supported the hypothesis that trust may develop via self-perception.

Building on the above ideas, a self-perception analysis of interpersonal trust development suggests that individuals may form their trusting beliefs in a partner by considering whether their own trust-related behaviors with respect to that partner indicate a trusting belief. Specifically, individuals who shared information fully and accurately with a partner should form a relatively high level of trust in the partner via self-perception, while individuals who withheld information and/or shared information inaccurately should form a relatively low level of trust. And, as discussed above, cooperative rewards should influence individuals to share information completely and accurately, while competitive rewards should influence individuals to withhold information and share it inaccurately. Thus, reward structures may influence individuals' behavior, which individuals may then use as a source of information for inferring their level of trust in the partner.

Hypothesis 3: The effect of reward structures on an individual's trust in a partner is mediated by the individual's own completeness and truthfulness in information sharing.

Causal Schemas. Kelley (1973) noted that individuals often make attributions based on limited information, rather than following the fairly formal guidelines outlined in the correspondent inference and covariance approaches. Individuals can make such attributions because they are able use their causal schemas, i.e., their preconceptions about cause-and-effect relationships, to draw inferences about the causes of behaviors and events. While causal schemas can range from simple beliefs (e.g., "good people do good things") to multiple schemas that might be compared and contrasted as plausible explanations for an observed behavior or event, there is evidence that individuals prefer simple schemas over more complex schemas.

A causal schema analysis of trust development suggests that rewards may influence the development of interpersonal trust via individuals' perceptions of their dyad's performance. Research supports both linkages in this causal chain. First, Deutsch (1949a; 1949b) suggested and found that cooperative rewards cause individuals to expect their group to have higher performance and functioning due to their perceived common fate. These effects are expected to exist aside from any impact on actual

performance. Second, research by Staw (1975) suggests that teams that perceive themselves as performing well will develop more positive appraisals of the group, suggesting that they may also develop higher levels of trust. At the conclusion of a group task, Staw's participants were randomly told that their group performed either far above average or far below average, and were then asked to report on the cohesiveness, communication and motivation that existed in their group. Participants in the high performance condition rated their groups higher on these characteristics than did participants in the low performance condition, indicating that their appraisals were shaped by their perceptions of group performance.

Hence, in the present study, we expect that reward structures will influence individuals' perceptions of team performance. Then we expect that individuals will conclude that high levels of joint performance imply high trust via their causal schemas, for instance reasoning that "High trust leads to high performance, and since we're a high performance team, we must trust each other." In sum, drawing on theories of causal schemas in the attribution process, we predict that reward structures will impact perceived performance, which will then impact trust.

Hypothesis 4. The effect of reward structures on an individual's trust in a partner is mediated by the individual's perception of the dyad's performance.

Initial Expectations. Lastly, we draw on research on schemas and their effects on the attribution process to explore the effects of mixed reward structures on trust. In most workplace situations, there is a mix of competitive and cooperative rewards, providing people with the opportunity to emphasize certain rewards and de-emphasize others (Deutsch, 1949b; Tjosvold, 1984). Yet prior research (Tjosvold, 1982, 1985) has only examined the effects of "pure" reward structures on trust. Contrary to the presumption that mixed reward structures simply combine elements of cooperative and competitive structures and therefore should produce trust levels at the midpoint of those produced by cooperative and competitive structures, we will propose that schema theory suggests a different, more complex prediction.

Thus far, we have not considered the effects of individuals' prior knowledge of one another on trust development. Addressing this point, Jones (1990) noted that individuals often have pre-existing expectations about the other person, typically derived from prior interaction with the person. These expectations fill in gaps in information and create "theory-driven" selection, processing, and interpretation of information in the attribution process. These expectations are often known as schemas.

A core prediction of schema theory is that once one associates a person with a particular schema, the schema will bias one's information processing about the person so that information consistent with the schema is more likely to be perceived, retained and recalled than information that is inconsistent. This reinforcement effect will continue as long as there are not large discrepancies between the information and the schema. However, when large discrepancies occur, individuals are likely to modify their schema, or perhaps adopt or form a new schema (e.g., Feldman, 1981; Fiske and Taylor, 1991).

In the present study, we expect that individuals in the high initial trust condition will utilize a schema that characterizes their partner as being trustworthy, and this schema will then influence their subsequent information processing. High initial trust individuals who are in a cooperative reward condition are likely to observe partner behavior that is cooperative and therefore entirely consistent with the trustworthy schema. High initial trust individuals in the mixed condition are likely to encounter mixed or ambiguous behavior that is not clearly inconsistent with the trustworthy schema, therefore their schema is likely to cause them to attend to and interpret behavior in a way that reinforces trust. However high initial trust individuals in the competitive condition are likely to encounter partner behavior that is clearly inconsistent with the trustworthy schema; these individuals may have to change their schema, probably to one that characterizes their partner as untrustworthy. Thus the effects of rewards on trust will be nonlinear: Mixed reward structures will produce trust levels more similar to cooperative rewards than competitive rewards. The same logic applies, conversely, to individuals in the low initial trust condition: Low initial trust individuals in competitive and mixed conditions should attend to and process information in

a manner that reinforces their low trust schema, while low initial trust individuals in the cooperative condition may observe behavior that contradicts their low trust schema and influences them to adopt a high trust schema. Consequently, trust levels in the mixed reward condition will be more similar to those in the competitive condition than those in the cooperative condition.

Hypothesis 5. The level of initial trust will influence the effect of reward structures on trust. In high initial trust dyads, trust levels produced by mixed reward structures will be more similar to those produced by cooperative reward structures than those produced by competitive reward structures. In low initial trust dyads, trust levels produced by mixed reward structures will be more similar to those produced by competitive reward structures than those produced by cooperative reward structures.

Method

Following guidance provided by Dobbins, Lane, and Steiner (1988), we chose an experimental method and laboratory setting as it improved our ability to examine specific mediating processes, and draw conclusions about causality; both issues are critical to our hypotheses.

Participants

Upon entering the laboratory, participants (224 upper-division business students) were randomly assigned to a computer terminal that would allow them to interact with a partner. Next, each dyad was randomly assigned to a high or low trust condition, and then to a cooperative, mixed or competitive reward condition. Individuals received extra-credit points in a class for participating.

Task

We adapted the moon (e.g., Bottger and Yetton, 1988) and wilderness survival (Marcic, 1995) tasks for this study. In these tasks, group members are told they are stranded on the moon or in the wilderness, and have a set of items (e.g., water, duct tape) that may help them survive. The objectives are to individually and jointly rank the items based on their importance for survival.

We adapted each of the two tasks by giving one individual in the dyad information about the usefulness of one-half of the items (role 1) and the other individual information about the usefulness of the other half of the items (role 2). Participants were told the information was to “provide clues on the use and

importance of each particular item within this environment.” We also provided ancillary information about each item that participants could use to mislead their partner about the importance of an item if they wished to do so. Hence, joint performance depended on the participants analyzing and sharing important information and not misleading each other with untruthful information.

We selected the moon and wilderness survival tasks for several reasons. First, these types of tasks have frequently been used in experimental research on joint problem solving (e.g., Bottger and Yetton, 1988; Littlepage, Schmidt, Whisler, and Frost, 1995), and are used extensively to train executives in joint problem solving. This acceptance by the practitioner community suggested that the tasks would be relatively high in experimental realism, and were more likely to produce externally valid findings. Indeed, participants displayed numerous indicators of being engaged in the task and wanting to perform well. For example, they began strategizing and communicating immediately and rarely stopped until time ran out; they cooperated with, competed with, and/or lied to their partners, displayed concerns over being taken advantage of by their partner, and demonstrated anger and feelings of violation when they felt they had been. Second, we wished to use participants’ behavioral experiences in an initial task as a basis for inducing them into a high or low level of initial trust, so that we could then analyze the joint effects of reward structures and initial trust on interpersonal trust levels in a second task that was nearly identical in nature. Hence, the correspondence between tasks allowed the participants’ trust to transfer most effectively across situations.

Procedure

In order to enhance experimental realism, participants worked with other participants (as opposed to interacting with a confederate). Participants were seated at different terminals and communicated via a commercial group problem-solving software program. Participants knew they were working with a partner, but could not see the partner and did not know the partner’s identity. We chose this medium because it helped eliminate a number of possible confounds such as assessments of similarity,

attractiveness, and liking, and nonverbal signals of trustworthiness, each of which could independently affect perceptions, behavior and/or trust. Additionally, it allowed us to keep an exact record of the dyads' problem-solving processes. A strict schedule was kept, so that each dyad was given an identical amount of time for each segment of the experiment.

After receiving instructions and answers to any questions, the participants interacted with their partner on the moon survival task, ranking the survival items first as a dyad, then as individuals. Participants were then told that they would be working with their partner on a similar task – wilderness survival – but this time they would be scored and rewarded based on their performance. (There were no stated rewards for the moon survival task). At this point, participants were given information about the wilderness survival task and the scoring system (manipulation of reward structures) that would be used.

Immediately prior to commencement of the wilderness survival task, two things happened: Participants were given feedback about their partner's behavior in the moon survival exercise (this was the trust manipulation and will be described below), and they were asked to fill out a short questionnaire that included the manipulation checks. Participants then worked together on the wilderness survival task, provided joint and then individual rankings, and completed a second questionnaire. At the conclusion of the study, participants received an immediate debriefing, including a disclosure of the false feedback.

Two steps recommended by Aronson, Ellsworth, Carlsmith, and Gonzales (1990) were taken to minimize demand characteristics so that, if demand characteristics existed, they would not be related to the variables of interest. Participants were told that the purpose of the study was to “understand problem solving in computer-mediated communication” in order to disguise our true interest in the effects of rewards on trust. And, we specifically asked participants to provide their honest responses and natural behavior, as opposed to trying to meet any perceived expectations of the researchers.

Trust and Reward Structure Manipulations

We provided participants with false feedback about their partner's behavior in the moon survival task in order to induce dyads into a state of relative high or low initial trust consistent with the conceptual definition of trust above. A researcher examined the transcripts of the moon survival task within view of the participants. Then the researcher gave a brief handwritten report to participants in the high trust condition indicating that their partner had (a) shared all relevant information and (b) shared the information accurately. Participants in the low trust condition received a report indicating that their partner had (a) withheld critical information and (b) shared some information inaccurately (i.e., lied). To make the reports more believable, each report listed specific examples, drawn from the transcripts, of the accuracies/inaccuracies and shared/withheld information. (The moon survival task was adapted so that the researcher could realistically portray information utilized in the task as accurate or inaccurate).

The three reward structures were derived from definitions commonly accepted in the literature (e.g., Tjosvold, 1984). Individuals in the cooperative reward condition were told that their score would be based upon the performance (accuracy of ranking) of their dyad. Individuals in the competitive reward condition were told that their score would be based upon their performance relative to their partner's performance. And individuals in the mixed reward condition were told that half of their score would be based upon the performance of their dyad and the other half of their score would be based on their individual performance relative to their partner's individual performance. The instructions were provided in written form. As an incentive, participants were informed that the highest-scoring participants would be included in a lottery to win \$75.

Measures

Manipulation Checks. Two categorical multiple-choice questions were used to check the reward structure manipulation. These and all other items are detailed in the appendix. A two-way cross-tabulation of participants' responses to the two questions indicated that they were strongly related ($\chi^2(9, N = 224) =$

379.11, $p < .001$), providing evidence of reliability. The trust manipulation was checked with a five-item scale adapted from Cummings and Bromiley (1996) ($\alpha = .93$).

Chi-square analyses of responses to the two reward manipulation check questions revealed significant differences across reward conditions. For question 1, $\chi^2(6, N = 224) = 294.90, p < .001$, 86% of the responses accurately reflected the reward condition; for question 2, $\chi^2(6, N = 224) = 299.69, p < .001$, 86% of the responses accurately reflected the reward condition; 90% of participants answered at least one question correctly. Chi-square analyses of responses to the two reward manipulation check questions revealed no significant differences across trust condition ($\chi^2(3, N = 224) = 1.35$ and 0.67 for questions 1 and 2, respectively, *ns*), indicating that the trust manipulation did not have any unintended effect on the reward manipulation check.

A 3 X 2 full factorial ANOVA conducted on the trust check yielded a main effect for trust condition, $F(1, 218) = 153.35, (p < .001)$, with participants in the high trust condition reporting higher levels of trust ($M = 29.69, SD = 5.29$) than those in the low trust condition ($M = 18.88, SD = 7.78$). Reward condition also had a significant, unintended effect on the trust check $F(2, 218) = 4.59 (p < .05)$ ($M_{competitive} = 22.96, SD = 8.39; M_{mixed} = 24.07, SD = 8.05; M_{cooperative} = 25.69, SD = 9.06$). The interaction term was insignificant. Since the unintended effect of rewards was much smaller (omega squared = .019) than the intended effect of trust (omega squared = .401), the statistical significance of the unintended effect should not be of great concern (Perdue and Summers, 1986). Finally, we noted that there were no substantial differences in the manipulation check reliabilities or results across role 1 and role 2.

Behavioral Mediators. We followed procedures that have been outlined in the literature on coding social interactions and group processes (Weingart, 1997) to develop reliable, objective measures of the actual behaviors occurring in the wilderness survival task. We first developed a coding scheme comprising three codes: “responding” = sharing information in response to a request for information; “volunteering” = sharing information without being requested to do so; and “lying” = sharing information

inaccurately. We then trained a coder who was blind to the conditions and hypotheses. The coder first “unitized” the data by breaking the discussions into the smallest units that had logical meaning. Each unit was then assigned a code, and the number of occurrences of each code was tallied for each member of each dyad. Hence, the responding, volunteering and lying scores for each individual represent the number of times the individual performed each act during the wilderness survival exercise.

One author independently coded a subset of the data so that inter-rater reliability could be checked at the beginning and end of the coding process. Guetzkow’s *U* (1950), a reliability index that measures disagreement in unitizing, was acceptable at both times: .03 and .03. Cohen’s kappa (1960), an inter-rater reliability index that measures agreement in coding the unitized process data, adjusted for chance agreement, was also acceptable at both times: .86 and .93. The responding and volunteering items were then summed to form an “information sharing” score for each individual.

Perceptual Mediators. Four items were adapted from Alper, Tjosvold, and Law (1998) to measure perceived motives in the wilderness survival task. Perceived performance was measured with two questions adapted from Alper et al. (1998). Since we were interested in participants’ *perceived* performance, we did not give them any feedback on actual performance on either of the two tasks.

Actual Performance. Consistent with other studies (e.g., Littlepage et al., 1995), this control variable was calculated as the sum of differences between the group’s and an expert’s rankings for each of the items. The sum was subtracted from a constant so that higher scores reflect better performance.

Dependent Variable. Trust was measured at the conclusion of the wilderness survival exercise, using the same 5-item scale (Cummings and Bromiley, 1996) used to check the trust manipulation.

Results

Descriptive statistics, intercorrelations and reliability coefficients are provided in Table 1. We used effects coding (Cohen and Cohen, 1983) to create the reward structure variables for the correlation and regression analyses, thus the three reward conditions are represented in the regression equations by two

effects coding variables. In order to avoid nonindependence of observations, we only used data provided by one member of each dyad (role 1 participants; $N = 112$).

 Insert Tables 1 & 2 about here.

Convergent and Discriminant Validity. A confirmatory factor analysis of the mediator and dependent variables (perceived motives, information sharing, lying, perceived performance, trust) indicated a relatively good fit and supported convergent validity for a five-factor model ($C^2 = 116.48$, $df = 69$, $p < .001$; GFI = .88, CFI = .96, NFI = .91, RMSEA = .079, all item-factor loadings $\geq |.46|$ ($p < .001$)). We noted high correlations among perceived motives, perceived performance, and trust. A series of discriminant analyses (Bagozzi and Phillips, 1982) fixed one, two or all three of the possible correlations among these three latent factors in the five-factor model at 1.0, and then employed a C^2 difference test on the values in the unconstrained vs. each of the constrained models. In all cases the C^2 of the unconstrained model was significantly lower ($p < .001$ for $C^2_{\text{difference}}$) than that of the constrained model, supporting the discriminant validity of the constructs.

Mediator Hypotheses. The Baron and Kenny (1986) procedure was used to examine the extent to which the effect of reward structures on trust was mediated by participants' attributions regarding their partners' behaviors (H1); perceived motives (H2); their own behaviors (H3); and/or perceived performance (H4) (see Table 2). In step 1, we regressed the mediator variables on the independent variable (reward condition). In all cases, the mediator was significantly predicted by both reward variables. (Note also that in steps 1a & 1b, partner behavior was wholly attributable to reward condition (reflecting a situational factor) and not the initial trust condition (reflecting an internal factor), a necessary condition for testing the correspondence bias hypothesis). In step 2, we regressed the dependent variable (trust) on the independent variable; all variables were significant predictors. Finally, in step 3 we regressed the dependent variable on the mediator and independent variables and noted the following: First, reward

condition was no longer a significant predictor of trust, and the magnitude of the betas decreased substantially (-.41 to -.03; .37 to .08), indicating that the effects were fully mediated. Second, partner's information sharing and lying behaviors were not significant predictors of trust, indicating no support for hypothesis 1; perceived motives and perceived performance were significant predictors of trust, supporting hypotheses 2 and 4; and own information sharing but not own lying were significant predictors of trust, providing partial support for hypothesis 3. These results are summarized in Figure 1. Finally, the relatively high R^2 (.63) suggests a low likelihood of erroneous conclusions due to an underspecified model.

 Insert Figure 1 about here.

Interaction Hypothesis. Step 4 presents the results of a moderated regression examining whether the effects of rewards are contingent on initial trust. The significance of one of the interaction terms ($b = .14$; $p < .05$ for initial trust x cooperative rewards) suggested the presence of an interaction (Aiken and West, 1991). To further investigate the effect, we plotted the mean levels of trust across the three reward conditions for individuals in the high trust condition, and then for individuals in the low trust condition. The pattern of results in the high trust condition was consistent with our prediction: Trust levels in the mixed condition (mean = 28.11) were more similar to trust levels in the cooperative condition (mean = 32.11) than in the competitive condition (mean = 23.11). However, the plot for the low trust condition was inconsistent with our prediction: Trust levels in the mixed condition (mean = 22.53) were more similar to those in the cooperative condition (mean = 24.86), rather than being more similar to those in the competitive condition (mean = 18.56). Thus hypothesis 5 received mixed support.

Research Implications

In this article we used attribution theory to model and examine the perceptual and behavioral routes through which reward structures may influence trust. We found full or partial support for hypotheses suggesting that rewards influence trust via social perception (causal schemas) and self-

perception, and that trust development is also influenced by attributional biases (suspicion, and schema effects). Our theory and findings highlight the usefulness of attribution theory for understanding trust development, including the multiple attributional processes that operate simultaneously to influence a single variable such as trust.

As discussed at the outset, reward structures are a powerful element of the organizational context, and represent a potentially useful tool for managers who wish to change employees' behaviors, perceptions and beliefs. While the ability of rewards to change employees' behavior is well recognized, we believe managers as well as researchers do not fully appreciate and are unable to anticipate the other important effects that rewards may have – on perceptions, and ultimately on trust. Attribution theory is highly useful for anticipating such effects, as the theory recognizes the powerful influence that context may have on behavior, it examines the processes through which individuals assess the influence of context on their own and others' behavior, and it enables the researcher to predict the beliefs and inferences that individuals will form based on their assessments.

We examined several specific attributional processes that were set in motion by a single contextual variable, rewards. We hope that our findings spur future research into other attribution processes that could be influenced by rewards, and other contextual variables that could influence trust development via attribution. For example, our theoretical framework and findings identified some key routes through which trust may develop: actual behavior, perceived motives and perceived performance. Scholars interested in identifying other antecedents of trust may find it worthwhile to focus on interventions or variables that influence these processes. For example, they might focus on goal structures that influence behavior, elements of organization culture that influence perceived motives, or positive feedback and “planned wins” that influence perceived performance.

One mediator hypothesis did not receive support. Reward structures influenced partner's behavior, but these effects were not transmitted to trust, providing no support for the correspondence bias

hypothesis (hypothesis 1). As anticipated in hypothesis 2, this may be because individuals engaged in sophisticated attributional processing due to suspicion effects, attributing their partners' behavior to situational rather than internal factors. This result may also be due to the fact that in our study, as in many actual work situations, participants may have had difficulty ascertaining, and little opportunity to verify, whether their partners were sharing information completely and/or accurately.

Our finding that, in the mixed reward condition, the effect of rewards on trust was influenced by the level of pre-existing trust may have implications for cooperation theory research. Cooperation theory research generally focuses on the effects of 'pure' cooperative or competitive reward structures despite the recognition that in the real world mixed structures predominate (Deutsch, 1949b; Tjosvold, 1984). Our research indicates that when situations are equally weighted with cooperative and competitive rewards, elements of the situation such as pre-existing trust may cause people to emphasize one of the pure rewards over the other.

As noted earlier, an experimental method and laboratory setting were chosen to provide a stronger basis for drawing conclusions about causality and to enable us to effectively measure and investigate the four hypothesized mediating processes. It also allowed us to reduce or eliminate a number of possible confounds such as perceptions of similarity, institutional and dispositional sources of trust, and cooperation norms. These objectives would have been very challenging to accomplish in a field setting, particularly since reward structures within organizations have a historic context, and are based on numerous external and internal business and management considerations, any number of which could have confounding effects on individuals' perceptions, behavior, and/or trust.

However, the method and setting also raise a concern about external validity. Several factors may limit the severity of this concern. A meta-analysis by De Vader, Bateson, and Lord (1986) provides direct evidence that studies of attribution processes conducted in the laboratory and in the field tend to produce very similar results, with the authors suggesting that results tend to generalize across settings. Within our

particular study we used several practices to attempt to maximize the potential for external validity. Specifically, we selected survival simulations as our experimental tasks in part because they are used extensively by corporate trainers to train managers in joint problem-solving (see for example Dyer, 1977; Skopec and Smith, 1997). This suggests that our experimental tasks reproduced essential elements of joint problem solving relevant to organizations. We also designed the experiment so that it contained the two elements that Rousseau et al. (1998) noted are essential for the development of trust – risk and interdependence. Including such essential elements has been recommended for enhancing external validity (Locke, 1986).

Finally, we examined trust development in computer-mediated dyadic relationships. To be conservative, our findings may be most applicable to virtual interpersonal relationships, which are increasingly prevalent and in which scholars have asserted that trust is crucial (e.g., Cascio, 2000). However, our theorizing was not limited to the virtual context, and dyads are a building block of larger groups, suggesting that our results may apply in face-to-face relationships and larger groups. Future research should examine the effects of rewards on trust in these contexts.

Managerial Implications

The findings in this article should be useful to managers who are interested in changing trust levels within their organizations, and also to managers who are interested in anticipating the effects of planned reward changes. From a managerial perspective, reward systems are a potentially useful tool because they are present in essentially all work organizations, management at some level of the organization typically has at least some ability to modify rewards, and rewards can often be modified on a system-wide basis, or on a more targeted basis. Our analyses, combined with prior research, suggest that managers can expect rewards to have strong, predictable effects on interpersonal trust. Yet our analyses also suggest that, rather than having a straightforward, direct effect on trust, rewards appear to affect trust by influencing individuals' perceptions about each others' motives, their perceptions of joint performance, and

their evaluations of their own behavior based on those reward structures. Thus, we expect that our findings will help managers better understand *how* rewards influence trust, and better anticipate some of the other important consequences of reward changes that are related to trust. Lastly, in cases in which managers are unable (e.g., due to collective bargaining) or unwilling to use reward systems to change trust levels, our mediation analysis suggests alternate perceptual routes through which trust levels may be changed.

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Table 1.

Means, Standard Deviations, and Intercorrelations

Variable	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Trust	24.95	7.89	.95									
2. Initial trust condition	.00	1.00	.36	-								
3. Reward (competitive)	.02	.81	-.24	.00	-							
4. Reward (cooperative)	.04	.82	.16	-.03	.48	-						
5. Partner's information sharing	2.16	1.46	.12	.01	-.22	.12	-					
6. Partner's lying	.52	1.11	-.01	-.05	.34	-.07	-.31	-				
7. Perceived motives	19.94	5.69	.69	.20	-.34	.10	.11	.02	.89			
8. Own information sharing	2.40	1.21	.48	.04	-.12	.29	.30	-.07	.44	-		
9. Own lying	.63	1.19	-.45	-.14	.28	-.17	-.14	.11	-.41	-.41	-	
10. Perceived performance	9.86	3.27	.71	.30	-.39	.10	.21	-.09	.77	.41	-.45	.91
11. Actual performance	17.25	6.03	.35	.02	-.34	.24	.48	-.48	.37	.47	-.47	.52

N = 112. Sample sizes in each reward condition are: competitive/high trust = 19, competitive/low trust = 18, mixed/high trust = 18, mixed/low trust = 17, cooperative/high trust = 19, cooperative/low trust = 21. Correlations greater than or equal to |.20| are significant at the .05 level, correlations greater than or equal to |.24| are significant at the .01 level, and correlations greater than or equal to |.30| are significant at the .001 level. Cronbach's alpha coefficients are presented on the diagonal where applicable.

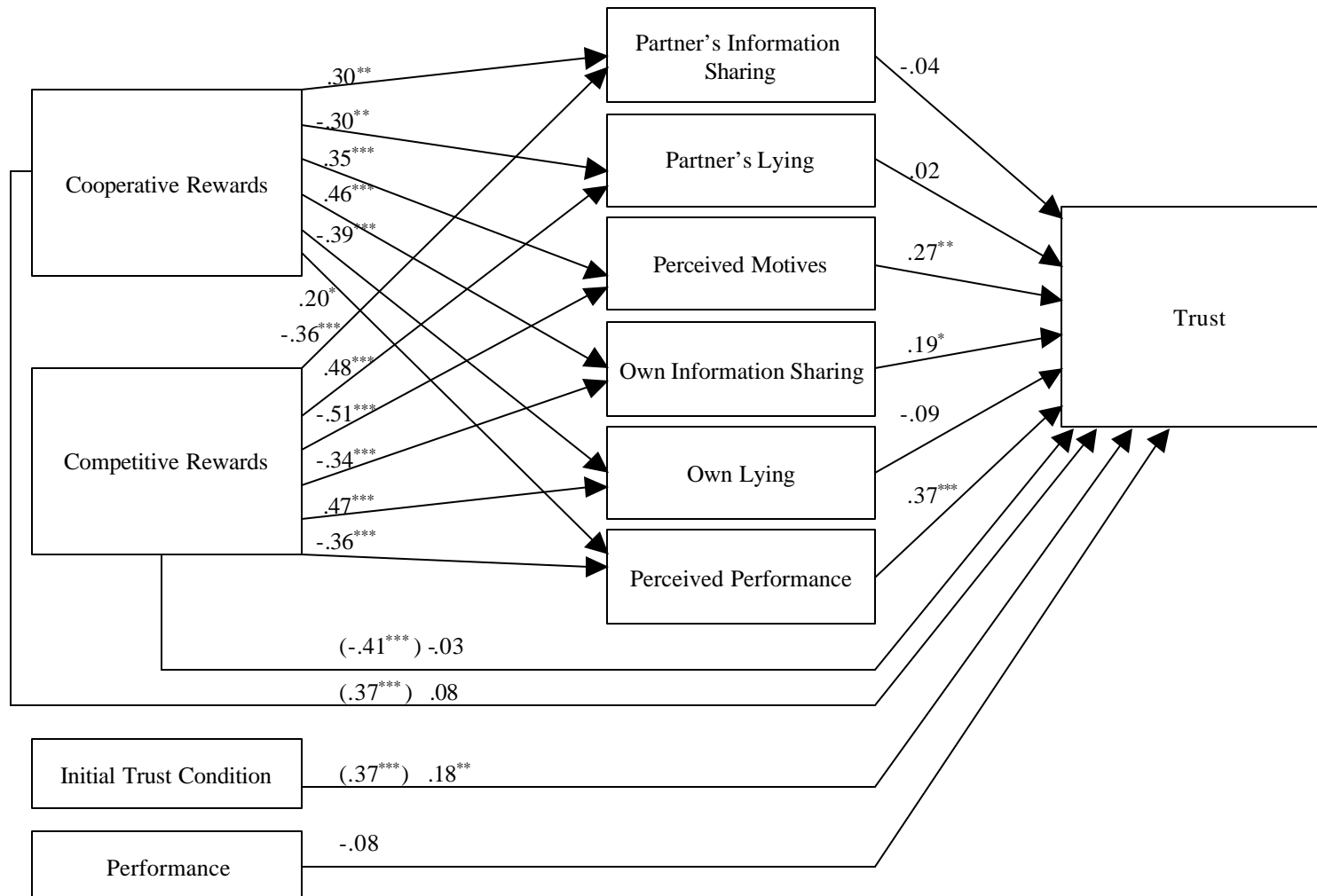
Table 2.

Summary of Regression Analyses^a

Step	Dependent Variable	Independent Variable	β	t	R^2	F
1a	Partner's information sharing	Reward (competitive)	-.36	-3.55***	.12	4.88***
		Reward (cooperative)	.30	2.95**		
1b	Partner's lying	Reward (competitive)	.48	4.88***	.19	8.24***
		Reward (cooperative)	-.30	-3.00**		
1c	Perceived motives	Reward (competitive)	-.51	-5.34***	.25	11.93***
		Reward (cooperative)	.35	3.63***		
1d	Own information sharing	Reward (competitive)	-.34	-3.43***	.18	7.83***
		Reward (cooperative)	.46	4.61***		
1e	Own lying	Reward (competitive)	.47	4.81***	.22	9.88***
		Reward (cooperative)	-.39	-4.05***		
1f	Perceived performance	Reward (competitive)	-.36	-3.68***	.42	19.73***
		Reward (cooperative)	.20	2.08*		
2	Trust	Initial trust condition	.37	4.58***	.29	14.83***
		Reward (competitive)	-.41	-4.48***		
		Reward (cooperative)	.37	4.04***		
3	Trust	Initial trust condition	.18	2.71**	.63	17.39***
		Reward (competitive)	-.03	-.35		
		Reward (cooperative)	.08	.91		
		Partner's information sharing	-.04	-.49		
		Partner's lying	.02	.25		
		Perceived motives	.27	2.68**		
		Own information sharing	.19	2.54*		
		Own lying	-.09	-1.19		
		Perceived performance	.37	3.35***		
4	Trust	Initial trust condition	.17	2.56*	.65	15.13***
		Reward (competitive)	-.02	-.23		
		Reward (cooperative)	.07	.81		
		Partner's information sharing	-.03	-.45		
		Partner's lying	.03	.41		
		Perceived motives	.22	2.19*		
		Own information sharing	.20	2.67**		
		Own lying	-.09	-1.23		
		Perceived performance	.41	3.72***		
		Initial trust x Reward (competitive)	-.09	-1.24		
Initial trust x Reward (cooperative)	.14	2.00*				

^a To conserve space, variables not central to the hypotheses were excluded from the table. Other variables included in the analyses are as follows: step 1a: Initial trust condition ($\beta = .02$); step 1b: Initial trust condition ($\beta = -.06$); step 1c: Initial trust condition ($\beta = .21^*$); step 1d: Initial trust condition ($\beta = .06$); step 1e: Initial trust condition ($\beta = -.15$); step 1f: Initial trust condition ($\beta = .30^{***}$), Actual performance ($\beta = .34^{***}$); step 3: Actual performance ($\beta = -.08$); step 4: Actual performance ($\beta = -.06$).
* $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 1. Summary of Mediated Effects of Reward Structures on Trust



Notes. To reduce complexity, the figure presents only the mediation hypotheses (steps 1-3 from Table 2). Effects coding reduces the three reward conditions (cooperative, mixed and competitive) to two variables. Hence the mixed reward condition is not shown. The numbers in parentheses indicate the direct effect of the predictor and control variables on the criterion prior to inclusion of the mediators in the regression equation.

* $p < .05$ ** $p < .01$. *** $p < .001$.

Appendix

Survey Items^aReward structure manipulation check

My score is based on: (a) the accuracy of my individual ranking, compared to the accuracy of my partner's individual ranking; (b) the accuracy of my team's ranking, compared to the accuracy of the average team; (c) both a & b; (d) other (please specify)_____.

This scoring system suggests that in order for me to obtain a high score: (a) my individual ranking must be accurate and my partner's individual ranking must be significantly less accurate; (b) my team's ranking must be very accurate as compared to the average team; (c) both a & b; (d) other (please specify)_____.

Trust (Used for manipulation check, and also to measure interpersonal trust after the wilderness survival task)

I feel that my partner is straight with me in the information she or he provides.

I feel that I cannot depend on my partner. (R)

I think my partner represents information inaccurately. (R)

I think that my partner's behavior lets me down as a teammate. (R)

I feel my partner takes advantage of the fact that I lack complete information in this project. (R)

Perceived motives

Our goals were incompatible with each other. (R)

We had a 'win-lose' relationship. (R)

Our goals went together.

We wanted each other to succeed.

Perceived performance

We (my partner and I) produced a quality solution on the team ranking.

I am satisfied with our team's decision.

^a Trust, perceived motives, and perceived performance were measured using a seven-point Likert-type scale with endpoints of "strongly disagree" and "strongly agree." The reward structure manipulation check used the multiple choice format shown.