

Fair Pay Allocation Decisions:  
From a Regulatory Focus Theory View

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## Abstract

Theorists have proposed two seemingly contradictory ways to allocate pay among interdependently working individuals—equity-based and equality-based pay—a problem called *theoretical dilemma*. This study diverges from the dominant view of the level of interdependence consideration and suggests a novel factor, group goal, as a determinant of fair pay allocation decisions. By evoking regulatory focus theory, I propose that individuals pursuing gain-oriented group goals prefer to differentiate pay among group members more than individuals pursuing nonloss-oriented group goals, because of different levels of cooperation and independent/interdependent self perceptions. Moreover, I propose that the theorized processes are strengthened when task complexity is high. The results from two laboratory experiments show general support of the theorized relationships.

Keywords: group goal, pay allocation, regulatory focus theory, self perception

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## INTRODUCTION

Over the past decade, organizations have increasingly turned to using teams or work groups (Hackman, 1990; Lawler, 2000; Turner, 2001). One survey showed that 68 percent of Fortune 1000 companies were using self-managing teams (Lawler, Mohrman, & Ledford, 1995). With this change, organizations face a critical issue — how to allocate pay, especially among team members — a problem called the *theoretical dilemma* (Pfeffer & Langton, 1993). Theorists have proposed two seemingly contradictory ways to allocate pay: equity-based and equality-based pay. The equity-based pay allocation proposes that an individual's contribution to outcomes relative to other members should determine pay allocation, because people will be motivated to contribute more if their pay depends on their particular contributions (Adams, 1963, 1965). The equality-based pay allocation proposes that group members should share equal pay allocations so that members will maintain or enhance harmonious and cooperative relations (Deutsch, 1985, 1986). Theorists have investigated various factors to reconcile the theoretical dilemma, and their most consistent finding is that task interdependence determines fair pay allocation decisions; when task interdependence is high, pay should be equalized among group members because group members need to maintain harmonious relationships and to avoid zero-sum or even negative-sum competition (Beal, Cohen, Burke, & McLendon, 2003; Campion, Medsker, & Higgs, 1993; Campion, Papper, & Medsker, 1996; Gully, Incalcaterra, Joshi, & Beaubien, 2002; Johnson & Johnson, 1989; Rosenbaum et al., 1980; Saavedra, Earley, & Van Dyne, 1993; Shaw, Duffy, & Stark, 2000; Shaw, Gupta,

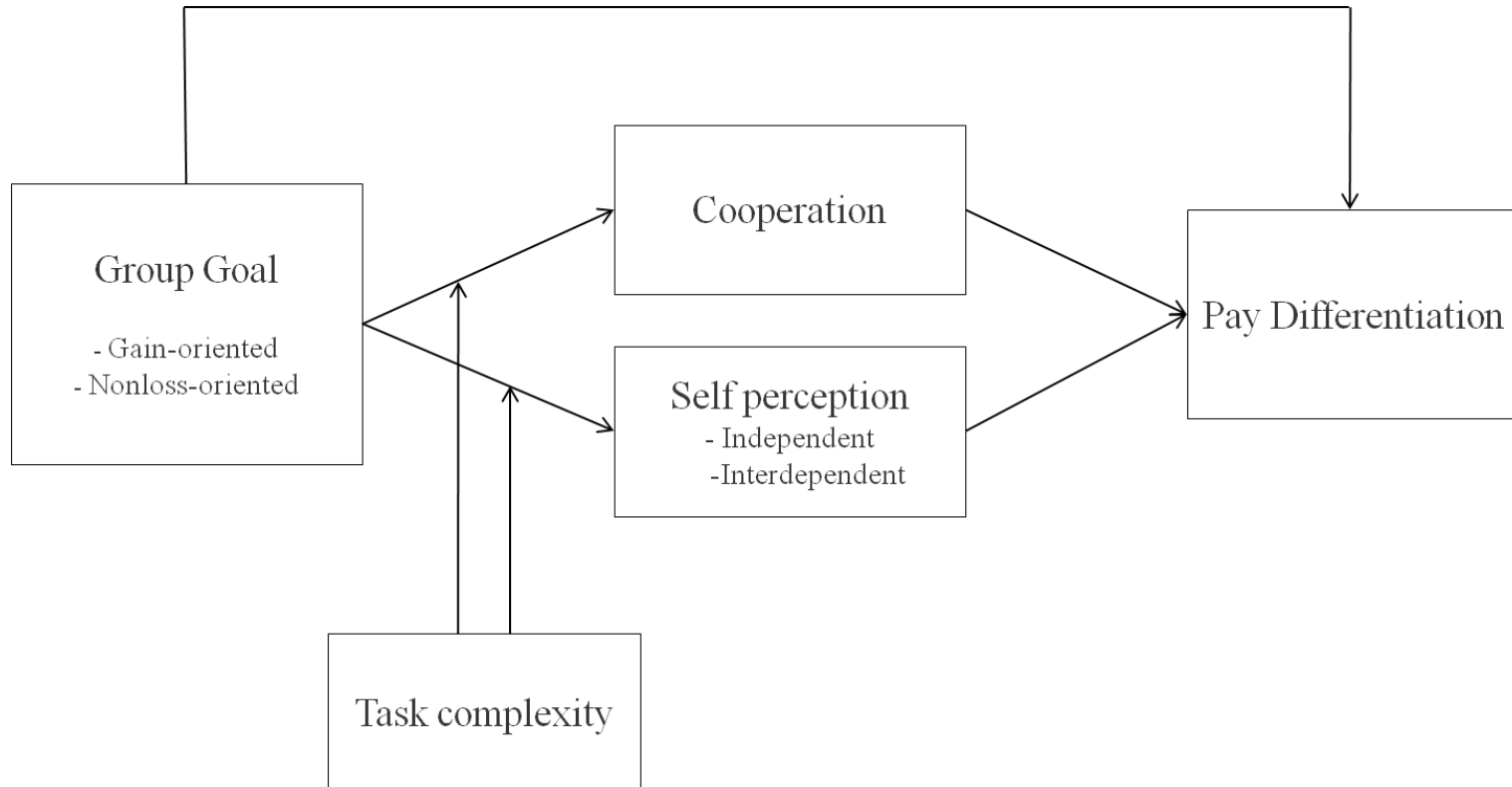
& Delery, 2002; Stanne, Johnson, & Johnson, 1999; Van Der Vegt & Van De Vliert, 2000; Wageman, 1995; Wageman & Baker, 1997).

Field and academic evidence, however, casts new doubts about the sole emphasis on task interdependence. A survey of Fortune 1,000 corporations showed that organizations are increasingly adopting equity-based pay plans even though they have also increased the use of highly interdependent teams or work groups as a basic building block of structure (Lawler & Mohrman, 2003). In addition, recent study findings suggest that equity-based pay can be effective even in highly interdependent task settings (Allen, Sargent, & Bradley, 2003; Beersma et al., 2003; Johnson et al., 2006). For example, Beersma et al. (2003) showed that, in a highly interdependent experimental task, equality-based pay allocation within the group increases one aspect of performance, accuracy, which is measured as the avoidance of errors, but it decreases the other aspect of performance, speed, which is measured as the amount of time the group takes to achieve its goal. In contrast, equity-based pay allocation increases speed but decreases accuracy. Their finding implies that group members working on a highly interdependent task may perceive that equality-based pay is not fair when the group goal is to increase speed. Thus, appropriate pay allocation decisions are more complicated than previous studies have suggested, and researchers must further examine the determinants of pay allocation decisions other than task interdependence (DeMatteo, Eby, & Sundstrom, 1998; Gerhart, Rynes, & Fulmer, 2009).

The purpose of this study is to propose an important determinant for fair pay allocation decisions in highly interdependent groups: *group goal*. Invoking regulatory

focus theory (Higgins, 1997), I suggest that individuals can have two different regulatory foci—promotion-focus and prevention-focus—depending on their goals. Goals may be gain-oriented (e.g., to attain positive outcomes) or nonloss-oriented (e.g., to avoid unfavorable outcomes). Individuals with a gain-oriented goal will be promotion-focused and will desire growth, promotion, advancement, and accomplishment; they tend to strive for gains even at the cost of losses. Individuals with a nonloss-oriented goal will be prevention-focused and will value safety, protection, and responsibility; they will tend to avoid losses even at the cost of potential gains. From this view, I propose that (a) individuals with a gain-oriented group goal will be less cooperative than those with a nonloss-oriented group goal, and (b) individuals with a gain-oriented group goal will perceive themselves as less related to other members (i.e., they will show high independent self perception), whereas those with a nonloss-oriented group goal will perceive themselves as more related to other members (i.e., they will show high interdependent self perception). Accordingly, I expect that individuals with a gain-oriented group goal will be more likely to perceive differentiated pay allocation among members to be fair than will those with a nonloss-oriented group goal. Moreover, I propose that the theorized processes will be strengthened when task complexity is high. Figure 1 displays the theoretical model. I test the hypotheses using two laboratory experimental designs with highly interdependent tasks — a memory-matching card task and a cube-counting task.

**FIGURE 1**  
**Theoretical Model**



I expect this study to make several theoretical and practical contributions. One, this study reveals an unknown but important contingent factor that influences fairness perceptions of pay allocation decisions within the group. Diverging from the dominant view of the level of task interdependence consideration in pay allocation decisions, this study suggests a novel contingency factor—group goal. In addition, this study shows how group goals are related to pay allocation decisions by revealing mediating roles of cooperation and self perception. Two, I extend the generalizability of the regulatory focus theory by applying it to the within-group pay-allocation context. Few researchers have attempted to apply regulatory focus theory to group contexts, and those who did focused on intergroup phenomena, that is, group members' attitudes toward out-group members, integrating social identity theory (e.g., Sassenberg, Jonas, Shah, & Brazy, 2007; Shah, Brazy, & Higgins, 2004) or stereotypes (Seibt & Förster, 2004). Instead, this study applies regulatory focus theory to explain intra-group phenomena, specifically group-member interactions, their attitudes, and the following fair pay allocation decisions. This study is also novel as it tests regulatory focus theory in the pay-allocation context. The theory has been adopted in several contexts such as persuasion (Lee & Aaker, 2004), creativity (Baas, De Dreu, & Nijstad, 2008), and leadership effectiveness (Neubert, Kacmar, Carlson, Chonko, & Roberts, 2008), but no study has explicitly examined the regulatory focus and pay allocation relationship. Three, practitioners may refer to this study as they design appropriate pay-allocation practices within teams. Use of compressed-pay allocations within teams may encourage cooperation, but may cause high performers to quit (e.g., Shaw & Gupta, 2007). This study sheds light on this

dilemma by showing that pay differentials are acceptable among group members when they have gain-oriented goals, and thus share promotion-focused strategic orientations, but compressed pay is preferable when they have nonloss-oriented goals, and thus share prevention-focused strategic orientations.

I develop the theory with the following boundary conditions. First, I investigate the fair pay allocation decisions within a workgroup with a performance goal as opposed to other groups that have different goals, such as fostering or maintaining enjoyable social relations (e.g., friendship groups). Prior studies have shown that the pay allocation decision is systematically different between performance groups and other groups (e.g., Deutsch, 1975). In this study, I use the term *groups* to refer to collections of individuals who are pursuing performance goals together. Second, I assume that workgroup members regard pay as a reward for their efforts and performance. General psychology and sociology literature has suggested that money can represent freedom, love, power, security, or even evil (e.g., Furnham & Argyle, 1998). However, in a workgroup or employee-management relationship setting, money is regarded as a medium of exchange for labor that represents the value of individual effort (see Mitchell & Mickel, 1999, for a review). For example, reinforcement theorists such as Skinner (1953) considered money to be a positive reinforcement stimulus and claimed that its presentation or deprivation could affect worker's efforts levels. Hence, the theory in this study is built on the assumption that group members regard money (or pay) as a reward for their efforts, and performance as being necessary for achieving a group goal. Third, I assume that individuals within workgroups are highly interdependent from a structural aspect, not

from a behavioral aspect. Researchers have defined interdependence from two different aspects: from a *structural aspect* — the context features that define relationships between entities that affect each other, and from a *behavioral aspect* — group members' actual amount of task-related interaction (see Wageman, 2001, for a detailed discussion). In this study, the term *high interdependence* refers to the context features that require all the individuals within the group to coordinate with each other for the final product (Thompson, 1967; Van de Ven, Delbecq, & Koenig, 1976; Wageman, 2001).

In the sections below, I first examine the propositions for the within-group pay allocations and compare equity-based pay and equality-based pay views on fair pay allocation decisions. Second, I review the regulatory focus theory and illustrate how group goals influence pay-allocation decisions with particular emphasis on two mediating factors: cooperation and self perception. Third, I propose that a contextual factor, task complexity, moderates the relationship between group goals and pay-allocation decisions. Fourth, I describe the test of my model using two laboratory experimental designs, and I discuss the implications of results found in this study.

## **THEORY DEVELOPMENT**

### **Pay Allocation within Groups**

Fair allocation of pay provides one platform for launching effective groups (Cropanzano & Schminke, 2001). The pay allocation literature has proposed two dominant ways to allocate pay: equity-based and equality-based allocations. According to equity theorists, people in social exchange relationships should be rewarded according to the level of individual contribution (Adams, 1963, 1965; Homans, 1961; Walster,



Berscheid, & Walster, 1973). Individuals judge the fairness of their pay by comparing the ratio between their contributions (e.g., work effort and skills) and their outcomes (e.g., pay) to the input-outcome ratio of their referents. When individuals perceive that their input-outcome ratio is similar to the referents, they feel that equity exists; when the ratios are dissimilar they perceive inequity. Because inequity distresses people, they may try to reduce their discomfort by changing their perceptions of their own or their referents' inputs and outcomes, by changing their actual inputs or outcomes, or by ending the inequitable relationships by leaving the workgroup. Empirical evidence has suggested that when individuals perceive equity, they are more likely to have positive work attitudes and behaviors such as enhanced work performance, increased extra-role behavior, less counterproductive work behavior, and better attitudes and emotions (see Cohen-Charash & Spector, 2001, for a meta-analytic review).

In group contexts, however, equity-driven incentive systems lead group members to focus on personal outcomes, which detract from teamwork, helping, coordination, and group performance as a whole (Heneman & Von Hippel, 1995; Mitchell & Silver, 1990; Shaw et al., 2002). From the social interdependence theory aspect (Deutsch, 1949, 1985), individuals who are interdependent should be rewarded equally because they perceive that their pay is positively correlated with other team members' pay (i.e., positive reward interdependence), and thus they have cooperative, or promotive, interactions. When one member's gain is associated with another's loss, negative-reward interdependence is induced, and group members act more competitively and contrarily; they discourage and obstruct each other's work efforts. Despite some exceptions (Gordon, Welch,

Offringa, & Katz, 2000; Rosenbaum et al., 1980), previous studies have generally shown that, in group settings, equality-based pay leads to better group performance than does equity-based pay (Cotton & Cook, 1982; DeMatteo et al., 1998; Johnson & Johnson, 1989; Johnson, Maruyama, Johnson, Nelson, & Skon, 1981; Miller & Hamblin, 1963; Stanne et al., 1999). For example, Johnson and Johnson (1989), in their meta-analytic review, found that equality-based pay heightens performance because group members are more likely to help others, exchange resources and information, provide constructive feedback, and be trusting and trustworthy.

In sum, equity theory suggests that differentiating individual pay levels is necessary to fairly balance the individual input-outcome ratio, whereas social interdependence theory suggests that equalizing individual pay is necessary because cooperation and avoidance of negative competition are important. The two seemingly contradictory views can be reconciled by considering the role of task interdependence, because highly interdependent tasks require group members to enhance cooperation and reduce negative competition. From this viewpoint, organizational researchers have proposed that a workgroup can achieve high performance by allocating pay equally when the members are highly interdependent and by allocating pay differently when the members are not highly interdependent (e.g., Wageman, 1995).

Although task interdependence plays an important role in determining the effectiveness of pay allocation, we must consider the group's goal, and the following strategic orientation—a plan of action designed to achieve a particular goal (e.g., Porter, 1996). Workgroups can pursue goals using different strategies because workgroup

performance can be evaluated in multiple dimensions. For example, in a basketball game, which is a highly interdependent task (Thompson, 1967; Van de Van et al., 1976), teams may use an offensive strategy (e.g., gain as many points as possible) or a defensive strategy (e.g., avoid point losses) because the goal, winning the game for example, can be pursued by different strategic orientations—gaining scores and not losing scores. From the regulatory focus theory viewpoint, individuals develop two different types of strategic orientations—promotion-focus and prevention-focus (Higgins, 1997, 1998)—depending on their goals.

### **Regulatory Focus Theory**

Controlled by the hedonic principle, people are motivated to approach pleasure and avoid pain (Freud, 1920/1952); they seek to align their behaviors and self-perceptions with goals and standards they are pursuing. That is, people regulate themselves. Regulatory focus theory (Higgins, 1997, 1998) extends the hedonic principle and proposes that people have different strategic inclinations in *how* they approach pleasure and avoid pain. Specifically, people may pursue two distinctive end-states: *ideal* selves, defined as the attributes one would ideally like to possess, and *ought* selves, defined as the attributes one should or ought to possess (Higgins, 1987, 1989). Building on the pursuit for distinctive end-states viewpoint, regulatory focus theory suggests that those individuals who aim to reduce the discrepancy between their ideal selves and actual selves will be *promotion-focused* and will regulate themselves with hopes, wishes, or aspirations; whereas those who aim to reduce the discrepancy between their ought selves and actual selves will be *prevention-focused* and will regulate themselves with duties,

obligations, or responsibilities. Hence, promotion-focused individuals are concerned with the presence and absence of positive outcomes that determine the match or mismatch with their ideal selves, and prevention-focused individuals are concerned with the presence and absence of negative outcomes that determine the mismatch or match with their ought selves.

Individuals with different regulatory focuses are also different in their strategic means for pursuing their desired end-states. Promotion-focused individuals are strategically inclined to approach matches to desired end-states and are eager to attain advancement and gains, whereas prevention-focused individuals are strategically inclined to avoid mismatches to desired end-states and are vigilant to insure safety and nonlosses. For example, Higgins, Roney, Crowe, and Hymes (1994) primed their study participants to be either promotion or prevention focused by asking them to recall episodes exemplifying approaching a match to a desired end-state and episodes exemplifying avoiding a mismatch to a desired end-state. Consistent with their prediction, the results showed that promotion-focused individuals remembered the episodes exemplifying approaching a match to a desired end-state, whereas the reverse was true for prevention-focused individuals.

In addition, individuals have different tactical preferences depending on their regulatory focuses; promotion-focused ones prefer to insure gains and insure against non-gains, whereas prevention-focused ones prefer to insure non-losses and insure against losses. Crowe and Higgins (1997) tested this tactical preference proposition and found that study participants approach tasks depending on their regulatory focuses. For

example, in a word-recognition memory task, study participants were shown 20 nonwords and were later asked to look at 40 nonwords and recall whether they had seen any of the nonwords before. The results showed that participants in the promotion-focus condition tended to say that they recognized the nonwords, a risky bias, to insure hits (i.e., to detect any words that they had seen) and to insure against errors of omission (i.e., to avoid missing any words they had seen); whereas participants in the prevention-focus condition tended to claim that they had not seen the nonwords, a conservative response bias, to insure correct rejection (i.e., to avoid reporting that they recalled words that they had not seen) and to insure against errors of commission (i.e., to avoid reporting that they recalled words that they had not seen). In sum, promotion-focused people are strategically inclined to approach matches to desired end-states and are concerned with gains and non-gains; prevention-focused people are strategically inclined to avoid mismatches to desired end-states and are concerned with losses and non-losses.

Note that the regulatory focus theory does not suggest that the two regulatory focuses are on a single continuum. Many people possess both promotion-focused and prevention-focused regulatory systems, but different situational influences could make one system predominant in self-regulation. For example, “a disciplinary history of receiving or losing warmth and affection from one’s parents contingent on one’s actions could strengthen the positive outcome focus system, whereas a history of receiving or escaping punishment and criticism from one’s parents could strengthen the negative outcome focus system” (Higgins et al., 1994, p. 277). In later life phases, significant others such as friends, spouses, coworkers, and employers can influence people’s

regulatory focuses. Accordingly, researchers measure an individual's regulatory focus as the relative strength of the two focuses (e.g., Shah, Higgins, & Friedman, 1998).

Because regulatory focus is not an individual difference variable per se, an individual's strength or accessibility of a regulatory focus can vary chronically or momentarily. Hence, situational activation may induce a person's regulatory focus. Indeed, the predictions from the regulatory focus theory have been tested and supported in both cases: when a person's regulatory focus was measured as a chronic individual difference and when it was experimentally induced (e.g., Crowe & Higgins, 1997; Förster, Higgins, & Idson, 1998; Higgins et al., 1994; Lee, Aaker, & Gardner, 2000; Roney, Higgins, & Shah, 1995; Shah et al., 1998). In addition, situational inducements of regulatory focuses were effective in a group setting when group members' strategic orientation is exogenously induced by others, such as group leaders (Faddegon, Scheepers, & Ellemers, 2008; Kark & Van Dijk, 2007; Levine, Higgins, & Choi, 2000; Neubert et al., 2008). For example, in an experimental study, Levine et al. (2000) gave their study participants different goals; some groups were instructed to work for additional compensation, and other groups were instructed to work to avoid losing the compensation they already had. The study results showed that the groups working for additional compensation were induced toward a promotion-focus, and the groups working for non-losses were induced toward a prevention-focus. Furthermore, as the number of sessions increased, each member's regulatory focus converged in the direction of their group's regulatory focus induced by the experimenter. Similarly, Faddegon et al. (2008) demonstrated that group mottos can influence members to adopt a shared identity

and the subsequent regulatory focus that influences their behaviors and emotions, which they named collective regulatory focus. As such, individuals given a gain-oriented group goal will share a promotion-focus: they will be sensitive to achieving positive outcomes, strategically inclined to approach matches, and eager to attain gains and advancements. Individuals given a nonloss-oriented group goal will share a prevention-focus: they will avoid negative outcomes and mismatches, and be vigilant to insure safety and non-losses.

**TABLE 1**  
**Distinctions between Promotion-focus and Prevention-focus**

	Promotion-focus	Prevention-focus
Goal/Values	Ideal with growth, accomplishment	Ought with obligation, duties
Strategic means	Approach matches	Avoid mismatches
Tactical Orientation	Gain, maximization	Non-loss, minimization
Bias	Risky bias	Conservative bias

**Group Goal, Cooperation, and Self Perception**

The difference between regulatory focus induced by group goals and regulatory focus formed by personal goals is that individuals self-regulate their personal goal pursuits, but individuals pursuing shared group goals are motivated to regulate other members' behaviors as well as their own. Group members expect their fellow members to behave and share self-conceptions aligned with the group goals and standards.

Specifically, the interactions of group members within a group pursuing a gain-oriented goal and the members within a group pursuing a nonloss-oriented goal are different in two aspects: (a) concerns for other members' performance and (b) performance backup.

One, when a group values gains, group members are less concerned about other members' performance than those in a group valuing losses, because *high performance* ascribes different meanings depending on the goals members are pursuing. In a group with a gain-oriented goal, the high performer will be the one who attains the most gains, but in a group with a nonloss-oriented goal, the high performer will be the one who sustains the fewest losses. Accordingly, a group with a gain-oriented goal encourages its members to achieve as many gains as possible, so all members strive to achieve gains; some members' losses may not be a major concern because the cost of losses is less than the value of gains. A group with a nonloss-oriented goal, however, can also encourage members to undergo as few losses as possible, but high performers can perform no better than a zero loss. Because nonlosses are important in a prevention-focused group, average to low performers' losses will significantly thwart the group in achieving its goal even if the highest performing individuals make no losses, and it is important for prevention-focused group members to sustain the fewest losses *all together*. Therefore, individuals with a nonloss-oriented goal are more concerned about other members' performance (i.e., nonlosses) than those with a gain-oriented goal.

Two, high performers can more easily back up low performers when a group values gains rather than losses. Backup, defined as assisting team members in performing their tasks, is critical to team effectiveness, especially in highly interdependent situations



in which undetected mistakes deteriorate group goal achievement (Marks, Sabella, Burke, & Zaccaro, 2002). Backup includes (a) providing a teammate with verbal feedback or coaching, (b) assisting a teammate in carrying out actions, or (c) assuming and completing a teammate's task (Marks, Mathieu, & Zaccaro, 2001). The type of backup depends on the group's goal. In a gain-oriented group, high performers can back up low performers' losses by increasing the gains of their own tasks or by assuming and completing low performers' tasks more efficiently. Several high performers' excessive gains can surmount the limited gains of low performers. Therefore, groups with a gain-oriented goal can attain the group goal, to gain maximization, by the contributions of some high performers who increase gains. In groups with a nonloss-oriented goal, high performers may back up low performers' losses by knowledge sharing or assistance. Because high performers can only sustain zero loss, their best performance does not additionally contribute to the group performance; every loss is still counted as the group's loss, and high performers' zero losses do not surmount other performers' losses. Instead, high performers who can achieve zero losses must share their knowledge or assist others to avoid additional group losses. Thus, I hypothesize:

*Hypothesis 1: Gain-oriented goal is negatively related to cooperation.*

In addition, individuals with a gain-oriented goal have higher independent self perceptions than individuals in a group with a nonloss-oriented goal, and vice versa for interdependent self perceptions. *Independent self perception* refers to an individual's perception about self as "an independent, self-contained autonomous entity who (a)

comprises a unique configuration of internal attributes (e.g., traits, abilities, morals, and values)” (Markus & Kitayama, 1991, p. 224). *Interdependent self perception* refers to an individual’s perception about self that “the relationship between self and other features the person not as separate from the social context but as more connected and less differentiated from others. People are motivated to find a way to fit in with relevant others, to fulfill and create obligation, and in general to become part of various interpersonal relationships” (Markus & Kitayama, 1991, p. 227). Accordingly, individuals having a high independent-self view perceive themselves based on their unique abilities or attributes and on the importance of distinguishing themselves from others; whereas individuals having a high interdependent-self view tend to perceive themselves largely based on their relationships with group members and on the importance of pursuing harmony (Cross & Madson, 1997).

People’s self perceptions are shaped and influenced by the contexts around them (for comprehensive reviews, see Cross, Hardin, & Gercek-Swing, 2011; Oyserman & Lee, 2008); social environments, such as homes, schools, and workplaces, inform them about who they are, who they should be, and how they understand themselves. Their self perception depends on their interpersonal interactions, past and ongoing affiliations and experiences within and across social contexts and institutional affiliations, and their location within the culture and social structure (Owens, 2003). As such, the overarching culture and values of a workgroup influence members’ self perceptions; they derive a sense of themselves as a group member with specific roles and relations to others (Ashforth & Mael, 1989; Ibarra, 1999; Lord, Diefendorff, Schmidt, & Hall, 2010). For

example, Ibarra (1999) illustrated that individuals shape themselves within the group according to (a) the role models they perceive to be desirable, (b) feedback they receive (i.e., experimenting provisional self), and (c) standards set by the workgroup. In this vein, I propose that a group's goal influences its members' self perceptions. Specifically, group members with a gain-oriented goal perceive themselves as being more independent; group members with a nonloss-oriented goal perceive themselves as being more interdependent.

A group with a gain-oriented goal emphasizes individual performers' roles, especially high performers. With the group's emphasis on achievement and autonomy, individuals with a gain-oriented goal can distinguish themselves positively, and thus are likely to have high independent self perception. A group with a nonloss-oriented goal emphasizes *all* members' performances, not just a few high performers. Thus, with its emphasis on fulfilling various social roles and maintaining interpersonal connections, group members must maintain harmonious relations. In addition, they may focus on fulfilling obligations and avoiding mistakes and may even focus on potentially negative aspects of the self and situations in an attempt to avoid future social mishaps.

Accordingly, those with a nonloss-oriented group goal may perceive that the interactions with other members are critical for the group performance, not just their own performance, and are likely to have high interdependent self perception. Thus, I hypothesize:

*Hypothesis 2a: Gain-oriented goal is positively related to independent self perception.*

*Hypothesis 2b: Gain-oriented goal is negatively related to interdependent self perception.*

### **Group Goal and Pay Allocation**

Deutsch (1975, 1985) adopted a functionalist approach to pay allocation and argued that groups that are striving for economic productivity and high performance prefer equitable allocation (i.e., each paid according to contribution), and groups emphasizing harmony and comfort prefer equal allocations (i.e., each paid an equal share). While agreeing with this proposition in general, I further argue that both pay allocation decisions—equity-based and equality-based—can be preferred among group members, even in workgroups pursuing economic productivity and high performance, depending on the groups' goal, that is, their strategic orientation.

For example, Beersma et al. (2003) showed that in a highly interdependent group, equality-based pay allocation increases accuracy but decreases speed; equity-based pay allocation decreases accuracy but increases speed. Although they explained their finding as the trade-off between speed and accuracy in human performance (Woodworth, 1899), we can interpret the results from the regulatory focus theory view. People may sacrifice accuracy in the pursuit of speed when they have gain-oriented goals because ebullient efficiency maximizes their gains. They are unlikely to waste time fully investigating potential errors; instead they may willingly pay the cost of one error to hit more targets. In contrast, individuals with a nonloss-oriented goal may sacrifice speed in the pursuit of accuracy because they are more determined to guard against possible losses and errors. Because people are more likely to make mistakes when they work as rapidly as possible,

individuals with a nonloss-oriented goal concentrate on guarding against making mistakes, even at the cost of speed. Similarly, Förster, Higgins, and Bianco (2003) argued that speed/accuracy decisions are influenced by the strategic inclinations of individuals varying in regulatory focus rather than by a built-in trade-off, and they empirically showed that promotion-focused individuals performed high on speed but low on accuracy, whereas prevention-focused individuals performed high on accuracy but low on speed. These empirical findings suggest that differentiated pay will be preferred more when group members have a gain-oriented goal than when they have a nonloss-oriented goal. For the concise use of terminology, I define pay differentiation as an individual's preference on differentiated pay among group members as a fair pay allocation decision (e.g., Meeker & Elliott, 1995). Accordingly, I hypothesize:

*Hypothesis 3: Gain-oriented goal is positively related to pay differentiation.*

I further illustrate that the relationship between the two types of group goal—gain-oriented and nonloss-oriented—and fair pay allocation decisions is mediated by the two individual perceptions stated above: (a) cooperation and (b) self perceptions.

First, individuals with a gain-oriented goal are more likely to favor equity-based pay allocation decisions than are individuals with a nonloss-oriented goal because they are less cooperative. Steiner (1972) first proposed that the necessity of cooperation determines the group pay allocation decision, and classified three task types—additive, conjunctive, and disjunctive tasks. Additive tasks refer to tasks in which each members' contribution is combined into a single group product and represented by the team average; disjunctive tasks are tasks in which the performance of the best member

determines the group's output; and conjunctive tasks are tasks in which the performance of the worst member determines the group's outcome. From this classification, Steiner postulated that in disjunctive tasks group members must be paid by their relative contribution in comparison with others, but in conjunctive tasks it is important to equalize pay. This postulation was tested and supported later by Miller and Komorita (1995) in a series of experiments.

In addition, Beersma et al.'s (2003) previously mentioned results can be interpreted from the necessity of cooperation among group members with different group goals. Specifically, equity-based pay is compatible with speed performance because high performers are less concerned with low performers' slow work, and they can back up low performers by assuming their tasks; while equality-based pay is compatible with accuracy performance because low performers' errors will directly and significantly thwart the group's ability to achieve its goal. Thus high performers must back up low performers' low accuracy through such behaviors as knowledge sharing or behavioral assistance.

Furthermore, although they performed individual-level studies, Jenkins (1986) and Jenkins, Mitra, Gupta, and Shaw (1998) provided similar implications. Jenkins's (1986) qualitative review of the incentive literature showed that individual incentives are positively related to performance quantity but not to performance quality. Similarly, Jenkins et al. (1998), in their meta-analytic review, showed that individual incentives are positively and significantly related to performance quantity but not to performance quality. The difference between performance quantity and quality may be similar, at least partly, to the difference between gain-orientation and nonloss-orientation. Quantity goal

induces individuals to be less concerned with others' performances, and it allows high performers to back up low performers by increasing their gains or by assuming or completing their tasks. Quality goal induces individuals to be more concerned with others' performances, and the high performers must share knowledge or provide assistance to back up low performers' losses. Accordingly, in groups with quality performance standards, cooperation is more important than in groups with quantity performance standards. This view suggests that group goals and the relative importance of cooperation cause insignificant correlations in quality performance and significant positive correlations between individual incentive and performance in quantity performance. In sum, I hypothesize:

*Hypothesis 4: The positive relationship between gain-oriented goal and pay differentiation is mediated by cooperation.*

Second, individuals with a gain-oriented goal have more distinctive, independent self perceptions, so they are more likely to differentiate pay based on performance than are individuals with a nonloss-oriented goal. Individuals with high independent self perception tend to distinguish themselves from others; rather than referring to the thoughts or feelings of others, they tend to think about themselves as a referent for their own abilities, attributes, or goals. Similarly, when they think about others, they consider individual characteristics and attributes rather than relational or contextual factors. In pay-allocation decisions, they are likely to give greater weight to their own and others' attributes that contribute to achieving the group goal. In contrast, individuals with high interdependent self perceptions/low independent self perceptions place less value on

individual attributes and more value on harmonious relationships. They tend to perceive themselves based on their relationships and emphasize harmonious interpersonal relationships, to recognize communalities as being more important than distinctive characteristics. In workgroup reward allocations, they are likely to consider relationships that contributed to achieving the group goal. Accordingly, they are likely to perceive fairness in compressed (or less differentiated) pay allocation. Indeed, previous empirical studies found support for these predictions (e.g., Chen, 1995; Kim, Park, Suzuki, 1990; Leung & Bond, 1984; Mannix, Neale, & Northcraft, 1995). Thus, I hypothesize:

*Hypothesis 5a: The positive relationship between gain-oriented goal and pay differentiation is mediated by independent self perception.*

*Hypothesis 5b: The positive relationship between gain-oriented goal and pay differentiation is mediated by interdependent self perception.*

### **The Moderating Role of Task Complexity**

Examining the nature of a group task is important because its structural aspects are likely to affect the cognitive and emotional experiences of its group members (e.g., Mathieu, Maynard, Rapp, & Gilson, 2008). I suggest that *task complexity*, defined as the extent to which a task entails low routine, high cognitive demand, and uncertainty (Herold, 1978; Schroder, Driver, & Streufert, 1967), influences the hypothesized relationship between group goal and group members' attitudes—cooperation and self perception.

First, when tasks are highly complex, individuals with a gain-oriented goal are more likely to value cooperation because complex tasks require more intricate thought processes and advanced knowledge and skills (Farr, 1990). When tasks are highly



complex, group members with a nonloss-oriented goal may perceive that they are less safe and secure because they are more likely to mismatch the desired goal. Specifically, low or average performers' roles become important because low or average performers' significant losses cause the group to fail to achieve its goal. Accordingly, when a group with a nonloss-oriented goal attains its goal, the members should emphasize cooperation. In a group with a gain-oriented goal, however, the value of a few individuals who can do well on the task will be more important when task complexity is high because it is likely that the performance difference is less influenced by luck or efforts but more influenced by their own attributes. Thus individual group members will be more likely to recognize performance differences when they work on complex tasks.

Second, individuals with a gain-oriented group goal are more likely to have high independent self perception/low interdependent self perception when tasks are highly complex. Performing highly complex tasks requires individuals who have superior physical or cognitive abilities (Campbell, 1988). In a group with a gain-oriented goal, where members value maximization of gains, members with high abilities are more likely to distinguish themselves from others because they significantly contribute to realizing the group goal. Low or average performers also perceive themselves as being distinguished from other members because the differences are more noticeable between their abilities as compared with the abilities of others. Thus, members with a gain-oriented group goal are more likely to have high independent self perception when task complexity is high. In a nonloss-oriented group, where minimization of losses is valued, however, members may perceive that they are less secure in their goal pursuit because

other members are less likely to have the appropriate skills for accomplishing a highly complex task. Such insecurity perceptions may lead members to have low independent self perception because they must understand others, expect others to perform well, and cooperate with others actively when necessary. In sum, I hypothesize:

*Hypothesis 6: Task complexity moderates the negative relationship between gain-oriented goal and cooperation, such that the relationship is stronger when task complexity is high.*

*Hypothesis 7a: Task complexity moderates the positive relationship between gain-oriented goal and independent self perception, such that the relationship is stronger when task complexity is high.*

*Hypothesis 7b: Task complexity moderates the negative relationship between gain-oriented goal and interdependent self perception, such that the relationship is stronger when task complexity is high.*

The preceding arguments produce an integrated moderated-mediation model that comprises several interrelated predictions among group goal, pay allocation, cooperation, and self perception. Stated formally:

*Hypothesis 8: The strength of the mediated relationship between gain-oriented goal and pay differentiation (via cooperation) will vary depending on the extent of task complexity; the indirect and total effects of gain-oriented goal via cooperation on pay differentiation will be stronger when task complexity is high.*

*Hypothesis 9a: The strength of the mediated relationship between gain-oriented goal and pay differentiation (via independent self perception) will vary depending on the extent of task complexity; the indirect and total effects of gain-oriented goal via independent self perception on pay differentiation will be stronger when task complexity is high.*

*Hypothesis 9b: The strength of the mediated relationship between gain-oriented goal and pay differentiation (via interdependent self perception) will vary depending on the extent of task complexity; the indirect and total effects of gain-oriented goal via interdependent self perception on pay differentiation will be stronger when task complexity is high.*

## METHOD – STUDY 1

### Participants and Design

For this study, 148 undergraduate students (41 three- to four-person groups) were recruited from a large university located in the Midwest United States. The experiment was based on a 2 (group goal: gain-oriented vs. nonloss-oriented)  $\times$  2 (task complexity: high vs. low) factorial between-subjects design. Participants were randomly assigned to the experimental conditions.

### Task

The experimental task was a three- to four-person group memory-matching card task. Two to three days before participation, the participants answered a required survey about their regulatory focus trait and personality. On arriving at the behavioral laboratory, participants were told that the study was being conducted to investigate group productivity and that they would work in groups of three or four. After getting the consent form signed, the experimenter escorted groups to a workroom with two tables holding memory-matching card tasks and four additional sets of red, green, blue, and orange cards that were randomly assigned to each participant. The experimenter explained the procedure as follows:

Welcome to the group productivity study. Today you will work on a memory-matching card task together, and your task is to find matching cards among the face-down cards. I will give you two minutes to memorize and three minutes to work on the task. While you are working on the task, I'd like you to follow some rules. First, you are not allowed to talk with each other. Second, you do not need to take turns to play; anyone who sees a match may flip a card. However, two people may not flip cards together; only one may flip the card. Third, one person may not take turns more than twice in a row. If you find a match, put your colored card on the spot where the matched cards were located and

move on. This task has been done many times in other universities and by other participants in this university, and I have the historical record of their performance. When you finish the task, I will give you individual and group performance feedback, and I will also give you your group performance percentile based on the historical data.

Before participants worked on the tasks, they had a practice session in which the experimenter showed all the cards for one minute before they were flipped down, and the participants worked on the task for one and a half minutes. The experimenter measured their individual and group performance as they played, and then gave performance feedback. Once participants understood the task, they moved to the other table and worked on the task for three minutes, after two minutes of memorization time. After the participants finished the task, they were escorted to a separate but adjoining workroom equipped with computers and pens, and they answered questions about the task and themselves while the experimenter evaluated individual and group performances. When participants finished answering the questions, the experimenter presented feedback sheets illustrating group performance and individual performance (by colors). Moreover, the participants were shown that, regardless of their actual performance, their group performed above average (83%), thereby inducing the winning condition (Elliott & Meeker, 1984, 1986). After that, the participants were asked to decide individually how the group reward should be most fairly allocated:

In this study, I'm also interested in the fairest way to allocate rewards to group members. Assuming that your group earned \$40 [\$30 for three-person groups] as a result of the performance (i.e., your group could have earned more or lost more depending on the performance), what do you think is **the fairest way** to allocate rewards to your group members?

Then the experimenter asked participants to explain why they thought their suggested pay allocation decision was fair. After the pay allocation questions, the participants answered more questions about their individual traits and demographic characteristics. When all the questions were answered, they were debriefed, and paid \$10 for their participation.

### **Experimental Conditions – Independent Variables**

**Group goal condition.** Group members in the *gain-oriented goal condition* were given an instruction paper, which the experimenter read aloud as follows: “The scoring method for this task is +4 points for each matching pair but -1 point for each mismatching pair. For example, if you find 11 matches but committed 5 mismatches, then the total score is 39 because  $(4 \times 11) + (-1 \times 5) = 39$ . Therefore, the goal of your group is to finish the task with the maximum score gains.”

Group members in the *nonloss-oriented goal condition* were given a different instruction paper with the gain-oriented group goal condition, which the experimenter read aloud: “The scoring method for this task is -4 points for each mismatching pair and +1 point for each mismatching pair. For example, if you commit 7 mismatches and find 12 matches, then the total score is -16 because  $(-4 \times 7) + (1 \times 12) = -16$ . Therefore, the goal of your group is to finish with the minimum score losses. There will be a penalty based on the number of cards left after three minutes and the penalty is much larger than the score losses by mismatches so I encourage you to try to finish the task in time.” The group goal variable was coded as 1 for gain-oriented goal and 0 for nonloss-oriented goal.

**Complexity condition.** Task complexity was manipulated by the cards selected. In the high-complexity condition, participants were given four- to six-letter nonwords (e.g., SKEIDE, SWAWLD, and SENZE) cards. In the low-complexity condition, participants were given four- to six-letter words (e.g., DIVE, PALE, and JET) cards, and six fewer cards were given than in the high complexity condition. Task complexity was coded as 1 for high complexity and 0 for low complexity. Appendix 1 shows the full list of nonwords/words used for this study.

### **Mediators and Dependent Variable (Survey Measures)**

**Pay differentiation.** After the task, each participant was given a performance feedback sheet (see Appendix 2) and was asked to allocate pay to their group members in **the fairest way**. Previous studies have shown that individuals tend to allocate pay equally when their decisions are made openly (e.g., Cook & Hegtvedt, 1983). To prevent this bias, participants made the pay allocation decisions in a partitioned computer room, and were assured that their decisions were strictly confidential and would not be revealed to other group members. Pay differentiation was measured as the standard deviation of allocated pay among group members.

**Cooperation.** One item measure was used: “To what extent were you cooperative with other group members when you were doing the task?” Respondents had five response options ranging from (1) *not at all* to (5) *very much*.

**Self perception.** A 16-item measure was adopted and modified from Singelis (1994) and Leung and Kim (1997). The items had five Likert-type response options. A sample item for *independent self perception* is “When I was working on the task, I felt

that I should be judged on my own contribution to the group performance” ( $\alpha = .79$ ). A sample item for *interdependent self perception* is “When I was working on the task, I felt that I sacrificed my self-interest for the benefit of my group” ( $\alpha = .60$ ).

### **Control Variables**

***Individual performance.*** Studies have shown that low performers tend to be more equitable than high performers because of the politeness ritual effect (Griffith, Sell, & Parker, 1993; Mikula, 1974, 1980; Schwinger, 1980). Thus, each participant’s performance within their group was dummy coded into three types—high performer, mediocre performer, and low performer—and was included in the analyses. The highest-scoring participant was coded as high performer and the lowest-scoring participant was coded as low performer; the others were coded as mediocre performers.

***Performance difference.*** Because performance difference among group members can influence a participant’s pay allocation decision (e.g., Elliott & Meeker, 1984, 1986), I included the performance difference measured by the standard deviation of each group member’s contribution to the group score.

### **Additional Survey Variables for Manipulation Check**

***Trait regulatory-focus.*** I controlled for the trait-regulatory focus to control for possible confound between experimentally manipulated regulatory-focus and pay allocation. Specifically, one to three days before the experiment, participants answered the 20-items Regulatory Focus Questionnaire (RFQ) developed by Higgins et al. (2001). The participants were given five Likert-type response options (1 = *Strongly disagree* to 5 = *Strongly agree*). A sample item for *promotion-focus* is “I feel like I have made progress

toward being successful in my life,” and a sample item for *prevention-focus* is “I often obeyed rules and regulations that were established by my parents.”

## RESULTS – STUDY 1

To check for possible confounds, the pay differentiation was regressed on age, gender, ethnicity, and trait regulatory focus. Trait regulatory focus was used to check for possible confound between experimentally manipulated group goals and pay allocation. The regression result shows that no variables were significantly related to pay differentiation. In addition, to assess the manipulation of the group goal conditions, participants were asked how concerned they were with the number of matches/mismatches when they were doing the task, with five response options (1 = *Not at all* to 5 = *Very much*). As expected, the individuals in a gain-oriented goal condition were concerned more about matches ( $M = 3.95$ ) than mismatches ( $M = 3.67$ ), whereas the ones in a nonloss-oriented goal condition were concerned more about mismatches ( $M = 3.76$ ) than matches ( $M = 3.69$ ), and the difference was significant ( $t(146) = 1.92, p < .05$ ). Moreover, the manipulation of task complexity was assessed with the question, “How complex was the task?” with five response options (1 = *Not at all* to 5 = *Very much*). As expected, the individuals with the nonwords condition perceived higher complexity ( $M = 2.95$ ) than the ones with the words condition ( $M = 2.52; t(146) = 2.63, p < .01$ ).



**TABLE 2 – STUDY 1**  
**Descriptive Statistics and Correlations**

	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.Pay differentiation	.03	.05											
2.Gain-oriented goal	.50	.50	.15*										
3.Task Complexity	.50	.50	-.10	.04									
4.Cooperation	3.63	1.06	-.13	-.20**	.05								
5.Independent self perception	3.28	.63	.22**	.26**	-.05	-.36**							
6.Interdependence self perception	3.37	.43	-.04	-.09	.08	.38**	-.38**						
7.Promotion-focus (trait)	3.56	.43	-.10	-.16*	.03	.17*	-.23**	.06					
8.Prevention-focus (trait)	3.47	.63	.06	.08	.03	.05	.01	-.03	.16*				
9.High performer	.28	.45	-.00	.00	.03	-.05	.11	-.14*	-.00	-.01			
10.Low performer	.3	.46	-.05	.01	.07	-.06	-.06	.05	.08	-.15*	-.41**		
11.Mediocre performer	.42	.50	.05	-.01	-.09	.10	-.05	.08	-.07	.15*	-.53**	-.56**	
12.Performance difference	.61	1.10	.06	-.42**	.05	.06	.11	-.04	-.07	.10	-.03	.02	.01

Notes: \*  $p < .05$ , \*\*  $p < .01$ . individual  $n = 148$ , group  $n = 41$ .

**TABLE 3 – STUDY 1**  
**Hierarchical Linear Modeling Results**

	Cooperation		Independent Self perception		Interdependent Self perception		Pay Differentiation		
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 3
<i>Control variables</i>									
High performer dummy	-.09	-.10	.10	.11	-.14	-.15 †	-.03	-.04	-.04
Low performer dummy	-.10	.10	-.03	-.02	-.01	-.02	-.07	-.06	-.06
Performance difference	-.03	-.03	.27 **	.28 **	-.10	-.10	.14	.09	.09
<i>Independent variables</i>									
Gain-oriented goal	-.21 *	-.22 *	.37 **	.38 **	-.13	-.14	.21 *	.13	.13
Cooperation								-.07	-.07
Independent self perception								.17 *	.17 *
Interdependent self perception								.05	.06
<i>Interaction terms</i>									
Complexity		.07		-.08		.09			-.09
Gain-oriented goal × Complexity		-.02		.03		-.01			-.10
Log Likelihood	-214.05	-221.34	-205.55 **	-208.08 **	-214.34	-216.78	-216.26	-214.78	-216.65

Notes: \*  $p < .05$ , \*\*  $p < .01$ . individual  $n = 148$ , group  $n = 41$ ; standardized  $\gamma$ -coefficients are reported.

The log likelihood is a measure of overall model goodness-of-fit. The log likelihood value is always negative, with higher values (closer to zero) indicating a better fitting model.

Table 2 shows the descriptive statistics and zero-order correlations among all the study variables. Hypotheses were tested using hierarchical linear modeling (HLM) methods because individual participants were nested within three- to four-persons groups. 5 percent of pay differentiation variance was explained by groups ( $p < .05$ ).

Model 1's in Table 3 test hypotheses 1 to 3. As expected, the gain-oriented goal variable was negatively related to cooperation ( $\gamma = -.21, p < .05$ ; first column of Table 3, Model 1). Also, the gain-oriented goal variable was positively related to independent self perception ( $\gamma = .37, p < .01$ ; third column of Table 3, Model 1), but it was not significantly related to interdependent self perception ( $\gamma = -.13, n.s.$ ; fifth column of Table 3, Model 1). The gain-oriented goal variable was positively related to pay differentiation ( $\gamma = .21, p < .05$ ; seventh column of Table 3, Model 1). Thus, hypotheses 1, 2a, and 3 were supported, but hypothesis 2b was not supported.

To test the mediation hypotheses (hypotheses 4, 5a, and 5b), pay differentiation was regressed on the three mediators—cooperation, independent self perception, and interdependent self perception—in addition to the main independent variable—gain-oriented goal (right column of Table 3, Model 3). The results show that the independent self perception variable was significantly related to pay differentiation ( $\gamma = .17, p < .05$ ), but cooperation ( $\gamma = -.07, n.s.$ ) and interdependent self perception variables were not significantly related to pay differentiation ( $\gamma = .06, n.s.$ ). I tested the statistical significance of the mediation effect by estimating the sampling distributions of the product of HLM coefficients using a bootstrap procedure with 1,000 samples to construct confidence intervals, because the distribution of products of regression coefficients and

significance tests of product terms have a high Type 1 error rate (MacKinnon et al., 2002; Shrout & Bolger, 2002). The results show that the mediated relationship between gain-oriented goal and pay differentiation through independent self perception was positive and significant (indirect effect = .06,  $p < .01$ ; total effect = .19,  $p < .01$ ). Thus, hypothesis 5a was supported in that independent self perception mediates the relationship between gain-oriented goal and pay differentiation, but hypotheses 4 and 5b were not supported.

Tests of hypotheses 6, 7a, and 7b necessitated the statistical significance of interaction between gain-oriented goal and task complexity on cooperation, independent self perception, and interdependent self perception (Models 2 in the left three columns of Table 3). The HLM results show that the interaction between gain-oriented goal and task complexity was not significantly related to cooperation ( $\gamma = -.02$ , *n.s.*), independent self perception ( $\gamma = .03$ , *n.s.*), and interdependent self perception ( $\gamma = -.01$ , *n.s.*). Thus hypotheses 6, 7a, and 7b were not supported. In addition, because hypotheses 6, 7a, and 7b were not supported, moderated-mediation hypotheses (i.e., hypotheses 8, 9a, and 9b) were not supported as well.

## **METHOD – STUDY 2**

Study 2 was designed to test for the generalizability of the Study 1 findings by examining them in the context of a different interdependent task. Study 1 results show that individuals with a gain-oriented goal preferred more differentiated pay because they had higher independent self perception than those with a nonloss-oriented goal. The role of cooperation, however, was limited in that individuals with a gain-oriented goal were less cooperative, but the level of cooperation was not related to their pay allocation

decisions. A measurement issue could have caused the limited role of cooperation in Study 1. Specifically, cooperation was measured with one item: “To what extent were you cooperative with other group members when you were doing the task?” I addressed this measurement issue in Study 2 by adopting three-item measures of cooperation that were used in previous studies (e.g., Chatman & Flynn, 2001). In addition, Study 1 results also show that task complexity is not significantly related to the theorized relationships among group goal, pay differentiation, cooperation, and independent/interdependent self perception. One possible explanation for this finding is that the experimental task used in this study, a memory-matching card task, is cognitively loading in that it requires participants to memorize words or nonwords, and thus the participants in the words-memory-matching task perceived moderate levels of complexity, rather than low complexity. Hence, the generated data may compare moderate to high levels of task complexity rather than low to high levels of task complexity. Study 2 addresses this issue by using a different experimental task, a cube-counting task, that people can perform more easily with limited use of their memory capability.

### **Participants and Design**

For Study 2, 121 undergraduate students (34 three- to four-person groups) were recruited from a large university located in the Midwest United States. I adopted the same experimental design used in Study 1: 2 (group goal: gain-oriented vs. nonloss-oriented) × 2 (task complexity: high vs. low) factorial between-subjects design. Participants were randomly assigned to the experimental conditions.

## **Task**

The experimental task was a three- to four-person group cube-counting task. Before participation, the participants answered a required survey about their regulatory focus trait and personality. On arriving at the behavioral laboratory, participants were told that the study was being conducted to investigate group productivity and that they would work in groups of three or four. After getting the consent form signed, the experimenter escorted groups to a workroom with a table that held a set of pictures of cubes, one answer sheet for the group, four blank notes for each participant, and colored pens with four different colors: red, green, blue, and orange. After the participants were randomly given different colored pens (red, green, blue, and orange) and blank notes, the experimenter explained the procedure as follows:

Welcome to the group productivity study. Today you will work on a cube-counting task together, and your task is to count the number of cubes from the pictures that will be shown to you soon. You will be given ten minutes for this cube-counting task. While you are working on the task, I'd like you to follow some rules. First, you are allowed to talk with each other. Second, you do not need to take turns to play; anyone who gets the correct answer can answer. Third, you can move on to the next question after any one of you writes the answer on the group answer sheet. Fourth, when you write the answer on the answer sheet, write with your own colored pen. Last, when you finish the task, I will give you individual and group performance feedback. This task has been done many times in other universities and by other participants in this university, and I have the historical record of their performance. So I will also give you your group performance percentile based on historical data.

Before participants worked on the tasks, they had a practice session in which the experimenter showed three pictures of stacked cubes, and the participants counted the number of cubes together for three minutes. The experimenter measured their individual

and group performance as they played and gave performance feedback. Once participants understood and were ready for the real task, they were shown pictures of stacked cubes for ten minutes. After they finished the task, they were escorted to separate but adjoining workrooms equipped with computers and pens, and answered questions about the task and themselves while the experimenter evaluated individual and group performances. When participants finished answering the questions, the experimenter presented feedback sheets illustrating group performance and individual performance (by colors). Moreover, the participants were shown that, regardless of their actual performance, their group performed above average (83%), thereby inducing the winning condition (Elliott & Meeker, 1984, 1986). After that, the participants were asked to decide individually how the group reward should be most fairly allocated:

In this study, I'm also interested in the fairest way to allocate rewards to group members. Assuming that your group earned \$40 [\$30 for three-person groups] as a result of the performance (i.e., your group could have earned more or lost more depending on the performance), what do you think is **the fairest way** to allocate the reward to your group members?

Then the experimenter asked participants to explain why they thought their suggested pay allocation decision was fair. After the pay allocation questions, the participants answered more questions about their individual traits and demographic characteristics. When all the questions were answered, they were debriefed and paid \$10 for their participation.

### **Experimental Conditions – Independent Variables**

*Group goal condition.* Group members in the *gain-oriented goal condition* were given an instruction paper that the experimenter read aloud as follows: “The scoring

method for this task is +4 points for each correct answer but -1 point for each incorrect answer. For example, if you get 8 correct answers but committed 2 incorrect answers, then the total score is 62 because  $(4 \times 8) + (-1 \times 2) = 30$ . Therefore, the goal of your group is to finish the task with the maximum score gains.” These instructions were intended to encourage the group members to pursue an ideal goal (i.e., high maximum score).

Group members in the *nonloss-oriented goal condition* were given a different instruction paper with the gain-oriented group goal condition, and the experimenter read it aloud as follows: “The scoring method for this task is -4 points for each incorrect answer and +1 point for each correct answer. For example, if you commit 3 incorrect answers and get 7 correct answers, then the total score is -5 because  $(-4 \times 3) + (1 \times 7) = -5$ . Therefore, the goal of your group is to finish with the minimum score losses.” For both conditions, 20 pictures were used. The group goal variable was coded as 1 for gain-oriented goal and 0 for nonloss-oriented goal.

***Complexity condition.*** Task complexity was manipulated by the complexity of the shape of pictures. Appendices 3 and 4 show the examples of the complex and easy tasks. Task complexity was coded as 1 for high complexity and 0 for low complexity.

### **Mediators and Dependent Variable (Survey Measures)**

***Pay differentiation.*** After the task, each individual participant was given a performance feedback sheet that was used in Study 1 (only the word “matches” was changed to “correct answers” and the word “mismatches” was changed to “incorrect answers”), and the participant was asked to allocate pay to their group members



in **the fairest way**. Identical to Study 1, participants were assured the confidentiality of their pay allocation decisions; pay differentiation was measured as the standard deviation of allocated pay among group members.

***Cooperation.*** A three-item measure was adopted and modified from Chatman and Flynn (2001). A sample item is “To what extent were you cooperative with other group members when you were doing the task?” Respondents had five response options ranging from (1) *not at all* to (5) *very much*.

***Self perception.*** The measure was identical to the 16-item measure used in Study 1. The reliability alpha coefficients were .76 for the independent self perception and .49 for the interdependent self perception.

### **Control Variables**

Identical to Study 1, individual performance and performance difference were measured and controlled. *Individual performance* was measured as three dummy variables—high, mediocre, and low performers—and *performance difference* was measured as the standard deviation of each group member’s contribution to the group score.

### **Additional Survey Variables for Manipulation Check**

As in Study 1, I measured trait-regulatory-focus to check the manipulations using the 20 items from Higgins et al.’s (2001) RFQ scale.

## **RESULTS – STUDY 2**

To check for possible confounds, the pay differentiation was regressed on age, gender, ethnicity, and trait regulatory focus. The regression result shows that no variables

were significantly related to pay differentiation. In addition, to assess the manipulation of the group goal conditions, participants were asked how much they were concerned with the number of correct and incorrect answers when they were doing the task, with five response options (1 = *Not at all* to 5 = *Very much*). As expected, the individuals in a nonloss-oriented goal condition were concerned more about correct answers ( $M = 4.15$ ) than those in a gain-oriented goal condition ( $M = 3.77$ ), and the difference was significant ( $t(119) = 1.50, p < .05$ ). Moreover, the manipulation of task complexity was assessed by asking, “How complex was the task?” with five response options (1 = *Not at all* to 5 = *Very much*). As expected, the individuals with the complex-pictures condition perceived higher complexity ( $M = 3.63$ ) than the ones with the words condition ( $M = 3.12$ ;  $t(119) = 1.52, p < .05$ ).

**TABLE 4 – STUDY 2**  
**Descriptive Statistics and Correlations**

	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Pay differentiation	.57	.83											
2. Gain-oriented goal	.51	.50	.06										
3. Task Complexity	.49	.50	.09	-.02									
4. Cooperation	3.61	.81	-.16*	-.18*	-.04								
5. Independent self perception	3.29	.57	.11	.15	.05	-.07							
6. Interdependence self perception	3.57	.34	.01	.09	-.12	.21*	-.06						
7. Promotion-focus (trait)	3.63	.46	-.08	.07	.13	-.07	-.15	-.20*					
8. Prevention-focus (trait)	3.60	.54	-.00	.13	.01	.12	.04	-.05	.16*				
9. High performer	.30	.46	-.20*	-.06	.03	-.01	.29**	-.20*	-.09	.02			
10. Low performer	.32	.47	.23*	-.03	-.01	-.03	-.37**	.12	.03	-.04	-.45**		
11. Mediocre performer	.38	.49	-.03	.09	-.02	.05	.06	.07	.06	.03	-.51**	-.53**	
12. Performance difference	.34	.31	.28**	-.31**	.30**	-.08	-.14	-.02	-.14	.07	.02	-.03	.00

Notes: \*  $p < .05$ , \*\*  $p < .01$ . individual  $n = 121$ , group  $n = 34$ .

**TABLE 5 – STUDY 2**  
**Hierarchical Linear Modeling Results**

	Cooperation		Independent Self perception		Interdependent Self perception		Pay Differentiation		
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 3
<i>Control variables</i>									
High performer dummy	-.10	-.11	.17*	.18*	-.17*	-.17*	-.10	-.14	-.13
Low performer dummy	-.15	-.15	-.29**	-.28**	-.05	.05	.20*	.26**	.26**
Performance difference	-.02	-.06	-.01	.02	-.01	.03	.34**	.34**	.37**
<i>Independent variables</i>									
Gain-oriented goal	-.11	-.12	.15*	.16*	.08	.08	.18*	.15	.16
Cooperation								-.03	-.02
Independent self perception								.21*	.20*
Interdependent self perception								-.01	-.01
<i>Interaction terms</i>									
Complexity		.09		.03		-.12			-.01
Gain-oriented goal × Complexity		-.07		.16*		-.05			.10
Log Likelihood	-177.30	-179.47	-166.80**	-168.58**	-175.62	-177.52	-166.55**	-167.52**	-169.78**

*Notes:* \*  $p < .05$ , \*\*  $p < .01$ . individual  $n = 121$ , group  $n = 34$ ; standardized  $\gamma$ -coefficients are reported.

The log likelihood is a measure of overall model goodness-of-fit. The log likelihood value is always negative, with higher values (closer to zero) indicating a better fitting model.

Table 4 shows the descriptive statistics and zero-order correlations among all the study variables. Hypotheses were tested using hierarchical linear modeling (HLM) methods because individual participants were nested within three- to four-persons groups. 16% of pay differentiation variance was explained by groups ( $p < .01$ ).

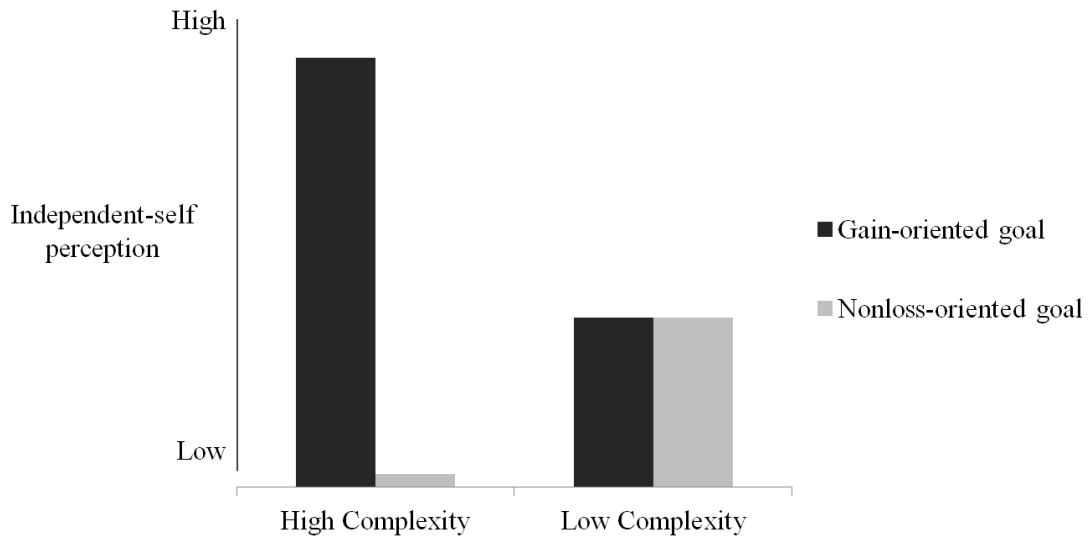
Models 1 in Table 5 test hypotheses 1 to 3. The gain-oriented goal variable was positively related to independent self perception ( $\gamma = .15, p < .05$ ; third column of Table 5, Model 1), but not significantly related to cooperation ( $\gamma = -.11, n.s.$ ; first column of Table 5, Model 1) and interdependent self perception ( $\gamma = .08, n.s.$ ; fifth column of Table 5, Model 1). The gain-oriented goal variable was positively related to pay differentiation ( $\gamma = .18, p < .05$ ; right-column of Table 5, Model 1). Thus, hypotheses 2a and 3 were supported, but hypotheses 1 and 2b were not supported.

To test the mediation hypotheses (hypotheses 4a, 4b, and 5), pay differentiation was regressed on the three mediators—cooperation, independent self perception, and interdependent self perception—in addition to the main independent variable—gain-oriented goal (right column of Table 5, Model 3). The results show that the independent self perception variable was significantly related to the pay differentiation ( $\gamma = .20, p < .05$ ), but cooperation ( $\gamma = -.02, n.s.$ ) and interdependent self perception were not significantly related to the pay differentiation ( $\gamma = -.01, n.s.$ ). I tested the statistical significance of the indirect effect by estimating the sampling distributions of the product of HLM coefficients using a bootstrap procedure with 1,000 samples to construct confidence intervals (MacKinnon et al., 2002; Shrout & Bolger, 2002). The results show that the mediated relationship between gain-oriented goal and pay differentiation through

independent self perception was positive and significant (indirect effect = .03,  $p < .05$ ; total effect = .19,  $p < .05$ ). Thus, hypothesis 5a was supported in that independent self perception mediated the relationship between gain-oriented goal and pay differentiation, but hypothesis 4 and 5b were not supported.

Tests of hypotheses 6, 7a, and 7b necessitated the statistical significance of interaction between gain-oriented goal and task complexity on cooperation and independent self perception (Models 2 in the left- to mid-columns of Table 5). The HLM results show that the interaction between gain-oriented goal and task complexity was not significantly related to cooperation ( $\gamma = -.07$ , *n.s.*) and interdependent self perception ( $\gamma = -.05$ , *n.s.*), but it was significantly related to independent self perception ( $\gamma = .16$ ,  $p < .05$ ). As expected, the form of the interaction in Figure 2 shows that the levels of independent self perception in gain-oriented goal and nonloss-oriented goal conditions are more different in high task complexity than in low task complexity conditions (Figure 2). Thus hypothesis 7a was supported, but hypotheses 6 and 7b were not supported.

**FIGURE 2 – STUDY 2**  
**First stage moderation effects of the task complexity on the relationship between gain-oriented goal and independent self perception**



To test the mediated-moderation hypothesis (i.e., hypotheses 8, 9a, and 9b), I took the nested-equation path analytic approach to mediated-moderation from Edwards and Lambert (2007) based on the estimates from the hierarchical linear modeling method. This approach addresses problems with Baron and Kenny’s (1986) causal steps approach and permits testing hypothesized models against alternative, nested models. This is accomplished by substituting the regression equation for the mediating variable into the equation for a given dependent variable. These reduced form equations are then used to derive direct, indirect, and total effects of the independent variable across levels of moderator variable. The theoretical model in this study is an example of a “first-stage” mediation hypothesis because the moderating effect of task complexity applies to the first stage of the indirect effect of gain-oriented goal on pay differentiation.

Specifically, the coefficients from two HLM equations—Model 2 of the fourth column of Table 5 and Model 3 of the right-column of Table 5—were used for the reduced form equation. First, the effects of gain-oriented goal and the predicted interaction effect between gain-oriented goal and task complexity on independent self perception are estimated with Equation 1:

$$M = a_0 + a_1X + a_2Z + a_3XZ + e_M \quad (1)$$

where M refers to the mediator independent self perception, X refers to gain-oriented goal, Z refers to the moderator task complexity, and XZ is the product of gain-oriented goal and task complexity.

The second equation estimates the effects of victimization and the mediator, independent self perception, on the dependent variable – pay differentiation:

$$Y = b_0 + b_1X + b_2M + e_Y \quad (2)$$

where Y refers to the dependent variable – pay differentiation. Substituting Equation 1 for M in Equation 2 produced the reduced form equation for the first-stage moderation model:

$$Y = b_0 + b_1X + b_2(a_0 + a_1X + a_2Z + a_3XZ + e_M) + e_Y \quad (3)$$

Equation 3 can be simplified as follows in Equation 4:

$$Y = (b_0 + a_0b_2) + (b_1 + a_1b_2)X + a_2b_2Z + a_3b_2XZ + b_2e_M + e_Y \quad (4)$$

Equation 4 can be rewritten in terms of simple paths to clarify the direct, indirect, and moderating effects:

$$Y = [b_0 + (a_0 + a_2Z)b_2] + [b_1 + (a_1 + a_3Z)b_2]X + b_2e_M + e_Y \quad (5)$$



In Equation 5, the direct effect of X (gain-oriented goal) on Y (pay differentiation) is captured by the term  $b_1$ , and the indirect effect of X on Y across different levels of Z (task complexity) is captured by the product term,  $(a_1 + a_3Z)b_2$ .

Path analysis conventions were used to describe the direct, indirect, and total effect of gain-oriented goal on pay differentiation at different levels of task complexity using path analysis conventions. That is,  $P_{MX}$  refers to the paths from X (gain-oriented goal) to M (independent self perception);  $P_{YM}$  is the path from M (independent self perception) to Y (pay differentiation);  $P_{YX}$  is the path from X to Y (that is, the direct effect of gain-oriented goal on pay differentiation);  $P_{YM} * P_{MX}$  is the indirect effects, and  $P_{YX} + P_{YM} * P_{MX}$  is the total effect of X on Y. Following Edwards and Lambert's (2007) suggestions, I constructed confidence intervals for the significance tests of indirect effects by estimating the sampling distributions of the product of regression coefficients using a bootstrap procedure with 1,000 samples. This procedure is necessary because calculations of the indirect effects involve products of regression coefficients, the distribution of products is non-normal, and significance tests of product terms have a high Type 1 error rate (Shrout & Bolger, 2002).

The path analytic results are shown in Table 6. As the table shows, the path estimates revealed that the indirect effects of gain-oriented goal on pay differentiation, through independent self perception, varied across levels of task complexity. The slopes in high and low levels of task complexity were significantly different for pay differentiation ( $p < .05$ ).

Specifically, when task complexity was high, the indirect effect of gain-oriented goal on pay differentiation— via independent self perception – was significant ( $P_{YM}P_{MX} = .06, p < .01$ ), and the total effect was also significant ( $P_{YX} + P_{YM}P_{MX} = .32, p < .01$ ). In contrast, when task complexity was low, the indirect effects of gain-oriented goal on pay differentiation – via independent self perception –was not significant ( $P_{YM}P_{MX} = -.00, n.s.$ ), and also the total effect was not significant ( $P_{YX} + P_{YM}P_{MX} = .06, n.s.$ ).

Furthermore, the form of the first-stage interaction and the total indirect effects show that the total effect of gain-oriented goal on pay differentiation (Figure 3) was stronger when task complexity was high rather than low. Thus, the mediated-moderation hypothesis was supported when the independent self perception was used as a mediator, but not when the cooperation was used as a mediator; hypothesis 9a was supported but hypotheses 8 and 9b were not supported.

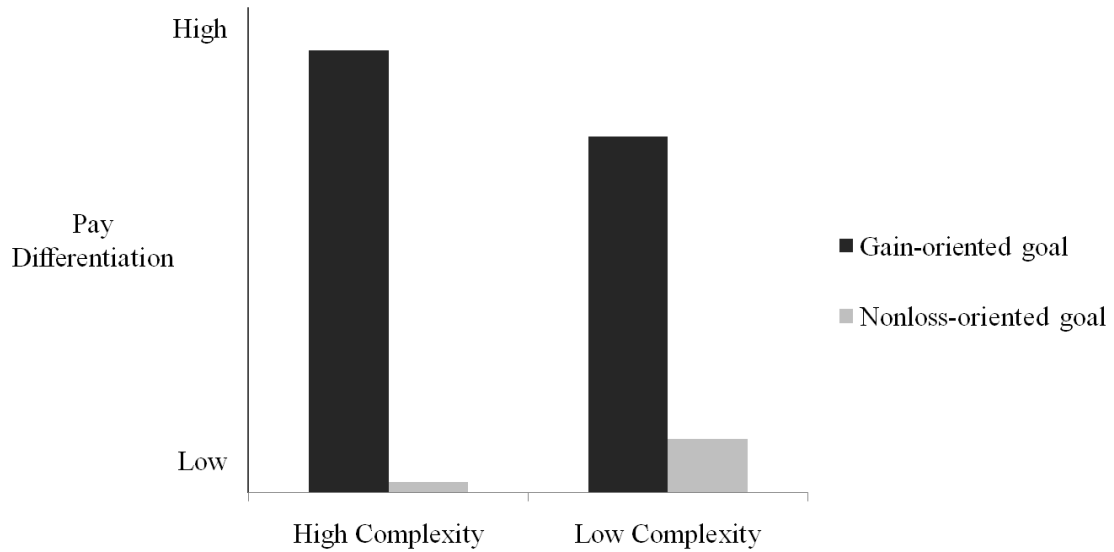
**TABLE 6 – STUDY 2**  
**Path Analytic Results**

	First Stage ( $P_{MX}$ )	Second Stage ( $P_{YM}$ )	Direct effects ( $P_{YX}$ )	Indirect effects ( $P_{YM}P_{MX}$ )	Total effects ( $P_{YX} + P_{YM}P_{MX}$ )
<i>Independent Self Perception</i>					
High Complexity	<b>.32**</b>	.20**	.26*	<b>.06**</b>	<b>.32**</b>
Low Complexity	<b>.00</b>	.20**	.07	<b>.00</b>	<b>.06</b>

Notes: \*  $p < .05$ , \*\*  $p < .01$ . individual  $n = 121$ , group  $n = 34$ .

Coefficients in bold are significantly different across workgroup conflict levels ( $p < .05$ ).

**FIGURE 3 – STUDY 2**  
**Moderated total effect of gain-oriented goal on pay differentiation (via independent self perception) at low and high levels of task complexity**



### DISCUSSION

Pay allocation within groups is a critical issue, especially considering the popularity of groups and teams in workplaces. In this study, I theorize that group goals determine individuals’ preferences regarding differentiated pay among group members. Invoking regulatory focus theory to the pay allocation literature, I distinguish two types of group goals, gain-oriented and nonloss-oriented, and propose that individuals with a gain-oriented group goal will prefer differentiated pay among group members more than those with a nonloss-oriented group goal. To explain the relationship between group goal and pay allocation decisions, I further theorize that the relationship between group goal and pay-allocation decisions is mediated by cooperation and independent self perception. The results from two laboratory experiments show general support of the theorized relationships in that a gain-oriented group goal is significantly and positively related to

differentiated pay allocation decisions, and the relationship is mediated by their independent self perception level. Moreover, the results also suggest that task complexity moderates the strength of the relationship between group goals and differentiated pay allocation decisions.

The most significant contribution of this study is that it introduces a novel factor—group goal—to illuminate fair-pay allocation decisions within groups. Note that the purpose of this study is not to dispute previous findings that task interdependence influences the pay-allocation effectiveness such that equity-based pay is preferred under low task interdependence conditions and equality-based pay is preferred under high task interdependence conditions. While agreeing with the previous proposition, I take the literature in a new direction by showing that, even in a highly interdependent task context, equity-based pay may be necessary when a group has a gain-oriented goal, but not when a group has a nonloss-oriented goal. Prior researchers have taken steps in this direction (e.g., Beersma et al., 2003), but those studies were limited in that they did not theorize the mechanisms of how group goals, in particular, are related to fair-pay allocation decisions. This study reveals a much more nuanced explanation for the relationship between group goal and pay allocation by presenting an important mediator, independent self perception.

From a theoretical standpoint, this study contributes to the pay fairness literature by arguing that regulatory focus theory can explain pay allocation within groups. Although organizational researchers have long been interested in pay fairness, their theoretical discussions have been mostly with respect to equity theory (Adams, 1963,

1965), social interdependence theory (Deutsch, 1985, 1986), or, somewhat broadly, distributive justice theory (e.g., Leventhal, 1976; Leventhal, Karuza, & Fry, 1980). Instead, this study adopts regulatory focus theory and shows that group goals, and the following individual strategic orientations, explain fairness perceptions about pay allocation. Specifically, this study shows that group members who have a gain-oriented group goal prefer more differentiated pay than those with a nonloss-oriented goal, because their strategic inclination toward gains induces them to perceive themselves as an independent, self-contained autonomous entity and less related to others; that is, they have high independent self perception (Markus & Kitayama, 1991). I expect this novel approach to answer the recent call for compensation researchers to further utilize management and social psychology theories (Gerhart & Rynes, 2003; Gerhart et al., 2009). Similar, but from a slightly different view, regulatory focus theorists might find this study interesting in that it extends the generalizability of the regulatory focus theory by applying it to the within-group pay-allocation context.

The two laboratory experiment results generally confirm the theorized relationships, but they also provide future research directions for the group goal and pay allocation literatures. Specifically, the results show that cooperation level is not related to their preferences on pay differentiation. Equal pay has often been emphasized in the compensation and pay allocation studies, and the main tenet of the argument was to enhance cooperation (e.g., Deutsch, 1986). However, the results from this study imply that it may be possible that people perceive equity-based pay to be fair even after they closely cooperate with each other. Supporting this view, a recent study by Pearsall,

Christian, and Ellis (2010) showed that under hybrid pay allocation (i.e., half equity-basis and half equality-basis), group members shared information more and were less engaged in social loafing than those who were paid equally. The results of this study, combined with Pearsall et al.'s (2010) findings, suggest that future research efforts may extend our understanding about the pay allocation and cooperation relationship by investigating situations in which group members cooperate with each other even when they are paid based on their individual contributions. For example, from a quick review of field evidence, basketball players seem to cooperate closely with each other even when they are paid based on their individual contributions.

Another possible direction for future researchers is to examine the effects of interaction between pre-designed pay scheme and group goal on individual/team performance. The focus of this study was to propose a novel determinant of people's pay allocation fairness perceptions, which has long been an interest of distributive justice researchers in various disciplines, including philosophy (e.g., Rawls, 1971), economics (e.g., Konow, 2003), sociology (Hegtvedt, 2005), political science (e.g., Frohlich, Oppenheimer, & Eavey, 1987), psychology (e.g., Leventhal et al., 1980), and management (e.g., Cohen-Charash & Spector, 2001). Thus, I directly measured an individual's fair pay allocation decisions (under different group goal condition) following the approaches of many previous distributive justice studies (e.g., Elliott & Meeker, 1984, 1986; Goodman, 1975; Meeker & Elliott, 1995; Miller & Kormorita, 1995). From a manager's viewpoint, this study helps designing a pay allocation scheme for a group under the assumption that people will perform better when they perceive fairness to the

pay allocation among group members. Indeed, previous studies have tested and established the pay fairness and performance relationship (e.g., Cohen-Charash & Spector, 2001). However, some researchers may suggest that even if individuals do not perceive fairness, an optimal pay allocation scheme can produce high performance. For example, researchers with this viewpoint often manipulated two different forms of pay allocation schemes (e.g., equal pay vs. equity-based pay) and examined the impact of such pay schemes on performance (e.g., Fehr & Schmidt, 2004). Such research design helps address the pay allocation-performance relationship concern, but it is also limited in that it fails to capture the possible optimal degree of the equal- and equity-pay mix by choosing two different forms of pay scheme manipulation. In this study, I established the group goal and pay allocation fairness relationship. Thus, a possible next step would be to examine the interaction effects of group goal and pay scheme on performance. This approach will address the concern about the pay allocation and performance relationship.

Moreover, the results show that independent self perception significantly mediates the relationship between group goals and pay allocation decisions. Although these results are encouraging, other factors might mediate the proposed relationship. For example, Dragoni (2005) argued that psychological climate, defined as individual group member perceptions of the work environment (see also, James & Jones, 1974), mediates group goal and individual attitudes. Taking this viewpoint, future researchers may be able to theorize the indirect effect of group goals on pay allocation decisions through psychological climates. From another view, collective efficacy—a group's aggregate perception that the group can perform a particular task (Lindsley, Brass, & Thomas,



1995; Mulvey & Klein, 1998)—may also be adopted to explain the relationship between group goals and pay allocation decisions.

Furthermore, this study is designed as a laboratory experiment relying on a sample of undergraduate students; thus the results may suffer from a generalizability issue. Although the use of laboratory experiments provides an optimal venue to test and build theory (Colquitt & Zapata-Phelan, 2007; Driskell & Salas, 1992), examining this study's theoretical model in field data settings may address the external validity issue.

Finally, practitioners may refer to this study as they design appropriate pay-allocation practices within teams. Although it may be necessary to compress pay among members when task interdependence is high, one known disadvantage of this decision is that the team is likely to lose high-performing individuals by failing to give them enough differential pay to recognize their individual efforts (e.g., Shaw & Gupta, 2007). This study sheds light on this dilemma by showing that pay differentials are acceptable even among highly interdependent group members when their goal is gain-oriented, but compressed pay is preferable when their goal is nonloss-oriented.

## **CONCLUSION**

To my knowledge, this study is one of the first if not the initial study to investigate the role of group goals in determining people's fairness perceptions about pay allocation within groups. Using regulatory focus theory, I find that individuals with a gain-oriented group goal prefer differentiated pay more than those with a nonloss-oriented group goal, because they have higher independent self perception. Moreover,

this study also shows that a contextual factor, task complexity, moderates the relationship between gain-oriented goal and pay-allocation decisions.

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**APPENDIX 1**  
**Words used for the Memory Matching Cards Task**

**1. Complex Task**

SMOWS, PSUXTE, SPIPCE, SPEB, TRAPS, SENZE, JELSED, GLANTE, GREIMB,  
GYGNS, SWAWLD, KITH, PSYLED, SKEIDE, SINKED, CWORBE, THWEA,  
PEMF, SPOMPH, FEEVES, NYKES

**2. Easy Task**

DIVE, PALE, JET, OUT, BUSH, DEFINE, WINE, EDIT, MOVIE, ROOT, RIGHT,  
DEPTH, HOPE, FLASH, GAME, VIEW, LIMIT, FOSSIL, TRIP, NET, AIR, WIDE,  
RUSH

**APPENDIX 2**  
**Performance Feedback Sheet**

**Performance Feedback**

*Group performance*

Total number of matches	
Total number of mismatches	
Final Score (+4 points for matching, -1 point for mismatching)	

*Individual performance*

	Total number of matches	Total number of mismatches	Total Score
Red			
Green			
Blue			
Orange			

Because your group score is \_\_\_\_\_, your group performance is \_\_\_\_\_ percentile!

PLEASE TURN PAGE AND ANSWER THE QUESTION...



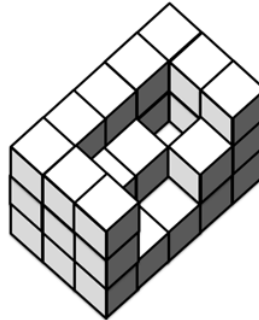
**APPENDIX 3**  
**Cube-counting Task Materials [Complex Task]**

**Directions: Count the number of blocks in each arrangement. Assume that blocks rest upon blocks immediately beneath them except in the case of arches.**

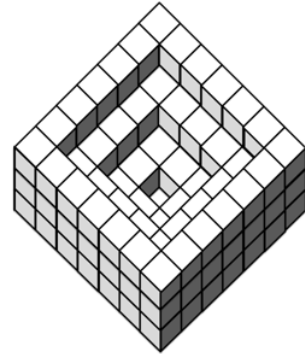
**Cube Counting**

Directions: Count the number of blocks in each arrangement. Assume that blocks rest upon blocks immediately beneath them except in the case of arches.

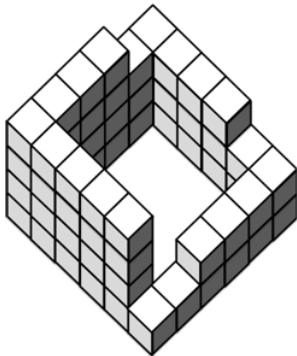
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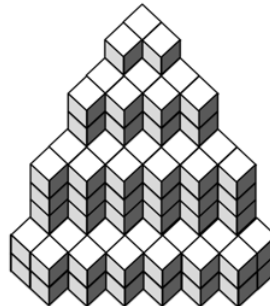
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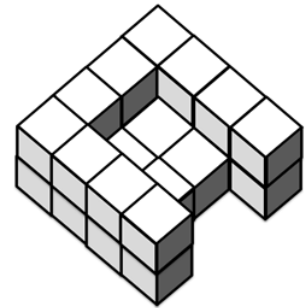
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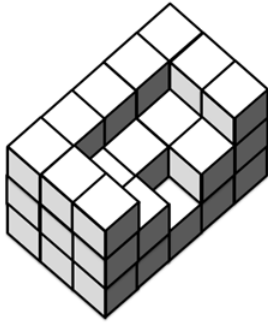
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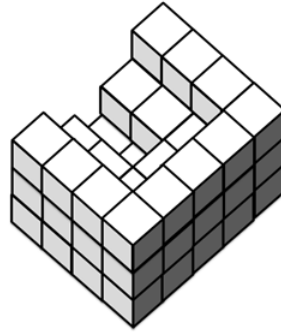
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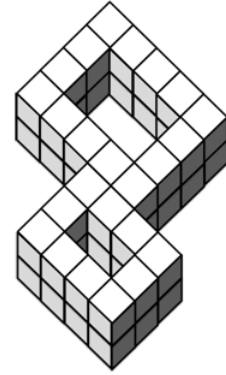
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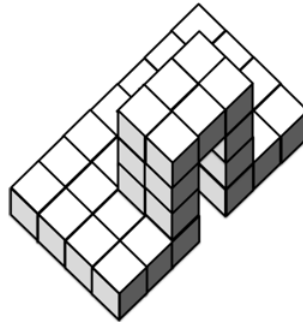
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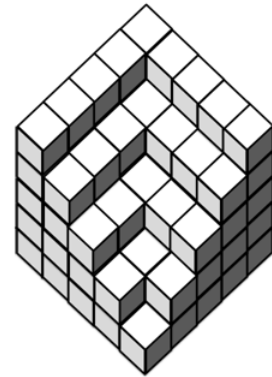
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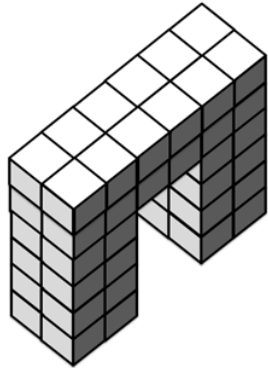
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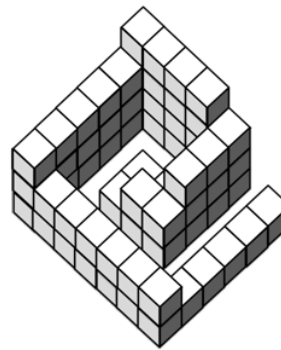
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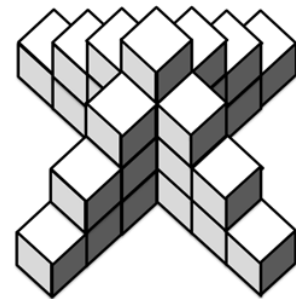
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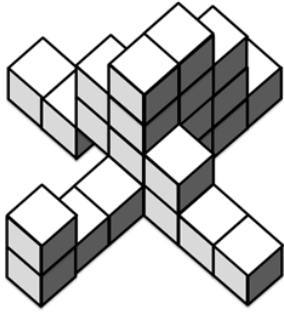
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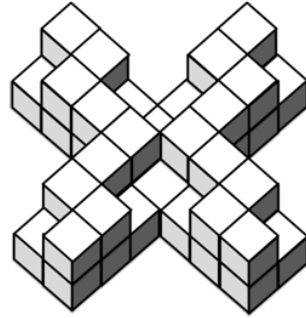
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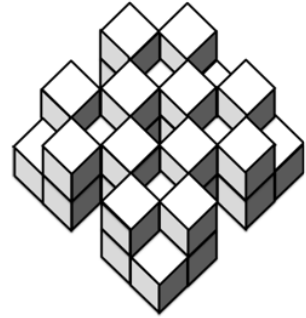
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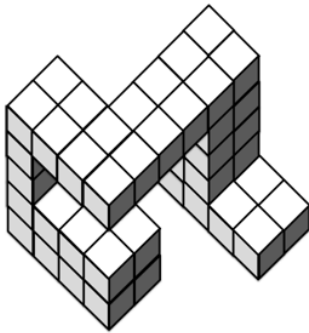
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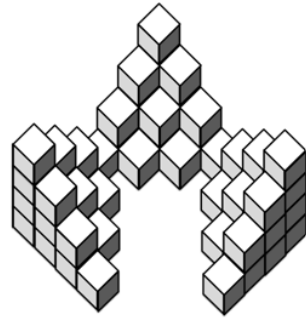
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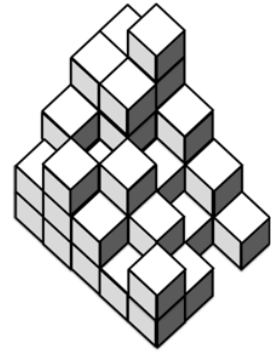
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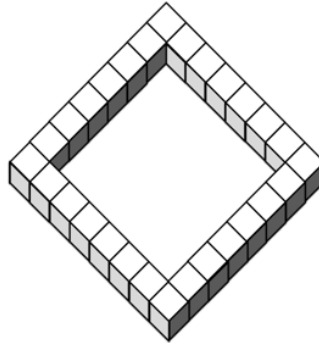
**APPENDIX 4**  
**Cube-counting Task Materials [Easy Task]**

**Directions: Count the number of blocks in each arrangement. Assume that blocks rest upon blocks immediately beneath them except in the case of arches.**

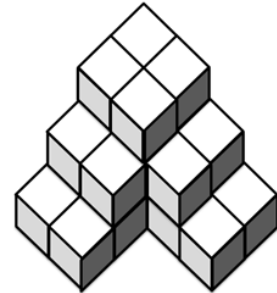
**Cube Counting**

Directions: Count the number of blocks in each arrangement. Assume that blocks rest upon blocks immediately beneath them except in the case of arches.

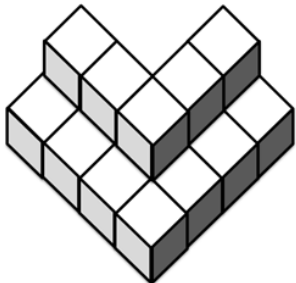
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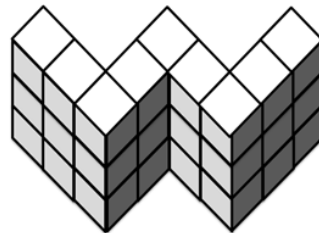
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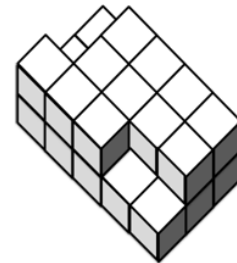
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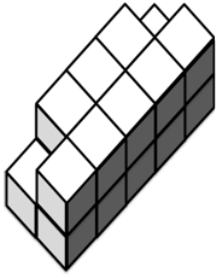
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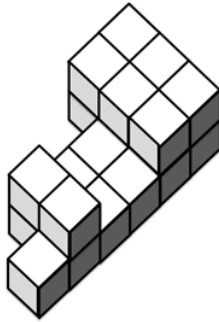
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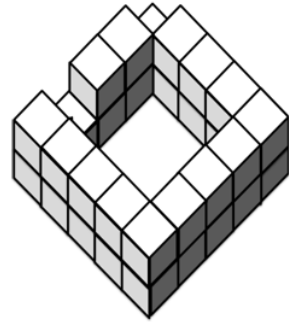
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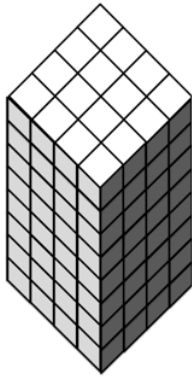
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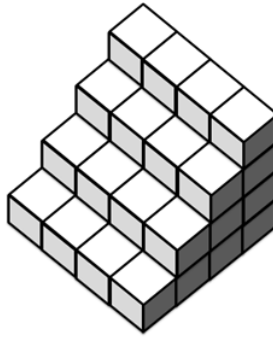
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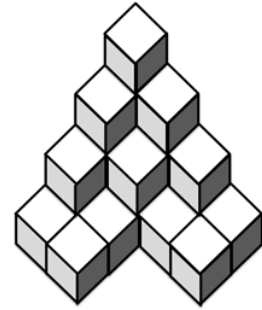
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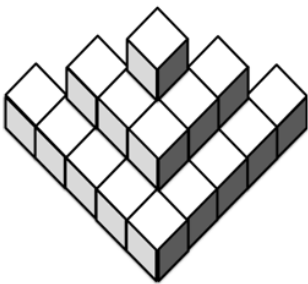
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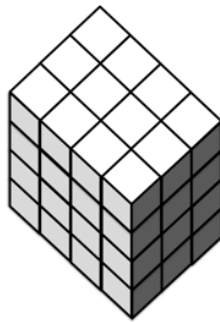
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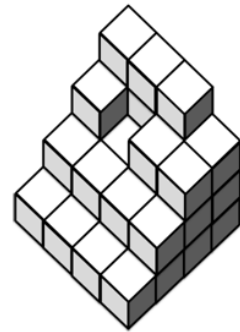
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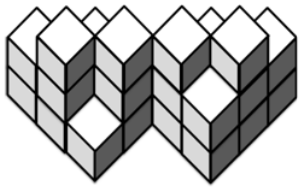
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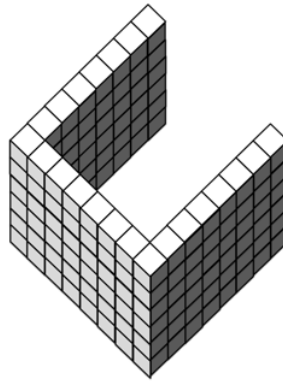
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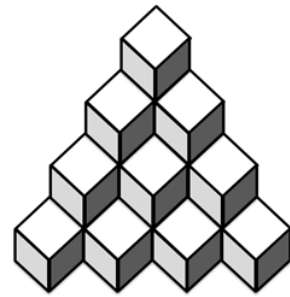
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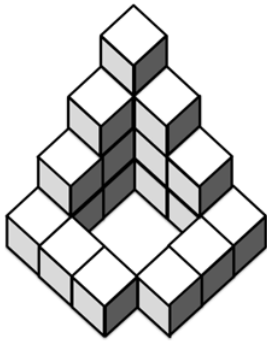
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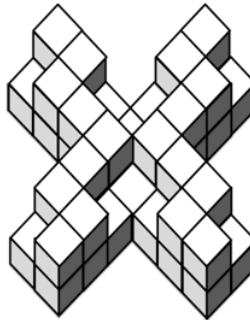
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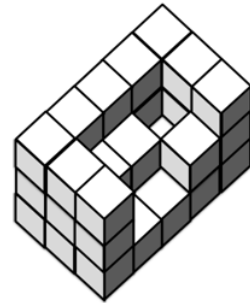
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**APPENDIX 5**  
**Scales of Measures – Before Participation Survey**

1. The following set of questions asks you about specific events in your life. Please indicate your answer to each question by clicking the appropriate number beside it.  
*[Regulatory Focus Questionnaire; Higgins et al., 2001]*

1) Compared to most people, I am typically unable to get what I want out of life.  
*(promotion-focus)*

1	2	3	4	5
Never or seldom		Sometimes		Very often

2) Growing up, I “crossed the line” by doing things that my parents would not tolerate.  
*(prevention-focus)*

1	2	3	4	5
Never or seldom		Sometimes		Very often

3) I often accomplished things that got me “psyched” to work even harder. *(promotion-focus)*

1	2	3	4	5
Never or seldom		Sometimes		Very often

4) I got on my parents’ nerves often when I was growing up. *(prevention-focus)*

1	2	3	4	5
Never or seldom		Sometimes		Very often

5) I often obeyed rules and regulations that were established by my parents. *(prevention-focus)*

1	2	3	4	5
Never or seldom		Sometimes		Very often

6) Growing up, I acted in ways that my parents thought were objectionable. *(prevention-focus)*

1	2	3	4	5
Never or seldom		Sometimes		Very often

7) I often do well at different things that I try. *(promotion-focus)*

1	2	3	4	5
Never or seldom		Sometimes		Very often

8) Not being careful enough has gotten me into trouble at times. (*promotion-focus*)

1                      2                      3                      4                      5  
 Never or                      Sometimes                      Very often  
 seldom

9) When it comes to achieving things that are important to me, I find that I don't perform as well as I ideally would like to do. (*promotion-focus*)

1                      2                      3                      4                      5  
 Never or                      Sometimes                      Very often  
 seldom

10) I feel like I have made progress toward being successful in my life. (*promotion-focus*)

1                      2                      3                      4                      5  
 Never or                      Sometimes                      Very often  
 seldom

11. I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them. (*promotion-focus*)

1                      2                      3                      4                      5  
 Never or                      Sometimes                      Very often  
 seldom

2. The following phrases describe people's behaviors. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. [*Big Five Personality Questionnaire – IPIP Scale; Goldberg, 1992*]

	Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate
1. Am the life of the party.	1	2	3	4	5
2. Feel little concern for others.	1	2	3	4	5
3. Am always prepared.	1	2	3	4	5
4. Get stressed out easily.	1	2	3	4	5
5. Have a rich vocabulary.	1	2	3	4	5
6. Don't talk a lot.	1	2	3	4	5
7. Am interested in people.	1	2	3	4	5
8. Leave my belongings around.	1	2	3	4	5
9. Am relaxed most of the time.	1	2	3	4	5
10. Have difficulty understanding abstract ideas.	1	2	3	4	5
11. Feel comfortable around people.	1	2	3	4	5

12. Insult people.	1	2	3	4	5
13. Pay attention to details.	1	2	3	4	5
14. Worry about things.	1	2	3	4	5
15. Have a vivid imagination.	1	2	3	4	5
16. Keep in the background.	1	2	3	4	5
17. Sympathize with others' feelings.	1	2	3	4	5
18. Make a mess of things.	1	2	3	4	5
19. Seldom feel blue.	1	2	3	4	5
20. Am not interested in abstract ideas.	1	2	3	4	5
21. Start conversations.	1	2	3	4	5
22. Am not interested in other people's problems.	1	2	3	4	5
23. Get chores done right away.	1	2	3	4	5
24. Am easily disturbed.	1	2	3	4	5
25. Have excellent ideas.	1	2	3	4	5

## Scales of Measures – After Task Completion Survey

Thank you for participating in this study. Please make yourself comfortable in the chair facing the computer. Please follow the instructions as you read them on the computer screen.

Click the <Continue> button below when you are ready.

### CAREFULLY READ AND ANSWER EACH OF THE FOLLOWING QUESTIONS

The following questions are about your experience, perception, and feeling while you were doing the task.

1. Please indicate the color you were assigned

Red \_\_\_\_\_  
Green \_\_\_\_\_  
Blue \_\_\_\_\_  
Orange \_\_\_\_\_  
Don't know what my color was \_\_\_\_\_

2. How involved were you in the task?

1                      2                      3                      4                      5                      6                      7  
not at all                      moderately                      very  
involved                      involved                      involved

3. To what extent were you concerned with the number of matches when you were doing the task?

1                      2                      3                      4                      5  
Not at all                      A little                      Somewhat                      Quite a bit                      Very  
much

4. To what extent were you concerned with the number of mismatches when you were doing the task?

1                      2                      3                      4                      5  
Not at all                      A little                      Somewhat                      Quite a bit                      Very  
much

5. How complex was the task?

1                      2                      3                      4                      5                      6                      7  
not at all                      moderately                      extremely  
complex                      complex                      complex

6. How difficult was the task?

1	2	3	4	5	6	7
not at all			moderately			extremely
difficult			difficult			difficult

7. To what extent were you cooperative with other group members when you were doing the task?

1	2	3	4	5
not at all	a little	somewhat	quite a bit	very much

8. To what extent did you have conflicts with other group members when you were doing the task?

1	2	3	4	5
not at all	a little	somewhat	quite a bit	very much

9. Rank order your group members from whom you believe was the best performer to whom you believe was the worst.

1<sup>st</sup> (best):

2<sup>nd</sup>:

3<sup>rd</sup>:

4<sup>th</sup> (worst):

10. To what extent do you think the high performing group members were valuable?

1	2	3	4	5
not at all	a little	somewhat	quite a bit	very much

11-1. Did you feel envious to other members who performed very well in the task?

1	2
Yes	No

11-2. [If yes in the question 11-1] To what extent did you feel envious to other members who performed very well in the task?

1	2	3	4	5
not at all	a little	somewhat	quite a bit	very much

12-1. Did you feel anger to other members who performed poorly in the task?

1	2
Yes	No

12-2. [If yes in the question 12-1] To what extent did you feel anger to other members who performed poorly in the task?

1	2	3	4	5
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not at all      a little      somewhat      quite a bit      very much

20. The following section consists of a number of words that describe different feelings and emotions. To what extent did you feel... [*Semantic differential mood scale; Lorr & Wunderlich, 1988; & PANAS; Watson, Clark, & Tellegen, 1988*]

	Not at all	A little	Somewhat	Quite a bit	Very
Happy	1	2	3	4	5
Upbeat	1	2	3	4	5
Satisfied	1	2	3	4	5
Sad	1	2	3	4	5
Disappointed	1	2	3	4	5
Discouraged	1	2	3	4	5
Angry	1	2	3	4	5
Uneasy	1	2	3	4	5
Fearful	1	2	3	4	5
Tense	1	2	3	4	5
Worried	1	2	3	4	5
Relaxed	1	2	3	4	5
Calm	1	2	3	4	5
Serene	1	2	3	4	5
Interested	1	2	3	4	5
Distressed	1	2	3	4	5
Excited	1	2	3	4	5
Upset	1	2	3	4	5
Strong	1	2	3	4	5
Guilty	1	2	3	4	5
Scared	1	2	3	4	5
Hostile	1	2	3	4	5
Enthusiastic	1	2	3	4	5
Proud	1	2	3	4	5
Irritable	1	2	3	4	5
Alert	1	2	3	4	5
Ashamed	1	2	3	4	5
Inspired	1	2	3	4	5

Nervous	1	2	3	4	5
Determined	1	2	3	4	5
Attentive	1	2	3	4	5
Jittery	1	2	3	4	5
Active	1	2	3	4	5
Afraid	1	2	3	4	5

21. The following statements are about your experience, perception, and feelings when you were doing the task. [*Self perception; Singelis, 1994; Leung & Kim, 1997*]

1) When I was working on the task, I preferred to be self-reliant rather than depend on others. (*Independent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

2) When I was working on the task, I sacrificed my self-interest for the benefit of my group. (*Interdependent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

3) When I was working on the task, I focused on my task no matter what others did. (*Independent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

4) When I was working on the task, I tried not to depend on others. (*Independent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

5) When I was working on the task, I respected the majority's opinions in my group. (*Interdependent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

6) When I was working on the task, cooperation with others was more important to me than my own accomplishments. (*Interdependent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

7) When I was working on the task, it was important to me to maintain harmony with my group. (*Interdependent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

8) When I was working on the task, I felt that I should be judged on my own contribution to the group performance. (*Independent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

9) When I was working on the task, I felt that it was important to act as an independent person. (*Independent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

10) When I was working on the task, I focused on my own performance, regardless of what others thought. (*Independent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

11) When I was working on the task, I felt uncomfortable disagreeing with my group. (*Interdependent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

12) When I was working on the task, I considered how I could be helpful to others in my group. (*Interdependent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

13) When I was working on the task, I felt that my performance is intertwined with others' performance. (*Interdependent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

14) When I was working on the task, my primary concern was to take care of my own performance. (*Independent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

15) When I was working on the task, I enjoyed being admired for my unique qualities. (*Independent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

16) When I was working on the task, I went along with what others suggested even when I would rather do something different. (*Interdependent self perception*)

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

22. The following statements are about your general feelings when you were doing the session. Please use the rating scale below to describe how accurately each statement describes your feeling.

*Task interdependence (Campion et al., 1993)*

1) I couldn't accomplish the group tasks without information or materials from other members of my group.

1	2	3	4	5
very inaccurate	moderately inaccurate	neither inaccurate nor accurate	moderately accurate	very accurate

2) Other members of my group depended on me for information or materials needed to perform the group tasks.

1	2	3	4	5
very inaccurate	moderately inaccurate	neither inaccurate nor accurate	moderately accurate	very accurate

3) Within my group, tasks performed by group members were related to one another.

1	2	3	4	5
very inaccurate	moderately inaccurate	neither inaccurate nor accurate	moderately accurate	very accurate

*Social Loafing (Limon & Boster, 2003)*

4) Members of my group tried as hard as they can.

1	2	3	4	5
very inaccurate	moderately inaccurate	neither inaccurate nor accurate	moderately accurate	very accurate

5) Members of my group are “free-riders.”

1	2	3	4	5
very	moderately	neither	moderately	very
inaccurate	inaccurate	inaccurate nor accurate	accurate	accurate

6) Members of my group are contributed less than I anticipated.

1	2	3	4	5
very	moderately	neither	moderately	very
inaccurate	inaccurate	inaccurate nor accurate	accurate	accurate

7) Given their abilities, my group members did the best they can.

1	2	3	4	5
very	moderately	neither	moderately	very
inaccurate	inaccurate	inaccurate nor accurate	accurate	accurate

### Scales of Measures – After All the Tasks and Surveys are Completed

1. The following statements are about you in general. Indicate how much you agree or disagree with the statements. [*Dispositional envy; Smith et al., 1999*]

1) I feel envy every day.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

2) The bitter truth is that I generally feel inferior to others.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

3) Feeling of envy constantly torments me.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

4) It is frustrating to see some people success so easily.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

5) No matter what I do, envy always plagues me.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

6) I am troubled by feelings of inadequacy.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

7) It somehow doesn't seem fair that some people seem to have all the talent.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

8) Frankly, the success of my neighbors makes me resent them.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

2. The following statements are about your general attitude toward team-based pay.  
[Team Reward Attitude; Shaw, Duffy, & Stark, 2001]

1) It makes sense to give rewards to team members based only on the overall performance of the team.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

2) A team member's rewards should be based only on the team's performance.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

3) Teams perform better when all team members get the same rewards.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

4) When working on a team, I prefer the rewards to be based on team performance.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

5) It's not fair to give every team member the same rewards regardless of how each person performs.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

6) I like to be rewarded based solely on my performance, not the team's performance.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

7) Team members work hard when they are rewarded equally.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

8) Members of my team should share equally in the team's successes and failures.

1	2	3	4	5
strongly disagree	disagree	neither	agree	strong agree

9) I exert more effort when rewards are based solely on the team's performance.



