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Clarifying the cohesion-performance relationship in teams: Backup behavior as a mediating mechanism

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Clarifying the Cohesion-Performance Relationship in Teams: Backup Behavior as a
Mediating Mechanism

by

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Dedication

This masters thesis is dedicated to my family, friends, and colleagues, especially my

parents, Patricia and Mike Prewett, who gave me all that I needed to succeed.

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ABSTRACT

The relationship between team cohesion and team performance has been

extensively studied, but behavioral mediators of this relationship have not been

adequately assessed. This study proposed that backup behavior mediates the relationship

between team cohesion and team performance. In addition, it was also hypothesized that

team goal commitment would moderate the relationship between team cohesion and team

backup behavior. 138 participants forming 46 teams of three were assigned to one of

fours conditions to test this framework: high cohesion/high goal commitment, high

cohesion/low goal commitment, low cohesion/high goal commitment, and low

cohesion/low goal commitment. Results indicated no significant differences between

conditions. However, correlations and regressions based upon self and observer ratings

suggest that team cohesion and team goal commitment, but not backup behavior, hold

strong relationships to team errors. Finally, exploratory analyses revealed an interaction

between team cohesion and team goal commitment on team performance indices.

Lowest performance occurred in teams with low cohesion and low goal commitment, but

there were no apparent difference between high and low goal commitment in teams with

high cohesion. Implications of these results are discussed in the paper.

Introduction

In the last two decades, the use of teams in organizations has increased dramatically. It was estimated in 1990 that 47% of large US companies used self-directed work teams (Lawler et al., 1992). Gordon (1992) observed that 80% of organizations with over a hundred employees used teams, and half of those employees are a member of at least one team. In addition, the transition to teams has generally increased overall organizational efficiency (e.g., Applebaum & Blatt, 1994; Levine & Tyson, 1990, cf. Guzzo & Shea, 1996). As a result of the recent shift to team-based work, considerable attention has been given in the literature to understanding and improving team effectiveness within the organization. Teams here are defined as a set of two or more individuals who interact adaptively, dynamically, and interdependently towards a goal that is shared by all individuals involved (Salas, Sims, & Burke, 2005).

In assessing team effectiveness, a multitude of antecedents has been studied and related to relevant outcomes of the team. Perhaps the most intriguing antecedent of team effectiveness is team cohesion, or the degree to which team members like one another. Nearly every model of team effectiveness includes team cohesion or a similar construct as an important component (e.g., McGrath, 1964; Gladstein, 1984; Campion, 1993). Cohesion has been studied for over half a century (e.g., Seashore, 1954), yet its relationship with team outcomes remains murky. In sum, studies have found a weak to moderately positive correlation between cohesion and performance. However, existing

research has failed to empirically demonstrate *why* team cohesion and team performance

seem to be related. Although a relationship with performance has been established,

researchers have yet to agree on the principle mediators of this relationship, or even the

causal flow of this relationship (e.g., Staw, 1975). It is the purpose of this paper to clarify

the relationship between team cohesion and team effectiveness. To resolve the problems

with causality described above, this study experimentally manipulates team cohesion in

order to observe causal effects on team effectiveness. Additionally, this study posits

backup behavior as a key mediating mechanism between team cohesion and team

effectiveness in order to explain why the two variables are related. Specifically, it is

expected that team cohesion will lead to an increase in helping behaviors among

teammates which will, in turn, enhance team performance. The rationale for the study is

developed next.

Team Cohesion: Definitions and Measurement

Though team cohesion has been studied for nearly sixty years, the definition and

operationalization of cohesion has been inconsistent. Various researchers have argued

that cohesion is a multidimensional construct, composed of task cohesion, social

cohesion, and sometimes group pride (e.g., Zaccaro, 1986; Zaccaro, 1988; Chang &

Bordia, 2001). Task cohesion describes cohesion that occurs between team members

because they are attracted to the task the group is performing. Social cohesion, on the

other hand, describes cohesion that occurs between team members because they like each

other and share an interpersonal bond. Other researchers have argued that task cohesion

is not a component of cohesion, but instead is a completely different construct that can be

better described as group goal commitment or group motivation (e.g., Langfred, 1998;

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Klein & Mulvey, 1995; Whitney, 1994). To complicate matters further, some researchers offer a third component to cohesion called group pride (Mullen & Copper, 1994; Beal, Cohen, Burke, & McClendon, 2003). Group pride refers to the feeling of pride that members feel for belonging to their specific team; usually such groups are high-achieving or elite (hence the source of pride). Still other differences in the definition exist, outlined in a review by Mudrack (1989). Sometimes cohesion is defined at the group level, such as Festinger's (1951) definition that cohesion was "the total field of forces which act on members to remain in the group" (p.164). Other times team cohesion is defined at the individual level, such as Pepitone & Kleiner's (1957) definition that team cohesion was individual members' attraction to the group. Recent researchers have avoided the problem altogether by not offering a definition at all.

Because a multitude of definitions have been offered for team cohesion, a multitude of scales have been constructed to measure these various definitions of team cohesion. To date, there is still not an accepted scale for measuring cohesion, and the norm appears to be creating a new scale for every study (Mudrack, 1989). Furthermore, different scales have different factor loadings depending on the scale author's conceptualization of cohesion. Seashore (1954) and Dobbins & Zaccaro (1986) each developed measures that assess social cohesion. Evans & Jarvis (1986) developed a one factor measure that defined cohesion as an individual member's attraction to the group. Carless & De Paola (2000) developed a scale that measures three factors: task cohesion, social cohesion, and an individual's attraction to the group. Many more studies have utilized a cohesion scale different from the ones mentioned above, and the result is a growing problem with consistency. As Mudrack (1989) stated in his review of the

literature, "investigators need to settle on a very few measures of cohesiveness if future research into the productivity-cohesiveness relationship is to accomplish anything of relevance" (p. 781). In an effort to address this issue in the team literature, this study argues that team cohesion is a team-level construct and, as a result, should be defined and measured at the team level. Additionally, as it will be discussed in detail later, this study argues that team cohesion consists of one factor, and that other such factors as task cohesion and group pride represent constructs with fundamentally different definitions than that of team cohesion.

Team Cohesion and Team Performance

Despite the problems associated with defining and measuring team cohesion, a number of studies have established the relevance of team cohesion in predicting team effectiveness. Perhaps the strongest argument for a cohesion-performance relationship is found in the several meta-analyses conducted recently (Evans & Dion, 1991; Mullen & Copper, 1994; Gully Devine, & Whitney, 1995; Beal et al., 2003). In aggregating numerous studies on cohesion and performance, these studies generally demonstrated a weak positive correlation between cohesion and performance. Additionally, these studies offer conditions under which the relationship is stronger. For instance, Gully et al. (1995) posited that the relationship is stronger when the teams are truly interdependent and the measurement of cohesion and performance are both conducted at the group level. According to Beal et al. (2003), the cohesion-performance relationship is stronger when measuring performance as a behavior instead of an outcome and when using efficiency measures instead of effectiveness measures.

One thing that is still unclear from the literature, however, is the direction of the cohesion-performance relationship. Correlations provided by meta-analyses can only estimate the strength of association between two variables in the population; they do not indicate the direction of the relationship or causality. Additionally, most studies included in the previously mentioned meta-analyses are cross-sectional, taking measures only once or twice in an organizational setting (e.g., Langfred, 2000; Podsakoff, MacKenzie, & Ahearne, 1997). These cross-sectional designs are weak indices of causality. Though it is often assumed that team cohesion causes team performance, some studies have provided evidence that high performance can also cause an increase in team cohesion (e.g., Greene, 1989; Mullen & Copper, 1994). In a critical study conducted by Staw (1975), teams receiving false positive feedback regarding their performance self-reported greater levels of team cohesion than teams receiving false negative feedback. Thus, it is still ambiguous whether cohesion enhances team performance, if it is simply an outcome that occurs because of high performance, or if the relationship operates in both directions. Thus, one of the purposes of this study was to test the causal relationship between team cohesion and team performance. It is specifically hypothesized that team cohesion will\ positively relate to team performance. Because teams have no prior history of performing together and because team cohesion was actively manipulated by the experimenter, it is believed that a positive relationship between team cohesion and team performance would highlight team cohesion as a causal factor in team effectiveness. H1: Team cohesion will positively relate to team performance

The Role of Backup Behavior

Although it seems clear that a relationship does indeed exist between team cohesion and team performance, it remains unclear why this relationship may exist. Only a small amount of research has focused on mediators of the cohesion-performance relationship (e.g., Seashore, 1954; Klein & Mulvey, 1995, etc.). Furthermore, this research has focused exclusively on motivational components as the driving mechanism in the cohesion-performance relationship. However, cohesion explains performance variance above and beyond goal-setting (Podsakoff et al., 1997; Langfred, 1998). It seems reasonable to suspect that behavioral, and not simply motivational, variables will drive the relationship. This paper argues that the relationship between team performance and team cohesion can be mediated by two types of behavior in the form of conflict and helping behavior. First, team cohesion may enhance performance by reducing conflict and strife among team members, which hinders performance. Indeed, a recent meta-analysis by De Dreu and Weingart (2003) suggested that both relationship-oriented conflict and task-oriented conflict have detrimental effects on team performance. Second, and of primary focus in this study, team cohesion should increase the frequency and quality of helping behaviors. Members of cohesive teams should be more willing to assist their teammates with their various tasks because of their liking for one another. Likewise, team members might avoid helping others if they do not like them, even though doing so will hurt their own outcome in the long run.

In the organizational psychology literature, helping behaviors have been categorized as "Altruism" under the broader construct of Organizational Citizenship Behavior (OCB; Organ, Smith, & Near, 1983), and it has been categorized as "backup

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behavior" in the team process literature (e.g., Dickinson & McIntyre, 1997; Marks, Mathieu, & Zaccaro, 2001; Salas et al, 2005). These two constructs, though different, are conceptually similar enough to warrant distinction. Altruism is defined as interpersonally directed citizenship behaviors, which may include assisting another employee with his/her task, orienting a new employee to the organizational culture, or voluntarily and spontaneously mentoring an employee(Organ, 1997). The key concept behind altruism is the *target* of the behavior; altruism specifically denotes a wide range of behaviors that are directed towards a person. Thus, altruism may not necessarily entail helping behavior, though such behaviors are classified as altruism if they do occur. Backup behavior, on the other hand, is defined as "assisting team members to perform their tasks" (Marks, Mathieu, & Zaccaro, 2001, p. 367). This may involve giving guidance on performing a task, correcting a mistake by another team member, or simply taking over an overloaded teammate's task. There are two key concepts driving the definition of backup behavior. First, the target of the behavior is specifically a team member. Second, the behavior towards the target is specifically task assistance. Dickinson & McIntyre (1997) and Marks et al. (2001) provided theoretical models of teamwork that include backup behavior as an important process variable in the development and performance of teams.

There are several reasons to believe that backup behavior will have a positive effect on team performance. First, helping behavior should enhance team member effectiveness (cf. Podsakoff & MacKenzie, 1997). Examples include helping train a new team member, assisting a team member with a computer problem, or taking on an overwhelmed team member's workload. Because performance outcomes are shared by all team members, it stands to reason that by giving assistance to a team member, team

performance will also be increased. Second, helping behavior should facilitate team coordination. Team members assisting one another can gain a better understanding of the various task functions and the actions required to integrate these task functions efficiently. As a result, more frequent and effective coordination should occur among team members. Finally, helping behavior should enhance team performance simply because team members may identify and correct mistakes being made by another team member (Marks et al., 2001). With assistance, errors in judgment or errors in execution are more likely noticed and corrected than they would be without such assistance.

Aside from theoretical arguments, substantial empirical research has evidenced the benefit of helping behavior in teams. Research driven by the OCB construct has generally found Altruism to significantly relate to team and group level performance. Mackenzie, Podsakoff, & Ahearne (1996) reported that altruism positively associated with team effectiveness in pharmaceutical sales teams, as judged by overall team sales. Using paper mill work teams, Podsakoff, Ahearne, & MacKenzie (1997) found that altruism was positively and moderately correlated with the quantity of paper produced by a work team. Furthermore, altruism was negatively and moderately correlated with the percentage of paper rejected by the quality control department. This suggests that altruism reduced the number of errors committed by mill worker teams and ultimately enhanced product quality. Only one study assessing performance and altruism has found a negative relationship. Podsakoff & Mackenzie (1994) found helping behavior to be negatively related to performance in insurance agents, a result that the authors attributed to the individualistic nature of the insurance sales industry. Because insurance sales comprise a more competitive type of occupation, helping behavior appears to become

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more of a detractor to individual performance. In such an instance, helping behavior would likely take away from an individual's effectiveness at selling because (s)he is spending time off-task to help another salesperson.

Research driven by the construct of backup behavior has also supported a link between team helping behavior and team performance. In using laboratory teams playing simulation games, Marks, Sabella, Burke, & Zaccaro (2002) reported strong positive correlations between both the quantity and quality of helping behavior and team performance. Furthermore, backup behavior, along with team coordination was found to play a mediating role between team mental models and performance. Porter, Hollenbeck, Ilgen, & Moon (2003) studied the effects of a disproportional workload across team members on backup behavior. In an effort to study a construct they termed "legitimacy of need" in team members, Porter et al. (2003) weighed one team member down with a heavier workload and observed subsequent effects on backup behavior and performance. They observed that teams with an overloaded team member provided more helping behaviors. In addition, backup behavior was significantly correlated with team performance.

Despite the encouraging evidence for the predictive validity of helping behaviors in teams, it should be noted that previous research has failed to adequately determine causality. For instance, many of the studies rely on cross-sectional data and only report the strength of association between helping and performance. Although research has been driven by the idea that helping behavior causes performance, there is little empirical evidence to suggest this is necessarily true. It seems intuitively plausible that a strong performance might cause teams to perform more helping behaviors in later tasks because

a) the team is in a positive mood because of their performance, or b) High performing

teams may self-report more helping behaviors due to halo effects (i.e., high performance

leads to a halo regarding helping behaviors). In support of this possibility, Bachrach,

Bendoly, & Podsakoff (2001) provided false feedback to experimental groups and then

asked them to rate their level of OCB. The better the performance rating a group

received, the higher they tended to self-report the occurrence of OCB within their group.

This would suggest some halo effects associated with team performance and self-report

data.

The current study attempts to provide more evidence for a causal relationship

between backup behavior and performance by utilizing experimental teams with no prior

history of working together and by providing experimental ratings of helping behavior in

lieu of self-report ratings. As a result, any helping behaviors would occur in a context

where teams have no prior performance knowledge. Given the results of the few

experimental studies that demonstrate a strong relationship between backup behavior and

team performance, this study proposes that backup behavior in teams will significantly

relate to team performance.

H2: Backup behavior will positively relate to team effectiveness

Although results of previous research are promising, they do not answer the

question of whether team cohesion can act as an antecedent to backup behavior, as

proposed in this study. Indeed, research on backup behavior has generally suffered from

a lack of understanding about the antecedents. Porter et al. (2003) addressed personality

antecedents using the Five Factor Model, and he identified a situational variable in

legitimacy of need. Marks et al. (2002) proposed a cognitive antecedent to backup

behavior in the form of team mental models. Team mental models describe the degree to

which team members share the same definitions and conceptualizations of the task and

the functions required to complete the task. This study departs from the previous studies

by assessing an affective antecedent to backup behavior: team cohesion.

Backup Behavior and its relationship to Team Cohesion

Several arguments support the notion of a link between cohesion and backup

behavior. First, it can be argued that a team operates in a social exchange system. Social

exchange theory (Blau, 1964) describes an open-ended exchange system, a system in

which obligations are not specified and the norm of reciprocity relies on trust and

attention to social etiquette. This is contrasted with an economic exchange system; where

explicit and often contractual obligations exist that enforce a norm of reciprocity.

Although team members are bound together by their common goals, there is no real

obligation to provide help to one another as they perform, and team members may choose

to interact as little as is needed. Thus, it can be argued that interpersonal behaviors

towards team members are guided by social exchange theory. As a result, cohesive teams

may exhibit more frequent and positive social exchanges because group members like

and trust one another more so than in non-cohesive groups (Kidwell, Mossholder, &

Bennet, 1997) and engage in generally more positive behaviors towards their teammates

than their non-cohesive counterparts. Second, cohesive teams might seek help more so

than their non-cohesive counterparts because they feel more comfortable approaching

teammates with a problem. This increase in help-seeking would likely cause an increase

in reciprocal helping behavior. In support of this, Williams & Anderson (1996) found

that help-seeking behavior was positively associated with helping behavior. Third, cohesion in teams may indirectly lead to an increase in helping behaviors by positively impacting the mood of team members. It has been documented that positive mood and affectivity generally leads to more pro-social behaviors (George, 1991; George & Bettenhausen, 1990; Organ & Ryan, 1995). Finally, at the most extreme, discordant teams may have members who purposely withhold assistance and information necessary for another team member to be effective.

Research on non-interdependent groups provides some indirect support for the link between team cohesion and team helping behavior. Anderson & Williams (1996) reported that the quality of a working relationship related significantly to helping behavior in a sample of nurses and support staff. Using retail employees, George and Bettenhausen (1990) found group cohesiveness was a strong predictor of prosocial behaviors. It should be noted, however, that prosocial behaviors in that study were defined as helpful behaviors towards the customer, not towards other employees. Other research by Kidwell, Mossholder, & Bennett (1997) provided evidence that group cohesion significantly predicts OCB above and beyond that predicted by job satisfaction and organizational commitment. Additionally, group cohesion was found to moderate the relationship between job satisfaction and OCB (Kidwell et al., 1997). Given the evidence documented in a group setting, Van Dyne, Cummings, & Parks (1995) concluded in their review that group cohesion was an important antecedent to affiliative and pro-social behaviors.

Studies that have assessed the link between helping behavior and cohesion typically focus on larger work groups rather than teams. Kidwell et al. (1997) identified

groups as people who worked together on a regular basis, a definition that suggests a similar working environment, but not teams working on a common task. A meta-analysis by Podsakoff, MacKenzie, & Bommer (1996a) found group cohesion significantly related to all five OCB dimensions, but particularly with altruism ($\underline{r}$ = .20). However, their meta-analysis included studies that used mostly groups rather than teams. Thus, it is difficult to draw conclusions on the relationship between team cohesion and backup behavior from these studies because of the nature of the group. Studies that have used teams when assessing backup behavior have generally focused on cognitive and personality antecedents. Marks et al. (2002) included a measure for "friendship" when assessing backup behavior, but this measure only tapped into a team member's familiarity with the other members. In short, the measure does not tap into any affective dimension, so it is still unknown whether affect plays a role in helping behavior in a team context. Thus, due to the lack of research in the area, another purpose of this study was to assess cohesion as an affective antecedent to backup behavior in a team context.

H3: Team cohesion will predict backup behavior

H4: Backup behavior will mediate the relationship between team cohesion and team performance

The Importance of Motivation: Goals and Goal Commitment

A number of moderators and/or mediators have been proposed to impact the relationship between team cohesion and team performance. Generally speaking, research has suggested that cohesion is a stronger predictor of performance when: 1) Sports teams are being studied (Mullen & Copper, 1994), 2) Teams and individual team members have more autonomy with their tasks at hand (Langfred, 2000), 3) Teams are more

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interdependent (Beal et al., 2003; Gully et al., 1995; Anderson, 1978), or, according to Beal et al. (2003), when work flow is more intensive or reciprocal (interdependent) than pooled or sequential (non-interdependent), 4) Smaller teams are used instead of larger teams (Mullen & Copper, 1994) and 5) the team has a high level of goal commitment (Greene, 1989; Whitney, 1994; Langfred, 1998). This project focuses specifically on team goal commitment in recognition that certain motivational components must be present for team cohesion to result in better task performance. Otherwise, team cohesion may drive off-task behavior such as casual conversations and the planning of social activities rather than task activities. Indeed, much of the recent research on team cohesion and team performance has evidenced the importance of team motivation in this relationship. Thus, the following section details the goal-setting literature and the importance of motivation in the team cohesion and team performance relationship.

  Goal commitment comes from the goal-setting motivational research developed by Locke & Laitham (1991). To summarize, this research is rooted in the study of individuals and their task work. It states that more difficult and specific goals generally lead to better task performance because these types of goals a) organize the individual's efforts towards completing their job and b) motivate individuals to accomplish a certain performance standard. When goals are set by an individual, the quality of these self-set goals is the most important issue. However, when goals are assigned to individuals by an organization, a leader, or an experimenter, then goal commitment becomes crucial in observing any benefits in performance. That is, the individual must accept and commit to achieving his/her assigned goal in order for the goal-setting process to be effective.

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Researchers (e.g., Locke & Laitham, 1991; Weldon & Weingart, 1993) have generally outlined two important determinants of goal commitment: the possibility of attaining the goal and the attractiveness of the goal. The possibility of goal attainment describes the strength of the group's belief that accomplishing the goal is indeed possible. The possibility of goal attainment has been associated with group efficacy, group goal difficulty, incompatible goals, and social influence (Weldon & Weingart, 1993). Of particular interest to researchers has been group efficacy, defined as the group's "judgment of how well the group can execute the actions required to perform the task" (Weldon & Wengart, 1993, p. 319). Essentially, groups with a lower efficacy will have a lower level of goal commitment because they believe they cannot accomplish the set goal. Whitney (1994) tested this possibility and found that the lowest levels of goal commitment were in groups of low self-efficacy with difficult goals, whereas the highest levels of goal commitment were in groups of high self-efficacy with difficult goals. Goal attractiveness, the second determinant of goal commitment, describes how attractive the goal is for the group to reach. The more important and desirable a goal is to achieve, the more committed a group will be to reach its goal (Weldon & Weingart, 1993). Situational factors (e.g., reward structures) and individual characteristics (e.g., organizational commitment, personality) have been proposed as the key components to goal attractiveness (Hollenbeck & Klein, 1987).

When assessing goal commitment at the team level, it becomes clear that goal commitment plays an important role in team effectiveness. According to a review of the goal-setting literature by Weldon & Weingart (1993), the relationship between the level of the goal (difficulty and specificity) and task performance appears to be moderated by

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the level of commitment a group has towards its goals (see also Hollenbeck & Klein,

1987). Indeed, research on group goal setting has found that group goal commitment is a

necessary attribute in order for group goals to enhance team effectiveness (Ambrose &

Kulik, 1999; Locke & Laitham, 1990). Conceptually, it stands to reason that for any

team predictor to have a relationship with the performance criterion, group goal

commitment must be present. Without such commitment, teams should lack the

motivation and effort to accomplish the task effectively, regardless of what other

attributes they might possess. Thus, it is no surprise that research has found team goal

commitment to play an integral role in the cohesion-performance relationship in teams.

Team Cohesion and Team Goal Commitment

Researchers as far back as Seashore (1954) and Stogdill (1959; cf. Greene, 1989)

proposed that group goal commitment, or group drive, is a necessary component for

cohesive teams to be effective. Goal commitment appears to play such an integral role in

the paradigm that some researchers include it as part of the cohesion construct itself (e.g.,

Zaccaro & Lowe, 1988; Hackman, 1992; Chang & Bordia, 2001). The component of

cohesion related to the group's commitment to its task goals is referred to as "task-based

cohesion" or task cohesion. In this case, commitment does not represent a moderating

influence on the cohesion-performance relationship because commitment is part of

cohesion. This author, among others (e.g., Klein & Mulvey, 1995; Langfred, 1998, etc.),

argues that goal commitment represents a separate construct from cohesion.

Commitment describes a construct that is cognitive in nature, best explained by

motivation and effort. Cohesion, on the other hand, describes a construct that is affective

in nature, best explained by positive feelings about others. It is possible to have a

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committed group, but not a cohesive one, perhaps due to the composition of personalities. Likewise, it is possible to have a cohesive group that is not committed to the task at hand.

Definitional arguments aside, a large amount of evidence seems to demonstrate that cohesive groups cannot be productive without also being committed to task-related goals, regardless of whether one chooses to conceptualize commitment as part of cohesion or separate. Zaccaro & Lowe (1986) found "task cohesion" to be moderately related to performance in the military, but interpersonal attraction remained unrelated. In a later study, Zaccaro et al. (1995) posited that task cohesion was a critical facilitator of team performance under temporal urgency. Mullen & Copper (1994) found task cohesion to be the primary predictor of performance, to the exclusion of interpersonal attraction and group pride. However, interpersonal attraction was found to be a stronger predictor of system viability. Beal et al. (2003) also found task cohesion to be the strongest predictor of performance, although interpersonal attraction and group pride also turned out to be significant predictors.

Studies that conceptualize commitment as a separate construct also demonstrate its importance to the cohesion-performance relationship. Whitney (1994) provided support that goal setting and goal orientation may enhance both group cohesion and group performance. Other suggestions are that commitment acts as a mediator between cohesion and performance (c.f., Shaw, 1981). Klein & Mulvey (1995) found that the cohesion-performance relationship disappeared after accounting for the effects of group goal commitment on performance. However, Klein & Mulvey (1995) leave several reasons to believe that commitment forms a moderating relationship with cohesion and performance in lieu of a mediating one. First, the researchers assumed a causal

relationship between cohesion and goal commitment without testing one. Instead, they tested a causal relationship between commitment and performance, as well as cohesion and performance. Second, cohesion might have a separate effect on performance among committed groups only. That is, cohesive groups that are committed to their task might perform better than non-cohesive groups that are also committed to their task. This possibility was not tested in Klein & Mulvey's study.

On the other hand, several studies have supported the possibility that commitment moderates the cohesion-performance relationship. First, indirect evidence is provided by Greene (1989) and Podsakoff, MacKenzie, & Ahearne (1997). Greene (1989) found that group drive and group goal acceptance both moderate the cohesion-performance relationship in a longitudinal study using groups in manufacturing and engineering firms. In a study of paper mill work teams, Podsakoff et al. (1997) also found goal acceptance moderated the cohesion-performance relationship. In both studies, cohesive teams that accepted their goals (a presumed component of goal commitment) performed better than non-cohesive teams that accepted their goals. There was no relationship between cohesion and performance when teams had low goal acceptance. Second, Langfred (1998) provided direct support for a moderating relationship in a Danish military sample. In that study, the highest performing teams were both committed and cohesive, while the lowest performing teams were cohesive and not committed.

These results suggest that goal commitment has a main effect for team performance, but that cohesion can account for performance variance above and beyond mere commitment. As such, it is predicted in this study that group goal commitment will account for some performance variance directly through an increase in team member

effort. Additionally, this study theorizes that the relationship between team cohesion and team performance is indirect. That is, it is mediated by backup behavior. In integrating team goal commitment into this framework, it is theorized that team motivational components such as goal commitment will not moderate the relationship between team cohesion and team performance. Rather, it is predicted that team goal commitment will moderate the relationship between team cohesion and the exhibition of behaviors that lead directly to team performance. In this particular study, the behavior of interest is backup behavior. Specifically, it is predicted that team goal commitment will moderate the relationship between team cohesion and team backup behavior. It is interesting to note that in the literature on backup behavior, as well as other team process skills, little attention has been given to motivational antecedents. This study addresses a specific gap in the team process research by addressing affective antecedents to team process skills, but also a motivational antecedent to team process skills in the form of goal commitment.

H5: Team goal commitment will positively relate to team performance.

H6: Team goal commitment will moderate the relationship between team cohesion and team helping behavior.

The Proposed Model and the Current Study

Only one study to date has examined team performance, team helping behavior, and team cohesion as an affective construct. Higgins (2002) examined team cohesion as a mediator between the OCB construct Altruism and team performance in work groups across multiple organizations. In her regression results, Altruism predicted "task cohesion," but neither Altruism nor any cohesion variables predicted group performance. This study proposes a causal ordering opposite of Higgins (2002). It proposes that

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helping behavior mediates the relationship between team cohesion and performance, with

team goal commitment moderating the relationship between Team Cohesion and Backup

Behavior (see Figure 1). Additionally, team goal commitment directly predicts some

variance in team Effectiveness.
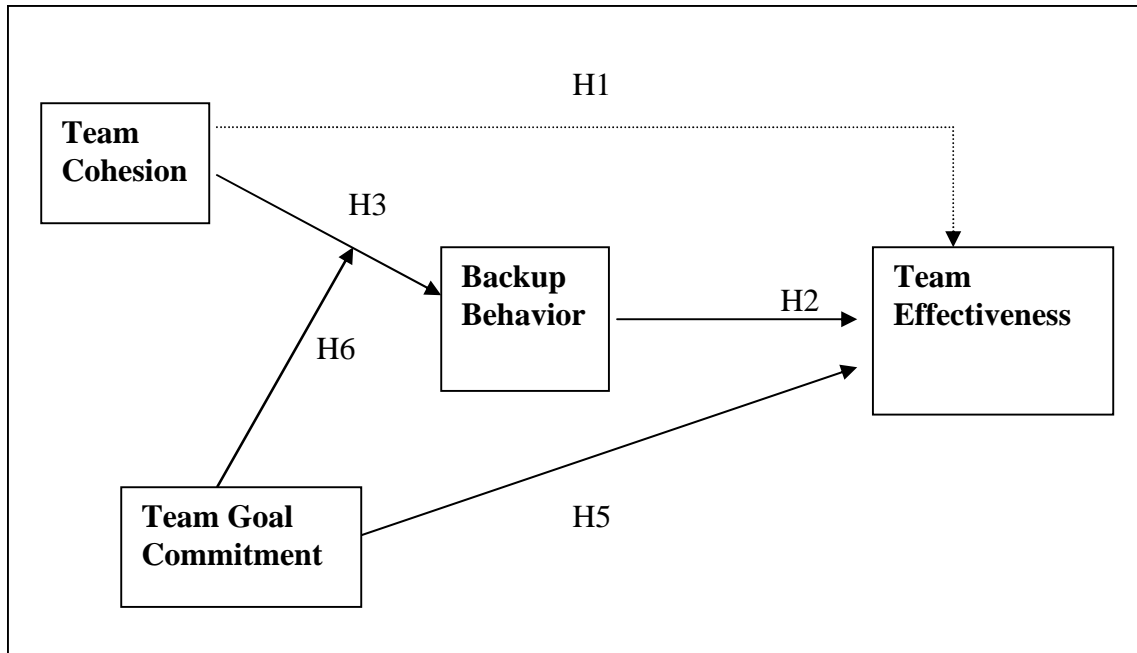
Figure 1. Proposed model for the relationships between team cohesion, team goal commitment,

backup behavior, and team performance

Method

Sample and Design

A total of 138 participants in 46 three-person teams were recruited from a large

southeastern university for this study. 72 percent of the sample was female and 73

percent was Caucasian, with a mean age reported of 20.75. This study incorporated a 2x2

between subjects factorial design, with teams randomly assigned into one of four

conditions: high cohesive-low commitment, high cohesive-high commitment, low

cohesive-low commitment, and low cohesive-high commitment.

Manipulations

Team cohesion was manipulated through a decision-making task before the

primary performance task. Team members were assigned issues to discuss on which

there was either great disagreement or great agreement among team members. First,

participant attitudes and opinions on twelve different controversial issues were assessed

at the beginning of the study through a short, 5-point Likert survey (Appendix B). These

are issues that have received considerable attention by the media and appear to be

polarizing or divisive issues within the general public. After collecting the surveys, the

experimenter determined which issues had the highest and lowest variances; this

indicates the issues that team members disagree on or agree on the most, respectively. In

the decision-making task, teams were instructed to consider the issue presented to them,

and come to an agreement regarding government policy on the issue. The team then

discussed the issue and wrote their concluding arguments on a form provided by the experimenter. In the low cohesive condition, teams were assigned the issue with the highest variance, or the issue with the most disagreement among team members. Teams in the high cohesive condition received the issue with the lowest amount of variance, or the issue with the most agreement. In general, descriptive statistics on the variance of the selected issues supported this manipulation. The average standard deviation on responses in the high cohesion condition was .297; the average standard deviation on responses in the low cohesion condition was 1.79. This would indicate reasonable differences in variance among team member opinions between the two conditions. In addition, teams in the high cohesive condition went through a short icebreaker exercise, in which team members introduced themselves and gave a brief description of their career interests. Teams in the low cohesion condition did not have an icebreaker. It should be noted that some teams in the low cohesion condition made independent efforts to become familiar with their team members (i.e., informal introductions).

According to Whitney (1994), teams with lower collective efficacy experience lower commitment to team goals. Based upon these findings, team goal commitment was manipulated indirectly through the manipulation of collective-efficacy. This was accomplished by changing the perceived difficulty of obtaining an assigned goal. During instructions for the primary performance task, teams in the low goal commitment condition were instructed that no team had successfully accomplished the goal, and that chances for success were extremely poor. According to Locke (2002), goal setting is most effective when the goal is specific and difficult, but perceived to be feasible. Taking this into consideration, teams in the high goal commitment condition were

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instructed that 20% of teams in the study had successfully reached the assigned goal, and that reaching the goal would distinguish the team as one of the best to participate in the study.

Procedure

Participants first signed informed consents, and then completed the demographics form (Appendix A) and the controversial topics form. Next, team members were assigned to an individual station to work on an individual Lego task with an associated goal. The purpose of the individual task was to provide team members an additional task and goal that would later compete with the team task and goal. Team members were instructed to construct an original model toy from Legos as though they were employees in a toy production company (Appendix C). The individual goal was first to complete the toy model before the end of the experiment (120 minutes) and to have the highest rated toy according to complexity (number of pieces used) and creativity (as rated by the experimenter). It should be noted that no experimental ratings were actually made upon the individual toys; the instructions were issued simply to establish the individual task as a legitimate task with a legitimate goal. The purpose for setting up the individual task in such a way was to allow the individual task to later compete with the team task for participants' time, effort, and energy.

The experimenter gave participants ten minutes to work upon their individual tasks. During this time, the experimenter then entered and analyzed the variance of items in the controversial topics survey to determine the issue for the team decision-making task, based upon the condition (as explained in the section above). Participants were instructed to advise government policy on the assigned issue and to spend ten minutes

debating the topic. Team members then wrote down their reasoning and subsequent decision on a response sheet (to ensure that team members engaged in debate with some degree of concern). For details on the instructions, please see Appendix D. Following this decision-making task, teams then proceeded to the main task (or performance task) for the study.

For the main task, the experimenter showed teams a Lego model of a cubic structure with a functional swinging gate and a model of an animal (a model dinosaur invented by Legos) that must fit inside the gate and surrounding structure. Team members were then assigned to one of three geographic stations, with each station designated for building one of the three components (the structure, the gate, and the dinosaur). Team members were instructed that they were in charge of building the component of the model assigned to each station. After all three components were completed, team members assembled the components together to make a structure that matched the shape of the model shown to them. In addition, teams were given sets of rules particular to each station that, if broken, counted as an error. An example of a rule is that the animal "must fit into through gate and structure while standing upright." The full list of rules is documented in Appendices G through I. This task was designed to ensure some degree of interdependence among team members, such that team members must coordinate their activities. For example, the team member making the gate had to ensure the gate was large enough for the animal to fit through, yet still compatible with the hinges and entryway of the structure. Additionally, the model that served as the guide for participants purposely broke rules contained within their rule sheets. For example, the animal did not fit inside the structure in the experimenter model. Thus, this

task contained an element of problem-solving, where teams had to recognize rule

violations and think of ways to avoid them while still successfully completing the task.

Finally, one of the team members had considerably more work for their station (the

structure) than the other team members. This created a situation where two of the three

team members always had an opportunity to help an overloaded team member once they

had completed their particular portions of the team project.[1] Under this context,

subsequent helping behavior exhibited by team members would be examined.

Team members were instructed that they may help their teammates if they wish,

or they may use their time to work on their individual task. Because one team member

was consistently overloaded, this constituted a choice for the other two team members of

whether to aid the overloaded team member or to work on their individual task to attain

their individual goal. It should be noted, however, that team members could make

multiple task/goal choices through the course of the experiment by alternating between

the individual and team task. Finally, teams were told their chances for succeeding in

their team task in order to manipulate team goal commitment (as explained above). Full

instructions for the main task can be observed through Appendices E and F. Once teams

had completed both tasks or worked until the end of the 2-hour experiment, team

members completed the cohesion and goal commitment self-report surveys and received

a debriefing form explaining the study purpose (the debriefing can be found in Appendix

O).

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[1] Porter et al (2003) suggest that team members provide more backup behavior when a team member is overloaded than when no one is overwhelmed. This study sought to provide a need for team members to help and examine variables which may influence the actual helping behaviors committed.

Measures

Team cohesion and team goal commitment were measured from multiple sources: team members and experimenters ratings. This was conducted in recognition of the problems that each form of measurement poses. Concerns with self-report data include mono-method bias (e.g. Howard, 1994; Schmitt, 1994; Spector, 1994) and artificial score inflation. On the other hand, the nature of such abstract constructs as team cohesion and team goal commitment imply that these variables cannot be easily observed and detected by outside observers, creating a problem for behaviorally anchored experimental ratings. For team cohesion, team goal commitment, and team backup behavior, observer ratings were obtained through analysis of a recorded video session of teams performing the main task. Two out of a total of four raters rated each team as a whole (at the team-level), and the average of these two ratings were taken to obtain an experimenter rating for the constructs of interest. These two raters were randomly assigned, such that any two raters could view and rate any given team. Raters were familiar with the study procedure, but blind to condition. Significant efforts were made to train the raters on behaviorally anchored rating scales prior to the experimental ratings. This training included frame of reference training, where raters were given examples of poor behavior on a construct and exemplary behavior on a construct. Furthermore, raters watched a sample video as a group in order to practice making their ratings, and to ensure that each rater conceptualized the construct and the relevant behaviors similarly. For the self-report measures of the team constructs, team scores were represented by the average of the team member response scores. Within team variance estimates are discussed in the measures section below.

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Team cohesion. Self ratings on team cohesion were measured using a 5-item scale adapted from Boyer & Sorensen (1986), and consistent with Whitney (1994). For item details, please refer to Appendix J. Upon a reliability analysis, Item 1 was dropped from this scale in order to improve scale reliability, resulting in a four item scale with an alpha of .69. At the team level, reliability estimates were computed by estimating the variance within teams on self-report cohesion scores. This was done by conducting a One Way ANOVA, in which Team membership was treated as a fixed factor and the team cohesion score was treated as the dependent variable. In this instance, high variability between teams and low variability within teams on the self-report score would indicate that the cohesion measure was indeed a team-level construct, in that team members felt similarly about the level of team cohesion. Results from the ANOVA revealed that Between Team variance (Mean Square = .905) was higher than within team variance (Mean Square = .296), resulting in a significant F value ($F_{44} = 3.055$, $\underline{p} < .01$). This would indicate reasonable agreement within teams in regards to team cohesion. Team self-report cohesion scores were obtained by averaging each team members' on the self-report scale. For the observer ratings, raters specifically watched for such indicators as team conversation and tone, positive or negative comments regarding team members, or positive or negative emotions displayed towards other team members. The observer rating form can be examined in Appendix L. Inter-rater reliability estimates displayed the difficult nature of rating an affective variable; the intra-class correlation coefficient (ICC; [2,2]) was a modest .56.

Team goal commitment. Self-report measures on team goal commitment were measured using a 3-item scale adapted from Whitney (1994). For example items, please refer to

Appendix K. Scale internal consistency was estimated at .63. Again, team-level

reliability was estimated using a One Way ANOVA treating team membership as a fixed

effect and goal commitment scores as the dependent variable. As with team cohesion,

between team variance (Mean Square = .539) on team goal commitment was larger than

within team variance (Mean Square = .369), resulting in a marginally significant F value

(F_{44} = 1.46, $\underline{p}$ = .06). These results indicate that more variance in team responses on goal

commitment was determined by team membership, rather than individual differences

within a team, an indication of reasonable reliability. As with team cohesion, team scores

on the self-report goal commitment measures were obtained by averaging each team

member's responses. Observers considered such behaviors as strategy development and

discussion, showing concern with errors in the model and the time elapsed (the team

goal), and asking the experimenter questions about the goals and/or the task. Appendix M

documents the rating form utilized by observers. The ICC ([2,2]) for the observer ratings

was .66.

Backup Behavior. Backup behavior was only measured through observer ratings. This is

because, by definition, backup behavior involves specific behaviors that are directed

towards other team members, and thus are easily observed. In this instance, concerns

regarding the accuracy of observer ratings are eased, but the concerns of the self-report

surveys remain intact. As a result, it was deemed that the observer ratings would prove

more accurate than team member self-reports. Examples of such behaviors include

putting Lego pieces on other team members' portions of the team task, searching for

errors in other team members' portions, and, in general, helping other team members

work on their part of the team task. Appendix N shows the rating form used by

observers. The inter-rater reliability value (ICC; [2,2]) for backup behavior was .82. Not surprisingly, observers could more easily identify the more behaviorally defined variable of backup behavior than the affective and motivational variables of team cohesion and team goal commitment, as evidenced by the disparate reliability values.

Team Performance. Team Performance was measured using two indices: errors committed and time to completion. Errors were counted as the number of rule violations committed during the course of the team task, or errors contained within the completed model. It should be noted that multiple errors could occur from multiple violations of the same rule. For example, if multiple areas of the animal did not match the provided model, an error was counted for each area crafted improperly. Time to task completion was measured from the start of the team task until at least one of the team members indicated that the team was finished with the team task. Because these indices were relatively objective, only the experimenter documented them (at the conclusion of the experiment); thus, no estimates of reliability are available for the criteria.

Control Variables. There was some concern that a few variables external to the variables of interest in this study may confound the relationship between the predictors and the criteria. Specifically, team Lego experience and gender were examined for potential relationships to the criteria in this study. Lego experience may provide specific task expertise that subsequently predicts team effectiveness. Additionally, it was worried that socialization effects during child development might lead more males to be experienced in Legos than females. As a result, team gender and team Lego experience were both measured as control variables. Measures these constructs are provided in Appendix B.

Analyses

Manipulation Check. Manipulation checks tested the effectiveness of the experimental

procedure in producing variance in team cohesion and team goal commitment. The

manipulations for team cohesion and team goal commitment were analyzed with

independent samples t-tests on both the self reports and the experimenter ratings for team

cohesion and team goal commitment. Analyses based upon the observer ratings did not

indicate any significant differences between the conditions for either team cohesion (t =

.955, n.s.) or team goal commitment (t = .480, n.s.). However, analyses based upon self-

reports were more indicative that the manipulations were successful. A significant

difference was detected between the cohesion conditions (t = 2.057, p < .05), and mean

differences between the goal commitment conditions were also more promising (t = 1.80,

p < .10), though not statistically significant. Interestingly, the mean differences observed

in both the self and observer reports of team cohesion ran opposite to expectations in the

study. Teams that were given a topic on which they disagreed reported greater levels of

team cohesion (M = 4.35 for self report; M = 3.66 for observer) than teams given a topic

with more agreement (M = 4.02 for self report, M = 3.39 for observer). One explanation

for this lies in the study setting. Students participating in a laboratory experiment for

extra credit are likely not motivated to argue and haggle with others in a similar situation.

In fact, it is very likely that providing team members with topics of disagreement fostered

more interaction and friendly debate. Teams that received a topic on which they agreed

had no reason to really engage their teammates and, thus, did not interact at the same

level as teams in the other condition. It should be noted that the main purpose of this

experiment was not to determine how best to manipulate team cohesion, but rather to

manipulate team cohesion in order to create variance in the independent variable to test

study hypotheses. Thus, that the cohesion manipulation worked in the opposite direction is of no consequence in testing study hypotheses; what is important is that significant differences between the two groups existed in terms of their reported levels of cohesion. Mean differences in team goal commitment, on the other hand, did occur in the expected direction. With regards to team goal commitment, study hypotheses were not phrased in terms of significant group differences. Hence, although the manipulation on team goal commitment was not statistically significant, team member reports of goal commitment could still predict substantial variance in the team criterion. As a result, hypothesis testing was implemented as planned. However, because the manipulation was not significant, there was some concern that a lack of variance in the predictor measure of team goal commitment could attenuate the predicted relationship between goal commitment and team performance.

Hypothesis Testing.

The hypotheses for this study were as follows:

H1: Team cohesion would positively relate to team performance.

H2: Backup behavior would positively relate team performance.

H3: Team cohesion would positively relate to backup behavior.

H4: Team backup behavior would mediate the relationship between team cohesion and team performance

H5: Team goal commitment would positively team performance

H6: Team goal commitment would moderate the relationship between team cohesion and team helping behavior

Hypotheses 1, 2, and 3 were tested by examining both zero-order correlations between the relevant variables. Should gender and team Lego experience hold significant positive relationships with either team errors or time to task completion, then hypotheses would tested while controlling for the effects of these control variables. The mediation hypothesis (H4) was tested using a procedure prescribed by Baron and Kenny (1986). This procedure first required a relationship between team cohesion and team performance (H1), a relationship between backup behavior and team performance (H2), and a relationship between team cohesion and backup behavior (H3). If all relationships were significant, then a partial correlation would examine the effects of team cohesion on team performance while controlling for backup behavior (H4). If the relationship between team cohesion and team performance should disappear, then results would support the notion of mediation. Hypothesis 5 was tested by examining the zero-order correlation between team goal commitment and team performance indices, as with Hypotheses 1, 2, and 3. Finally, hypothesis 6 was tested using a moderated regression. This regression entered the predictors of team cohesion, team goal commitment, and their interaction term into a general linear model predicting backup behavior.

Results

Preliminary Analyses

Before testing study hypotheses, each of the predictor and outcome variables of interest in this study were examined for normality. Based upon these analyses, three particular variables displayed notably skewed distributions: the dependent variable of team errors and the self report predictor variables of team cohesion and team goal commitment. Team errors were positively skewed (Skew = 2.22), indicating that a majority of team committed relatively few errors. The self-reports of team cohesion and team goal commitment were both negatively skewed (Skew = -1.5 and -1.5, respectively), indicating a ceiling effect. Indeed, the range of team scores for cohesion and goal commitment did not dip below the highest three points of the scales (3-5). Although these skewed distributions were noted, these violations were not deemed severe enough to affect the correlations obtained for hypothesis testing. As a result, hypothesis testing was continued as planned. All other variables had distributions that did not appear suspect.

Table 1 presents the team-level descriptive statistics and correlations for all study variables. Upon examining the correlations between study variables, several observations are particularly relevant with regards to the hypothesis testing. First, the hypothesized predictors in this study (cohesion, goal commitment, and backup behavior) appear to

Table 1. Team-level Descriptive Statistics and Inter-correlations

Variable	M	SD	1	2	3	4
1. Gender[a]	--	--	--			
2. Lego Experience	2.46	.49	-.26	--		
3. Self report Cohesion	4.19	.55	-.09	.04	--	
4. Observer rated Cohesion	3.56	.90	-.19	.02	.56**	--
5. Self report Goal Commitment	4.46	.42	.00	.26	.54**	.47**
6. Observer Goal Commitment	3.50	.93	-.14	.13	.37*	.65**
7. Backup Behavior	3.70	1.08	-.09	-.01	.46**	.70**
8. Errors Committed[b]	4.11	5.67	.08	-.22	-.51**	-.32*
9. Time to Task Completion[b, c]	39.64	9.84	.15	-.13	-.29	-.17

Note. [a]male = 0, female = 1, such that positive correlations indicate a relationship with being female. [b]Negative relationships with Errors Committed and Time to Task Completion indicate positive relationships with Team Effectiveness. [c]Time in minutes.
* $p < .05$. ** $p < .01$.

Table 1 (continued). Team-level Descriptive Statistics and Inter-correlations

Variable	5	6	7	8	9
1. Gender[a]					
2. Lego Experience					
3. Self report Cohesion					
4. Observer rated Cohesion					
5. Self report Goal Commitment	--				
6. Observer Goal Commitment	.48**	--			
7. Backup Behavior	.47**	.80**	--		
8. Errors Committed[b]	-.39*	-.39*	-.30	--	
9. Time to Task Completion[b, c]	-.23	-.32*	-.06	.34*	--

Note. [a]male = 0, female = 1, such that positive correlations indicate a relationship with being female. [b]Negative relationships with Errors Committed and Time to Task Completion indicate positive relationships with Team Effectiveness. [c]Time in minutes.
* $p < .05$. ** $p < .01$.

show correlations stronger in magnitude with the errors dependent variable than with the task completion time variable. Second, self-report measures of team cohesion and goal commitment generally have higher correlations with the dependent variables than the observer or experimenter ratings. Finally, there were very strong correlations observed among the observer rated predictors (cohesion, goal commitment, and backup behavior), suggesting a halo effect. Because no significant relationships were established with the time to task completion, regressions testing the proposed mediation pathway (H4) utilized only team errors as the dependent variable.

Hypothesis Testing

H1: Hypothesis 1 predicted that team cohesion would positively relate to team performance. Both self and observer ratings of team cohesion exhibited significant

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negative correlations with team errors, with self ratings demonstrating a particularly

strong effect (r = -.51, $\underline{p}$ < .01). Also of note is a moderate correlation between self-

ratings and time to completion (r = -.29), though not statistically significant. Given these

results, Hypothesis 3 was partially supported. Although team cohesion did relate to

errors, it did not significantly relate to task completion time.

H2: Hypothesis 2 stated that backup behavior would positively relate to team

performance. Based upon the zero-order correlation, the relationship with team errors

was not statistically significant (r = -.30, $\underline{p}$ = .056) and the relationship with time to

completion was particularly small (r = -.06, n.s.). As a result, Hypothesis 2 was not

supported; backup behavior did not relate team performance. Its moderate effect size

with team errors, however, suggests that a relationship between the two may yet play a

role with regards to team cohesion as the lack statistical significance could be a power

problem

  H3: Hypothesis 3 predicted that team cohesion would positively relate to backup

behavior. This hypothesis was strongly supported. Team cohesion, based upon team

self-reports and observer ratings, was strongly and positively relates to team backup

behavior as rated by observers.

  H4: Hypothesis 4 stated that backup behavior would mediate the relationship

between team cohesion and team performance. Although H2 was not fully supported, the

correlation between backup behavior and errors was deemed large enough to affect the

relationship between team cohesion and team performance. As a result, the mediation

hypothesis was still tested as planned with regards to team errors (given that H1 and H3

were supported). Hypothesis 4 was not tested with regards to time to task completion as

Table 2. Partial Correlations with Team Errors

Variable	Zero-order correlations	Controlling for Team Cohesion	Controlling for Goal Commitment	Controlling for Backup Behavior
1. Self report Cohesion	-.51**	--	-.39*	-.45**
2. Self report Goal Commitment	-.39**	-.16	--	-.30
3. Backup Behavior	-.30	-.08	-.14	--

* p < .05. ** p < .01.

none of the requisite relationships were supported to allow for mediation, and it was not

tested with observer ratings for team cohesion given concerns with mono-method bias.

Table 2 presents the zero-order correlations and the partial correlations between self

ratings of team cohesion, team goal commitment, backup behavior, and team errors.

Interestingly enough, the relationship between team cohesion and team errors remains

significant and strong when controlling for backup behavior. If one controls for team

cohesion, however, the relationship between backup behavior and team performance all

but disappears. Thus, Hypothesis 4 was not supported; backup behavior did not mediate

the relationship between team cohesion and team performance.

H5: Hypothesis 5 stated that team goal commitment would be positively

associated with team performance. Results indicate that both observer and self-reports of

team goal commitment correlate negatively with errors committed. With regards to time

to completion, experimenter goal commitment significantly related to team performance,

but the self-report measures did not. Across nearly all indices, however, Hypothesis 5 was supported.

H6: Hypothesis 6 posited that team cohesion and team goal commitment would interact to predict backup behavior, such that teams with the high cohesion and high goal commitment would perform the best. This hypothesis was tested using only self-reports of team cohesion and team goal commitment due to concerns with observer halo and to avoid mono-method bias. The interaction term from the moderated regression was small and not significant (b = .087, n.s.), indicating no interaction between team goal commitment and team cohesion occurred to predict backup behavior. As a result, hypothesis 6 was not supported. Based upon the zero-order correlations, it appears that team goal commitment and team cohesion may hold more direct relationships with backup behavior.

To further address the question of causality in this study, a final analysis tested group differences on errors and task completion through two 2x2 ANOVAs. These procedures examined any significant differences between conditions that could be explained the study manipulations. When using error as the dependent variable, no significant effects were detected for cohesion (F = 2.72, $\underline{p}$ = .11), goal commitment (F = .653, n.s.) and the interaction (F = .314, n.s.). Mean differences were even less substantial when a univariate procedure was applied to a team's task completion time. The results of each of these analyses are presented in Figures 2 and 3. Although the
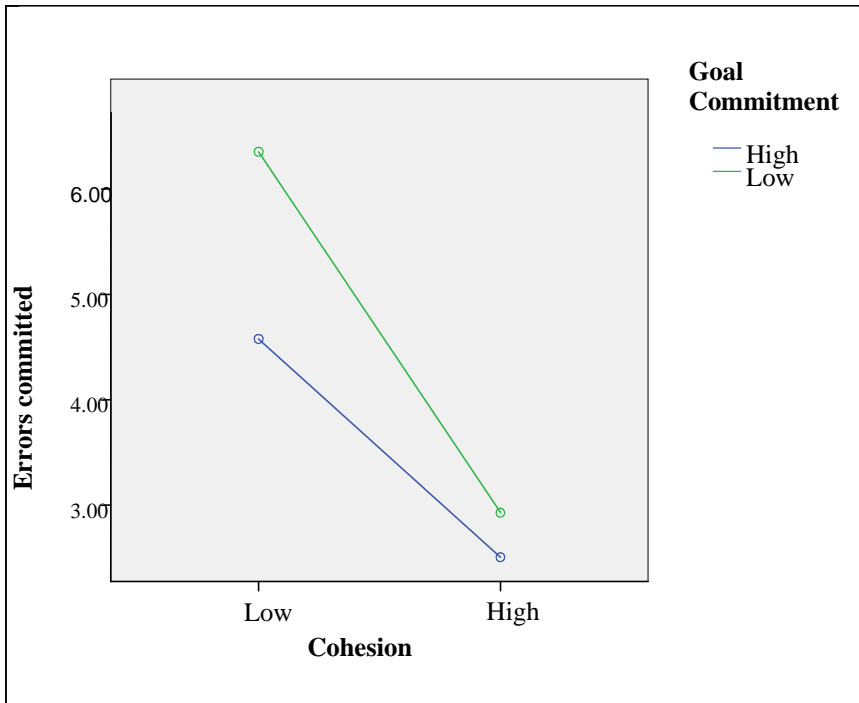
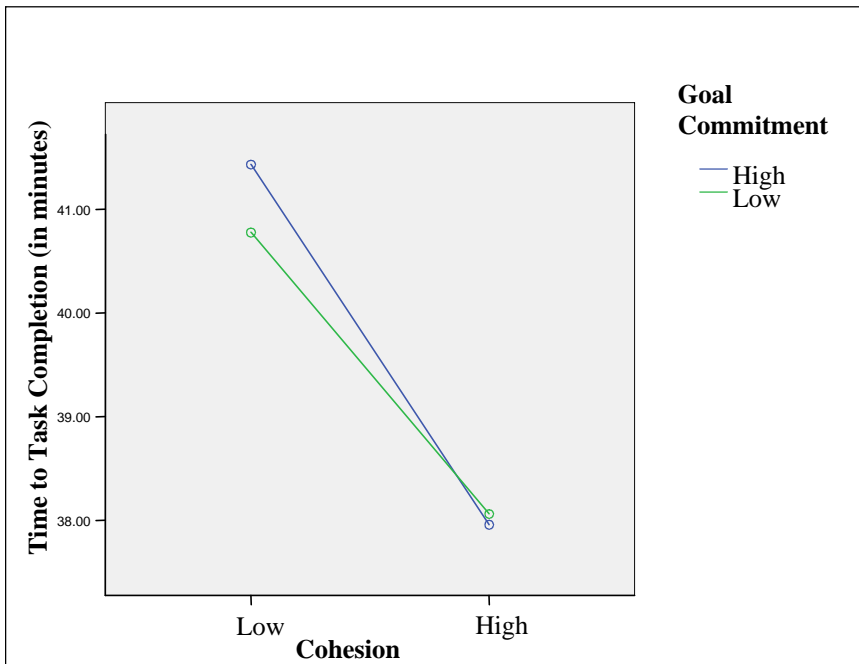*Figure 2. Estimated Task Error Means by Condition.*

Figure 3. Estimated Time Completion Means by Condition.

small effect for team cohesion was encouraging, results of the ANOVA did not demonstrate significant differences in performance based upon condition.

Exploratory Analyses

Theory suggested focusing on backup behavior as a mediator in the cohesion-performance relationship. However, the test of mediation opened the possibility that the relationship between backup behavior and team performance may be spurious (i.e., both resulting from team cohesion). Previous research suggests that team cohesion and team goal commitment are both predictors of team performance without taking backup behavior into consideration (e.g., Langfred, 1998). Additionally, the strongest correlations observed in the current study were between team cohesion, team goal commitment, and team performance. Thus, exploratory analyses focused on explicating the relationship between team cohesion, team goal commitment, and their interaction on performance through a series of regressions.

First, a moderated regression was first employed on self and observer ratings for team errors, due to strong correlations observed with team errors. Based upon experimenter ratings, significant effects were found for observer ratings of team cohesion ($\underline{b}$ = -1.18, $\underline{p}$ < .05), team goal commitment ($\underline{b}$ = -1.39, $\underline{p}$ < .01), and the interaction term ($\underline{b}$ = 1.97, $\underline{p}$ < .05). When based upon self-reports, team cohesion ($\underline{b}$ = -3.81, $\underline{p}$ = .01), team goal commitment ($\underline{b}$ = -2.75, $\underline{p}$ < .05), and their interaction ($\underline{b}$ = 5.26, $\underline{p}$ < .05) is also significant in predicting team errors. In order to substantively interpret the nature of these interactions, it was helpful to construct graphs depicting the trends observed in each variable. Figures 2 and 3 graphically display the results of these regressions for self ratings and observer ratings, respectively. Here, "low" groups represent the predicted

errors committed for teams one standard deviation *below* the group mean for cohesion or for goal commitment, whereas "high" groups represent the predicted errors for teams one standard deviation *above* the group mean for cohesion or for goal commitment. Results of the moderated regression suggest that team goal commitment impacted the amount of errors committed in teams low in cohesion. However, this difference disappears in teams with high cohesion. This could suggest that team goals, and commitment to these goals, are important when team members have little care or affinity towards one another. However, the importance of team goals seems to dissipate in teams with higher levels of cohesion. More interesting is that this trend holds across the type of rater (self vs. observer).

Following these analyses, a second set of regressions were used to determine if the observed interaction would hold when considering a team's time to task completion as the criterion. Neither the self nor the observer ratings produced significant results with regards to task completion time. This was not surprising given the lack of main effects (nonsignificant zero order correlations) with task completion time. However, it is interesting to note that the regression on the self report ratings behaved similarly to the regressions conducted with errors as the dependent variable. Figures 4 and 5 graphically present the results when time to task completion is regressed upon self ratings of team cohesion, team goal commitment, and the interaction of the two. Although not statistically significant, the trends observed in this graph echo the trends noted in the analyses with team errors. Results of regressing time on experimenter ratings of the predictor did not demonstrate the trends noted above.

Due to the intriguing results observed in the regression analyses of team cohesion and team goal commitment, results from the ANOVAs presented earlier were graphed. Figures 6 and 7 present the results of the ANOVA conducted on team errors and time to task completion, respectively. Although results from the univariate procedures were not statistically significant, the data formed a similar pattern to the regression results explained above. In closing, across 5 of the 6 analyses performed on team cohesion and team goal commitment, a common theme emerged; team goal commitment appears to affect team performance in teams with lower levels of cohesion, but not in teams with higher levels of team cohesion. Explanations for this pattern are explained in the discussion section.

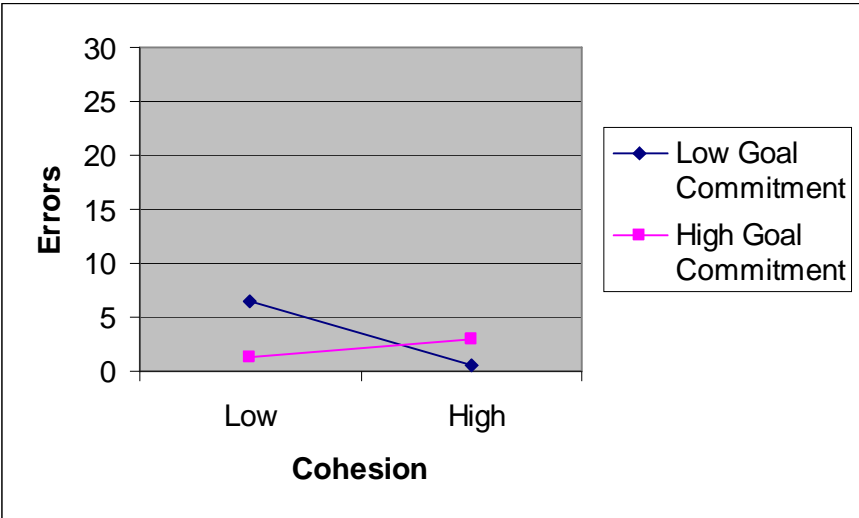*Figure 4.* Regression of Task Errors on Self Report Team Cohesion and Team Goal
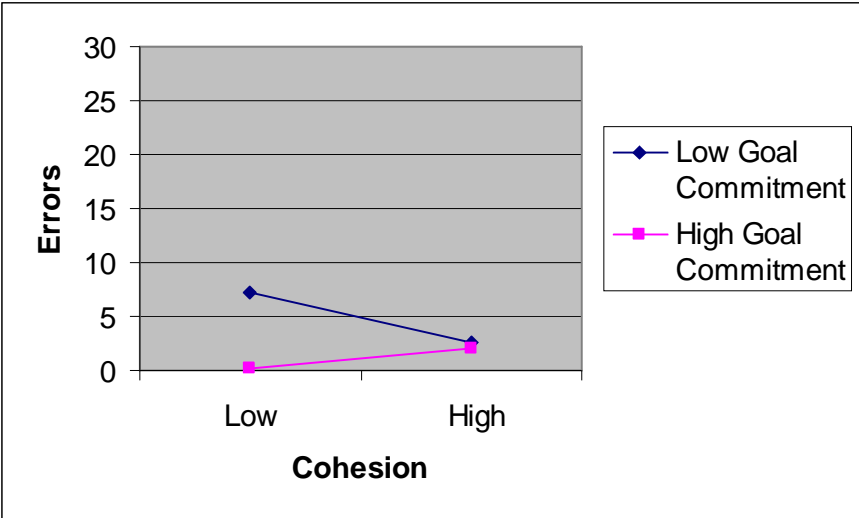
Commitment.

Figure 5. Regression of Task Errors on Observer Rated Team Cohesion and Team Goal
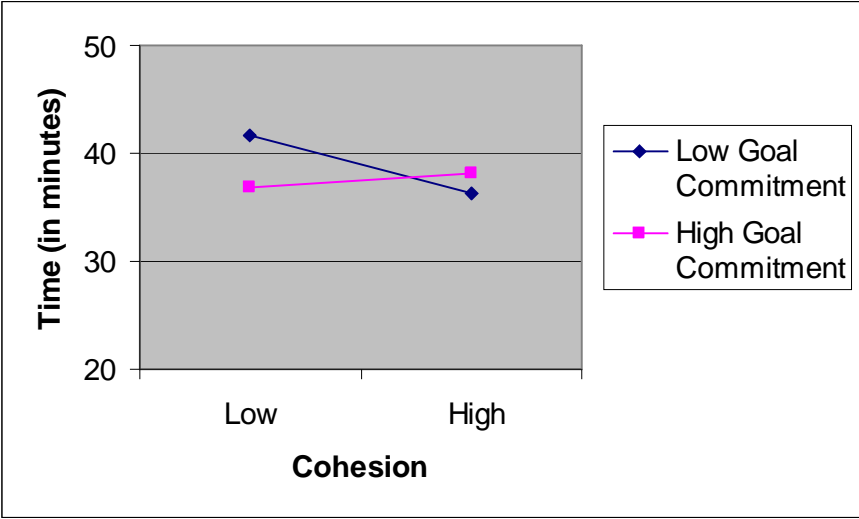
Commitment.

Figure 6. Regression of Time to Task Completion on Self Reports of Team Cohesion and Team Goal Commitment.
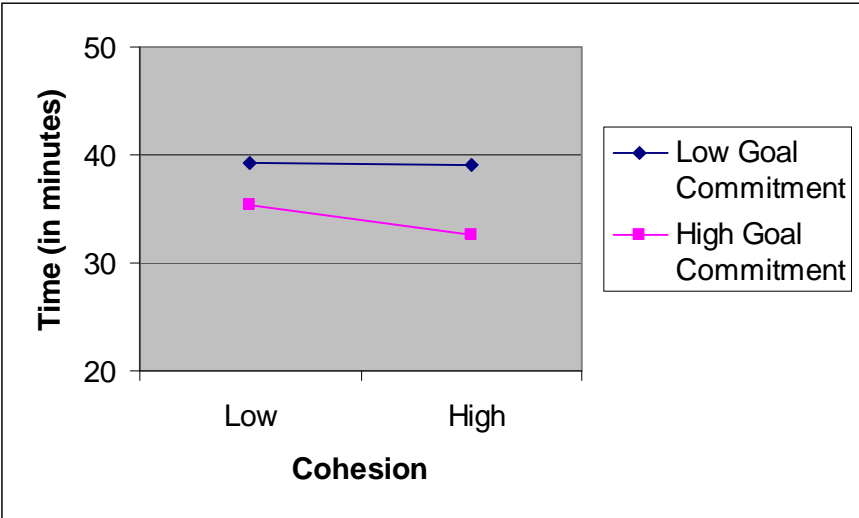
Figure 7. Regression of Time to Task Completion on Observer rated Team Cohesion and Team Goal Commitment

Discussion

The purpose of this study was to clarify the relationship between team cohesion and team performance. It is generally recognized that team cohesion has an established link to team performance in the literature. What has not been established satisfactorily is both the direction of this relationship and mechanisms explaining how cohesion affects performance. Although team cohesion has been assumed to precede team performance, a lack of experimental studies has led to a weak empirical basis supporting the causal flow of this relationship. This study manipulated team cohesion in order to observe subsequent effects on team performance. Additionally, this study utilized teams with no prior history of performing together, such that team cohesion should form as teams are performing their task, rather than forming due to past performances. It was hypothesized that a significant positive relationship between team cohesion and team performance would exist. This hypothesis was strongly supported with regards to accuracy; both experimenter ratings and self ratings of team cohesion related significantly to team errors in the completed model. Also, mean differences between the two cohesion conditions, although not statistically significant, favored the more highly cohesive teams. These results together suggest that team cohesion does indeed cause higher levels of team performance in terms of accuracy. It should still be noted that this study did not demonstrate that team performance does *not* cause an increase in team cohesion. Indeed,

it quite likely that a positive feedback system exists, where team cohesion influences team performances, which in turn influences team cohesion.

There are two specific limitations to the test of the causal relationship between team cohesion and team performance. The first limitation lies in the timing of the self-report measures. Because self report surveys were completed at the end of the experiment (and after the task), it is possible that team members completed the surveys while having general knowledge of how they performed. Team members were never informed of their actual performance; however, their perception of their performance may indeed have influenced self-reports of team cohesion, and it is possible that their perceptions of performance could have been related to their actual performance. This may explain why the self-report measures of team cohesion held stronger correlations with team performance. However, there are a couple of reasons to doubt this explanation. First, other sources of measuring team cohesion also suggest that team cohesion enhances team accuracy, not vice versa. More specifically, mean differences in errors did favor the high cohesive condition, and the relationship between the experimenter ratings of cohesion and team performance was significantly positive. Second, if perceptions of performance influenced the responses to one self-report survey (team cohesion), one would expect perceived performance to affect responses to the other self-report survey (goal commitment). If this were the case, the relationship between team cohesion and team performance should dissipate after controlling for the other self-report scores of team goal commitment because the two scores are caused by the same factor (perceived performance by the team member). However, after controlling for the effects of team goal commitment, team cohesion still held a significantly positive

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relationship with team errors. On the other hand, controlling for team cohesion reduced the relationship between goal commitment and team errors to a small, non-significant correlation. This would suggest self-reports of team cohesion contribute unique variance to team errors beyond what the other self-report survey contributes.

The second limitation to the conclusion that team cohesion caused an increase in team performance lies in the complex results of the study manipulations. That is, the manipulation of team cohesion worked opposite to expectations, which may cause some concern as to what was actually manipulated. It should be noted that the particular manipulation was chosen due to theoretical reasons, not empirical considerations. Because few studies have attempted to manipulate team cohesion experimentally, there is little empirical knowledge of how to successfully manipulate this variable. As a result, this study used theory to develop the manipulation and to predict how teams would respond to the manipulation. Specifically, it was theorized that teams discussing a topic on which they agreed upon would demonstrate higher cohesion than teams discussing a topic which they disagreed upon. Results from this study only partially supported this theory. Although teams in the different conditions did display differences in terms of team cohesion, these differences did not occur in the theorized direction. When qualitatively assessing the decision-making task, it appeared that sources of disagreement rarely (if at all) led to conflict in this particular study. Rather, they appeared to initiate discussion and interaction. As noted earlier, individuals in newly established teams likely have specific motivations to avoid conflict and to focus on building relationships among team members. Additionally, the objective of the discussion task was to reach a consensus on a particular policy. Thus, conflict among team members would

significantly hinder attaining the team goal on the decision-making task, providing

additional incentive for team members not allow their disagreements to create friction

among team members. For these reasons, disagreements may be handled constructively

as teams search for a compromise, rather than destructively leading to conflict. In this

event, disagreement would actually be more beneficial to team cohesion than agreement.

Under the current objective, teams that agreed upon a topic would have already reached a

conclusion, such that no discussion or interaction was actually needed. In summary, this

study manipulated agreement among team members, not conflict. Although

disagreement has the potential to lead to conflict (which guided the original theory

behind the manipulation), results of the study indicate that disagreement can also enhance

team member relationships. When team members are motivated to avoid conflicts

because the team goal requires that they agree, then disagreement may enhance team

cohesion rather than ruin it.

From a practical standpoint, the manipulation provided in this study could serve

as a guide for team-building exercises. That is, providing team members with an

objective to reach an agreement, but then imposing a topic on which there is

disagreement, may draw teams closer together. In contrast, teams where members realize

they have similar opinions on a topic may have little discussion and thus, lower levels of

team cohesion. When team members agree upon a topic, there is little need for

discussion and, as a result, little need for interaction. Thus, team building may be able to

utilize an exercise in which team members have disagreements, but the team goal is

agreement. Thus, in order to obtain the team goal, team members must learn to work out

their differences, a skill that will be highly useful as the team performs later tasks.

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The second aim of this study was to explore mediating variables in the relationship between team cohesion and team performance, that is, to better understand the mechanism by which team cohesion results in performance. Although a multitude of research has established a connection between team cohesion and team performance, relatively little research has investigated the mechanisms through which team cohesion impacts performance. This study specifically examined a behavioral variable as a mediator: backup behavior. It was hypothesized that there would be positive relationships between backup behavior and team cohesion, as well as backup behavior and performance. Additionally, it was hypothesized that backup behavior would fully mediate the relationship between team cohesion and team performance. Most of these hypotheses were generally unsupported. Although a positive relationship was found between team cohesion and backup behavior, the relationship between backup behavior and team performance was much more tenuous. The observed correlations between backup behavior and team performance was not statistically significant and, based upon the partial correlations, contributed very little variance to team performance after controlling for the effects of team cohesion. This result was perhaps the most surprising result from this study.

Previous research has supported backup behavior as a strong predictor of team performance. Theoretically, it makes sense that the more team members aid one another in their tasks, the better the team will perform. One explanation for the inconsistent findings in this study resides in the amount of backup behavior a team needs to perform well. It is reasonable to think that high performing teams may simply need less backup behavior precisely because they are doing their job well. On the other hand, teams who

are performing poorly may be in the process of making more errors, and as a result have a greater need for backup behavior. Thus, backup behavior may be an important behavioral variable in underachieving teams for performance, but less so when team members display a high amount of competence in their tasks. Should this be the case, one would expect a weak correlation between the two variables. In fact, this weak correlation may be explained by a nonlinear relationship between backup behavior and team performance, with a strong relationship at the lower end of the performance distribution and a weaker one towards the high end of the distribution.

From a larger perspective, specific team roles may also influence the impact of backup behavior on team member performance. For example, a team member performing a critical role should not leave his/her post to help another team member (i.e., a surgeon should not stop operating to aid an anesthesiologist). However, it may be helpful for team members in less critical roles to backup fellow team members. Clearly, the relationship between backup behavior and team performance is not simple and direct, as previously expected. It may be premature to categorize backup behavior as a critical team process behavior if the benefits of backup behavior are only realized in particular situations. Future research should account for team member competencies when studying the two variables and investigate the possibility of a nonlinear relationship between backup behavior and performances. Furthermore, more qualitative and process research is needed in order to identify specific instances and specific team roles where backup behavior may be instrumental to team performance.

The final goal of this research project was to examine the role of goals and their motivational underpinnings in the cohesion-performance relationship. It was

hypothesized that commitment to team goals would not only directly impact team performance, but that it would also interact with team cohesion to predict backup behavior. The first of these hypotheses was supported; both self and observer ratings of team goal commitment positively related to team errors, and observer ratings of team performance related to time to task completion. The second of these hypotheses was not supported; there was no interaction detected between team cohesion and team goal commitment to predict backup behavior.

Perhaps the most interesting result of this study, however, was uncovered during the exploratory analyses that examined the joint effects of team cohesion and team goal commitment on team performance. Results from the moderated regressions suggest that the worst performing teams have lower levels of both team cohesion and team goal commitment. However, they also suggest that no substantial differences in performance exist between low and high levels of goal commitment within highly cohesive teams. These results are only partially consistent with previous research. Although past studies have found that teams low in cohesion and low in goal commitment typically perform the worst (e.g., Podsakof, 1997; Langfred, 1998), they also typically find that teams high in cohesion and high in goal commitment perform the best. These results implied that maximizing both variables is the most beneficial to team performance. Results from the current study, however, suggested that maximizing either team cohesion or team goal commitment, but not necessarily both, will improve team performance.

Why did results from this study differ from the results of previous studies? That is, why did goal commitment not appear to predict incremental performance variance once team cohesion reached higher levels? One speculation is in the different samples

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obtained for study. Previous studies examined work teams in pre-existing work teams.

These teams had prior histories working together, and were likely very familiar and

comfortable working with one another. In this scenario, cohesive teams might be more

likely to procrastinate task goals in order to socialize, or they may feel less compelled to

work towards task goals to avoid disrupting the team norm. In short, familiarity may

breed complacency. As a result, greater focus on team goals is needed to maximize team

performance. However, team cohesion may still be beneficial in combination with team

goal commitment so as to avoid conflicts among team members and to generally promote

a positive morale.

   This particular study, on the other hand, examined newly formed teams with no

prior history of working together. In this scenario, team members who have a general

liking for one another may be more anxious to perform well with their new team

members. That is, team members may not wish to "let down" their team members with a

poor performance. . In such an instance, team cohesion may act as its own motivator,

replacing the need for motivational tactics such as goal-setting. There is some previous

research consistent with such a position. For example, Liden (2002) provided evidence

that cohesive teams have less social loafing when performing their task. Additionally,

Klein & Mulvey (1996), using newly formed student teams, found that goal commitment

mediated the relationship between team cohesion and team performance. Of course,

these studies were limited in duration.   Future research should examine the relationships

of team cohesion and team goal commitment to team performance dynamically to fully

determine if team cohesion may indeed act as its own motivator to new teams, but begin

to show detrimental effects as teams develop.

Limitations

Of course, no study is without limitations. Team research is expensive in time and effort, and as is often the case in team research, the number of teams in the study was rather small. Additionally, the original manipulations proposed in this study did not appear to have the desired effect upon participants. Thus, after running a pilot sample of ten teams, it was decided to change the study procedure in order to more effectively manipulate the predictor variables.. Clearly, the smaller sample size adversely affected power in the current study. Indeed, some of the observed effect sizes (correlations and mean differences) in this study were of moderate strength; however, the lack of a sufficient sample prevented a strong statistical test of their significance..

A second limitation is in the sample of teams collected for this study. In truth, student samples can be both strength and a weakness in research. Some researchers have argued that students represent a wider range of the population than is typically found within organizations. As a result, there are fewer concerns with range restriction. However, this also heightens concerns about the generalizability of the results found with student samples. If students do not represent the same population as employees in an organization, then are results of studies with student participants valid? In order to verify if the results of this study truly extend to an applied setting, additional research is needed with a sample of organizational employees. It should be noted that utilizing student teams in a laboratory does have some advantages. Utilizing laboratory teams allows for the manipulation of specific variables in a controlled setting; this is a critical aspect of lab research when the causal flow between variables is ambiguous, as is the case with team cohesion and team performance. Additionally, student teams provided an opportunity to

study teams with no prior history of performing together. This provides an important insight into managing newly formed teams. Indeed, some relationships with team performance may be quite dynamic; important in the developing stages of the team, but less so once a team has performed its job for a long time.

Finally, each of the measures used to capture the relevant study variables in this research project contained a weakness. Self ratings suffered from rater inflation, and ran the risk of being influenced by the team member's perceived performance on the task. Observer ratings suffered from potential halo effects, and ran the risk of not fully capturing the more behaviorally ambiguous variables of team goal commitment and team cohesion. Furthermore, reliability measures for both the self report surveys and the observer ratings were modest and indicated imperfect measurement of these variables from both sources. In recognition of the weakness of each approach to measuring latent variables such as team cohesion or team goal commitment, multiple sources of ratings were certainly needed in order to compensate for one another's shortcomings. However, in those instances where one source of data supported a relationship when the other source did not, it was difficult to determine which source, if any, was telling the correct story. The most compelling evidence for a relationship occurred when multiple sources or indices indicated similar effect sizes.

Despite these limitations, this study demonstrated encouraging relationships between team cohesion, team goal commitment, and team performance. First, evidence from multiple indices supports the notion of a causal relationship from team cohesion to team performance. However, this causal relationship was not proved, of course. Second, this study suggested that the relationship between backup behavior and team performance

is more complex than originally believed. This evidenced by the modest, non-significant

correlation found between backup behavior and team performance in the study. Finally,

in addition to being an affective variable, it suggested that team cohesion may also act as

a motivational variable to affect team performance.

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Appendices

Appendix A

Demographics Questionnaire

1. ☐ Male   ☐ Female

2. Age _____

3. How would you best describe your ethnic or racial background?

☐ African American/Black
☐ American Indian/Native American
☐ Hispanic/Chicano/Mexican American
☐ Asian American
☐ Caucasian/European American
☐ Other (please specify below)
                    _____

4.   What, if any, is your past experience in using Lego's?

☐   None
☐   A little experience
☐   Some experience
☐   A lot of experience

5.   How well did you know your teammates before today?

☐ Not at all
☐ A Little
☐ Somewhat well
☐ Very well

Appendix B

Controversial Topics Survey

Instructions: Please indicate the degree to which you agree with the following statements below. Answers will be kept completely confidential and will not have any impact outside of the study. We are simply interested in your opinions on some topics.

1) It should be illegal to have an abortion.

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

2) The use and sale of handguns should be made illegal.

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

3) Marijuana should be legalized as a regulated substance.

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

4) It should be illegal for states to have a death penalty.

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

5) Affirmative Action programs should be made illegal

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

6) Casinos should be legalized to improve state funding.

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

7) Smoking should be banned in all public places.

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

8) It should be illegal to test products on animals.

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

9) Prostitution should be a legal, regulated business.

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

10) The state lottery should be banned as a form of gambling

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

11) It should be illegal for couples of the same sex to marry

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

12) It should be illegal to end the life of the terminally ill (euthanasia)

1	2	3	4	5
Strongly Disagree		**Neutral**		**Strongly Agree**

Appendix C

Instructions for Individual Lego Task

Scenario: You are currently working for a toy company in its new toy development department. The marketing department has indicated that animal action figures should be the next big hit with kids. Your boss wants you to design an animal action figure that will serve as the model for the production team to create the new toy. Your job is to decide which animal the toy should look like and model that animal for the toy production team to work with. Because the new toy is still in its developing stages, your boss does not expect a polished, perfect model. He does expect, however, for you to have something to give him in 90 minutes.

Instructions: Please decide on an animal to model and use the legos at your station to construct a simple model of the animal. The model does not have to have a lot of detail, but you should be able to use it in order to explain your idea to your boss at the toy company. Your goal is to have a toy to show your boss by the end of the experiment. Performance will be judged by the model complexity (number of pieces used) and model creativity (as rated by the experimenter). In 10 minutes I will interrupt you and have you start another task. You will have the opportunity to come back to this individual task later on in the experiment, so any progress made now will help you later on.

Appendix D

Instructions for Team Decision-making Task

"For the following task, imagine that you are part of a committee that advises government officials on policy-making or particular courses of action. Your job is to utilize your knowledge and opinions of the issue to reach a conclusion about the policy and advise the government official according to the conclusion you reach. Additionally, please argue from the position that you circled earlier on the topics survey. You will have up to 10 minutes to discuss the issue and reach a consensus. All opinions and views expressed during this debate will not leave the lab and will be kept confidential."

1.) **Abortion:** The U.S. government is at present debating whether to pass a law banning all forms of abortion. You and your teammates are on the advisory committee to decide on whether or not to pass this ban. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

2.) **Gun Laws:** The U.S. government is at present debating whether to pass a law banning the sale and use of handguns. You and your teammates are on the advisory committee to decide whether or not to pass this ban. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

3.) **Marijuana Legalization:** The U.S. government is at present debating whether marijuana should be legalized. You and your teammates are on the advisory committee to decide whether or not legalization should go ahead. You have ten minutes to discuss the issue and arrive at preliminary recommendation.

4.) **Death Penalty:** The U.S. government is at present debating whether to ban capital punishment. You and your teammates are on the advisory committee to decide whether or not to pass this ban. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

5.) **Affirmative Action:** The U.S. government is at present debating whether to ban affirmative action. You and your teammates are on the advisory committee to decide whether or not to pass this ban. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

6.) **Animal Testing:** The U.S. government is at present debating whether to ban scientific testing on animals. You and your teammates are on the advisory committee to decide whether or not to pass this ban. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

7.) **Euthanasia:** The U.S. government is at present debating whether to ban euthanasia (ending a terminally ill patient's life). You and your teammates are on the advisory committee to decide whether or not to pass this ban. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

8.) **Public Smoking:** The U.S. government is at present debating whether to ban all smoking in public places. You and your teammates are on the advisory committee to decide whether or not to pass this ban. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

9.) **Same-sex Marriages:** The U.S. government is at present debating whether to ban same-sex marriages. You and your teammates are on the advisory committee to decide whether or not to pass this ban. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

10.) **Prostitution:** The state of Florida is at present debating whether to legalize prostitution as a regulated business. You and your teammates are on the advisory committee to decide whether or not to go ahead and legalize prostitution as a business. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

11.) **Casinos:** The state of Florida is at present debating whether to open casinos for additional state funding in certain areas of the state. You and your teammates are on the advisory committee to decide whether or not the plan to open casinos should go ahead. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

12.) **Lottery:** The state of Florida is at present debating whether to remove the state lottery. You and your teammates are on the advisory committee to decide whether or not to remove the lottery. You have ten minutes to discuss the issue and arrive at a preliminary recommendation.

Appendix E

Task Instructions - High Goal Commitment Condition

The following task is designed to measure spatial orientation at the team level. This task will be

videotaped so that we can rate certain team behaviors later on. In the center of the table is a

model of a house with a functional swinging gate and a dinosaur. The goal of the task is to build

a similar structure to the model in the center by constructing its requisite pieces and having at

least one of you put them together at the end. One of you will build the dinosaur, one will build

the gate, and the other one will be building the surrounding structure. Each component will be

built in a special geographic location marked by the tape on the table. Pieces for building each

component are provided in their respective locations on the table. Keep in mind that not all the

pieces in each location are needed to build your part of the model. Your team will be judged by

the total time it takes to complete the task. In addition, certain rules are assigned to building each

part of the model, which you should see in front of you. Take a moment to read them now

(pause and let them read). Here are some additional rules I am giving you verbally:

- You may not take any pieces out of their respective locations for any reason.

- You may not touch or rotate the model placed in the center of the table.

- You cannot put the three components together in the center of the table until each of the

  individual components is finished.

- Infractions of any of these aforementioned rules will cost your team 1 minute per

  infraction.

I will give you one warning when you break any of these rules I just mentioned. After that, I will begin adding penalty minutes every time you break one of the rules. I will not tell you when you break one of the rules on your sheets, so make sure to follow the rules on your rule sheet. Your specific task is to build the {dinosaur, gate, surrounding structure}. Now, you may notice that the model breaks some of the rules mentioned earlier as well as some of the rules given to you at your station. For instance, the dinosaur does not fit inside the gate. Also, pieces of the same color for the structure are touching, which is a rule given to the "structure station." Please be aware of these rule violations and make sure to avoid them when building your own model.

Although it is not required, you may help your teammates with their task(s), but only by leaving your station and walking over to your team member's station. You are not allowed to switch responsibilities (e.g., if anyone is working on the structure, the "structure" person must be one of those people working).

Timing will begin when the experimenter tells you to begin work. Timing ends when at least one of you combines at the structures in the center of the table. If rules are broken in the completed model, then the penalty minutes will be added to your total time.

Team Goal: Your team has a timed goal of 35 minutes to complete this task. 20% of the teams who have performed this task have completed it successfully in 35 minutes, so this

is a difficult goal that, should you achieve it, will distinguish you as one of the best teams in this experiment. Even if you do not meet your goal, we would like you to continue working until you finish the task.

Keep in mind that you are still responsible for finishing your model toy assigned to you earlier. If you have finished your particular task, but your team is not ready to put the model together, you can use your time to work on the individual Lego task assigned to you earlier, or you can help your teammates complete their part of the group task.

Before you begin, you can briefly manipulate the model in the center to get a feel for how it works. You cannot take any pieces apart, however. Please let me know if you have any questions.

Appendix F

Main Task – Low Goal Commitment Instructions

The following task is designed to measure spatial orientation at the team level. This task will be videotaped so that we can rate certain team behaviors later on. In the center of the table is a model of a house with a functional swinging gate and a dinosaur. The goal of the task is to build a similar structure to the model in the center by constructing its requisite pieces and having at least one of you put them together at the end. One of you will build the dinosaur, one will build the gate, and the other one will be building the surrounding structure. Each component will be built in a special geographic location marked by the tape on the table. Pieces for building each component are provided in their respective locations on the table. Keep in mind that not all the pieces in each location are needed to build your part of the model. Your team will be judged by the total time it takes to complete the task. In addition, certain rules are assigned to building each part of the model, which you should see in front of you. Take a moment to read them now (pause and let them read). Here are some additional rules I am giving you verbally:

- You may not take any pieces out of their respective locations for any reason.

- You may not touch or rotate the model placed in the center of the table.

- You cannot put the three components together in the center of the table until each of the individual components is finished.

- Infractions of any of these aforementioned rules will cost your team 1 minute per infraction.

I will give you one warning when you break any of these rules I just mentioned. After that, I will begin adding penalty minutes every time you break one of the rules. I will not tell you when you break one of the rules on your sheets, so make sure to follow the rules on your rule sheet. Your specific task is to build the {dinosaur, gate, surrounding structure}. Now, you may notice that the model breaks some of the rules mentioned earlier as well as some of the rules given to you at your station. For instance, the dinosaur does not fit inside the gate. Also, pieces of the same color for the structure are touching, which is a rule given to the "structure station." Please be aware of these rule violations and make sure to avoid them when building your own model.

Although it is not required, you may help your teammates with their task(s), but only by leaving your station and walking over to your team member's station. You are not allowed to switch responsibilities (e.g., if anyone is working on the structure, the "structure" person must be one of those people working).

Timing will begin when the experimenter tells you to begin work. Timing ends when at least one of you combines the three structures in the center of the table successfully. If rules are broken in the completed model, then the penalty minutes will be added to your total time.

Team Goal: Your team has a timed goal of 35 minutes to complete this task. I have to be honest with you; your chances of meeting this goal are nearly impossible. None of the

teams who have performed this task have actually completed it successfully in 35 minutes. Even

if you do not meet your goal, we would like you to continue working until you finish the task.

Keep in mind that you are still responsible for finishing your model toy assigned to you

earlier. If you have finished your particular task, but your team is not ready to put the

model together, you can use your time to work on the individual Lego task assigned to you

earlier, or you can help your teammates complete their part of the group task.

Before you begin, you can briefly manipulate the model in the center to get a feel for how it

works. You cannot take any pieces apart, however. Please let me know if you have any

questions.

Appendix G

Rule sheet for the Structure in the Task

1.) The structure does not have to completely replicate the model, although it must retain the same shape. Windows must be the same height and design, and should start 5 rows up from the bottom of the structure, just like the model in the center.

2.) Two blocks of the same color may not touch. Two blocks of the same color may touch diagonally, however.

3.) No spaces are allowed, other than the pre-designed windows.

4.) The structure must "cover" or enclose the swinging gate on the front.

5.) The structure must be completely connected. That is, a person should not be able to separate any two blocks without having to take them apart.

6.) The structure must be wide and long enough for the gate to swing completely inward.

Appendix H

Rule Sheet for the Gate

1.) The gate must be able to swing forwards and backwards while remaining attached to the structure.

2.) The gate must retain the design in the model, though any two colors may be used. The colors used should imitate the same *pattern* of colors used in the gate.

3.) The pieces connecting the gate to the structure may not touch another piece on the STRUCTURE of the same color.

4.) The gate must be tall enough for the dinosaur model to "walk" through.

5.) The gate may not be attached to the structure until both the structure and the dinosaur are completed.

Appendix I

Rule Sheet for Dinosaur

1.) The dinosaur must completely replicate the model provided. This means it must be the same size, shape, etc.

2.) The dinosaur must be able to "walk" through the swinging gate and fit inside the structure (it must be able to fit).

3.) You cannot move the dinosaur into the structure until both the gate and the structure are completed.

Appendix J

Team Cohesion Self-Report Scale

Please indicate how much you agree with the following statements by circling the appropriate number.

1.) The people in my team were not very friendly to one another.

Strongly Disagree   Strongly Agree
            1   2   3   4   5

2.) The people in my team enjoyed working with one another.

Strongly Disagree   Strongly Agree
            1   2   3   4   5

3.) The people in my team took interest in one another.

Strongly Disagree   Strongly Agree
            1   2   3   4   5

4.) My team really stuck together through our tasks.

Strongly Disagree   Strongly Agree
            1   2   3   4   5

5.) If given a similar situation in the future, this team would not want to work together again.

Strongly Disagree   Strongly Agree
            1   2   3   4   5

Appendix K

Team Goal Commitment Self-Report Scale

1.) It was important for our group to attain the goal that was assigned.

Not Very Important   Very Important

1   2   3   4   5

2.) Our group was committed to pursuing the assigned goal.

Not Very Committed   Very Committed

1   2   3   4   5

3.) Our group didn't really decide to achieve our assigned goal.

Strongly Disagree   Strongly Agree

1   2   3   4   5

Appendix L

Experimenter Rating Scale for Team Cohesion

Definition: Refers to the attitudes that team members have toward one another and the team task. It reflects the acceptance of team norms, level of group cohesiveness, and the importance of team membership.

General adjective		Behavioral Indicators to Illustrate and define some scale points
Description of each scale point		
Complete Skill In	5	• Team shows a willingness to cooperate. • Team demonstrates positives attitudes towards one another
A Lot of Skill In	4	
Adequate Skill In	3	• Team cooperates, but seems hesitant to do so, or does not cooperate fully. • Team displays small amounts of frustration or other negative emotions
Some Skill In	2	
Hardly Any Skill In	1	• Team members experience conflict with each other • Team members have negative attitudes towards one another and frequently display anger, frustration, etc.

Behavioral Observations for Legos task:
_____A. Team says things in positive tone towards other team members when talking and/or says something positive about each other's work

Comments:_____
_____
_____
_____
_____

_____B. Team is polite towards one another, makes conversation, etc.

Comments:_____
_____
_____
_____

Appendix M

Experimenter Rating Scale for Team Goal Commitment

Definition: Refers to the attitudes that team members have towards the team task and the team goal. It reflects the importance of achieving the goal and the level of commitment or effort the team has towards achieving the goal.

General adjective		Definition of scale points
Description of each scale point		
Complete Skill In	5	• Team demonstrates that they place a high importance on achieving the team goals • Team makes achieving the team goal a top priority and exhibits a high amount of effort towards attaining that goal
A Lot of Skill In	4	
Adequate Skill In	3	• Team is aware of team goals but does make accomplishing them the top priority • Team appears complacent with regards to accomplishing team goals
Some Skill In	2	
Hardly Any Skill In	1	• Team is not aware of team goals • Team does not put forth any noticeable effort to accomplish the goal put before them

Behavioral Observations for Legos:
_____A. Team repeats the goal to each other as reminders or to help develop strategy

Comments:_____
_____

_____B. Team appears focused on time elapsed or time left to goal (e.g., asks experimenter how much time has passed).

Comments:_____
_____

_____C. Team appears to take time as a consideration (working quickly vs. not appearing concerned with time).

Comments:_____
_____

Appendix N

Experimenter Rating Scale for Team Backup Behavior

Definition: Backup behavior involves assisting the performance of other team members. This implies an understanding of other members' tasks. It also implies that the member is willing and able to provide and seek assistance.

General adjective		Behavioral Indicators to Illustrate and define some scale points
Description of each scale point		
Complete Skill In	5	• When a team member is having difficulty, makes a mistake, or is unable to perform duties, other team member steps in to assist and ensures that the activity is completed properly • Team provides critical assistance to each other without neglecting their own task • When players are having difficulty or are overburdened, players display a willingness to seek assistance from each other rather than struggle and make mistakes
A Lot of Skill	4	
Adequate Skill In	3	• Team may struggle and make numerous mistakes before finally seeking assistance • Team may not provide each other help until asked. • Team provides help, but assistance is weak (i.e. offers a couple of suggestions vs. helping to build the structure).
Some Skill In	2	
Hardly Any Skill In	1	• Team fails to provide assistance to the other player who is having difficulty, makes a mistake, or is unable to perform his or her duties • Team is unwilling to ask for help even when it is available

Behavioral Observations for Legos Task:
Team members observe person A (structure) lagging behind and/or struggling and come to assist by: 1) sorting legos, 2) helping to build structure or other pieces,

3) providing direction or suggestions on how to accurately complete the structure, or 4) some other behavior that demonstrates a person is helping.   Please provide comments and notes below

_____

_____

_____

_____

_____

_____

Appendix O

Debriefing Form

Thank you for participating in this study. The purpose of this study is to assess the influence of various factors on team performance. As teams are being more widely used in organizations (Gordon, 1992), isolating factors that improve team performance has become important in business research. This study looked at the influence of team cohesion, team goal commitment, and team helping behavior (the amount of help offered to teammates by a team member) on your team's performance on the Lego task.

In this study, we manipulated team cohesion and team goal commitment to observe any subsequent effects on team helping behavior and team performance. The first task involving the hiring decision was designed to change your team's level of cohesion, or ability to get along with one another. Some teams received a cooperative task, where they introduced themselves to one another and simply had to agree on one candidate for the hire. It was hoped that this would create a higher level of cohesion among teammates. Other teams received a competitive task, where they had to fight for the hire one particular candidate. It was hoped that this would lead to lower levels of team cohesion.

The second task, the Lego task, was designed to measure your performance as a team on a particular project. Additionally, the amount of help each teammate offered to the rest of the team will be measured later by looking at the video tape. The instructions before the Lego task were slightly different for different groups of teams. Some teams

were told that their chances of meeting the assigned goal were very good. This was done in

order to encourage a higher level of goal commitment to the Lego task. Other teams were told

that their chances at success were very poor. This was done in order to encourage lower levels

of goal commitment. We were interested to see if any differences in goal commitment would

result in any difference in team performance. It is predicted that higher levels of team goal

commitment and team cohesion would lead to higher

levels of team helping behavior. Higher levels of team helping behavior, in turn, would lead to

higher levels of team performance.

Again, we thank you for your participation. If you have any questions regarding this

study or this area of research, please feel free to contact Matt Prewett by e-mail at

mprewett@mail.usf.edu or by phone at 813-903-1062. Additionally, you may contact Dr.

Michael Brannick at mbrannic@luna.cas.usf.edu or by phone at 813-974-0478. To learn more

about the challenges of assessing teams at work, please consider enrolling in classes such as

Industrial/Organizational Psychology.

References

Gordon, J. (1992). Work teams – How far have they come? *Training, 29,* 59-65.