EFFICACY BELIEFS AND TEAM EFFECTIVENESS:
A MESO APPROACH

ILONA BERTH
B.B.A. International Business, Reutlingen University, 2007

A Thesis
Submitted to the School of Graduate Studies
of the University of Lethbridge
in Partial Fulfillment of the
Requirements for the Degree

MASTERS OF SCIENCE IN MANAGEMENT

Management
University of Lethbridge
LETHBRIDGE, ALBERTA, CANADA

Abstract

Following a meso-contingency approach (Rousseau & House, 1994), this study examined the relationship between efficacy beliefs and effectiveness outcomes in a team context. Specifically, the interaction effects of self-efficacy and group efficacy as well as their direct effects on effectiveness outcomes at the individual level and at the group level were examined. Forty-two work teams (174 members and 42 supervisors) from several industries within Western Canada completed a survey assessing their efficacy beliefs, their attitudes at work, and their performance. The cross-level hypotheses revealed that self-efficacy positively related to individual effectiveness and to team attitudes but not to team performance. Group efficacy positively correlated with team effectiveness but not with individual effectiveness. Moreover, group efficacy as a shared belief and as a perception of individual team members was hypothesized to moderate the relationship between self-efficacy and team members' effectiveness. However, these moderation hypotheses were not supported.

Acknowledgments

This Master's thesis would not have been possible without the support of many. First and foremost, I would like to thank my supervisors Dr. Mahfooz Ansari and Dr. Helen Kelley for their wonderful support and guidance. I have come to know Dr. Mahfooz Ansari as someone who goes beyond what is expected. He took pride in sharing with his students his compassion for science, academic rigor, inventiveness, and in-depth research knowledge. Dr. Mahfooz Ansari was there for me no matter what time of the day and he pushed me harder as a researcher and as a person. I learned a lot from him. Dr. Helen Kelley was always there to listen, encourage, and to give me excellent advice. Her efficacy expertise, determination to find research participants, and her attention to details has been crucial to my success. I am honored to have had the opportunity to work with such remarkable scholars and supervisors.

Second, I would like to show my gratitude to my reader Dr. Gail Hepburn for her valuable comments, insights, and her creative ideas, especially, regarding my theoretical model. I would also like to thank Dr. Ekin Pellegrini for serving as the external examiner and sharing her expertise.

Moreover, a special thank you should be given to the following faculty members: Salvador Barragan, Dr. Janelle Enns, Dan Kazakoff, Dr. Kubilay Gok, Dr. Joshua Knapp, Craig Milner, and Cheryl Meheden. I could have not completed my pilot study without their incredible dedication and support.

It goes without saying that a study would not be possible without its participants – in my case, students, work teams, and their organizations. It is a pleasure to pay tribute to

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Chapter 1: Introduction

Teams have emerged as one of the primary sources for organizational success (Belbin, 1984; Cohen & Bailey, 1997; Margerison, McCann, & Davies, 1995). Hence, many organizations have replaced their bureaucratic structures with flatter arrangements that emphasize team-based work (Guzzo, 1997). Although physical changes have been arranged, there are still many gaps in our understanding of how organizational teams function and how their effectiveness can be enhanced.

Initially, researchers focused only on structural design aspects as possible predictors of effectiveness but they now also consider cognitive attributes (Wright, Barker, Cordery, & Maue, 2003). Among the cognitive constructs, efficacy beliefs have evolved to be one of the key variables that help to explain how effectiveness is influenced (Hardin, Fuller, & Davison, 2007; Jung & Sosik, 2003; Van Dolen, De Ruyter, & Carman, 2006). Self-efficacy is an individual-level concept that has been defined as the "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" (Wood & Bandura, 1989a, p. 408). Group efficacy, on the other hand, is a shared belief that has been referred to as "the group's sense of its capacity to complete a task successfully or to reach its objectives" (Whiteoak, Chalip, & Hort, 2004, p. 158).

Social cognitive theory (Bandura, 1986, 1997) has laid the conceptual foundations for efficacy-performance relationships and its postulates have received empirical support. A wide range of studies have analyzed the relationship between efficacy beliefs and effectiveness outcomes at both the individual and the group level of analysis. Research consistently showed that efficacy beliefs contribute significantly to the level of

motivation and performance at their respective level of analysis (Bandura & Locke, 2003; Gully, Incalcaterra, Joshi, & Beaubien, 2002; Stajkovic, Lee, & Nyberg, 2009; Stajkovic & Luthans, 1998b).

However, recent developments in research show a tendency towards studies that embrace several levels of analysis to examine organizational phenomena (Ashkanasy, 2009; Scherbaum & Ferreter, 2009). Unlike single-level approaches, such multi-level and cross-level studies address the nested nature of organizations (Klein & Kozlowski, 2000). They recognize "that individuals, groups, and organizations are not separate conceptual categories, but parts of a whole, each affecting and being affected by the other" (Lindsley, Brass, & Thomas, 1995, p. 647). In other words, contextual influences of the group may affect individual-level characteristics and processes, whereas individual differences among group members may influence characteristics and processes at the group level (Chen & Kanfer, 2006; Klein & Kozlowski, 2000). Such cross-level effects may thus explain additional variance in both individual- and group-level components (Chen, Kirkman, Kanfer, Allen, & Rosen, 2007).

Although individual- and group-level studies on efficacy beliefs have been plentiful, only a few studies include both levels (Chen & Bliese, 2002), and even fewer studies have simultaneously examined cross-level effects of self-efficacy and group efficacy on effectiveness outcomes in a team context (Chen & Kanfer, 2006; Chen, Kanfer, DeShon, Mathieu, & Kozlowski, 2009). The few existing cross-level studies have been limited in several ways. First, to my knowledge, team research has only focused on the direct effects of self-efficacy and group efficacy as possible predictors of effectiveness, neglecting the possibility of an interaction between the two constructs.

Second, only a few effectiveness criteria at the group and at the individual level have been examined (e.g., Lent, Schmidt, & Schmidt, 2006; Tasa, Taggar, & Seijts, 2007) as dependent variables of the cross-level effects (e.g., group performance and individual teamwork behavior). Effectiveness includes three dimensions: (a) performance outcomes (e.g., efficiency and quality), (b) attitudinal outcomes (e.g., satisfaction and commitment), and (c) behavioural outcomes (e.g., turnover and absenteeism) (Cohen & Bailey, 1997). Past research (e.g., Feltz & Lirgg, 1998; Katz-Navon & Erez, 2005; Seijts, Latham, & Whyte, 2000) has focused largely on performance outcomes, thus leaving many aspects of effectiveness needing investigation. Finally, previous studies (e.g., Katz-Navon & Erez, 2005; Seijts et al., 2000) have used similar research designs. To my knowledge, all studies used students as their sample and all except one (Feltz & Lirgg, 1998) employed simulation to test the cross-level hypotheses. Consequently, the generalizability of the results to business settings, according to Tasa et al. (2007), is difficult to determine and requires additional field research.

To address these issues, this study used a meso-contingency approach to examine the relationship between efficacy beliefs and effectiveness in a team context. A meso approach integrates the psychological processes of micro research as well as the socioeconomic processes of macro research (Rousseau & House, 1994). This approach is defined as a "simultaneous consideration of main and interaction effects at several levels" (Rousseau & House, 1994, p. 15). In this case, self-efficacy and group efficacy have been examined for their direct and interaction effects on various effectiveness outcomes at the individual and at the group levels. The basic idea of a contingency/interactional approach (Lewin, 1951) is that behavior at work (B) is a function of the interaction between the

characteristics of the individual (P) and those of the environment (E), symbolized as $B = f$ (P, E). The variant of this model assumes that environment and person have to somehow fit together in order for the person to perform well (Kristof, 1996). From an interactional perspective, this fit can be examined by how a moderating variable affects the relationship between a predictor and a criterion variable (Umanath, 2003). In this study, I hypothesize that the relationship between a team member's self-efficacy belief and effectiveness depends on the efficacy belief of his or her team.

Thus this study contributes to the existing efficacy literature in three important ways. First, to my knowledge, this is the first study to conceptualize team members' personal effectiveness as a function of the interaction between self-efficacy and group efficacy. It is hypothesized that it is the joint, interactive impact of both efficacy beliefs rather than their separate main effects that predicts team members' effectiveness. Second, the study includes various effectiveness criteria (e.g., job involvement and group commitment) which, thus far, have not been investigated in previous cross-level studies on efficacy beliefs. Third, the cross-level hypotheses were tested using a field study approach. Previous cross-level studies on efficacy-effectiveness relationships in a team-context focused on simulations with student samples, thus, making inferences to work teams in a real-life setting difficult.

This thesis is divided into five chapters. In Chapter 2, I introduce the constructs of self-efficacy and group efficacy and describe their relationship with various work outcomes. I also illustrate the theoretical model and the development of hypotheses. In Chapter 3, I describe the methodology employed to assess the research model. The results of the various analyses are described in Chapter 4. Finally, Chapter 5 discusses the

research findings, theoretical and practical implications, potential study limitations, and

future research directions.

Chapter 2: Review of the Literature

This chapter, a review of the literature, consists of four sections. I begin by clarifying the difference between the terms group and team and how they will be employed in this thesis. I then provide a brief overview of the constructs, self-efficacy and group efficacy. Aspects will be discussed such as their dimensionality, terminology, and the relationship between the two efficacy beliefs. In the third section, I present theoretical and empirical findings on the relationship between efficacy beliefs and work outcomes. Finally, I present my theoretical model and discuss the development of hypotheses.

Group versus Team

The first step when approaching the literature on collectives in organizations is to clarify the terminology concerning groups and teams. According to Katzenbach and Smith (1993), "[a] team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable" (p. 45). The term "group", in contrast, has been applied in a broader sense embracing several types of groups in organizational and social settings (Brannick & Prince, 1997). As "group" encompasses "team" but the reverse may not always be true, the former will be employed in this chapter to integrate the various ways collectives are labeled in the organizational literature. The term "team" will only be employed in the methodology section because the main study specifically addresses work teams.

Self-efficacy

The following section serves as an introduction to the construct of "self-efficacy". It addresses its conceptualization, development, and distinguishable characteristics. A theoretical model of self-efficacy (Bandura, 1997; Stajkovic & Luthans, 1998a) is depicted in Figure 2.1. and will be described thereafter.
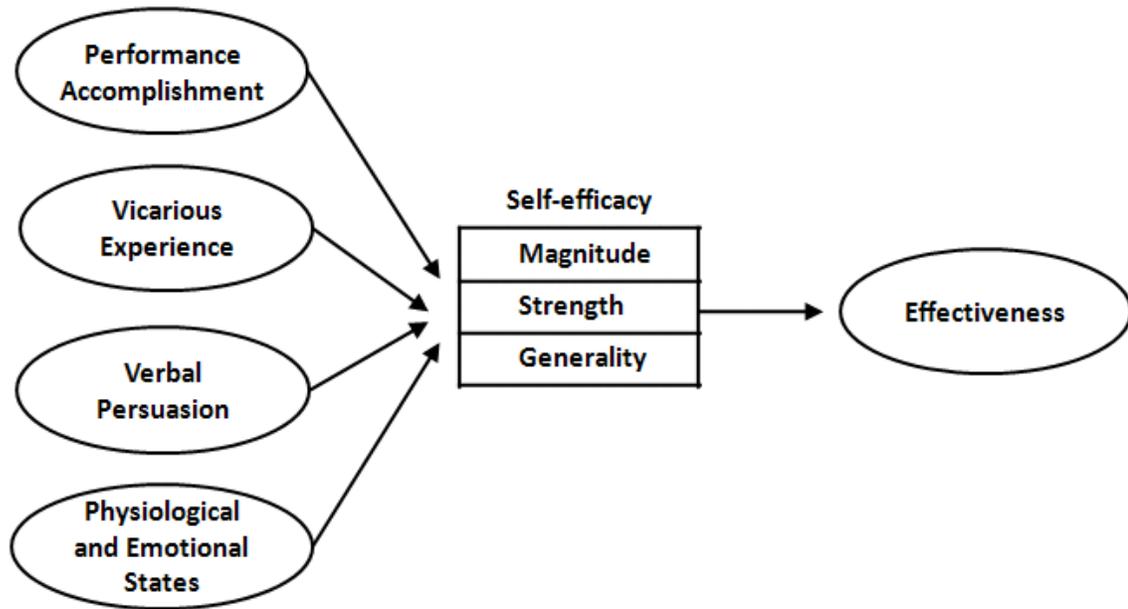
Figure 2.1. Theoretical Model of Self-efficacy.

Dimensionality and focal points. Self-efficacy is an individual-level construct and varies according to three dimensions (Bandura, 1977a, 1986, 1997). The first dimension is self-efficacy *magnitude,* which is concerned with the level of task difficulty (e.g., low, moderate, high) and complexity a person believes he or she can accomplish. An individual with high magnitude might be expected to perceive him/herself as able to accomplish more difficult tasks (Compeau & Higgins, 1995). The second dimension is self-efficacy *strength*. This dimension addresses a person's degree of certainty (e.g.,

strong or weak) that he or she can accomplish the respective level of task difficulty and complexity (Stajkovic & Luthans, 1998a). Finally, self-efficacy beliefs vary according to their level of *generality* -- the degree to which the judgment is limited to a particular activity or domain (Stajkovic & Luthans, 1998a). Some researchers (e.g., Luthans, Zhu, & Avolio, 2006; McNab & Worthley, 2008) view self-efficacy as a trait-like general efficacy belief which is more abstract and not linked to a certain context. Others (e.g., Bandura, 1997; Early, 1994; Stajkovic & Luthans, 1998a) assume that personal efficacy beliefs either relate to a certain task (task-specific self-efficacy) or a certain domain (domain-specific self-efficacy). Such specific self-efficacy beliefs are, for instance, "production self-efficacy" (Mosley, Boyar, Carson, & Pearson, 2008) which is specific to the manufacturing domain, or "computer self-efficacy" which is specific to computer tasks (Hardin et al., 2007). Out of the three types of self-efficacy definitions, task-specific self-efficacy – that is, "one's belief in one's capability to perform a task" (Gist, 1987, p. 472) – has been the dominant perspective in the organizational literature (Luthans et al., 2006).

Aside from the variations in generality, strength, and magnitude, all self-efficacy definitions contain three focal points (Gist & Mitchell, 1992). First, self-efficacy summarizes an individual's perception of his or her ability to perform in general or to execute a certain task. It does so by embracing internal and external information that an individual acquired over time. Second, an individual's perception of self-efficacy is malleable. It changes depending on the extraneous and internal experiences of the individual. Finally, self-efficacy provokes behavioral action. For example, it might cause an individual to adapt his or her performance due to a change of circumstances.

Development. The development of self-efficacy beliefs is based on four categories of information: performance accomplishment, vicarious experience, verbal persuasion, and physiological and emotional states (Bandura, 1977a, 1986). The most influential source of information is one's own behavior and its consequences, which serve as direct feedback. Individuals can also learn through vicarious experience when they observe others succeed or fail. The third determinant of self-efficacy beliefs is verbal persuasion, which is especially effective if the person who tries to convince the other individual is perceived as trustworthy and competent. Finally, one's physical and emotional state (e.g., level of stress) also contributes to the development of personal efficacy beliefs.

Distinction from similar constructs. Self-efficacy has been clearly distinguished from three related constructs: outcome expectancy, self-esteem, and locus of control.

Outcome expectations are a person's judgment of the potential consequences that his or her behavior may cause (behavior-outcome expectancy), whereas efficacy expectations are a person's judgment of his or her ability to execute a certain behavior (person-behavior expectancy) (Bandura, 1977a, 1986, 1997). For instance, an employee's confidence to accomplish a certain job task would be considered an efficacy expectation. An outcome expectation, on the other hand, would be if the employee contemplates the consequences of accomplishing this particular task such as positive feedback from his or her supervisor. Bandura (1977a, 1986, 1997) also noted that self-efficacy expectations influence outcome expectations. An individual who is confident to accomplish a particular task is more likely to assume a positive outcome, while an individual who doubts his ability is more likely to assume negative consequences of his or her action.

Self-efficacy has also been distinguished from *self-esteem.* Whereas self-efficacy represents judgments of personal capability, self-esteem addresses an individual's judgments of self-worth (Bandura, 1997). Both self-efficacy and self-esteem capture cognitive, affective, and motivational components. However, self-esteem contains more affective components, whereas self-efficacy stresses motivational components (Chen, Gully, & Eden, 2004). Self-esteem is a global and stable evaluation of oneself, while self-efficacy tends to address specific tasks and situations and varies over time depending on the experiences people gain (Stajkovic & Luthans, 1998a). Individuals develop self-esteem by assessing their personal characteristics such as intelligence or appearance. Self-esteem, however, is not influenced by individuals' varying self-efficacy beliefs.

Stajkovic and Luthans (1998a) also distinguished self-efficacy from *locus of control*. According to Stajkovic and Luthans (1998a), locus of control can either be internal, when individuals believe that they themselves can control their life, or external, when they believe their life is in control of other external factors. Locus of control is a causal belief about one's behavior and its consequences, while self-efficacy relates to an individual's perception of his or her capabilities to perform.

Group Efficacy

Group efficacy derives from the individual-level construct of self-efficacy (Bandura, 1997; Parker, 1994). Similar to self-efficacy, group efficacy is a dynamic construct that changes over time depending on the information, performance feedbacks, and experiences of the group. However, it is far more complex than self-efficacy because it involves the interaction of not only one but several individuals (Gibson & Earley,

2007). Because of its inherent complexity, several different views concerning its conceptualization and its denotation are found in the literature.

Levels of analysis. Group efficacy has been defined as either an individual-level, group-level, or cross-level construct. At the individual level, definitions of group efficacy consider only intrapersonal processes similar to self-efficacy. Group efficacy is referred to as "an individual's assessment of the group's collective ability to perform task-related behaviors" (Van Dolen et al., 2006, p. 325). Perceptions of group efficacy are assumed to reside within each individual and allow for varying perspectives of the group's ability among group members.

Other researchers (e.g., Lindsley et al., 1995; Parker, 1994; Tasa et al., 2007) argue that group efficacy is beyond the group members' individual cognition and that it also includes interpersonal processes. Its conceptualization at the group level reflects the group's shared belief in its ability to perform. Group efficacy is viewed as a product of collective cognition, in that group members share and discuss their capabilities and knowledge to develop their collective efficacy belief (Gibson & Early, 2007).

The third type of definition focuses on the dynamic nature of group efficacy and how it evolves over time through group member interaction. Jung and Sosik (2003) discovered that at the beginning, group members have heterogeneous perceptions of their group's efficacy which become more homogenous over time. They view group efficacy as a cross-level phenomenon that begins at the individual level and evolves to the group level.

Dimensionality. Like self-efficacy, group efficacy is a multidimensional construct and varies according to its strength, magnitude, and generality (Bandura, 1997). In

particular, researchers distinguish between general group efficacy beliefs and context-specific group efficacy beliefs. According to the general conceptualization, group members have one general belief about their performance ability which is applied across domains and tasks (Gibson, 1999; Jung & Sosik, 2003). In the organizational context specifically, tasks are often so interconnected that they cannot be separated into single tasks and, therefore, only the development of general beliefs is possible (Gibson, Randel, & Early, 2000).

The majority of the efficacy literature, however, describes group efficacy as a task specific construct (Gibson et al., 2000; Zellars, Perrewe, Rossi, Tepper, & Ferris, 2008). Instead of referring to the group's ability to perform in general, task-specific definitions relate to the group's ability to perform a specific task (Lindsley et al., 1995). According to this perspective, group members possess separate efficacy beliefs for each task. For instance, whereas a group may have a low efficacy belief concerning client retention, their perceived ability to acquire new clients may be high. Recently, researchers have also started to consider domain specific constructs of group efficacy. "Virtual team efficacy" which is specific to teams with members in different locations, is an example of such a domain-specific definition (Hardin, Fuller, & Valacich, 2006).

Terminology. Besides varying definitions of group efficacy, researchers have also employed different terminology such as collective efficacy or group potency to describe a group's efficacy belief. Collective efficacy and group potency are both terms that have been either applied as substitutes of group efficacy or as distinguishable constructs. For instance, some researchers (e.g., Hardin et al., 2006; Jung & Sosik, 2003) view group efficacy as the umbrella term of group potency and collective efficacy. The term group

potency appears to be viewed as similar to general group efficacy, whereas collective efficacy appears to be viewed as similar to task-specific group efficacy. Others (e.g., Gully et al., 2002) differentiate between group efficacy and collective efficacy. They argue that unlike group efficacy, which focuses on small collectives, collective efficacy can be applied to various types and sizes of collectives such as communities, organizations, or even nations.

Definition and Conceptualization

As mentioned previously, the literature distinguishes between different conceptualizations of efficacy beliefs such as general, task-specific, and domain-specific perceptions. Efficacy researchers recommend that efficacy measures must be tailored to the domain being studied (Gist & Mitchell, 1992) and must match the level of generality of the performance outcome (Chen, Gully, & Eden, 2001; Gibson et al., 2000; Hardin et al., 2006) to receive high explanatory and predictive power. Hence, the present study focuses on domain-specific efficacy beliefs regarding one's job (job-related self-efficacy and job-related group efficacy). I adopted the following definition of self-efficacy: the extent to which individuals believe that they are able to conduct tasks that are specific to their job at hand (Riggs & Knight, 1994). In addition, I defined group efficacy as a group's shared belief regarding its ability to successfully perform its job-related behavior (Lindsley et al., 1995; Riggs, Warka, Babasa, Betancourt, & Hooker, 1994). Hence, I conceptualized group efficacy as a group-level construct that is domain-specific.

Self-efficacy-Group Efficacy Relationship

Bandura (1997) suggests that group efficacy is rooted in self-efficacy and that each group member's self-efficacy belief is related to his or her group's shared efficacy

belief due to the group members' interdependence among each other. For example, a group member's sense of self-efficacy will possibly be lower when he or she is surrounded by a group with a low group efficacy belief than when he or she is surrounded by a group with a high group efficacy belief (Bandura, 1997).

The relationship between self-efficacy and group efficacy has also been empirically addressed. Some researchers (e.g., Chen et al., 2009) found that group efficacy significantly predicted self-efficacy, whereas other researchers (e.g., Caprara, Barbaranelli, Borgogni, & Steca, 2003; Gibson, 2003; Lent et al., 2006; Watson, Chemers, & Preiser, 2001) examined the notion of self-efficacy as an antecedent of group efficacy. For instance, Lent et al. (2006) found that in a study of engineering student groups, self-efficacy significantly predicted group efficacy. Moreover, Gibson (2003) found that self-efficacy was positively related to group efficacy in two studies. However, Gibson noted that the study design did not allow for strong claims of causality and that future research would be needed to address this issue.

Finally, a third group of researchers (e.g., Parker, 1994) tested the general relationship between the two constructs without specific assumptions of causality. Parker (1994) measured elementary school teachers' self-efficacy and group efficacy beliefs and found that in at least some domains (such as mathematics), self-efficacy and collective-efficacy are related but independent constructs.

Efficacy-Effectiveness Relationships

In the 1980's, organizational researchers started to integrate efficacy beliefs in the field of management (e.g., Locke, Frederick, Lee, & Bobko, 1984; Stajkovic & Luthans, 1998b). Past research analyzed the effects of efficacy perceptions in various parts of

organizational and human resource processes such as recruitment and selection, training and development, or career interest and choice (Gist & Mitchell, 1992; Mosley et al., 2008). Organizational researchers, however, have shown special interest in the value to predict various work-related effectiveness outcomes. In fact, Lindsley et al. (1995) noted that "the interest in efficacy and its importance to the study of organizational behavior rests in its relationship to individual, group, and organizational performance" (p. 671).

Social Cognitive Theory

Social cognitive theory (Bandura, 1986, 1997) constitutes the most salient theory in explaining efficacy-related phenomena (Gibson & Early, 2007). This theory hypothesizes the predictive power of efficacy beliefs in regards to employees' and groups' motivation, attitudes, and behavior (Stajkovic & Luthans, 1998b). According to this theory, human beings are part of a triangular, reciprocal interrelation among themselves, their behavior, and the surrounding environment. They process external information with the help of cognitive processes such as self-reflection which then determine their behavioral actions. For instance, people reflect on past experience, personal thoughts and knowledge, and act on the conclusions drawn.

Perceived self-efficacy is part of this self-reflection process. This belief in one's abilities influences what activities people choose, how much effort they put into tasks, and how long they persist when facing difficulties (Bandura, 1986, 1997). The theory proposes that group members who perceive their abilities to achieve a certain task at a high level will exert more effort and thus will be more likely to successfully perform that task than group members who perceive their abilities as low. Consequently, successful

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performance does not only depend on possessing a required skill set but also on an adequate mindset to activate one's skills (Bandura, 1997).

As self-efficacy affects individual behavior, group efficacy influences the action of a group as a whole. This efficacy belief affects what type of actions groups choose, how determined group members are in achieving group objectives, and how easily they surmount obstacles (Bandura, 1997). Hence, social cognitive theory suggests that efficacy beliefs are one of the primary determinants of the extent to which individuals and groups are likely to put in the effort required to perform successfully (Bandura, 1986, 1997). Research seems to support this assertion (e.g., Stajkovic, 2006; Stajkovic et al., 2009).

Single-Level Relationships

Individual level. At the individual level of analysis, the relationship between self-efficacy and individual effectiveness outcomes has been well supported (Gibson et al., 2000). Significant positive relationships have been found between self-efficacy and motivational, affective, and behavioral outcomes (e.g., Bandura, 1997; Stajkovic & Luthans, 1998b; Wood & Bandura, 1989b). Overall, the findings suggested that the higher one's self-efficacy belief, the better the work outcomes (Stajkovic, 2006).

Group level. At the group level of analysis, various studies (e.g., Gibson, 1999; Gully et al., 2002; Hardin et al., 2006; Pescosolido, 2003; Prussia & Kinicki, 1996) reported a positive relationship between group efficacy and group performance. For example, a recent meta-analysis based on findings from 69 studies, 83 adjusted correlation estimates, 4,250 groups, and 18,891 individuals revealed that group efficacy was significantly related ($r = .35$) to group performance (Stajkovic et al., 2009). Group

efficacy has also been found to significantly correlate with collective motivation constructs such as group cohesion (e.g., Kozlowski & Ilgen, 2006).

However, efficacy-effectiveness relationships at the group level are more complex than those at the individual level (Gibson, 1999). Several studies (e.g., Chen et al., 2002; Durham, Knight, & Locke, 1997) have reported a weak or no relationship between group efficacy and group performance. Some researchers (e.g., Bandura, 1997; Gibson, 1999; Gibson & Early, 2007; Gully et al., 2002; Lindsley et al., 1995) have argued that the variation in magnitude of the effects is due to the existence of moderating factors such as task interdependence. For instance, Gully et al. (2002) conducted a meta-analysis and found that the relationship between group efficacy and group performance was stronger when the group was interdependent than when it was not.

Cross-Level Relationships

Studies that simultaneously tested the cross-level impact of self-efficacy and group efficacy on various effectiveness outcomes have been rare. The majority of the studies (e.g., Feltz & Lirgg, 1998; Katz-Navon & Erez, 2005; Lent et al., 2006; Seijts et al., 2000) investigated whether self-efficacy or group efficacy is a more influential predictor of group performance. Overall, results of these studies suggest that group efficacy is a stronger predictor of group performance than self-efficacy.

For example, Seijts et al. (2000) found that in a mixed-motive investment task, the correlations between group efficacy and the group's performance were significantly higher than the correlations between self-efficacy for individual performance and the group's performance given at least a moderate degree of task interdependence. Similarly, in the context of collegiate ice hockey, team efficacy beliefs have been found to be a

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stronger predictor of team performance than player efficacy beliefs (Feltz & Lirgg, 1998).

In addition, in a study of student project teams, Lent et al. (2006) found that group efficacy had stronger correlations with students perception of their team's performance as well as the team's overall performance rated by the course instructor than did self-efficacy.Finally, Katz-Navon and Erez (2005) tested the differential effect of self- and group-efficacy on group performance of high and low interdependent simulation tasks. They found that task interdependence determined which efficacy belief became salient and influenced group performance. Under conditions of low task interdependence, self-efficacy was significantly correlated with individual performance and group performance, whereas no significant effect of group efficacy on either performance outcome was found. Under conditions of high task interdependence group efficacy was significantly correlated with group performance, whereas no significant effect of self-efficacy on group performance was found.

Besides group performance, several cross-level studies investigated additional effectiveness criteria. For example, Tasa et al. (2007) found that in a simulation study with business students both self-efficacy for teamwork and group efficacy predicted individual teamwork behavior (rated by peers). Group efficacy was also significantly correlated with aggregated levels of individual teamwork behavior. Hence, the Tasa et al. (2007) study suggests that individuals are more likely to be motivated to engage in teamwork behaviors when they find themselves in efficacious groups. Another cross-level study (Van Dolen et al., 2006) investigated the influence of self-efficacy and group efficacy on customer's moderated group chat satisfaction in socially moderated groups and task moderated groups of business students. Self-efficacy was significantly related to

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satisfaction in both socially moderated and task moderated groups, whereas group efficacy was only correlated to chat session satisfaction in socially moderated groups. Finally, Lent et al. (2006) found that group efficacy had stronger correlations with group cohesion at both the individual and the group level of analysis than did self-efficacy.

Theoretical Model and Hypotheses Development

People do not spend their life isolated from one another (Bandura, 1977b, 1986, 1997). In an organizational setting, for instance, individuals are embedded in various groups such as work teams which in turn are embedded in departments and the organization itself. Klein and Kozlowski (2000) consequently noted that "given the nature of organizations as hierarchically nested systems, it will be difficult in practice to find single-level relations that are unaffected by other levels" (p. 13).

Within the context of teams, cross-level influences may take on two directions. *Top-down effects* or so called *contextual influences* occur when higher-level units such as team characteristics and processes influence lower-level units such as individual team members' cognition and behavior (Chen & Kanfer, 2006; Klein & Kozlowski, 2000). Team characteristics can either affect individual-level units directly or by moderating the relationships and processes at the lower-level unit (Klein & Kozlowski, 2000). *Bottom-up effects*, on the other hand, occur when individual characteristics and behaviors, the lower-level properties, influence higher-level units such as team processes (Chen & Kanfer, 2006; Klein & Kozlowski, 2000). Multi-level theorizing has also suggested an asymmetry in cross-level effects, in that top-down influences are stronger and unfold faster than do bottom-up effects (Chen et al., 2009; Klein & Kozlowski, 2000). This is

partly due to the fact that it is easier to change the behavior of an individual than that of a team as a whole (Chen & Kanfer, 2006).

Theoretical Model

Empirical evidence and theoretical considerations suggest that both self-efficacy and group efficacy affect effectiveness outcomes in the team context. However, the cross-level studies show no consistency (e.g., strength and significance of the relationships) in the direct effects of self-efficacy and group efficacy on individual effectiveness and group effectiveness. One reason for this inconsistency in the results may be that self-efficacy and group efficacy instead of operating independently – that is, they each have separate and additive direct effects on effectiveness criteria – play an interactive role in influencing effectiveness. In other words, the impact of self-efficacy on effectiveness depends on the level of group efficacy and vice versa. I am aware of no research that has examined the possibility of an interactive relationship between the two efficacy beliefs in influencing effectiveness outcomes within the context of work teams. Thus, the current study seeks to clarify this relationship by addressing both possibilities (direct effects and interaction effects) and testing their contrasting hypotheses in regards to various effectiveness outcomes. The study's theoretical framework (Bandura, 1997; Chen & Kanfer, 2006; Klein & Kozlowski, 2000) is depicted in Figure 2.2.
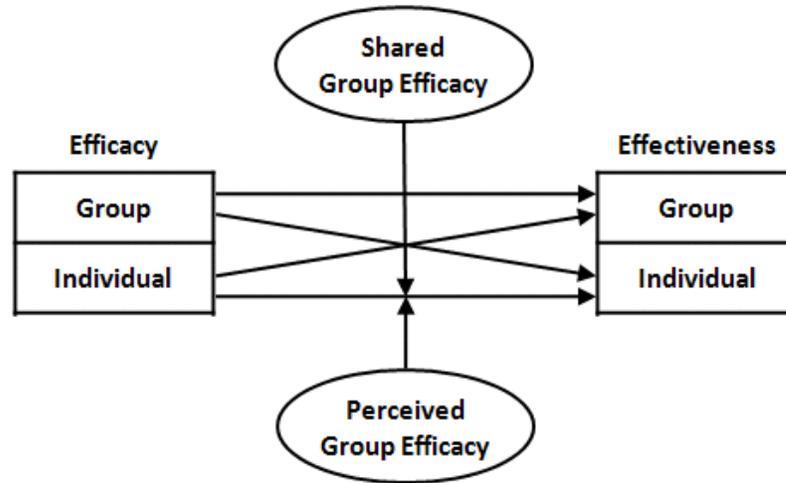
Figure 2.2. Theoretical Framework.

The framework includes direct relationships between efficacy beliefs and effectiveness outcomes at both the same level as well as at across levels. Furthermore, group efficacy at the individual level (perceived group efficacy) and at the group level (shared group efficacy) are assumed to moderate the relationships between self-efficacy and individual effectiveness.

In total, six effectiveness criteria have been included in the research model: individual performance, team performance, team commitment, job involvement, team satisfaction, and job satisfaction. There were two reasons to select these indicators of effectiveness. First, the model should include both performance and attitudinal outcomes at the group and individual levels. Second, the model should include effectiveness criteria that previous studies have not yet investigated (e.g., job involvement) to contribute to the efficacy literature.

Finally, previous research (e.g., Gibson, 1999; Gully et al., 2002; Katz-Navon & Erez, 2005; Seijts et al., 2000) has shown that task interdependence moderates the

relationship between efficacy beliefs and effectiveness outcomes. Hence, all relationships

in this study are tested by controlling for task interdependence.

Direct Hypotheses

The hypothesized direct effects are illustrated in Figure 2.3. and will be described

thereafter.
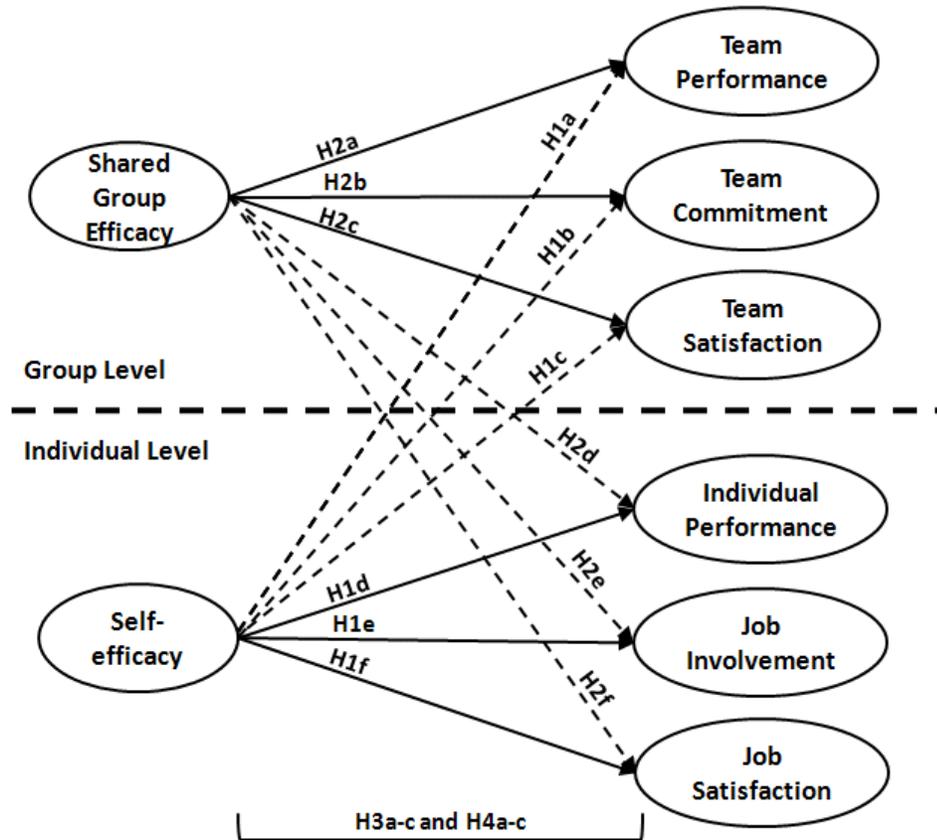
Figure 2.3. Direct Hypotheses.

Note. Dotted lines show weaker cross-level effects.

Overall, the above discussed theoretical and practical considerations seem to

suggest that the higher the efficacy belief, the higher the effectiveness outcomes (e.g.,

Bandura, 1997; Stajkovic et al., 2009). Social-cognitive theory proposes that highly-

efficacious individuals and teams exert more effort and persistence, set higher goals, and

consequently are more effective than those individuals and teams that do not believe in

their abilities (Bandura, 1997). Moreover, single-level studies (e.g., Stajkovic et al., 2009, Stajkovic & Luthans, 1998b) demonstrated positive correlations between efficacy beliefs and effectiveness outcomes at their respective level of analysis. Cross-level studies (e.g., Feltz & Lirgg, 1998; Lent et al., 2006; Seijts et al., 2000; Tasa et al., 2007) found that self-efficacy correlates positively with group performance and group cohesion, whereas group efficacy correlates positively with individual teamwork behavior. Hence, I expect that, after controlling for task interdependence, both self-efficacy and group efficacy will be positively related to effectiveness outcomes both at the individual level and group level.

> *H1a-f: Self-efficacy will be positively related to a) team performance, b) team commitment, c) team satisfaction, d) individual performance, e) job involvement, and f) job satisfaction.*

> *H2a-f: Shared group efficacy will be positively related to a) team performance, b) team commitment, c) team satisfaction, d) individual performance, e) job involvement, and f) job satisfaction.*

Social cognitive theory further suggests that group efficacy is more than the sum of the members' self-efficacy beliefs (Bandura, 1997). As a product of collective cognition, group efficacy also includes interpersonal processes such as group coordination and cooperation, whereas self-efficacy focuses solely on intrapersonal processes (Bandura, 1997; Gibson & Early, 2007; Lindsley et al., 1995). This differentiation leads to the assumption that self-efficacy would be more closely related to individual-level outcomes which share the focus on intrapersonal processes, whereas group efficacy would be more closely related to group-level outcomes that also include interpersonal components.

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Indeed, cross-level studies showed that, in most cases, self-efficacy was a stronger predictor of individual-level outcomes than was group efficacy, whereas group efficacy was a stronger predictor of group-level outcomes than was self-efficacy. For example, self-efficacy was more strongly correlated with individual teamwork behavior than was group efficacy (Tasa et al., 2007). In contrast, group efficacy was more strongly correlated with group cohesion and group performance than was self-efficacy (Feltz & Lirgg, 1998; Katz-Navon & Erez, 2005; Lent et al., 2006, Seijts et al., 2000). In fact, Katz-Navon and Erez (2005) noted that the latter one may be the case because group efficacy, unlike self-efficacy, includes judgments of team processes such as group coordination and cooperation that are central to group performance. Therefore, I expect that, after controlling for task interdependence, efficacy beliefs at one level will be a stronger predictor of the outcomes at the same level, whereas their cross-level effects will be weaker. Thus, the following hypotheses have been derived:

> *H3a-c: Self-efficacy will be a stronger predictor of a) individual performance, b) job involvement, and c) job satisfaction than shared group efficacy will be.*

> *H4a-c: Shared group efficacy will be a stronger predictor of a) team performance, b) team commitment, and c) team satisfaction than self-efficacy will be.*

Moderation Hypotheses

In addition to the possibility that efficacy beliefs influence effectiveness outcomes directly, it may also be likely that the two beliefs interact in influencing work outcomes. The hypothesized moderation effects are illustrated in Figure 2.4 and will be described thereafter.
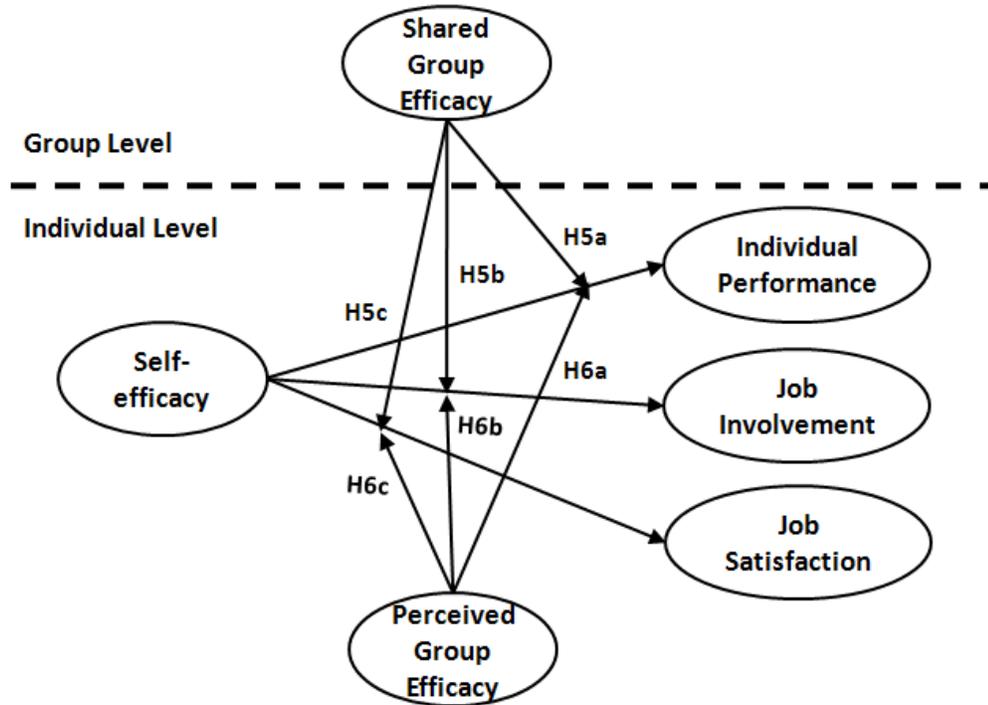
Figure 2.4. Moderation Hypotheses.

As multi-level theory suggests that top-down effects are more dominant and unfold faster than do bottom-up effects (Klein & Kozlowski, 2000), I expect that shared group efficacy will have a moderating top-down effect on the relationship between a group member's self-efficacy belief and his or her personal effectiveness.

Indeed, Chen et al. (2009) suggested that additional research is needed to explore contextual factors that may moderate the relationship between self-efficacy and individual performance. This study takes this suggestion even further by examining the possible interaction effects on the relationship between self-efficacy and three effectiveness criteria: individual performance, job involvement, and job satisfaction (see Figure 2.2).

Moreover, Chen and Kanfer (2006) argued that "coordination of activities at the team level may facilitate or hinder the impact of individual self-regulatory influences on

performance" (p. 244). They proposed that group motivational states such as group efficacy may influence the relationship between self-efficacy and individual effectiveness by affecting the goal generation processes in between. For example, a group member who is highly efficacious may not set high personal goals and plans due to the missing support and effort of his or her low-efficacious team.

In the context of schools, Lui, Chang, and Meng (2005) found that school-level collective efficacy moderated the relationship between teachers' self-efficacy beliefs and their personal characteristics (e.g., job satisfaction, work devotion, and internal motivation). Self-efficacy was more positively related to teacher's personal characteristics for teachers in high-efficacious schools than for teachers in low-efficacious schools. I assume that similar relationships may occur in the context of work teams. In high-efficacious teams, which provide encouragement and support, self-efficacy may be strongly associated with individual effectiveness. Conversely, in low-efficacious teams, which may provide little support and encouragement, the effects of self-efficacy on effectiveness will likely be constrained, and hence the relationship will be weaker. This assumption leads to the development of the following hypotheses:

H5a: Shared group efficacy will moderate the relationship between self-efficacy and individual performance. Specifically, in high-efficacious teams the positive relationship between self-efficacy and individual performance will be stronger than in low-efficacious groups.

H5b: Shared group efficacy will moderate the relationship between self-efficacy and job involvement. Specifically, in high-efficacious teams the positive relationship between self-efficacy and job involvement will be stronger than in low-efficacious teams.

H5c: Shared group efficacy will moderate the relationship between self-efficacy and job satisfaction. Specifically, in high-efficacious teams the positive relationship between self-efficacy and job satisfaction will be stronger than in low-efficacious teams.

Similarly to group efficacy as a shared belief, a team member's individual perception of his or her group's efficacy belief may moderate the relationship between his or her self-efficacy belief and the team member's effectiveness. For example, team members who are personally efficacious may not exert as much effort on behalf of their team if they believe their team as a whole is incapable to carry out challenging tasks (Shamir, 1990). Hence, I derived the following hypotheses.

H6a: Individual perceptions of group efficacy will moderate the relationship between self-efficacy and individual performance. Specifically, if the team's ability to perform its tasks is perceived as high the positive relationship between self-efficacy and individual performance will be stronger than if the team's ability to perform its tasks is perceived as low.

H6b: Individual perceptions of group efficacy will moderate the relationship between self-efficacy and job involvement. Specifically, if the team's ability to perform its tasks is perceived as high the positive relationship between self-efficacy and job involvement will be stronger than if the team's ability to perform its tasks is perceived as low.

H6c: Individual perceptions of group efficacy will moderate the relationship between self-efficacy and job satisfaction. Specifically, if the team's ability to perform its tasks is perceived as high the positive relationship between self-efficacy and job satisfaction will be stronger than if the team's ability to perform its tasks is perceived as low.

Overall, I hypothesized that both self-efficacy and shared group efficacy will be positively correlated to individual and team effectiveness – however, with differing effect sizes. Furthermore, I suggested that the relationship between self-efficacy and team members' effectiveness will be moderated by perceived group efficacy as well as shared group efficacy. Next, Chapter 3 discusses the methodology employed to test the developed hypotheses.

Chapter 3: Methodology

This study included two phases. The first phase consisted of a pilot study which was conducted as a means of assessing the psychometric properties of the self-efficacy and group efficacy measures as well as to refine their wording for the main study. The pilot study was a longitudinal two-wave survey in a paper-and-pencil format. The second phase consisted of the main study which included a cross-sectional survey. The objective of this study was to test the derived hypotheses in a real-life organizational setting. Both studies are described below. The first section includes a description of the sample and measures employed for the pilot study. The second section contains an overview of the sample, research procedures, measures, and the data analysis employed for the main study.

Pilot Study

Sample

A longitudinal two-wave study was conducted with undergraduate students who had been working in project groups as part of their course requirements over the course of one semester. The sample was a convenience sample because the survey was conducted in only those courses that included team projects and where instructors agreed to participate. Survey data were collected from a total of 109 groups consisting of 490 undergraduate students in 14 management courses. Group sizes ranged from 3 to 7 members. Data were collected at two points in time (T_1: 432 surveys and T_2: 431surveys) with an overall response rate of approximately 80%. The response rate was calculated based on the overall number of students (542 individuals) who were registered in the 14 courses because the actual number of students attending the classes when the survey was

distributed could not be assessed for all courses. The first survey was distributed between 2 and 4 weeks after project groups had been formed so that group phenomena, such as group efficacy, have had sufficient time to evolve.[1] The second survey was distributed towards the end of the semester before students received their performance feedback concerning their group projects. The time difference between T_1 and T_2 ranged from 3 to 5 weeks depending on the course structure.

Students received either course credit for their participation or a pen with the university logo as a thank you for their time. Participation in the study was voluntary.

Measures

Self-efficacy was measured with a 10-item scale developed by Riggs et al. (1994). The wording of the items was changed to the context of the study in that the word "job" was replaced with the word "group project". A sample item is "There are some tasks required by my group project that I cannot do well" (see Appendix A). Group efficacy was measured with a 7-item scale developed by Riggs et al. (1994). The wording of the items was changed to the context of the study in that the word "department" was replaced with the word "group" (see Appendix A).

To ensure that the efficacy measures possessed adequate psychometric properties, Amos 18.0 software was used to conduct confirmatory factor analysis (CFA). The hypothesized two-factor solution (self-efficacy and group efficacy) fit the data reasonably well (T_1: $\chi^2 = 500.76$, *df* $= 118$, $p < .001$; GFI = .868; CFI = .850; RMSEA = .087; T_2: $\chi^2 = 697.051$, *df* $= 118$, $p < .001$; GFI = .821; CFI = .786; RMSEA = .107) and had

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[1] Previous research on leader-member exchange has shown that a relationship between a supervisor and his or her subordinate can develop as early as within the first 2 weeks of interaction (Liden & Maslyn, 1998; Liden, Wayne, & Stilwell, 1993).

superior fit indices compared to the alternative one-factor model (T_1: χ^2 = 1098.035, df = 119, p < .001; GFI = .691; CFI = .617; RMSEA = .139; T_2: χ^2 = 1394.795, df = 119, p < .001; GFI = .623; CFI = .530; RMSEA = .159). In addition, reliability analyses revealed acceptable Cronbach's alphas of .85 (T_1) and .88 (T_2) for job-related group efficacy and of .74 (T_1) and .79 (T_2) for job-related self-efficacy.

Finally, a principal components analysis (CPA) with varimax rotation was conducted and revealed that negatively-worded items and positively-worded items were clustering separately for several measures. Consequently, originally reverse-scored items of all measures employed in the main study were positively worded. For instance, "I doubt my ability to do my job." was replaced with "I rarely doubt my ability to do my job".

Main Study

Procedure

The researcher approached team-based organizations in person, by phone, mail and/or via email to inquire about their work teams' interest in participating in the study. Once in contact with the organization, the researcher clarified which work teams fit the study criteria. First, the work teams had to be embedded in an organization and they had to have clearly defined memberships as well as identifiable tasks to perform (Guzzo, 1997). Second, teams had to have a fairly fixed membership so that a constant rotation of members could be avoided. Third, there had to be at least a minimal degree of task-interdependence among the team members. That is, to a certain degree, team members needed to interact, to coordinate, and to exchange information among each other in order to accomplish their team tasks and goals. Finally, teams had to be working together for a

minimum of one month so that group-level phenomena, such as group efficacy, have had sufficient time to develop and that a performance evaluation was possible.

Upon receiving approval from the organization and the teams themselves, work teams had the choice to complete the survey either in an online or in a paper-based format. Within a team, the members and the supervisor were asked to employ the same format. To access the online survey, each participant received a team-specific link via email so that the researcher was able to match the responses afterwards according to teams. Participants were first asked to read through a cover letter and could then access the survey by clicking the "next" button. After completing the survey, participants were asked to press the "submit" button to send the survey to the researcher. When teams requested paper surveys, each team supervisor received an assessment package and was asked to distribute the surveys to the members of his or her team. Assessment packages contained the following: (a) cover letters, (b) a team supervisor survey, (c) team member surveys, and (d) pre-addressed and stamped envelopes. Each survey included a team code so that the researcher was able to match the responses afterwards. Participants were asked to place the completed survey in the envelope provided, to seal it, and to send it directly back to the researcher.

In both the online survey and the paper survey, participants were informed through a cover letter that the survey was completely voluntary and that they were free to discontinue participation at any point. Moreover, to assure the same frame of reference, participants received specific instructions on which team they should refer to when completing the survey (e.g., list of member names, number of team members). Team supervisors and team members were asked to provide information on various measures

and demographics (see Table 3.1, Appendix B, and Appendix C). All participants were offered the opportunity to be entered in a draw for one of three $100 gift certificates for a local shopping mall. Organizations and respondents were also provided with an overall research summary.

The response rate is rather difficult to estimate in this study because various methods were employed to gather participants. However, when considering all individuals (approximately 519 members and 77 supervisors) in those 77 teams that prior agreed to participate and thus had received a survey link or a survey package, one could place the response rate at approximately 55%.

Sample

Overall, 69 team supervisors and 259 team members from 72 teams completed the survey. Several teams were dropped from the sample to ensure sufficient quality of the data for analyses at the group level. First, teams needed to have a minimum of two team members who completed the survey (Cohen, Ledford, & Spreitzer, 1996). Second, only those teams were included that had data available from the team supervisor and from a minimum of 50% of the team members (Bunderson, 2003; Rulke & Galaskiewicz, 2000). As team members and supervisors were asked to report the team size to ensure the same frame of reference, the final team size was calculated by taking the mean of all reported sizes (Cohen et al., 1996). Members were dropped if they reported a team size that was two standard deviations above or below the mean (Cohen et al., 1996). Furthermore, 39 cases with incomplete surveys (more than 10% of responses missing) were removed. This reduced the final sample size to a total of 42 teams with 174 team members.

Overall, 40 teams completed the survey online and only 2 teams employed the paper-based format. 95.2% of the work teams represented the service industry and 4.8% the manufacturing industry located in Western Canada. The convenience sample contained teams from a variety of subsectors (40.5% educational settings, 9.5% social services, 9.5% healthcare, 7.1% financial services, 7.1% information technology, 4.8% food and beverages, 2.4% engineering, and 19% from other areas). Furthermore, 64.3% of the teams worked for a non-profit organization and 73.2% worked for a public organization. Teams ranged in size from 2 to 16 members ($M = 5.58$, $SD = 4.33$) and had been working together from 0.2 to 25 years ($M = 3.64$, $SD = 2.00$).

Team members were predominantly female (76.2%) and ranged in age from 20 to 65 years ($M = 38.48$, $SD = 10.93$). On average, team members had worked in their position for 5.6 years and for their organization for 7.1 years. Moreover, their average teamwork experience was 13.2 years and they worked with their current work team for an average of 3.2 years. Team members worked an average of 37 hours per week and they spent on average 28.6 hours per week in their team. In terms of their ethnic background, 90.7% were Caucasian, 4.1% were Asian/Pacific Islander, 1.7% were Hispanic/Latin American, 1.7% were South Asian, and 1.7% had multiple or other backgrounds. Moreover, their education differed (34.7% bachelor, 28.2% diploma, 11.8% high school, 11.8% masters, 3.5% trade school, 0.6% doctorate, and 9.4% with other educational backgrounds).

Supervisors ranged in age from 24 to 58 years ($M = 44.38$, $SD = 8.38$) and the majority were female (57.1%). Their ethnic background was predominantly Caucasian (92.9%), followed by First Nations (2.4%), South Asian (2.4%), and other ethnic

backgrounds (2.4%). In terms of their education, 31% completed a master's degree,
26.2% had a bachelor degree, 16.7% had a diploma, 7.1% had a high school degree, 7.1%
completed trade school, 7.1% had other educational certifications, and 4.8% completed a
doctorate degree. Moreover, team supervisors had worked for their organization for an
average of 11.4 years, had worked in their position for an average of 6.2 years, and had
been supervising their team for an average of 4.4 years. Their average work hours per
week was 43.5 hours. Furthermore, the amount of interaction supervisors had with their
team varied (83.3% constantly throughout the day, 11.9% once a day, and 4.8% once a
week). However, the type of interaction was predominantly face-to-face (97.6%).

Measures

A summary of all survey measures is depicted in Table 3.1. The table outlines the
following information for each measure: author(s), number of items, number and type of
scale anchor points, and the reliabilities reported in previous studies. Measures were
chosen because they have been widely used in reputable, academic journals and because
past research has shown that these measures possess adequate psychometric properties.
To reduce common method bias of the self-reported measures, scale formats and scale
anchors were varied (Podsakoff, MacKenzie, Jeong-Yeon, & Podsakoff, 2003).
Moreover, the wording of most measures has been adapted to the study context (as
indicated in Table 3.1). Further measurement details are provided below.

Efficacy measures. Team members were asked to report on two types of efficacy
beliefs: self-efficacy and group efficacy. Team member's job-related self-efficacy was
measured with a 10-item scale developed by Riggs et al. (1994). A sample item is, "I
have confidence in my ability to do my job".

Job-related group efficacy was measured with a 7-item scale developed by Riggs et al. (1994). The wording of the items was changed to the context of the study in that the word "department" was replaced with the word "team". Furthermore, some items were considered too similar to items of the performance construct as they did not include the notion of ability. Consequently, they were rephrased. For example, "This department is not very effective." was changed to "This team is able to be very effective."

Both self-efficacy and group efficacy were specifically useful as they measured efficacy beliefs across various job types (Riggs et al., 1994) and thus addressed the variety of teams in the sample (see Appendix B).

Table 3.1 *Measures Assessed by Team Supervisors and Members.*

Measure	Author(s)	# of Items	# of Points	Source	α
Job-related Self-efficacy	Adapted from Riggs et al., 1994	10	7; strongly disagree to strongly agree	Member	.86; .80 (reported by Riggs & Knight, 1994); .74, .79 (pilot study)
Job-related Group Efficacy	Adapted from Riggs et al., 1994	7	7; strongly disagree to strongly agree	Member	.88; .84 (reported by Riggs & Knight, 1994); .85, .88 (pilot study)
Individual Performance	Adapted from Williams & Anderson, 1991	7	7; never to always	Member	.91
Team Performance	Adapted from Ancona & Caldwell, 1992; Van der Vegt & Bunderson, 2005	6	7; far below average to far above average	Supervisor	
Job Involvement	Adapted from Lodahl & Kejner, 1965	6	5; strongly disagree to strongly agree	Member	.73 (reported by Jones, James, Bruni, & Sells, 1977)
Team Commitment	Adapted from Vandenberghe, Bentein, & Stinglhamber, 2004	6	7; very inaccurate to very accurate	Member	.83
Job Satisfaction	Adapted from Brayfield & Rothe, 1951	5	5; strongly disagree to strongly agree	Member	.84, .87, .88, .92 (reported by Judge, Locke, Durham, & Kluger, 1998)
Team Satisfaction	Nguyen, Seers, & Hartman, 2008	3	5; strongly disagree to strongly agree	Member	.89
Task Interdependence	Van der Vegt & Janssen, 2003	5	5; strongly disagree to strongly agree	Member	.91, .85, .89 (reported by Bachrach, Powell, Bendoly, & Richey, 2006)
Social Desirability	Adapted from Crowne & Marlowe, 1960	7	T/F	Member	.79 (reported by Ramanaiah, Schill, & Leung, 1977)
Demographics	--	15 16	--	Member Supervisor	--

Note. α = Coefficients alpha in original studies and pilot study. See Appendix B for all member-reported measures and Appendix C for all supervisor-reported measures.

Performance outcome measures. In total, two types of performance outcomes were assessed in the main study: individual performance and team performance. Individual performance was assessed with a 7-item self-report scale (Williams & Anderson, 1991) that was developed to assess subordinate's in-role behavior. As the original scale was used for supervisor ratings, the instructions and wording of the items were changed to suit a self-reported measure. Team members had to evaluate how frequently they demonstrated various work behaviors. A sample item is "I engage in activities that will directly affect my performance evaluation" (see Appendix B).

Team performance was assessed using supervisory rating. Each supervisor was asked to evaluate his or her team's performance along six performance criteria. While doing so, supervisors were asked to compare the performance of their teams with the performance of teams that performed similar tasks (Van der Vegt & Bunderson, 2005). Four performance criteria (efficiency, quality, overall performance, and adherence to schedules) were based on previous research by Ancona and Caldwell (1992) and two additional criteria (productivity and mission fulfillment) were based on research by Van der Vegt and Bunderson (2005) (see Appendix C).

Attitudinal outcome measures. Team members were asked to report on a total of four attitudes: job involvement, team commitment, job satisfaction, and team satisfaction. Job involvement is defined as "the extent to which individuals personally identify with their work" (Cook, Hepworth, Wall, & Warr, 1981, p. 120). A short version (six items) of the initial 20-item scale of job involvement developed by Lodahl and Kejner (1965) was employed. Overall, this short version has been used more frequently than the original scale (Cook et al., 1981). Instead of measuring team member's involvement in their job

in general, the wording of the items was adapted to assess only team members'
involvement in the team activities of their job. For instance, "I am very much personally
involved in my work" was replaced with "I am very much personally involved in the
team components of my work" (see Appendix B).

Affective team commitment concerns the "identification with, involvement in,
and emotional attachment to the [collective]" (Allen & Meyer, 1996, p. 253). This
construct was assessed with a 6-item scale from Vandenberghe et al. (2004), which
constituted a revised version of Meyer, Allen, and Smith's (1993) affective commitment
scale. All items were adjusted to the context of the study in that the term "work group"
was replaced with the term "team". A sample item is, "I feel emotionally attached to my
team" (see Appendix B).

Job satisfaction is "the pleasurable emotional state resulting from the appraisal of
one's job as achieving or facilitating the achievement of one's job values" (Locke, 1969,
p. 316). This construct was assessed using a 5-item scale from Judge et al. (1998), which
constituted a short version of Brayfield and Rothe's (1951) index of job satisfaction (see
Appendix B).

Team satisfaction was measured with a 3-item scale from Nguyen et al. (2008)
which has been derived from the Job Descriptive Index (JDI) developed by Smith,
Kendall, and Hulin (1969). The items addressed team members' satisfaction with the
team tasks, the team members, and overall with being part of the work team (see
Appendix B).

Demographic and control variables. The following demographic information and
two control variables (task interdependence and social desirability) were assessed in the

main study. Task interdependence refers to the "extent to which team members cooperate and work interactively to complete tasks" (Stewart & Barrick, 2000, p. 137). This construct was measured with five items adapted from Van der Vegt and Janssen (2003). The wording of the items was adjusted to the context of the study in that, for instance, the word "colleagues" was replaced with the word "team members". A sample item is "I need information and advice from my team members to perform my job well" (see Appendix B).

In order to control for any aspect of the survey that might be affected by social desirability, a measure of social desirability was employed. The scale consists of seven items and is a condensed version of Crowne and Marlow's (1960) widely used 33-item scale. A sample item includes: "I have never intensely disliked anyone" (see Appendix B).

Team members were asked to provide information on the following demographics: age, gender, ethnicity, educational background, job title, organizational and job tenure, working hours per week, tenure with the supervisor, length of membership in the team, previous team work experience, team size, and the work time devoted to working in the team per week (see Appendix B).

Team supervisors were asked to provide similar information on their age, gender, ethnicity, educational background, job title, organizational and job tenure, team size, tenure with the team, team longevity, nature of the team, and the average amount and type of interaction they had with their teams (see Appendix C).

Data Analysis

First, several steps were taken to assess the psychometric qualities of the measurements used. Confirmatory factor analysis (CFA) and principal components analysis (PCA) were conducted to test for construct validity. In addition, CFA with all member-rated constructs, an item parceling approach to CFA, and Harmon's one-factor analysis were employed to examine whether the measurements were influenced by common method bias.

Second, I addressed the multi-level structure of the data. Several variables (group efficacy, team commitment, and team satisfaction) were conceptualized at the group level but were measured at the individual level. Hence prior to hypotheses testing, these variables were examined to determine whether the proposed team-level constructs were indeed shared and thus could be aggregated.

I calculated the within group inter-rater reliability index (r_{wg}) to assess whether the members within a group agreed on the group constructs measured (James, Demaree, & Wolf, 1984). Moreover, I calculated intraclass correlation coefficients (ICC) to examine whether the group constructs differentiated between groups (James, 1982). To calculate coefficients ICC(1) and ICC(2), several one-way random effects analyses of variance (ANOVA) were conducted, in which the grouping variable team was entered as the predictor and the variables of interest as the outcome (Bliese, 1998). The derived components were then entered in the following formulas (Bliese, 1998):

$$\text{ICC}(1) = (\text{MSB} - \text{MSW}) / [\text{MSB} + \{(k-1) * \text{MSW}\}] \qquad \text{(Equation 1)}$$

$$\text{ICC}(2) = (\text{MSB} - \text{MSW}) / \text{MSB} \qquad \text{(Equation 2)}$$

(where MSB equals the Mean Square Between groups, MSW is the Mean Square Within groups, and k is the group size). Because group size varied, I employed the arithmetic mean as suggested by Bliese (1998). Once group-level reliability was established, the variables at the individual level were aggregated through the calculation of group mean scores (Klein, Danserau, & Hall, 1994).

Third, composite scores were created so that descriptive statistics and correlations of all variables at the individual level could be examined. Composite scores were computed using all the prior measured items. However in the case of team performance, only the four highest loading items (efficiency, mission fulfillment, overall performance, and quality of work produced) were used because this one-factor model revealed superior fit indices ($\chi^2 = 24.480$, $df = 2$, $p < .001$; IFI = .954; CFI = .954; RMSEA = .216) compared to the one-factor model including all six items ($\chi^2 = 157.616$, $df = 9$, $p < .001$; IFI = .820; CFI = .819; RMSEA = .262).

Fourth, to ensure that subsequent regression results were not influenced by extreme values (Hair, Black, Babin, & Anderson, 2010), the data were screened for outliers. Instead of deleting the respective cases, I changed their outlier scores to the values of the next most extreme score that was still connected to the rest of the sample (Tabachnick & Fidell, 2007). This approach made outlier cases less deviant and allowed us to retain the respective team members and their teams for subsequent group-level analyses.

Fifth, hypothesis testing was conducted in three steps because hypotheses required three different types of regression analyses: hierarchical linear modeling, hierarchical multiple regression, and hierarchical polynomial regression.

The first type of hypotheses were macro-micro hypotheses (H1d-H1f, H2d-H2f, and H3a-H3c) with outcomes at the individual level and predictors at the individual and group level (Snijders & Bosker, 1999). These hypotheses were examined using hierarchical linear modeling and PASW/SPSS Statistics 18.0 software (Bickel, 2007). HLM allows researchers to simultaneously model within-level and between-level relationships (Hofmann, 1997; Raudenbush & Bryk, 2002). Lower-level models describe the variable relationships within each work team (lower-level unit) and higher-level models illustrate how these within-unit relationships vary across teams (Hofmann, 1997; Raudenbush & Bryk, 2002). This approach allowed us to examine both within-group variance and between-group variance in the outcome variables.

A series of HLM models needed to be developed that step-by-step examine the various preconditions of multi-level hypotheses. First, null models (including a random intercept but no predictors) were developed to examine whether there is significant within- and between-group variance in the outcome variable. Second, random-coefficient models (including only individual-level predictors) were specified. These types of models provide information on: (a) the direct effect of the individual-level predictor on the outcome variable, (b) whether there is significant variance in the intercept across groups (a necessary condition for direct effects of the group-level predictor on the outcome variable), and (c) whether there is significant variance in the slope across groups (a necessary condition for moderation effects of the group-level predictor on the individual-level relationships). If all preliminary conditions are met, intercepts-as-outcomes models would be specified to examine the direct effect of group-level predictors on the outcome variable. Finally, slopes-as-outcomes models would be developed to examine the cross-

level interaction effects of group-level predictors on the relationship between a predictor and an outcome variable at the individual level. Moreover, all predictor variables were grand-mean centered to reduce effects of multicollinearity and to facilitate the interpretation of intercept terms (Bickel, 2007; Raudenbush & Bryk, 2002).

The second set of hypotheses were micro-macro hypotheses (H1a-H1c, H2a-H2c, and H4a-H4c) with outcomes at the group level and predictors at the individual and group level (Snijders & Bosker, 1999). Unfortunately, HLM is not yet capable of examining these types of hypotheses because the sample size of the outcome variables is smaller than the sample size of some of the predictors (Bickel, 2007; Croon & van Veldhoven, 2007). This means that variables of macro-micro hypotheses cannot remain at their conceptualized level for the analysis (group-level predictors remain at the group level and individual-level predictors and outcomes remain at the individual level) and that macro-micro hypotheses should be analyzed using hierarchical multiple regression. Hence, self-efficacy, which was conceptualized at the individual level, was aggregated to the group level (assigning each team its average self-efficacy score) for the regression analyses (Croon & van Veldhoven, 2007). The control variables task interdependence and social desirability were also aggregated to the group level for this analysis. Furthermore, all predictors were mean-centered to reduce effects of multicollinearity (Aiken & West, 1991).

The third set of hypotheses included Hypotheses 6a through 6c which suggested that perceived group efficacy will moderate the relationship between self-efficacy and individual effectiveness. These individual-level hypotheses were investigated using a series of hierarchical polynomial regression analyses and PASW/SPSS Statistics 18.0

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software. According to Edwards and Parry (1993), polynomial regression is the most

appropriate choice of analysis to examine the congruence between two predictors and the

impact of the congruence on an outcome variable. All predictors were mean-centered to

reduce effects of multicollinearity (Aiken & West, 1991). The estimated regression

equation (Edwards, 2001; Edwards & Parry, 1993) is given below:

$$Z = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + e \qquad \text{(Equation 3)}$$

In equation 3, Z represents the outcome measure, X and Y are the component measures,

b_0 is the intercept, b_1 to b_5 are the slopes, and e is the random disturbance term. Overall,

five predictors were employed to measure possible interaction effects: self-efficacy (P),

perceived group efficacy (O), their quadratic terms (P^2 and O^2), and the interaction term

(P x O). The control variables, task interdependence and social desirability, were entered

in the first block. The second block included the linear terms P and O. Finally, in the third

block, the quadratic terms (P^2 and O^2) and the interaction term (P x O) were entered as a

set to examine curvilinearity. That way, the variance explained by the higher order terms

in combination with the interaction term can be examined after controlling for P and O

(Edwards & Coopers, 1990). Generally polynomial regression is followed by response

surface methodology (RSM; Box & Draper, 1987) to further interpret the unstandardized

regression coefficients. However, in this study regression analyses did not yield

interaction terms that significantly contributed to the regression model and hence surface

methodology could not be conducted.

Finally, task-interdependence and social desirability were used as control

variables in all types of regression analyses. Preliminary screening of work teams

allowed me to eliminate those teams with no dependency among team members.

However, the sample teams still varied between low and high task interdependence and thus task interdependence needed to be controlled for.

In summary, Chapter 3 provided an overview of the methodology employed during the pilot study and the main study. Having illustrated the various steps of the data analysis, analysis results will be discussed in Chapter 4.

Chapter 4: Results

The present chapter discusses data analyses and results and is divided into two sections. The first section, goodness of measures, addresses the preliminary analyses regarding the dimensionality and distinctiveness of the measures, evidence against common method bias, and the multi-level structure of the data. The second section, hypothesis testing, contains the descriptive statistics and correlations as well as the regression results of hypothesis testing.

Goodness of Measures

Dimensionality and Distinctiveness

The first step of the data analysis was to test the measurement models by conducting a series of confirmatory factor analyses using Amos 18.0 software. The analyses were conducted using raw data as input and maximum likelihood estimation. The purpose of this analysis was to show that the hypothesized models were superior to alternative models in terms of their fit indices.

I used four fit indices to assess the goodness of fit of all measurement models: $\chi 2$ statistic, incremental fit index (IFI), comparative fit index (CFI) (Bentler, 1990), and root mean square error of approximation (RMSEA) (Browne & Cudeck, 1993). As the $\chi 2$ is highly sensitive to sample size, its goodness of fit is evaluated in relation to its degrees of freedom and a χ^2/df of 3.00 or less is recommended (Kline, 1998). As a rule of thumb, IFI and CFI values greater than .90, and RMSEA value less than .10 are considered acceptable (Hair et al., 2010). I also accepted indices that were approximately three percent away from the appropriate levels because the expectation is that the appropriate levels would have been reached with a bigger sample size (Hair et al., 2010). Table 4.1 contains the fit indices of the competing measurement models.

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Each of the hypothesized models for the predictor and outcome measures displayed better fit indices than competing models and fit the data reasonably well. The hypothesized two-factor model of efficacy (self-efficacy and group efficacy) demonstrated a better fit when compared to an alternative one-factor model. The hypothesized five-factor model of member-rated outcomes (individual performance, job satisfaction, team satisfaction, job involvement, and team commitment) was compared to a one-factor model and displayed better fit indices. A separate analysis had to be conducted for task interdependence which was used as the control variable, and team performance which was rated by a different source than the other measures. Both one-factor models (task interdependence and team performance) demonstrated acceptable fit indices.

Because the hypothesized models of CFA did not show all of the appropriate fit indices (specifically for RMSEA), I also conducted a principal components analysis (PCA) for all measures. Results confirmed the hypothesized factor numbers for each of the measurement models and showed adequate factor loadings. Consequently, all measures were included in subsequent data analyses.

Table 4.1 *Confirmatory Factor Analysis.*

Measures	*Model*	*χ2*	*df*	*χ2/ df*	*IFI*	*CFI*	*RMSEA*
Efficacy[a]	2-factor	390.830*	118	3.31	.867	.866	.094
	1-factor	1137.200*	119	9.56	.503	.499	.182
Member-rated Outcomes[b]	5-factor	773.130*	314	2.46	.906	.905	.078
	1-factor	2917.718*	324	9.01	.468	.465	.183
Task Interdependence[c]	1-factor	13.11*	5	2.66	.984	.984	.080
Team Performance[d]	1-factor	24.480*	2	12.24	.954	.954	.216

Note.
[a] 2-factor model= Hypothesized model of efficacy (self-efficacy and group efficacy). 1-factor model (efficacy). $N = 260$.
[b] 5-factor model = Hypothesized model of member-rated outcomes (individual performance, job satisfaction, team satisfaction, job involvement, and team commitment). 1-factor model (member-rated outcomes). $N = 240$.
[c] $N = 260$.
[d] Model includes the four highest loading items out of six. $N = 241$.
*$p < .001$.

Evidence against Common Method Bias

If data have been collected by one method only, results may be confounded by common method bias (Podsakoff et al., 2003). Three types of data analysis were conducted to test for the existence of common method bias and revealed that the present data were not influenced by common method bias. First, a CFA analysis was run on all member-rated constructs. If common method bias would have been present, a one-factor model would have shown a superior fit. However, as hypothesized, a multi-factor model was superior to all other alternative models—an indication that team members were reporting on different constructs (see the top part of Table 4.2).

Second, an item parceling approach to CFA, where composite scores were employed as indicators of factors instead of single items, was conducted and revealed similar results (see the bottom part of Table 4.2).

Finally, Harmon's one-factor test (Podsakoff & Organ, 1986) was employed. This test entails an exploratory factor analysis with all independent and dependent variable items rated by the team members. An un-rotated components matrix revealed eight factors with eigenvalues greater than 1.0. These factors together accounted for a total of 68.14% of the variance and the first and largest factor accounted for only 27.37% − that is, less than 50% of the total variance explained. This again provides evidence that no common method bias issues are present as no general factor emerged that accounted for the majority of the variance in the resulting factors.

Table 4.2 *CFA Check for Common Method Bias.*

Measures	*Model*	$\chi 2$	*df*	$\chi 2/df$	*IFI*	*CFI*	*RMSEA*
Efficacy &	6-factor	1456.014*	614	2.37	.873	.872	.073
Member–rated	3-factor	3793.946*	899	4.22	.592	.589	.116
Outcomes[a]	2-factor	4418.134*	901	4.90	.504	.501	.128
	1-factor	5170.963*	902	5.73	.398	.395	.141
Item parceling[b]	3-factor	177.644*	62	2.87	.918	.917	.088
	2-factor	91.642*	13	7.05	.827	.824	.159

Note. N = 240
[a]6-factor model: self-efficacy, group efficacy, job satisfaction, team satisfaction, job involvement, and team commitment, N = 260. 3-factor model: efficacy, performance, and attitudes. 2-factor model: individual-level variables and group-level variables. 1-factor model: member-rated variables.
[b]3-factor model: efficacy (self-efficacy and group efficacy), performance (individual performance items), and attitudes (job satisfaction, team satisfaction, job involvement, and team commitment). 2-factor model: efficacy (self-efficacy and group efficacy), and effectiveness (individual performance, job satisfaction, team satisfaction, job involvement, and team commitment).
*p < .001.

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Multi-level Data Structure

Table 4.3 contains the aggregation statistics for the following variables: perceived group efficacy, individual team commitment, and individual team satisfaction.

An r_{wg} value of .50 suggests moderate agreement and a median value of .70 or higher is considered acceptable (James et al., 1984). Overall, of the 126 estimates of inter-rater agreement (42 per aggregate variable), 95 were greater than .70. The slightly lower r_{wg} values of individual team commitment and individual team satisfaction compared to perceived group efficacy may be due to the wording of the items. Perceived group efficacy items refer to the group domain, whereas items of the individual team commitment and individual team satisfaction measures refer to the individual domain. Klein, Conn, Smith, and Sorra (2001) have found that, in specific situations, items that have a group referent instead of an individual referent led to higher within-group agreement.

According to a one-way analysis of variance, all three aggregated variables differed significantly between teams ($p < .01$). An ICC(1) value explains the variance in the team member's response that can be accounted for by group membership. Values between .15 and .23 are moderate to moderately high and are viewed as realistic in applied research settings (Bliese, 2000; Bliese & Hanges, 2004). An ICC(2) value represents the reliability of the group mean scores. As a reliability coefficient, an ICC(2) value is considered acceptable if it reaches .70 or higher (Klein & Kozlowski, 2000). However, ICC(2) values vary as a function of ICC(1) and group size so that ICC(2) values may not exceed .70 if either component is small (Klein & Kozlowski, 2000).

Hence, the slightly lower ICC(2) values in this study may be due to the relatively small average group size of 4.14.

Overall, the r_{wg} and ICC values suggest that within-group agreement and within-group and between-group variance were sufficient to support the aggregation of the variables of interest. The new group-level variables were named: shared group efficacy, team commitment, and team satisfaction.

Table 4.3 *Aggregation Statistics.*

Variables	Inter-rater agreement	Intraclass Correlations		
	$r_{wg(J)}$	ICC(1)	ICC(2)	F test
Perceived Group Efficacy	.23 to .99, median: .91	.23	.55	2.22***
Individual Team Commitment	.47 to .86, median: .76	.15	.48	1.94**
Individual Team Satisfaction	-.86 to 1.00, median: .73	.21	.53	2.12**

Note. N (groups) = 42.
  **$p < .01$.
***$p < .001$.

Hypothesis Testing

Descriptive Statistics and Correlations

Table 4.4 displays zero-order correlations, means, standard deviations, and reliability estimates of all study variables. Overall, reliability coefficients (.84 to .95) were well beyond the minimum level of acceptance (Nunnally & Bernstein, 1994).

Variable means were relatively high (above the median of the scale) except for job involvement. Standard deviations for job involvement, individual team commitment, job satisfaction, individual team satisfaction, and task interdependence were all at the acceptable levels of .70 (5-point scale) and 1.0 (7-point scale) or higher. Standard deviations for self-efficacy and perceived group efficacy were slightly below 1.0. Individual performance had a very low standard deviation of .45 and a very high mean of 6.62 indicating that team members were rating themselves mostly at the higher end of the

performance scale. That people tend to overrate their own performance is a common phenomenon in the performance literature (Murphy & Cleveland, 1995).

Pearson's correlation coefficients were calculated separately for variables at the individual level and at the group level. Self-efficacy and perceived group efficacy significantly correlated at .22 which accounts for a shared variance of 4.8%. Moreover, self-efficacy significantly correlated with all outcome variables at the individual level. Perceived group efficacy significantly correlated with all outcome variables except job satisfaction. Task interdependence did not significantly correlate with any of the predictors or performance variables but with all four attitudinal outcomes. Correlations at the group level were positive and statistically significant except for the relationship between team performance and team commitment. Finally, I computed the relationship between social desirability and all study variables, and some of the correlations were significant ($p < .05$ and $p < .01$). Though social desirability was weakly correlated with some of the outcome measures, I controlled it in all subsequent analyses for hypothesis testing.

Table 4.4 *Means, Standard Deviations, Correlations, and Coefficients Alpha for the Individual- and Group-Level Variables.*

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9
Individual											
1. Self-efficacy	5.64	0.72	**.84**								
2. Perceived Group Efficacy	5.90	0.86	.22**	**.90**							
3. Individual Performance	6.62	0.45	.35**	.22**	**.87**						
4. Job Involvement	2.88	0.71	.24**	.19*	.14	**.84**					
5. Individual Team Commitment	5.62	1.14	.34**	.50**	.24**	.53**	**.95**				
6. Job Satisfaction	3.97	0.76	.30**	.14	.25**	.46**	.50**	**.92**			
7. Individual Team Satisfaction	4.13	0.65	.23**	.62**	.13	.31**	.61**	.34**	**.89**		
8. Task Interdependence	3.86	0.68	.08	.07	.09	.23**	.21**	.16*	.13	**.84**	
9. Social Desirability	--	--	.10	.19*	.20**	.24**	.18**	.18*	.14	-.01	--
Group											
1. Shared Group Efficacy	5.93	0.52	--								
2. Team Commitment	5.64	0.74	.54**	--							
3. Team Satisfaction	4.17	0.42	.62**	.77**	--						
4. Team Performance	5.71	0.73	.46**	.27	.35*	**.86**					

Note. N (individuals) = 174. *N* (groups) = 42. Coefficients Alpha are displayed on the diagonal in bold.

p < .05.

**p* < .01.

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Macro-Micro Hypotheses

Hierarchical linear modeling (HLM) was employed to examine macro-micro

hypotheses (H1d-H1f, H2d-H2f, H3a-H3c, and H5a-H5c) – hypotheses that had outcome

variables at the individual level of analysis.

A series of HLM models was developed to test these hypotheses. I first ran null

models to examine whether there was significant within- and between-group variance in

all three effectiveness criteria--a precondition for further hypotheses testing. Results of

the null model analyses are provided in Table 4.5. The analysis revealed a significant

within-group variance in individual performance, job involvement, and job satisfaction.

However, no statistically significant between-group variance could be found in individual

performance, job involvement, and job satisfaction.

Self-efficacy. Hypotheses 1d through 1f suggested that self-efficacy would be

positively correlated to individual performance, job involvement, and job satisfaction. As

there was significant within-group variance in the outcome variables, random-coefficient

models for all three outcome variables were specified. The models included task-

interdependence and social desirability as control variables, and self-efficacy as the

individual-level predictor. Results of the random-coefficient analyses are provided in

Table 4.5. As can be seen, self-efficacy significantly predicted individual performance

($\gamma_{30} = .022$, $t(231) = 4.58$, $p < .001$), job involvement ($\gamma_{30} = .020$, $t(24) = 2.37$, $p < .05$),

and job satisfaction ($\gamma_{30} = .029$, $t(29) = 3.60$, $p < .01$). Moreover, effect sizes (R^2) were

calculated based on the reduction in the residual variance (slopes were fixed for this

analysis) as predictors were added to the model (Bickel, 2007; Hofmann, 1997). After

controlling for task interdependence and social desirability, self-efficacy explained an

additional 11% of the within-group variance in individual performance, 4% in job involvement, and 8% in job satisfaction. Consequently, Hypotheses 1d through 1f were supported.

Shared group efficacy. Hypotheses 2d through 2f suggested that shared group efficacy would be positively related to individual performance, job involvement, and job satisfaction. Hypotheses 5a through 5c proposed that shared group efficacy would moderate the relationship between self-efficacy and team members' effectiveness. To directly test both sets of hypotheses, several preconditions had to be fulfilled. These conditions were significant between-group variance (a) in the outcome variables, (b) in the individual-level intercepts (to test direct hypotheses), and (c) in the individual-level slopes of self-efficacy and the outcome variables (to test moderating hypotheses).

All three conditions were examined based on information from the previously established null models and random coefficient models. The established null models revealed no significant between-group variance in any of the three outcome variables (see Table 4.5). Accordingly, the random coefficient models[2] showed no significant between-group variance in the individual-level intercepts for individual performance ($\tau_{00} = 0.02$)[3], job involvement ($\tau_{00} = 0.02$, $SE = 0.03$, $p > .05$), and job satisfaction ($\tau_{00} = 0.08$, $SE = 0.04$, $p = .064$). Also, the random coefficient models indicated no significant between-group variance in the individual-level slopes of self-efficacy (control variables had fixed slopes) for individual performance ($\tau_{11} = 0.01$)[4], job involvement ($\tau_{11} = 0.07$, $SE = 0.06$,

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[2] Additional information on the random coefficient models which is not included in Table 4.5.
[3] The covariance parameter for individual performance was redundant and thus the test statistic and confidence interval could not be computed.
[4] The covariance parameter for individual performance was redundant and thus the test statistic and confidence interval could not be computed.

$p > .05$), and job satisfaction ($\tau_{11} = 0.03$, $SE = 0.05$, $p > .05$). As none of the preconditions were met, Hypotheses 2d through 2f and Hypotheses 5a through 5c were not supported and no further intercepts-as-outcomes models and slopes-as-outcomes models were specified.

      Self-efficacy vs. shared group-efficacy. Hypotheses 3a through 3c suggested that self-efficacy would be a stronger predictor of individual performance, job involvement, and job satisfaction than shared group efficacy would be. To test these hypotheses I would have used a comparative analysis where the impact of self-efficacy on the individual outcomes is examined while controlling for shared group efficacy and *vice versa*. This approach would have allowed us to compare which predictor accounts for more additional (over and above the variance accounted for by the control variables) variance (ΔR^2) in team members' effectiveness and thus is the better predictor. However, previous null models and random regression models revealed that shared group efficacy did not significantly predict any of the individual effectiveness criteria and thus a comparative analysis was not needed. Thus, Hypotheses 3a through 3c were only partially supported because shared group efficacy was hypothesized to be a significant predictor of individual effectiveness (even though a weaker one).

Table 4.5 *Hierarchical Linear Modeling: Self-efficacy and Shared Group Efficacy on Individual Effectiveness.*

Variables	Individual Performance				Job Involvement				Job Satisfaction			
	Estimate	*SE*	*Wald Z*	*Sig.*	Estimate	*SE*	*Wald Z*	*Sig.*	Estimate	*SE*	*Wald Z*	*Sig.*
Null models												
Residual (σ^2)	0.20	0.02	9.30	.000	0.49	0.06	8.25	.000	0.51	0.06	8.23	.000
Intercept (τ_{00})	0.00	0.00	--	--	0.00	0.03	0.17	.869	0.07	0.04	1.49	.137
Variables	Estimate	*SE*	*df*	*t*	Estimate	*SE*	*df*	*t*	Estimate	*SE*	*df*	*t*
Random coefficient models												
Intercept (γ_{00})	6.62	0.04	416	171.06***	2.89	0.05	29	53.13***	3.94	0.07	37	58.20***
Task Interdependence (γ_{10})	0.02	0.05	141	0.51	0.22	0.07	167	3.06**	0.18	0.08	162	2.36*
Social Desirability (γ_{20})	0.05	0.02	170	2.73**	0.10	0.03	158	3.37**	0.08	0.03	157	2.70**
Self-efficacy (γ_{30})	0.22	0.05	231	4.58***	0.20	0.08	24	2.37*	0.29	0.08	29	3.60**

Note. *N* (individuals) = 174. *N* (groups) = 42.

*p < .05.

**p < .01.

***p < .001.

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Micro-Macro Hypotheses

Hierarchical multiple regression was used to examine micro-macro hypotheses (H1a-1c, H2a-2c, and H4a-4c) – hypotheses that had outcome variables at the group level of analysis. The significance of the ΔF of step 2 as well as the significance of t for betas of each predictor was examined to determine whether aggregated self-efficacy and shared group efficacy were predictors of team effectiveness. The results obtained in the multiple regression models are presented in Tables 4.6 and 4.7.

Self-efficacy. Hypotheses 1a through 1c suggested that self-efficacy will be positively related to team performance, team commitment, and team satisfaction. Aggregated self-efficacy was entered in step 2, after controlling for social desirability and task interdependence in step 1. In step 2, the additional variance accounted for by aggregated self-efficacy as well as the betas of aggregated self-efficacy were only significant for team commitment and team satisfaction but not for team performance (see Table 4.6). Therefore, aggregated self- efficacy significantly predicted only team commitment and team satisfaction but not team performance. Hence, Hypotheses 1c and 1b were supported, whereas Hypothesis 1a was not supported.

Shared group efficacy. Hypotheses 2a through 2c proposed that shared group efficacy will be positively related to team performance, team commitment, and team satisfaction. The analysis disclosed that shared group efficacy significantly predicted team performance, team commitment, and team satisfaction (see Table 4.7). Hence, Hypotheses 2a through c were supported.

Self-efficacy vs. shared group efficacy. Hypotheses 4a through 4c suggested that shared group efficacy will be a stronger predictor of team effectiveness (team

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performance, team commitment, and team satisfaction) than self-efficacy will be. To test

this proposition, I examined the impact of aggregated self-efficacy on individual

effectiveness while controlling for shared group efficacy and *vice versa*. This approach

allowed us to determine the stronger predictor by comparing the additional variance (Δ

R^2) that each efficacy belief accounted for in the outcome variables. The results are

presented in Tables 4.6 and 4.7. Aggregated self-efficacy accounted for 8% of the

variance in team commitment and 6% of the variance in team satisfaction (see Step 3 in

Table 4.7) over and above the variance accounted for by the control variables and by

group efficacy in the outcome variables. However, aggregated self-efficacy did not

account for any additional variance in team performance. Shared group efficacy

accounted for 19% of additional variance in team performance, 12% in team

commitment, and for 18% in team satisfaction (see Table 4.6) over and above the

variance accounted for by the control variables and by aggregated self-efficacy in the

outcome variables. Consequently, Hypotheses 4b and 4c were supported and Hypotheses

4a was partially supported because aggregated self-efficacy was hypothesized to be a

significant predictor of team performance (even though a weaker one).

Table 4.6 *Hierarchical Multiple Regression: Self-efficacy and Shared Group Efficacy on Team Effectiveness.*

Variables	Team Performance			Team Commitment			Team Satisfaction		
	Step1 β	Step2 β	Step3 β	Step1 β	Step2 β	Step3 β	Step1 β	Step2 β	Step3 β
Control Variables									
Aggregated Task Ind.	-.10	-.07	-.09	.19	.27	.25	.17	.25	.23
Aggregated Social Des.	.00	-.06	-.08	.19	.03	.01	.07	.12	.10
Predictors									
Aggregated Self-efficacy		.20	-.01		.51**	.36*		.49**	.29*
Predictors									
Shared Group Efficacy			.48**			.40**			.48**
R^2	.01	.04	.23	.07	.30	.42	.11	.32	.50
ΔR^2	.01	.03	.19	.07	.23	.12	.11	.21	.18
ΔF	.20	1.35	8.78**	1.51	12.15**	7.92**	2.30	11.93**	13.49**

Note. *N* (groups) = 42. Task Ind. = Task interdependence. Social Des. = Social Desirability.
*$p < .05$.
**$p < .01$.

Table 4.7 *Hierarchical Multiple Regression: Shared Group efficacy and Self-efficacy on Team Effectiveness.*

Variables	Team Performance			Team Commitment			Team Satisfaction		
	Step1 β	Step2 β	Step3 β	Step1 β	Step2 β	Step3 β	Step1 β	Step2 β	Step3 β
Control Variables									
Aggregated Task Ind.	-.10	-.09	-.09	.19	.20	.25	.17	.19	.23
Aggregated Social Des.	.00	-.09	-.08	.19	.09	.01	.27	.16	.10
Predictors									
Shared Group Efficacy		.47**	.48**		.53***	.39**		.59***	.48**
Predictors									
Aggregated Self-efficacy			-.01			.34*			.29*
R^2	.01	.23	.23	.07	.34	.42	.11	.44	.50
ΔR^2	.01	.22	.00	.07	.27	.08	.11	.33	.06
ΔF	.20	10.67**	.01	1.51	15.38***	5.20*	2.30	22.90***	4.40*

Note. *N* (groups) = 42. Task Ind. = Task interdependence. Social Des. = Social Desirability.

*$p < .05$.

**$p < .01$.

***$p < .001$.

Individual-level Hypotheses

Hypotheses 6a through 6c suggested that perceived group efficacy will moderate the relationship between self-efficacy and individual effectiveness (individual performance, job involvement, and job satisfaction). Interaction effects are evaluated based on three criteria (Edwards, 1994; Kalliath, Bluedorn, & Strube, 1999). First, the proportion of variance explained by the overall equation had to be significant. Second, the quadratic terms (P^2 and O^2) and the interaction term (P x O) had to be significant either individually or as a set. Finally, the coefficients pattern implied by the model needed to be valid.

The hierarchical polynomial regression results are summarized in Table 4.8. Results revealed that the regression model (R^2) was statistically significant for all three outcome variables. However, the additional variance explained by the quadratic and interaction terms was not significant (ΔR^2). Furthermore, regression coefficients were predominantly significant for the term P indicating a linear relationship but not for the quadratic and interaction terms (except O^2 for job satisfaction). Consequently, Hypotheses 6a through 6c were not supported and no further analysis on response surfaces was conducted.

In summary, Chapter 4 illustrated the results of measurement analysis and tests of various major hypotheses. A closing discussion of the study results will follow in Chapter 5. The discussion includes the study's major findings, theoretical and practical contributions, potential limitations, and future research directions.

Table 4.8 *Hierarchical Polynomial Regression: Self-efficacy and Perceived Group Efficacy on Individual Effectiveness.*

Variables	Unstandardized Regression Coefficients								
	TI^a	SD^b	P^c	O^d	P^2	$P \times O$	O^2	R^2	ΔR^2
Individual Performance	.03	.04*	.14***	.08	.01	.03	.02	.18***	.01
Job Involvement	.21**	.08**	.10	.08	-.04	.03	.02	.16***	.01
Job Satisfaction	.12	.06	.20**	.13	.02	-.00	.11*	.17***	.04

Note. N (individuals) = 174.
[a]TI = Task Interdependence.
[b]SD = Social Desirability.
[c]P = Personal variables.
[d]O = Organizational variables.
*$p < .05$.
**$p < .01$.
***$p < .001$.

Chapter 5: Discussion

The primary focus of efficacy research has been to examine the relationship between efficacy and effectiveness at the same level of analysis (Chen & Bliese, 2002; Chen & Kanfer, 2006; Chen et al., 2009). However, recent developments in research highlight the importance of multi-level and cross-level studies which attend to the nested nature of organizations (Ashkanasy, 2009; Klein & Kozlowski, 2000; Scherbaum & Ferreter, 2009). To address this gap, this study investigated the direct and interaction effects of self-efficacy and group efficacy on various effectiveness outcomes at the individual level and at the group level. Main hypotheses suggested that (a) self-efficacy and shared group efficacy are positively related to individual effectiveness and team effectiveness, (b) self-efficacy is a stronger predictor of individual effectiveness, whereas shared group efficacy is a stronger predictor of team effectiveness, and (c) the relationship between self-efficacy and individual effectiveness is moderated by shared group efficacy and by perceived group efficacy. Overall, the direct hypotheses received partial support, whereas the moderation hypotheses were not supported.

Major Findings

Direct Hypotheses

Direct cross-level hypotheses were found to be partially supported.

Self-efficacy. Consistent with social cognitive theory (Bandura, 1997), self-efficacy positively correlated with all three criteria of team member's effectiveness (individual performance, job involvement, and job satisfaction). Hence, team members who believed more in their personal ability to do their job: (a) performed better in their job, (b) were more involved in the team aspects of their job, and (c) were more satisfied

with their job in general than team members who believed less in their job-related abilities. Furthermore, self-efficacy was found to be positively correlated to attitudes of the team as a whole (team commitment and team satisfaction). Teams that had a higher average of self-efficacy among their team members showed higher levels of team commitment and team satisfaction than teams that had a lower team-average of self-efficacy beliefs among their team members. However, contrary to previous cross-level research (e.g., Feltz & Lirgg, 1998; Katz-Navon & Erez, 2005; Lent et al., 2006; Seijts et al., 2000), self-efficacy did not significantly predict team performance.

A possible explanation for the non-significant correlation between self-efficacy and team performance may be that team attitudes contain a much larger proportion of intrapersonal processes than team performance does. This difference can be best explained by the differing ways that the constructs were measured. Team performance was measured directly at the group level using supervisory ratings. In contrast, team commitment and team satisfaction were assessed by the individual team members and were aggregated (team average) to the group level. Thus, they had their origin in team members' personal perception of how much they were satisfied with and committed to their team. In conclusion, team attitudes compared to team performance contained a much larger proportion of intrapersonal processes than did team performance which may have been the reason why self-efficacy did relate to team attitudes but not to team performance.

A final aspect which may have led to a non-significant relationship between self-efficacy and team performance may have been the weak psychometric properties of team performance. For instance, the measure showed low standard deviations, high mean

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values, and the fit indices of confirmatory factor analysis (CFA) slightly deviated from the accepted values.

Shared group efficacy. Shared group efficacy was positively related to team performance, team commitment, and team satisfaction. Hence, work teams that believed more in their collective ability to perform their job, performed better as well as were more committed to and more satisfied with their teams than work teams that believed less in their collective ability to perform their job. However, contradictory to previous research (Tasa et al., 2007; Van Dolen et al., 2006), shared group efficacy did not significantly predict individual performance, job involvement, and job satisfaction. In other words, whether the team as a whole believed in its job-related abilities or not, had no impact on: (a) team members' satisfaction with their job, (b) team members' involvement in the team aspects of their job, and (c) team members' personal effectiveness.

One potential reason that shared group efficacy did not predict individual effectiveness might be due to the methodology employed to test the macro-micro hypotheses. The overall sample size was fairly small (174 members in 42 teams) and this might have limited the statistical power of hierarchical linear modeling to detect cross-level effects (Bickel, 2007). A commonly used rule of thumb for an optimal HLM sample size is at least 20 groups and at least 30 observations per group (Heck & Thomas, 2000). However, Maas and Hox (2004) have found that a minimum of 50 groups is needed to avoid biased estimates of standard errors at the group level.

That shared group efficacy did not relate to team member's job satisfaction and job involvement may have been related to the specific sample composition. Work teams

were predominantly from non-profit organizations and team members were predominantly female. Hence, to determine their level of job satisfaction and job involvement, team members may rather focus on social aspects of their team (e.g., their colleagues' personality) rather than on their team members' professional competence. There may also be a cultural explanation in that Canada is a country with a tendency towards individualism where "there are relatively loose bonds with others…and [where] success is measured by personal achievement" (Hofstede, 2010, paras. 1, 3). Hence, employees may focus more on the personal aspects of their job (e.g., job position, promotion opportunities, and fulfillment of personal needs) in determining their job satisfaction and job involvement than on team aspects such as group efficacy.

Self-efficacy vs. shared group efficacy. As hypothesized, self-efficacy appeared to be a stronger predictor of individual performance, job involvement, and job satisfaction than shared group efficacy. In fact, shared group efficacy did not significantly account for any of the additional variance in the individual effectiveness criteria. Furthermore, as hypothesized, shared group efficacy appeared to be a stronger predictor of team performance, team commitment, and team satisfaction than self-efficacy. Shared group efficacy accounted for approximately double the amount of additional variance in team commitment and team satisfaction when compared to self-efficacy, and shared group efficacy significantly accounted for additional variance in team performance whereas self-efficacy did not.

Moderation Hypotheses

Consistent with previous multilevel theorizing, which suggests that top-down effects are more dominant and unfold faster than do bottom-up effects (Klein &

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Kozlowski, 2000), only a moderating top-down effect of group efficacy was examined. However, cross-level moderation hypotheses were not supported by the data.

Shared group efficacy. Shared group efficacy, as a contextual variable, did not significantly moderate the relationship between self-efficacy and team members' effectiveness (individual performance, job involvement, and job satisfaction). That is, whether the team as a whole believed in its ability to perform its job or not, had no impact on the relationship between team members' belief in their personal ability to do their job and team members' personal effectiveness.

Perceived group efficacy. As with shared group efficacy, perceived group efficacy did not significantly moderate the relationship between self-efficacy and individual effectiveness (individual performance, job involvement, and job satisfaction). In other words, team members' perception of their team's overall ability to perform its job, did not have an impact on the relationship between team member's personal self-efficacy belief and their own attitudes (job involvement and job satisfaction) and their personal performance.

Neither the work teams' shared belief in their abilities nor the team members' personal perception of their team's efficacy belief moderated the relationship between self-efficacy and individual effectiveness. This might be possible because of the type of work teams that were included in the sample. The majority of team members, even though they were part of a team, had their own job position within that team which was only to a certain degree cross-linked (e.g., no complementary skill set of the team members). For example, a finance department in a higher education institution would have four team members, out of which two are responsible for accounts receivable and

two for accounts payable. Hence, work goals may be separated into departmental goals

and job position goals and thus the overall efficacy belief in the department plays a minor

role for the individual's goal generation process. The individual may still set high goals

for his or her job position and exert the needed effort to perform well in his or her job

position even though he or she may think that the department overall does not have the

capability to achieve the departmental goals.

Another aspect may have been the fact that the sample was a convenience sample.

Instead of applying random sampling, I targeted organizations that I assumed to be

supportive of my research. For instance, I approached organizations that were known to

be community oriented, that were higher education institutions, and organizations that

were familiar with my university. Hence, the sample may have been too convenient in

that it included work teams that were too alike. For example, work teams in the sample

did not significantly vary in their self-efficacy-individual effectiveness slopes across

teams and therefore no between-group variance existed that could be explained by a

potential moderator such as shared group efficacy.

Finally, it may be possible that shared group efficacy was not a significant

moderator due to the sample limitations. The overall sample size was fairly small (174

members in 42 teams) and may have limited the statistical power of hierarchical linear

modeling to detect interactional cross-level effects (Bickel, 2007).

Theoretical Contributions

This study addressed the shortage of cross-level studies on efficacy-effectiveness

relationships and contributed to the efficacy literature in three important ways.

First, past research focused only on direct cross-level effects of efficacy beliefs on effectiveness outcomes. Hence, to my knowledge, this was the first study to examine a potential interaction effect of self-efficacy and group efficacy on team members' personal effectiveness. Although moderation hypotheses were not supported, these findings enhance our understanding of how self-efficacy and group efficacy compare to each other in influencing effectiveness in the context of work teams.

Second, past research focused largely on team performance as the outcome variable, thus leaving many aspects of effectiveness needing investigation. This study acknowledged the diversity of effectiveness and included attitudinal as well as performance criteria at both the individual level of analysis and at the group level of analysis. In total, six effectiveness criteria were investigated: job involvement, job satisfaction, team commitment, team satisfaction, individual performance, and team performance.

Finally, previous cross-level studies on efficacy-effectiveness relationships have used research designs which make inferences to business situations difficult. To my knowledge, all studies used student samples and the majority employed simulation to test the cross-level hypotheses. This study made a first step to enhance the generalizability of results to work teams in a real-life setting by using a field study approach.

Practical Implications

From a practical perspective, understanding how self-efficacy and group efficacy relate to each other in influencing effectiveness has important implications on how to best manage work teams and their individual members (Chen & Kanfer, 2006). For example, it does determine, whether organizations should focus their efforts (e.g., recruiting and

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training) more on increasing individual members' personal efficacy beliefs or on increasing the team's collective efficacy belief to achieve high effectiveness.

My results showed that team members' personal effectiveness (individual performance, job involvement, and job satisfaction) was solely related to how much they believed in their own ability to do their job – the higher the self-efficacy belief, the higher the individual effectiveness of the team member. In contrast, the relationship between efficacy beliefs and the effectiveness of the team as a whole was more complex. Team attitudes were related to both efficacy beliefs but group efficacy was more dominant. In contrast, the level of team performance depended only on the team's confidence in its collective job ability.

Overall, results show that there is no single strategy that suits all organizations but that it rather depends on whether the organization views individuals or teams as the major source of success. If individual effectiveness is the more important criterion for the organization then management should be encouraged to focus on building team members' personal efficacy beliefs. In contrast, if team effectiveness is the more important criterion, organizations should differentiate between performance and attitudes. In terms of performance, management should focus on improving teams' collective efficacy beliefs. In terms of attitudes, management should consider building both efficacy beliefs with a stronger focus on group efficacy. Finally, if both individual effectiveness and team effectiveness are equally important to the organization, management should focus on building both efficacy beliefs with a slightly stronger focus on self-efficacy.

There are various areas (e.g., recruiting, training, and feedback system) that allow for techniques that increase individuals' and work teams' confidence in their abilities. For

instance, managers could increase initial efficacy by selecting only individuals who already possess strong confidence in their abilities to perform the job (i.e., through personality tests and assessment centers). Hiring efficacious individuals further enables managers to create work teams with high initial group efficacy.

Moreover, research has shown that positive performance feedback and persuasion play an important role in increasing efficacy beliefs (e.g., Bandura, 1997; Gist & Mitchell, 1992; Tasa et al., 2007). Hence, organization should encourage performance feedbacks that highlight "early successes" of teams and team members and that incorporate counseling or coaching to clarify on how to best "tackle" aspects that need further improvement (Gist & Mitchell, 1992; Tasa et al., 2007).

Yet, another way to enhance efficacy beliefs is through the use of adequate training strategies. To best increase efficacy beliefs, training should provide individuals with an opportunity to (a) perform job-related tasks and to receive immediate feedback regarding their performance and to (b) observe how others successfully execute those job-related tasks so that the individuals can model this effective behavior (Bandura, 1997; Gist, 1987). Training examples are on-the job training, shadowing, work simulations and samples, outdoor training, and team building.

Potential Limitations

Despite various theoretical contributions and practical implications, this study is not without limitations. First, due to the cross-sectional research design, the current research does not allow for conclusions about causality. However, past research based on experiments or longitudinal design has supported the efficacy-effectiveness direction (e.g., Katz-Navon & Erez, 2005; Tasa et al., 2007).

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Second, the study may have been compromised by the size and composition of the sample. The overall sample size was fairly small (174 members in 42 teams) and this may have limited the statistical power of hierarchical linear modeling to detect cross-level effects (Bickel, 2007) and the power of multiple regression to detect effects at the same level of analysis (Hair et al., 2010). In terms of multiple regression, Hair et al. (2010), recommends that the ratio of observations to independent variables should never be less than 5:1 and further recommends that 15 to 20 observations per independent variable would be desirable. This study contained 2 independent variables and 2 control variables in the multiple regression analysis. Consequently, the sample should have a minimum of 20 observations and ideally should amount to 60 to 80 observations. In addition to the sample size limitations, the sample constitutes a convenience sample. Work teams in the sample have been predominantly from non-profit organizations (73%) and public organizations (64%), and team members were predominantly female (76%). Hence, the composition of the sample reduces the generalizability of study results to other types of organizations such as private and profit organizations which employ work teams with predominantly male members.

Third, measures of group performance and individual performance did not have ideal psychometric properties. For instance, measures showed low standard deviations and high mean values. Also, confirmatory factor analysis (CFA) fit indices slightly deviated from the accepted values. This might be possible because the type of sample made it difficult to find performance measures that were general enough to cover a wide range of industries and professions. In regards to team performance, most existing measures had performance criteria which were specific to a certain profession or

company (e.g., the researcher examined work teams from one pharmaceutical company and employed the company's performance criteria). To generate a team performance measure which would embrace work teams from various areas, I combined performance criteria that I found to be fairly general (e.g., efficiency and overall performance) from two different measures (Ancona & Caldwell, 1992; Van der Vegt & Bunderson, 2005). Both aspects, combining criteria from two different measures and employing general performance criteria that may have left too much room for differing interpretations by the supervisors may have led to weaker psychometric properties of team performance.

In regards to individual performance, I initially employed peer evaluation to assess individual performance. However, the peer evaluation had to be changed to a self-reported measure, because team members were uncomfortable and reluctant to evaluate their peers. Even though, on theoretical grounds, peer evaluation is viewed as a reasonable approximation of team members' individual performance (Kenny & Berman, 1980; Murphy & Cleveland, 1995), participants described peer evaluation in their comments as "unfair" and felt that individual performance should instead be evaluated by the team supervisors. Employing a self-reported measure of performance has the advantage that team members, compared to other parties, will be well informed about their own performance (Murphy & Cleveland, 1995). However, self-reported measures also have the disadvantage that people tend to overrate their own performance (Murphy & Cleveland, 1995). Another aspect that may have been related with the weaker psychometric properties of individual performance is that the original measure constituted a supervisory-rating of employee behavior. Hence, the items and instructions had to be reworded to generate a self-reported measure.

Finally, data were collected by one method only and thus results may be confounded by common method bias. However, specific CFA analyses (e.g., parceling approach) and a Harmon's one-factor test (Podsakoff & Organ, 1986; Podsakoff et al., 2003) were conducted and it was found that that no serious threat to common method bias was present in the data.

Future Research Directions

Future research should aim towards understanding the cross-level relationships between efficacy and effectiveness outcomes to a greater degree. One way would be to incorporate additional effectiveness criteria besides performance. It may, for instance, be interesting to examine the effect of efficacy on behavioral outcomes such as turnover, absenteeism, and team longevity.

Moreover, future research should attempt to strengthen the internal and external validity of this study by conducting field studies with samples from different industries (e.g., private and for-profit organizations) and to support causality of the found relationships by conducting longitudinal and experimental designs.

Another aspect to address in future studies is to further examine the possible moderation effect of group efficacy on the relationship between self-efficacy and individual effectiveness. Although shared group efficacy was not found to be a significant moderator in this sample of work teams, future studies may consider reexamining the moderating effect of group efficacy in samples where there are stronger slope differences among work teams.

Also, future research should attempt to build appropriate measures of individual performance and team performance which can be employed across organizations and professions.

Finally, future studies may want to take the cross-level approach to test efficacy-effectiveness relationships in a team context even further and employ a "bracketing" approach where constructs at a level higher and a level lower than the phenomenon of interest are included in the research model (Hackman, 2003). For instance, organizational efficacy at the company level and self-efficacy at the individual level may be combined to explain team effectiveness.

Conclusion

In conclusion, the current study provided evidence of the positive, direct effects of self-efficacy on team members' personal effectiveness (individual performance, job involvement, and job satisfaction) as well as on the effectiveness of work teams as a whole (team commitment and team satisfaction). Furthermore, this study revealed positive, direct effects of group efficacy on team effectiveness (team performance, team commitment, and team satisfaction). Thus, this study highlighted the importance of efficacy beliefs for the effectiveness of work teams and the individuals within.

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Appendix A

Pilot Study Measures

Job-related Self-efficacy Measure (Riggs et al., 1994)

The following statements are about **your personal ability** to accomplish the tasks required by your **group project in this particular course**. Please indicate the degree of your **agreement or disagreement** with each statement by **CIRCLING** the response number that applies to you. There are no right or wrong answers.	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
01	I have confidence in my ability to do my part of the group project.	1	2	3	4	5	6	7
02	There are some tasks required by my group project that I cannot do well.	1	2	3	4	5	6	7
03	When my performance is poor, it is due to my lack of ability.	1	2	3	4	5	6	7
04	I doubt my ability to do my part of the group project.	1	2	3	4	5	6	7
05	I have all the skills needed to perform my part of the group project very well.	1	2	3	4	5	6	7
06	Most students in this class can do my part of the group project better than I can.	1	2	3	4	5	6	7
07	I'm an expert at my group project assignment.	1	2	3	4	5	6	7
08	My future in this project is limited because of my lack of skills.	1	2	3	4	5	6	7
09	I am very proud of my ability to complete my part of the group project.	1	2	3	4	5	6	7
10	I feel threatened when others watch me work.	1	2	3	4	5	6	7

Job-related Group efficacy Measure (Riggs et al., 1994)

The following statements are about **your group's ability** to accomplish the tasks required by your **group project in this particular course.** Please indicate the degree of your **agreement or disagreement** with each statement by **CIRCLING** the response number that applies to you. There are no right or wrong answers.		Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
01	The group I work with has above average ability.	1	2	3	4	5	6	7
02	This group is poor compared to other groups doing similar work.	1	2	3	4	5	6	7
03	This group is not able to perform as well as it should.	1	2	3	4	5	6	7
04	The members of this group have excellent educational skills.	1	2	3	4	5	6	7
05	Some members of this group should be excluded due to lack of ability.	1	2	3	4	5	6	7
06	This group is not very effective.	1	2	3	4	5	6	7
07	Some members in this group cannot do their tasks well.	1	2	3	4	5	6	7

University of
Lethbridge

4401 University Drive   Phone 403.329.5148   www.uleth.ca/man
Lethbridge, Alberta, Canada Fax 403.329.2038
T1K 3M4

Faculty of Management

TEAM CHARACTERISTICS & DYNAMICS STUDY (Team Member Survey)

Dear Participant,

You are invited to participate in a research study on team characteristics and dynamics. This research will require about **15 minutes** of your time. There are no anticipated risks or discomforts related to this research. By participating, you may benefit others by helping people to better understand team dynamics. In addition, as a thank-you, you will have the chance to win one of three $100 gift certificates for a local shopping mall.

Several steps will be taken to protect your identity and keep your responses confidential. Once you submit the completed survey, the information will be encrypted and send directly to the researcher. There are no names attached to the survey, therefore, your responses will be anonymous. Moreover, your responses will be treated with complete confidentiality. In fact, *no one apart from the researcher and her supervisors will see the responses or know who has completed the survey or not*. The survey data will be stored on a server located in a secure facility and protected by a firewall. Only the researcher and her supervisors will have access to the survey data. All information will be destroyed after 5 years.

Your participation in this research is completely voluntary. **You are free to withdraw from the study at anytime.** The results from this study will be presented as part of a Master's thesis. In addition, the results from this study will be presented in journals read by academic scholars and by business professionals. The results may also be presented in person to groups of business professionals or academic scholars. All data are presented in aggregate format; at no time will your name or the name of your organization be used or any identifying information revealed. If you wish to receive a copy of the results from this study, you may contact the researcher (email: ilona.berth@uleth.ca). If you have any other questions regarding your rights as a participant in this research, you may contact Margaret McKeen (email: mckeen@uleth.ca) from the Office of Research Services at the University of Lethbridge at 403-329-2747.

Your completion of this survey indicates your agreement to participate. Once you have completed the survey, please press the submit button to send it to the researcher. Thank you for taking the time to participate in this study. It is greatly appreciated.

Please retain this page for future reference

Ilona Berth
MSc (Management) Candidate

Supervisors:
Dr. Mahfooz A. Ansari   Email: mahfooz.ansari@uleth.ca   Phone: (403) 329-2069
Dr. Helen Kelley   Email: helen.kelley@uleth.ca   Phone: (403) 329-2686

Team Characteristics and Dynamics Questionnaire

INSTRUCTIONS

(1) When responding to the questions in this survey, please consider only the specific team for which you are responding.

(2) All individuals are eligible to be entered in a draw for **one of three $100 gift certificates** for a local mall. **Please write your email address below if you would like to be entered into the draw.** The email address will be removed from the survey and kept in a separate and secure location. Winners will be randomly drawn after data collection has concluded. The researcher will contact the winners via email and arrangements will then be made to obtain the gift certificates. Only those who choose to provide an email address will be entered in the draw. Email addresses will be used only for draw purposes. After gift certificates have been successfully distributed, all email addresses will be destroyed (except for those participants who agree to be contacted for future studies).

Email address:

_____

(3) Please check this box if you would be willing to be contacted via email to participate in future studies.   □

Job-related Self-efficacy Measure (Riggs et al., 1994)

The following statements are about **your personal ability to accomplish the tasks required by your job**. Please indicate the degree of your **agreement or disagreement** with each statement by **SELECTING** the response that applies to you. There are no right or wrong answers.	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
01	I have confidence in my ability to do my job.	o	o	o	o	o	o	o
02	There are hardly any tasks required by my job that I cannot do well.	o	o	o	o	o	o	o
03	When my performance is good, it is due to my ability.	o	o	o	o	o	o	o
04	I rarely doubt my ability to do my job.	o	o	o	o	o	o	o
05	I have all the skills needed to perform my job very well.	o	o	o	o	o	o	o
06	Most people in my line of work cannot do my job better than I can.	o	o	o	o	o	o	o
07	I'm an expert at my job.	o	o	o	o	o	o	o
08	My future in this job is secure because of my skills.	o	o	o	o	o	o	o
09	I am very proud of my job skills and abilities.	o	o	o	o	o	o	o
10	I feel confident when others watch me work.	o	o	o	o	o	o	o

Job-related Group Efficacy Measure (Riggs et al., 1994)

	The following statements are about **this work team's ability to accomplish its work tasks**. Please indicate the degree of your **agreement or disagreement** with each statement by **SELECTING** the response that applies to you. There are no right or wrong answers.	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
01	This team I work with has above average ability.	o	o	o	o	o	o	o
02	This team is able to be superior compared to other teams doing similar work.	o	o	o	o	o	o	o
03	This team is able to perform as well as it should.	o	o	o	o	o	o	o
04	The members of this team have excellent job skills.	o	o	o	o	o	o	o
05	No member of this team should be fired due to lack of ability.	o	o	o	o	o	o	o
06	This team is able to be very effective.	o	o	o	o	o	o	o
07	Most members in this team are able to do their tasks well.	o	o	o	o	o	o	o
08	Overall, this team is very effective	o	o	o	o	o	o	o

Individual Performance Measure (Williams & Anderson, 1991)

	Listed below are various work behaviors of a worker in the workplace. Please indicate how **FREQUENTLY** **you demonstrate these behaviors at work** by **SELECTING** the response that applies to you. There are no right or wrong answers.	Never	Almost never	Seldom	Sometimes	Usually	Almost always	Always
01	I adequately complete my assigned duties.	o	o	o	o	o	o	o
02	I fulfill responsibilities specified in my job description.	o	o	o	o	o	o	o
03	I perform tasks that are expected of me.	o	o	o	o	o	o	o
04	I meet the formal performance requirements of my job.	o	o	o	o	o	o	o
05	I engage in activities that will directly affect my performance evaluation.	o	o	o	o	o	o	o
06	I fulfill aspects of my job I am obligated to perform.	o	o	o	o	o	o	o
07	I succeed to perform my essential duties.	o	o	o	o	o	o	o

Job Involvement Measure (Lodahl & Kejner, 1965)

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The following statements are about **your involvement in the team activities of your job**. Please indicate the degree of your **agreement or disagreement** with each statement by **SELECTING** the response that applies to you. There are no right or wrong answers.						
01	The major satisfaction in my life comes from the team activities of my job.	o	o	o	o	o
02	The most important things that happen to me involve the team activities of my job.	o	o	o	o	o
03	I am really a perfectionist regarding the team aspects of my work.	o	o	o	o	o
04	I live, eat and breathe the team activities of my job.	o	o	o	o	o
05	I am very much personally involved in the team aspects of my work.	o	o	o	o	o
06	Few things in life are more important than the team aspects of my job.	o	o	o	o	o

Team Commitment Measure (Vandenberghe et al., 2004)

		Very inaccurate	Inaccurate	Slightly inaccurate	Neutral	Slightly accurate	Accurate	Very accurate
The following statements refer to **your feelings towards this work team.** Please indicate the **degree of accuracy** of each statement by **SELECTING** the response that applies to you. There are no right or wrong answers.								
01	I really feel a sense of "belonging" to this team.	o	o	o	o	o	o	o
02	I feel proud to be a member of this team.	o	o	o	o	o	o	o
03	This team means a lot to me.	o	o	o	o	o	o	o
04	I feel emotionally attached to this team.	o	o	o	o	o	o	o
05	I feel like "part of the family" in this team.	o	o	o	o	o	o	o
06	I feel a strong sense of "belonging" to this team.	o	o	o	o	o	o	o

Job Satisfaction Measure (Brayfield & Rothe, 1951)

The following statements are about **your general satisfaction with your job**. Please indicate the degree of your **agreement or disagreement** with each statement by **SELECTING** the response that applies to you. There are no right or wrong answers.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
01	I feel fairly well satisfied with my present job.	o	o	o	o	o
02	Most days I am enthusiastic about my work.	o	o	o	o	o
03	Each day of work seems like it is over before I know it.	o	o	o	o	o
04	I find real enjoyment in my work.	o	o	o	o	o
05	I consider my job rather pleasant.	o	o	o	o	o

Team Satisfaction Measure (Nguyen et al., 2008)

The following statements are about **your satisfaction with your work team**. Please indicate the degree of your **agreement or disagreement** with each statement by **SELECTING** the response that applies to you. There are no right or wrong answers.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
01	I am satisfied with my team members.	o	o	o	o	o
02	I am satisfied with my team task(s).	o	o	o	o	o
03	Overall, I am satisfied with being a part of my team.	o	o	o	o	o

Task Interdependence Measure (Van der Vegt & Janssen, 2003)

The following statements are about **your job.** Please indicate the degree of your **agreement or disagreement** with each statement by **SELECTING** the response that applies to you. There are no right or wrong answers.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
01	I need information and advice from my team members to perform my job well.	o	o	o	o	o
02	I have a multi-person job which makes it necessary for me to coordinate or cooperate with my team members.	o	o	o	o	o
03	I need to collaborate with my team members to perform my job well.	o	o	o	o	o
04	My team members need information and advice from me to perform their jobs well.	o	o	o	o	o
05	I regularly have to communicate with my team members about work-related issues.	o	o	o	o	o

Social Desirability Measure (Crowne & Marlowe, 1960)

The following statements are about **your general attitudes and behaviors**. Please indicate whether the statements below are **true or false** by **SELECTING** the response that applies to you. There are no right or wrong answers.		True	False
01	I have never intensely disliked anyone.	o	o
02	No matter who I'm talking to, I'm always a good listener.	o	o
03	I am always willing to admit it when I make a mistake.	o	o
04	I am always courteous, even to people who are disagreeable.	o	o
05	I have never been irked when people expressed ideas very different from my own.	o	o
06	I have never felt that I was punished without cause.	o	o
07	I have never deliberately said something that hurt someone's feelings.	o	o

Demographic Measures

As with the rest of your answers to this questionnaire, the following information will NOT be used to identify your responses individually. Rather, this information will be used at the group level for the purpose of describing the overall characteristics of our sample. Please answer the general demographic questions below.

(1) What is your age? _____ years

(2) What is your gender?

    1. Male □ 2. Female □

(3) What is your racial/ethnic heritage?

1. Asian/Pacific Islander	□	6. Middle Eastern	□
2. African/Black	□	7. South Asian	□
3. Caucasian/White	□	8. Multiple backgrounds	□
4. First Nations/Aboriginal	□	9. Other	□
5. Hispanic/Latin American	□	_____(please specify)	

(4) What is the highest level of education you have completed?

1. Doctorate	□	4. Diploma	□
2. Masters	□	5. High school	□
3. Bachelors	□	6. Trade school	□
		7. Other	□

(5) What is your job title? _____

(6) How long have you been working at this position? _____ months _____years

(7) How long have you been working with this organization? _____ months _____years

(8) On average, how many hours per week do you work for this organization? _____hours

(9) On average, how many hours per week do you spend working in this team? _____hours

(10) How many members are there in this work team? _____ members
(Include yourself but not your team supervisor)

(11) How long have you been working with this work team? _____ months
    _____years

(12) How long have you been working for the supervisor this team reports to?
    _____ months _____ years

(13) How much teamwork experience do you have in a work setting? _____ months
    _____years

(14) Have you already filled out this particular survey for another team?

    1. Yes □   2. No □

(15) What is the name/title of this work team (e.g., department name)?
    _____ *This is solely for matching purposes and nobody else
    will see the responses but the researcher. All names will be destroyed as soon as
    the data are entered in the computer.*

Do you have any comments regarding this survey?
_____
_____
_____

"Submit" Survey Button

Thank you for taking the time to participate in this study. It is greatly appreciated. Your participation will help contribute to the advancement of human resources, psychology and management. If you are interested in the results of this study or if you have any questions, complaints, or concerns about this research please contact the researcher at ilona.berth@uleth.ca.

Thank you very much for participating!

Appendix C

TEAM CHARACTERISTICS & DYNAMICS STUDY (Team Supervisor Survey)

Dear Participant,

You are invited to participate in a research study on team characteristics and dynamics. This research will require about **5 minutes** of your time. There are no anticipated risks or discomforts related to this research. By participating, you may benefit others by helping people to better understand team dynamics. In addition, as a thank-you, you will have the chance to win one of three $100 gift certificates for a local shopping mall.

Several steps will be taken to protect your identity and keep your responses anonymous. Once you submit the completed survey, the information will be encrypted and send directly to the researcher. There are no names attached to the survey, therefore, your responses will be anonymous. Moreover, your responses will be treated with complete confidentiality. In fact, *no one apart from the researcher and her supervisors will see the responses or know who has completed the survey or not.* The survey data will be stored on a server located in a secure facility and protected by a firewall. Only the researcher and her supervisors will have access to the survey data. All information will be destroyed after 5 years.

Your participation in this research is completely voluntary. **You are free to withdraw from the study at anytime.** The results from this study will be presented as part of a Master's thesis. In addition, the results from this study will be presented in journals read by academic scholars and by business professionals. The results may also be presented in person to groups of business professionals or academic scholars. All data are presented in aggregate format; at no time will your name or the name of your organization be used or any identifying information revealed. If you wish to receive a copy of the results from this study, you may contact the researcher (email: ilona.berth@uleth.ca). If you have any other questions regarding your rights as a participant in this research, you may contact Margaret McKeen (email: mckeen@uleth.ca) from the Office of Research Services at the University of Lethbridge at 403-329-2747.

Your completion of this survey indicates your agreement to participate. Once you have completed the survey, please press the submit button to send it to the researcher. Thank you for taking the time to participate in this study. It is greatly appreciated.

Please retain this page for future reference

100

Ilona Berth
MSc (Management) Candidate

Supervisors:
Dr. Mahfooz A. Ansari   Email: mahfooz.ansari@uleth.ca   Phone: (403) 329-2069
Dr. Helen Kelley   Email: helen.kelley@uleth.ca   Phone: (403) 329-2686

INSTRUCTIONS

(1) When responding to the questions in this survey, please consider only the specific team for which you are responding.

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Email address:

_____

(3) Please check this box if you would be willing to be contacted via email to participate in future studies.   □

Team Performance Measure
(Ancona & Caldwell, 1992; Van der Vegt & Bunderson, 2005

		Far below average	Below average	Slightly below average	Average	Slightly above average	Above average	Far above average
The following statements have been designed for you to provide information about **the performance of this team you supervise**. When doing so, think of how this team performs compared to other teams that perform similar tasks. For each performance criterion, please **SELECT** the response that best describes this **team's performance level**. There are no right or wrong answers.								
01	Efficiency–*the amount of effort that it takes to accomplish a certain task*	o	o	o	o	o	o	o
02	Productivity–*how much work is done in a certain amount of time*	o	o	o	o	o	o	o
03	Mission fulfillment–*the fulfillment of specific tasks or duties assigned*	o	o	o	o	o	o	o
04	Overall performance	o	o	o	o	o	o	o
05	Quality of work produced	o	o	o	o	o	o	o
06	Adherence to schedules	o	o	o	o	o	o	o

Demographic Measures

As with the rest of your answers to this questionnaire, the following information will NOT be used to identify your responses individually. Rather, this information will be used at the group level for the purpose of describing the overall characteristics of our sample. Please answer the general demographic questions below.

(1) What is your age? _____ years

(2) What is your gender?

      1. Male   □   2. Female □

(3) What is your racial/ethnic heritage?

1. Asian/Pacific Islander	□	6. Middle Eastern	□
2. African/Black	□	7. South Asian	□
3. Caucasian/White	□	8. Multiple backgrounds	□
4. First Nations/Aboriginal	□	9. Other	□
5. Hispanic/Latin American	□	_____ (please specify)	

(4) What is the highest level of education you have completed?

1.	Doctorate	□	4.	Diploma	□
2.	Masters	□	5.	High school	□
3.	Bachelors	□	6.	Trade school	□
			7.	Other	□

(5) What is your job title? _____

(6) How long have you been working in this position? _____months_____years

(7) How long have you been working with this organization? _____ months _____years

(8) On average, how many hours per week do you work for the current organization? _____hours

(9) How long have you been supervising this work team? _____ months_____years

(10) How many members are there in this work team you supervise? _____members

(11) How frequently do you interact with this work team you supervise?

1.	Never- a few times a year	□	5.	Once a week	□
2.	Once every few months	□	6.	Once a day	□
3.	Once a month	□	7.	Constantly	□
4.	Once every few weeks	□		throughout the day	

(12) What type of interactions do you generally have with this work team you supervise?

1.	Video Conferencing/Telephone	□
2.	E-mail/Internet messaging	□
3.	Face-to-face	□

(13) How long has this work team you supervise been working together? _____ months_____years

(14) In a few words, please describe the nature of this team you supervise (e.g., project team, task force, committee)

_____

_____

(15) Have you already filled out this particular survey for another team?

     1. Yes □   2. No □

(16) What is the name/title of this work team (e.g., department name)?
_____ *This is solely for matching purposes and nobody else will see the responses but the researcher. All names will be destroyed as soon as the data are entered in the computer.*

Do you have any comments regarding this survey?
_____
_____
_____

"Submit" Survey Button

Thank you for taking the time to participate in this study. It is greatly appreciated. Your participation will help contribute to the advancement of human resources, psychology and management. If you are interested in the results of this study or if you have any questions, complaints, or concerns about this research please contact the researcher at ilona.berth@uleth.ca.

Thank you very much for participating!