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FACTORS RELATED TO THE FORMATION
OF GROUP EFFICACY**

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ABSTRACT

Extending previous research investigating factors related to the formation of group efficacy, this research examined predictors across cultures and groups of various types. Based on theories of collective cognition, hypothesized predictors included self-efficacy, group affect, status differential, and collectivism; these were investigated using two methodologies (simulation and field study) each conducted in two cultural contexts. Self-efficacy, group affect, and collectivism were significant predictors, explaining between 27 and 49 percent of the variance in group efficacy across the studies. Implications for theory and research are discussed.

Key Words: group efficacy, self-efficacy, collective cognition, group information processing, social cognitive theory, affect, status, collectivism, culture

Group efficacy, a group's collective belief in its capabilities to perform a task (Gibson, 1999) has a demonstrated impact on group effectiveness (e.g., Chen et al. 2002; Durham, Knight & Locke, 1997; Earley, 1999a; Gibson, 1999; Greenlees, Nunn, & Graydon, 1999; Feltz & Lirgg, 1998; Lee, Tinsley & Bobko, 2002; Mulvey & Klein, 1998; Parker, 1994, Sliver & Bufanio, 1996), yet we know very little about how group efficacy forms and operates. Across studies, the magnitude of the relationships between group efficacy and performance have been inconsistent (Gully, Joshi, & Incalcaterra, 2001; Gully et al. 2002; Stajkovic and Lee, 2001). Although this is likely due to the inherent structural differences in the beliefs across groups, few researchers have addressed the structure of group efficacy, that is, the defining properties of the construct and features of its operation (Gibson and Earley, 2002). Identifying the structure of group efficacy highlights how it can take on characteristics that exert an influence that is independent of the interaction that initially caused it to emerge (Morgeson and Hofmann, 1999). The patterning of action and series of ongoing events and event cycles between the individuals in the group is definitional -- it forms the structure of group efficacy. The structure inheres in the mutual interaction rather than within any one individual involved.

In contrast, previous research has almost exclusively focused on how group efficacy functions with a focus on the outcomes of group efficacy. This has substantially informed our understanding of group performance. However, by focusing on the function of group efficacy, researchers have somewhat neglected the defining features that cause it to be distinct from lower-level analogues (Gibson and Earley, 2002).¹ Importantly, because constructs with different structures can result in the same function, to focus only on function provides an incomplete understanding of compositional, design, and process factors that must be managed to improve performance. Explicitly considering both structure and function allows a fuller articulation of the construct, thereby facilitating theoretical integration and practical operationalization (Morgeson & Hofmann, 1999).

¹ Recent research conducted by Lester, Meglino and Korsgaard (2002) and by Chen et al. (2002) have begun to address the formation of general performance beliefs (potency), but have not specifically addressed group efficacy (distinction elaborated upon below) and still focus on the functional outcomes of group beliefs, as opposed to the structural features.

In this article, I extend traditional approaches and provide new insight on the construct of group efficacy by emphasizing structural features. Drawing upon theories of collective cognitive processes, I argue that group efficacy beliefs vary across groups and cultures because the configuration of factors that impact the cognitive process differs from group to group. Given the predictive value of group efficacy for group effectiveness, gaining insight into this variance in the formation of group efficacy is important for predicting and improving the effectiveness of collaborative group-based approaches to work. This paper begins with a brief review of research addressing efficacy beliefs at the individual level. Next, previous research investigating related constructs pertaining to group level performance beliefs is reviewed to place the construct of group efficacy in the context of this larger literature. Third, the factors that play a role in collective cognition and are important for group efficacy are delineated, and hypotheses regarding these factors are developed. This framework is then tested in two empirical studies using distinct methods and conducted in different cultural and group contexts with large samples of groups. Results are discussed in terms of implications for collective cognition theory and research.

Self-Efficacy

Social Cognitive Theory (Bandura, 1986; 1997) has proven to be a useful framework for predicting and directing individual work behavior. The social portion of this theory acknowledges that the origins of human thought and action often lie outside the individual. The cognitive portion recognizes the influential causal contribution of thought processes to human motivation, affect, and action. Social Cognitive Theory focuses primarily on the individual, and a major underlying assumption of the theory is that self-referent thought mediates the relationship between knowledge and action. In other words, even though a person may possess certain skills, whether she or he will use them well under diverse circumstances is dependent upon the person's thought processes as he or she approaches tasks. It is for this reason that different people with similar skills, or the same person on different occasions, may perform poorly, adequately, or extraordinarily (Bandura, 1986: 391).

Self-efficacy, an individual's belief in his or her own capability to perform a task, is a major component of Social Cognitive Theory. Research investigating individual work behavior has

demonstrated that the higher the level of self-efficacy, the better an individual performs (Barling & Beattie, 1983; Campbell & Hackett, 1986; Cervone & Peake, 1986; Earley, 1993; Eden & Aviram, 1993; Gist, Stevens & Bavetta, 1991; Hill, Smith, & Mann, 1987; Stajkovic & Luthans, 1998; Wood & Locke, 1987). It is important to note that previous theoretical and empirical research on efficacy has placed a central emphasis on the *cognitive components* of such beliefs. Formation of self-efficacy is viewed as a result of thinking through the task at hand, past performance, and factors associated with the current situation. Subsequently, the belief then influences individual thought, behavior and action. Key factors with a demonstrated influence on the formation of self-efficacy beliefs include: previous performance, vicarious learning, social persuasion, and physiological or psychological arousal (Bandura, 1997).

Group Performance Beliefs

Numerous theorists have proposed that the similar phenomena predicted and observed in accordance with self-efficacy are also applicable at the group level and function to explain group performance (Bandura, 1997; Chen et al, 2002; Earley, 1999; Guzzo, 1986; Kirkman et al., 2001; Lindsley, Brass & Thomas, 1995; Zaccaro, Blair, Peterson & Zazanis, 1995). These beliefs have been conceptualized and operationalized in various ways. At least four different approaches can be identified (Gibson and Earley, 2002): (1) a general, individually expressed cognition about the group that when aggregated represents the group belief, (e.g., Campion, Medsker and Higgs, 1993; Chen and Bliese, 2002; Guzzo et al., 1993; Jex and Bliese, 1999; Kirkman and Rosen, 1999; Lee, Tinsley, and Bobko, 2002; Lester et al., 2002; Lewis and Gibson, 2002; Riggs and Knight, 1994; Sosik et al., 1997; Schaubroeck, Lam and Xie, 2000; Tesluk & Mathieu, 1999); (2) a task-specific, individually-expressed cognition about the group, that when aggregated represents the group belief (e.g., Durham et al., 1997; Fernandez-Ballesteros et al., 2002; Lindsley, Brass and Thomas, 1995; Little and Madigan, 1997; Mulvey and Ribbens, 1997; Mulvey and Klein, 1998; Parker, 1994; Prussia and Kinicki, 1996); (3) a general, group-expressed cognition assessed by the group as a whole (e.g., Sayles, 1958); and finally, (4) a task-specific group-held cognition expressed and assessed by the group as a whole (Earley, 1999a; Feltz and Lirgg, 1998; Gibson, 1999, 2001b; Gibson, Randel, and Earley, 2000; Greenlees et al., 1999; Kirkman et al.,

2001; Lee et al., 2002; Silver and Bufanio, 1996; Zander & Medow, 1963; Zander, Medow & Effron, 1965).

In this article, I focus primarily on the fourth approach, which I refer to as group efficacy, defined as a group's collective belief in its capabilities to organize and execute the course of action required to produce given levels of attainments on a specific task. This belief is assessed by asking the group as a whole to respond as one, since each individual's private assessment may not accurately reflect the collective history that characterizes the group in comparison with other groups. Empirical evidence that supports this was obtained in research conducted by Gibson, Randel, and Earley (2000). In a series of studies, the authors examined three general methods for assessing group performance beliefs, namely, the potency scale, aggregating group members' personal estimates of their group's capability, and a judgment formed by the group as a whole after discussion for sequential performance periods. Perhaps the most intriguing findings were obtained when comparing the predictive validity of the various measures. Results suggest that assessments of group efficacy using group discussion methods are better predictors of group outcomes than assessments using aggregation methods. The assessments using the group discussion method explained more variance in the time it took groups to reach agreement and in the level of intra-group agreement. Similar results were obtained in Kirkman, Tesluk and Rosen's (2001) investigation of team empowerment.

Perhaps even more important, a group-held, task-specific conceptualization begins to address structural concerns. That is, with an emphasis on the group as a whole rather than the individual members as separate units, and a focus on the processes, patterns of interactions and connections between members that occur as the belief is formed for specific tasks, this conceptualization best addresses the origin of the construct (Bar-Tal, 1990). Individual members of a group come and go, yet there remains within the group a socially constructed and collectively shared history as evidenced by group norms, routines, and patterns of interaction. A structural approach to group efficacy informs us about these processes. This does not mean that we cannot learn from the functional approach. Though I focus on a structure, I will

draw upon some of the related functional research described above in defining potential factors related to the formation of the belief in the next section.

Predictors of Group Efficacy

Although substantial previous research has investigated the consequences of group efficacy, predictors of such beliefs have been less frequently studied. Important recent efforts have identified group cohesion and group norms (Lee et al., 2002) and charismatic leadership and group cooperation (Lester et al., 2002) as predictors of generalized positive thinking in groups, but failed to uncover equally as plausible effects for the more task-specific beliefs captured by group efficacy. Similarly, Fernandez-Ballesteros et al. (2002) determined that individual efficacy contributed to a more generalized sense of efficacy to effect social change through unified action, but did not investigate group efficacy per se. Thus, we know very little about the factors that contribute to group efficacy.

Theories of collective cognition -- the process of accumulation, interaction, examination, and accommodation of information in a collective -- suggest an array of elements that can potentially impact group efficacy formation (Gibson, 2001a). Just as self-efficacy results from the process of individual social cognition, group efficacy results from the process of collective cognition, and group efficacy is one type of cognitive product that results from this process. As an initial attempt to integrate related literature and develop a theoretical framework for the structure of group efficacy, a key variable at each phase of the process of collective cognition was delineated using previous research as a guide (e.g., Corner et al., 1994; Gibson, 2001a; Hinsz et al., 1997; Prussia & Knicki, 1996). Hypotheses regarding these relationships are developed below and depicted in Figure 1.

Insert Figure 1 About Here

Accumulation: The Role of Self-Efficacy

During the accumulation phase of collective cognition, new incoming information is acquired, filtered, and then stored for processing (Gibson, 2001a). It is in this phase that the “raw material”-- that is, the bits of evidence and information from which group efficacy will be formed -- comes into the group's

awareness. One such set of information pertains to characteristics of members in the group. For example, across two studies (a lab experiment involving Air Force ROTC cadets and a field study involving 24 community basketball teams), Chen et al. (2002) found that average levels of achievement motivation within a group (which they referred to as team drive) were strong predictors of group efficacy. Durham et al. (1997) examined student groups' task performance, and found that leader abilities and mean follower ability were related to group efficacy, which in turn influenced team performance.

In addition to these follower characteristics, members' degree of confidence in their own ability to accomplish their component of the group task, that is their individual self-efficacy, is likely to impact the formation of group efficacy. Over time these levels of self-efficacy among members become a component of long-term group memory that is drawn upon as the group formulates a group efficacy belief. Bandura (1986) speculated that "collective efficacy is rooted in self-efficacy." Likewise, Lindsley et al. (1995) proposed several factors that might encourage "efficacy performance spirals" among beliefs at an individual, group, and organizational level. Others have noted the importance of investigating the embeddedness of phenomena at different levels of analysis (Mossholder & Bedian, 1983).

Theories of polarization and social influence (Moscovici & Zavalloni, 1969) would suggest that in general, if group members believe that they can perform their own component of the group task (i.e., if members have high self-efficacy), then the group as a whole will likely believe it can perform together as a group. Thus, a norm for high efficacy beliefs will exist at both the individual and group level. Likewise, low member self-efficacy can potentially result in low group efficacy as that member discusses the reasons why he or she cannot perform his or her component of the group task. In this manner, self-efficacy beliefs influence group efficacy through mechanisms similar to social persuasion and vicarious learning. Although there may be rare circumstances in which individual members believe that they can perform the group's task well individually, but the group as a whole cannot, this is not likely to be the case when the referent is the group's ability to perform a specific group task, as is the case with group efficacy beliefs. Initial support for this link was obtained in a unique study that empirically investigated task-specific group efficacy among six hockey teams regarding game competencies such as skating,

checking, turnovers, and power plays (Feltz and Lirgg, 1998). Although functionally focused on predictors of team outcomes, these scholars found that aggregated individual player efficacy beliefs were related to the teams' efficacy beliefs, and that a team's beliefs were subsequently related to wins. Importantly, the reverse was not true. This study examined only a small number of teams, but the results indicate that self-efficacy has an important relationship with group efficacy. Likewise, Fernandez-Ballesteros et al. (2002) found that perceived individual efficacy contributed to a sense of collective efficacy to effect social change, but an alternative model in which perceived collective efficacy was assigned causal primacy affecting individual efficacy provided a poorer fit to the data. Based on this preliminary evidence, the following hypothesis is proposed:

H1: The higher the mean self-efficacy in the group, the higher the level of group efficacy.

Interaction: The Importance of Group Affect

During the interaction phase of collective cognition, information is retrieved, exchanged and structured; members share subjective impressions of what has occurred or what may occur based on what has been stored; and these impressions are utilized to form group efficacy (Gibson, 2001a). This integrated body of knowledge is then used in subsequent stages as the group efficacy belief takes shape and processing continues. A critical group attribute expected to impact group efficacy formation during these processes is the affective tone of the group. Similar to individual affect, group affect represents the general mood or climate of the group as a whole and can be observed by outsiders as a characteristic of the group that forms early in the group's processes of collaboration (George, 1990; Bartel & Saavedra, 2000; Kelly & Barsade, 2002). By interacting with one another, the group exchanges knowledge about the group affect and this knowledge can be directly related to subsequent cycles of collective cognition.

For example, evidence from information processing research indicates that people who feel good tend to have positive material more accessible in memory (Nasby & Yando, 1982; Teasdale & Russel, 1983). Furthermore, having a positive affective state at the time of encoding information has been found to be associated with superior memory for compatible information (Bower, Monterio, & Gilligan, 1978). Positive affect among top management teams predicts subsequent firm performance (Barsade et al. 2002).

Specifically regarding efficacy, at the individual level, Kavanagh and Bower (1985) demonstrated that a positive mood manipulation resulted in higher self-efficacy scores and a negative mood resulted in lower self-efficacy scores. This research suggests that a positive affective state when forming an efficacy belief will be associated with a high degree of efficacy.

At the group level, it is expected that positive group affect will be associated with an information search from long-term memory that is limited to positive information, such as evidence regarding factors that will facilitate group performance, or positive past experiences. Drawing upon this positive information during the interaction phase, it is expected that group efficacy will be higher than if the group is characterized by neutral or negative affective tone. In this manner, group affect functions to impact group efficacy much like physiological and psychological arousal impact self-efficacy. The following hypothesis summarizes this:

H2: The higher the level of positive affect in the group, the higher the level of group efficacy.

Examination: The Role of Status Differential

During the examination phases of collective cognition, group members negotiate, interpret, and evaluate the knowledge available to them (Gibson, 2001a). Through processes of communication and discussion, information is combined and weighted as more or less important for group efficacy. A critical element relevant at this phase is the status differential within the group. Status is the formal level of authority obtained within an organization (Wiersema & Bird, 1993), and work is often structured and designed based on status levels. Specifically, teams in which one or two key individuals have high status can be contrasted with teams in which status is more evenly disbursed. Efficient information exchange and strategy formulation may be impeded in the teams with low status differentials (Finkelstein, 1992), and perceptions regarding authority structure in a group shape participation, type and amount of effort, roles, and strategies for participating (Kahn & Kram, 1994). This impacts the interpretation and evaluation of information. Investigating this phenomenon empirically, Walsh, Henderson, & Deighton (1988: 194) found that as a group attempts to come to a consensus with regard to a particular decision or estimate, a “negotiated belief structure” arises within the group representing the “politically enacted

collection of schemata employed by the group in their deliberations.” In high status differential groups (groups in which one or two members have greater status), discussion is dominated by the high status member(s). Even more importantly, Earley (1999) demonstrated differential contributions to estimates of collective capability based on status. Although he was specifically concerned with the absolute status of a given member, rather than overall status differential in the team, Earley (1999) demonstrated that particularly in high power distance (cultures which accept and expect power differences among workers), group efficacy is more strongly tied to the higher rather than lower status group members' personal judgments.

Thus, status is important because it may serve a “weighting” function (Bandura, 1982, 1986; Gist and Mitchell, 1992). Experiences contributed to group interactions by individuals with high status (e.g., a facilitator or a member with more tenure in the group) may be weighted more heavily than information contributed by other individuals. That is, by highlighting certain items of information, drawing attention to faulty logic, and presenting arguments in support of particular conclusions, group members can affect one another's perceptions, judgments, and opinions (Stasser & Davis, 1981). Several theorists have noted the intimate connection between the patterning of interaction in groups based on roles and status, and the interpretation given to group events by group members (Sandelands & Stablein, 1987; Bartunek, 1984; Ranson, Hinings & Greenwood, 1980). In essence, high status individuals in a group often perform the “verbal persuasion” role often cited as a critical factor influencing self-efficacy.

Furthermore, without status differentials, roles regarding leadership are often ambiguous. Role ambiguity is a condition in which members lack a basic understanding of either the function they play in the group, the activities they are responsible for, or potentially how the group fits into the larger organizational context (Rizzo, House, & Lirtzman, 1970). Status can thus serve an essential guiding function that enables members to make more efficient use of each other's personal store of problem-relevant information. Preliminary evidence suggests that when members know which other members of the group have expertise in which specific knowledge domains, the amount of unshared information they actually discuss increases significantly (Stasser, 1991). Clearly defined status differentials enable this

sharing. In addition, Chen and Bliese (2002) found that the leadership climate at a higher organizational level (e.g., the extent to which upper-level officers establish clear work objectives) was a strong predictor of group efficacy within the units. In a second study, Sosik et al. (1997) found a positive effect of transformational leadership (exerting influence by broadening and elevating followers' goals and providing the confidence to go beyond minimally acceptable expectations) on group efficacy.

Thus, those in high status roles may often perform the function of “encoding” or “organizing” information, acting as catalysts that guide the group from accumulation and interaction around group knowledge to active consideration of that knowledge. These individuals are often engaged in assigning information-gathering activities among team members, interpreting information, and resolving disagreements and/or directing individual team members into action, thus facilitating examination of information (Gersick, 1988). Based on these factors, it is expected that high status differential groups will generally have higher group efficacy. The person with the greatest status “takes charge,” acts as a team leader, and facilitates interaction, thereby increasing the extent to which the group feels as though it will be able to accomplish its task objectives. By organizing and encoding information, the high status individual helps the group to process information. This role clarity instills a belief that the group can coordinate effectively and perform well. The following hypothesis captures this idea:

H3: The higher the status differential within the group, the higher the level of group efficacy.

Accommodation: The Importance of Cultural Values

The final phase of collective cognition can be thought of as accommodation (Gibson, 2001a) and involves integrating, deciding, and acting on the information processed in previous phases. Members share meaning systems and make relevant comparisons. As information is integrated and compared and action is initiated, cultural values serve as criteria that guide social comparisons, integration of information, and decisions (Erez & Earley, 1993). The cultural value that has received the most attention in the organizational literature and is highly pertinent for group efficacy is the value of collectivism. Collectivism is a multi-faceted value construct; however, at a general level, in societies low on collectivism, the self-concept tends to be defined in individual or trait terms, whereas in highly

collectivistic societies, the self-concept is defined with reference to a societal or cultural group (Earley & Gibson, 1998; Hofstede, 1980; Triandis, 1989). Furthermore, in a collectivistic society, the success of the collective is assumed to ensure the well-being of the individual, and an individual's feelings of success are derived from the group (Erez & Earley, 1993).

Particularly in a collectivistic society, self-evaluations will depend on evaluations of the group to which they belong (Tajfel & Turner, 1986). Therefore, in collectivistic societies, group members are motivated to perceive their own group (or in-group) in positive terms and other groups (out-groups) in negative terms (Ashforth & Mael, 1989; Erez & Earley, 1993; Triandis, 1989). Indeed, evidence suggests that for collectivists, once the self and others are perceived as members of a distinct social group, the group is seen as more homogeneous and as more extreme than it actually is (Allen & Wilder, 1979; Doise, Deschamps, & Meyer, 1979; Mackie, 1986; Rothbart, et al, 1978).

Individuals differ with respect to the values they hold or consider important; however, beyond the individual differences, it is possible to characterize groups by the values that are prevalent within that context (Earley, 1993; Gibson, 1999; Kluckhohn, 1951; Parsons, 1968). The distribution of collectivism contrasts most of the Latin American, Asia, and African cultures, which tend to be high on collectivism, with most of the North American and Northern and Western European cultures, which tend to be low in collectivism (Triandis, 1989: 510).

In terms of group efficacy formation, it is expected that collectivists will naturally retain and act more frequently based on positive, rather than negative, information about the group, because viewing their group in a positive light affords collectivists a strong sense of self-fulfillment. Preliminary evidence for this effect was obtained by Schaubroeck et al (2000), who found that group-referent thoughts were more pertinent than self-referent thoughts were for coping with job stress for collectivists, but not for individualists. Relatedly, Kirkman and Shapiro (2001), found that collectivism was significantly and positively related to team productivity, team cooperation, and team empowerment. In a cyclical fashion, the sense of fulfillment collectivists feel when they think about their group encourages the maintenance of high group efficacy so as to bolster the individual members' self-concepts (Erez & Earley, 1993).

Through mechanisms similar to the psychological arousal mentioned by Bandura (1997) as a predictor of self-efficacy then, collectivism is therefore likely to result in high group efficacy beliefs. The following hypothesis summarizes this notion:

H4: The higher the level of collectivism in the group, the higher the level of group efficacy.

Having identified several important factors related to group efficacy formation, the hypotheses were tested in two intercultural empirical studies that were part of a larger project investigating teams across cultures (other topics investigated in conjunction with this project have been described elsewhere; see Note 1). The first study utilized an experimental design involving a complex business simulation conducted in the U.S. and Hong Kong. The second study investigated efficacy correlates and efficacy beliefs among teams of nurses in matched hospitals located in the U.S. and Indonesia.

SIMULATION STUDY

The first study was designed to maximize organizational realism, while minimizing same-source bias, and controlling for potentially confounding variables. An experimental approach allowed direct manipulation of status differential. Manipulating status provided a realistic approximation of the conditions in most organizations, given that work group composition and the number of status levels represented in a group are often determined by decision-makers outside the group. A survey measure of group efficacy was completed by each group. Group affect was measured by external raters. Sampling across countries allowed for variation on collectivism; based on previous research, U.S. groups were expected to be less collectivistic than Hong Kong groups (Erez & Earley, 1993).

Method

Sample. The sample of 30 groups each in the U.S. and Hong Kong (for a total of 60 groups) was comprised of 294 randomly assigned students; group size ranged from 4 to 5 members with a mean of 4.90 members. Approximately half the sample were women; 52% were undergraduates, 28% were masters' level, and 20% were executives who received partial course credit for participation. The U.S. sample consisted of 47% Asians, 30% White, 15% Latino, 5% Pacific Islanders, and 2% Black participants; the Hong Kong sample was 91% Asian and 8% White. A series of ANOVA's revealed no

significant differences across countries or groups in terms of group size, education level, gender, age, and socio-economic status. Furthermore, none of these variables were significantly related to the key variables of interest in this study.

Task. An elaborate business simulation called “Looking Glass Inc.” (Lombardo, McCall & DeVries, 1989) was modified to test the hypotheses. Previous research indicates that the simulation is sufficiently engaging to develop group identity and to study collective cognitive processes, and each division consists of five managers who interact as a group for two hours (Chatman & Barsade, 1995; Gibson, 1999; Lombardo et al., 1989). Although all participants were fluent in English, a Hong Kong Chinese and an American research assistant reviewed the experimental materials and the instructions to identify vocabulary and procedures that might have been unclear, and they were then edited using their suggestions to ensure the underlying meaning would be the same in both countries. Assistants were trained to interact with the groups to ensure consistency and were blind to the experimental conditions.

Procedure. Participants were randomly assigned to groups to help prevent internal validity threats (Cook & Campbell, 1979), and groups were randomly assigned to either the Advanced Products Division (“APD”) or the Commercial Glass Division (“CGD”). Each division interacted in a separate room (their “division headquarters”) to emphasize their “groupness,” and the setting resembled an executive board room. Participants were then randomly assigned a role (i.e., plant manager, director, or vice president) using a process that varied depending on the status differential condition. In the high status differential condition, all three position levels were represented, and status differences were emphasized in the introductory memo found in participant's in-box. In the low status differential condition, only two levels (i.e., directors and vice president) were represented. The relatively equal status among participants was emphasized in the introductory memo. Following a brief introduction to the study, participants were given a file folder containing a set of 5 -10 memos (their “in-basket”). The first memo described their role, their division, and corporate objectives. The other memos provided information and suggested the group discuss and decide on actions the division should take. The final

memo in the in-basket instructed participants to develop an “outcome memo” containing the basic elements of a strategic plan for their division.

Participants were then informed that their sessions would be videotaped for review by a panel of experts and that these experts would rate the effectiveness in terms of individual contributions to the group, communication and information-sharing processes, and whether the strategic plan developed in their memo addressed key issues in a feasible and cost-efficient manner. Finally, before participants began working together as a group, they individually completed surveys assessing demographic characteristics and collectivism. Next, participants read through their in-basket materials and began interacting as a group, collectively identifying problems, sharing information, analyzing this information, discussing courses of action, and developing solutions. After interacting for 15 minutes in the simulation, participants took a short break and completed the survey assessing self-efficacy, a preliminary individual measure of group efficacy, and each group collectively completed a collective measure of group efficacy. At the end of the simulation, each group drafted its “outcome memo.” Last, participants completed a post-experimental survey assessing the status manipulation. Post-experimental interviews indicated that participants were blind to experimental conditions and hypotheses.

Measures

Status differential was experimentally manipulated. A dummy variable with 1=high status differential and 0=low status differential was assigned to each group based on experimental condition. As a manipulation check, at the end of the simulation, participants were asked to respond to five items measuring the degree to which status differences existed within their group using a five-point scale in which 1=strongly disagree and 5=strongly disagree. Responses to these five items were then averaged to arrive at the respondent's overall perception of status differences. In the high status differential condition, the mean perception of status differences was 3.26; in the low status differential condition, the mean perception was 2.83 ($t=5.15$, $df=291$, $p<.001$) indicating that this manipulation was effective.

Self-efficacy was measured with a 5-item scale developed by Locke et al. (1984). Each item represented a different level of overall effectiveness (Item #1=lowest level of effectiveness; #5=highest

level of effectiveness). The participants were asked to rate their self-efficacy for each level of effectiveness using a 100-point certainty scale, where 0=certain that the performance level cannot be achieved, and 100=certain the performance level can be achieved. Participants were informed that ratings for their individual performance would be based on observers' ratings of effectiveness, specifically, the degree to which they performed their individual components of their task effectively. After participants had completed their certainty for achieving each level of effectiveness, a composite measure of self-efficacy was computed by taking the average across the levels.

Group affect was assessed using one U.S. and one Hong Kong Chinese observer who viewed videotapes of the groups' interactions. These expert observers were blind to the experimental conditions and were extensively trained by the instructor in group observation methods as part of a course on experimental research. The two observers viewed the videotapes in separate rooms over a six-week period. After viewing the videotapes of the group interaction, these two outside observers responded to six indicators of mood within each group during the simulation using a modified six-item version of the Job Affect Scale (Brief, Burke, George, Robinson, & Webster, 1988) and a 5-point scale for each item (1=not at all and 5=very much). The reliability of this measure was estimated at .94 using the inter-rater reliability procedure described by Tinsley and Weiss (1975). Based on these estimates, the two observers' scores were averaged on each item for each group. A principal component analysis demonstrated that all six items loaded on a single factor having an eigen value of 6.41 and accounting for 64.1% of the variance. Factor loadings ranged from .85 to .75. Based on these estimates, a composite rating of group affect was created for each group by averaging across the six items.

Collectivism was measured on a 5-point scale (1=strongly disagree, 5=strongly agree) using three items from a questionnaire developed by Earley (1993). Items asked respondents if they agree with statements such as, "*Problem solving by groups gives better results than problem solving by individuals,*" focusing on collectivism in the workplace, with higher scores reflecting greater collectivism. The reliability of this scale (Cronbach's Alpha) was .87. Principal component analysis demonstrated that the items loaded on a single factor having an eigen value of 4.19 and accounting for 52.3% of the variance,

and factor loadings ranged from .65 to .81. Thus a collectivism score was created for each individual by taking the mean of his or her responses across the three items.

Group efficacy was measured with a 5-item survey. The instrument and technique were developed by incorporating the recommendations of Locke et al. (1984) and other research on constructing measures of group efficacy (Gibson, Randel, & Earley, 2000; Kirkman, Tesluk, & Rosen, 2001) and have been used effectively with large samples of groups, including nursing teams (Gibson, 1999, 2001b); participants in management simulations (Gibson, 1999; 2001b), Silver and Bufanio, (1996), and Earley (1999); executives (Gibson et al., 2000); sports teams (Greenlees et al. 1999); manufacturing teams (Kirkman, et al. 2001); insurance teams (Kirkman et al. 2001); and students working on group projects (Lee et al. 2002). As per Gibson et al. (2000), the measure is designed to best capture collective cognitions such as group efficacy that are arrived at through collaborative information processing. Each group received one copy of the survey. Items represented different levels of overall effectiveness on the simulation task (Item #1=lowest level of effectiveness; #5=highest level of effectiveness). The group discussed how certain it was that it would achieve each level of effectiveness and then indicated its certainty using a 100-point scale (0=certain the effectiveness level cannot be achieved;100=certain the effectiveness level can be achieved). Certainty scores were obtained through open discussion and interaction. One group member then recorded certainty scores for each of the five levels of effectiveness on the group's survey, and these scores were then averaged across levels to arrive at a composite score for group efficacy (see Note 2).

Aggregation Issues. All variables in this study were conceptualized as group-level attributes; however, individual group members were viewed as the best informants for the average level of self-efficacy and collectivism in each group. Thus, individual scores on self-efficacy and collectivism were aggregated to the group level by taking the average of group members' scores. Between-group differences and within-group agreement were demonstrated to justify aggregation (Goodman et al., 1990). The ANOVA F-ratio comparing between-group variance to within-group variance for self-efficacy ($F=1.55$, $df=(59,234)$, $p<.01$) and collectivism ($F=2.16$, $df=(59, 234)$, $p<.001$) demonstrated sufficient between-

group differences (Hays, 1981). Within-group agreement was estimated using (r_{wg}) (James, Demaree, and Wolf, 1993). The average r_{wg} coefficient across groups was .65 for self-efficacy and .82 for collectivism, demonstrating adequate consistency within the group (e.g., see Nunnally, 1967: 226). As a third test, WABA I was conducted as suggested by Dansereau, Alutto, and Yammarino (1984). This test compares the between-group eta to the within-group eta by computing an E ratio that can be tested for both statistical and practical significance (see Note 3). The self-efficacy E ratio met tests of statistical significance ($F=1.51$, $df=(59, 234)$, $p<.05$), but not of practical significance; the collectivism E ratio was both statistically ($F=2.16$, $df=(59, 234)$, $p<.001$) and practically (0 degree test) significant. Overall, the analyses suggest it was appropriate to infer group-level constructs.

Results

A t test indicated statistically significant country differences for collectivism ($t= -6.98$, $df=292$, $p<.001$). Those in Hong Kong had higher collectivism than in the U.S. These country differences confirm that sampling in the U.S. and Hong Kong increased variance on the collectivism. The means, standard deviations and intercorrelations of the variables in the regression models are shown in Table 1.

Insert Table 1 About Here

Tests of hypotheses. Multiple regression models were used to test the hypotheses, with group efficacy as the dependent variable. Significance of t for betas for each term was examined to determine which variables were significant predictors. Results obtained in the model appear in Table 2. Standardized partial regression coefficients are listed for each predictor. Self-efficacy (beta=.49, $t=4.78$, $p<.001$), group affect (beta=.25, $t=2.46$, $p<.05$), and collectivism (beta=-.24, $t=-2.53$, $p<.01$) were significant predictors of group efficacy. Altogether 49% of the variance in group efficacy was predicted ($R^2=.49$, $F=13.29$ (4,55), $p<.001$). These findings support H1 concerning the positive relationship between self-efficacy and group efficacy and H2 concerning the positive relationship between group affect and group efficacy. Although significant, the relationship between collectivism and group efficacy

was in a direction opposite to what was predicted, thus providing no support for H4. No support was obtained for H3 concerning the relationship between status differential and group efficacy.

As an additional test of these effects, a hierarchical model was run with country entered on the first step, the main effects of the five predictors entered on the second step, and the multiplicative interaction of collectivism with country was entered on the third step. As per Gibson (1999), the logic here is that collectivism, and not country of origin, drives the hypothesized relationship. After controlling for country in the first step, and the variance attributed by the collectivism is accounted for in the second step, the country interaction in the third step should not account for additional variance. Results verified that this was the case. The R^2 for the main effect of country in the first step was not significant, nor did the interaction of collectivism x country account for significant additional variance in the third step.

Insert Table 2 About Here

FIELD STUDY

Field studies in the U.S. and Indonesia were designed to confirm the results obtained in the simulations. To increase the external validity of the findings, it was important to confirm the predictors of group efficacy among on-going groups in a natural setting. Cultural contexts with even greater variance in collectivism were selected. Indonesians often rate at the most collectivistic extreme, whereas Americans rate at the extreme opposite end of the continuum (Hofstede, 1980).

Method

Sample. Previous research indicated that variance could be obtained on status differential in nursing teams within hospitals (Argote, 1982). Eight hospitals in the U.S. and Indonesia were invited to participate based on similarities in size (50-200 beds), technical domain (general), and access (public), and inclusion of four types of wards (in-patient, out-patient, emergency, and obstetrics). Two hospitals in the U.S. and one hospital in Indonesia agreed to participate. In both the U.S. and Indonesia naturally occurring subsets of nurses within a ward considered themselves permanent teams (three to six nurses per team) and shared the same schedule. Team members worked interdependently on a regular basis; the core

of their jobs involved completing *as a team* tasks such as admitting and discharging patients, periodic recording of vital signs, and starting or changing an IV. There was 43% participation at U.S. site #1, 55% participation at U.S. site #2, and 69% at the Indonesian site, the final sample consisting of 71 teams (36 U.S. and 35 Indonesian) represented by 185 nurses (94 U.S. and 91 Indonesian). Not all members of every team were available to participate, and so each team was represented by two to five members, with mean participation of three nurses per team. Interviews confirmed that nurses who did not participate were unable to do so due to factors beyond their control such as scheduling conflicts.

Interviews with the nursing administration in each organization ensured that there were no country, organizational, or team differences in resource availability, compensation structure, or human resource policies. A series of analyses of variance confirmed no statistically significant differences across countries, organizations, units, or teams in gender, age, years employed, education, or longevity of the team. Teams had been intact for approximately four years.

Procedure. All English-version materials were reviewed by U.S. and Indonesian nursing supervisors who recommended changes in the content, design, and presentation of the instruments prior to the materials being translated into *Bahasa Indonesian*, back-translated, and then reviewed by the researcher and the nursing administrators to ensure the intended meaning remained consistent across the translations. All sessions in Indonesia were conducted with an interpreter. In both countries, teams reported to a conference room, objectives of the project were introduced and it was explained that quality of care for each team would be assessed by patients and data would be distributed back to them to improve their effectiveness. Next, nurses were asked to complete surveys assessing self-efficacy, collectivism, and group efficacy. After four weeks, all teams met with the researcher for a 45-minute feedback session.

Measures. *Group efficacy* was measured with the same group-level technique used in the simulation study. The team was asked to discuss how certain it was that the team would achieve five levels of effectiveness using a 100-point scale (0=certain the effectiveness level cannot be achieved;100=certain the effectiveness level can be achieved). The certainty scores were obtained

through open discussion and interaction as group members reviewed previous experience, situational constraints, and factors expected to facilitate the group's effectiveness. One group member recorded certainty scores for each level of effectiveness on the group's survey, and these scores averaged across levels to arrive at a composite score for group efficacy.

Self-efficacy and *collectivism* were measured with the same instruments used in the simulation study; similar factor structures and reliability were obtained. Aggregate, group-level indices of self-efficacy and collectivism were created by averaging individual scores. Self-efficacy ($F=2.28$ $df=(67, 116)$, $p<.001$) and collectivism ($F=1.33$ $df=(67,116)$, $p<.10$) met the requirements for between-group differences; adequate within-group agreement was also demonstrated ($r_{wg}=.84$ for self-efficacy; $r_{wg}=.70$ for collectivism). The self-efficacy E ratio met tests of both statistical significance ($F=2.42$, $df=(70, 116)$, $p<.01$) and practical significance (0 degree test). Collectivism E-ratios also indicated statistical ($F=1.36$, $df=(70, 116)$, $p<.05$) and practical (0 degree test) significance. Overall, these analyses provide adequate evidence for inferring group-level constructs.

Status differential was measured by assessing the number of different hierarchical levels (e.g., nurse's aid, nursing assistant, head nurse, or ward director) represented in each team (1=only one level represented, 2=two levels represented, etc.).

Group affect was measured with three items that assessed the atmosphere and mood within the team. Each team was rated by 2-3 nurses outside the team (i.e., other nurses on the ward and a supervisor), using a 5-point scale (1=extremely negative affect; 5=extremely positive affect). The James et al. (1993) within-group agreement (r_{wg}) of the ratings was .95. Given this, ratings on each item were averaged across raters for each team and subjected to principal component analysis. Results indicated all 3 items loaded on one factor, with an eigen value of 2.13 accounting for 71.15 percent of the variance. Thus, scores across the 3 items were averaged to arrive at a composite score for group affect.

Results

A series of t tests indicated statistically significant country differences for collectivism ($t=-6.91$, $df=183$, $p<.001$). Indonesians had higher levels of collectivism than U.S. participants, confirming that

sampling in the U.S. and Indonesia increased variance on collectivism. Means, standard deviations and intercorrelations of the variables are shown in Table 3.

Insert Table 3 About Here

Tests of hypotheses. Analyses were conducted as in the simulation study. Multiple regression was used to test the hypotheses. Significance of t for betas for each term was examined to determine which variables were predictors of group efficacy. Results obtained in the multiple regression models appear in Table 4. Standardized partial regression coefficients are listed for each predictor. As in the simulation study, self-efficacy (beta=.45, $t=4.10$, $p<.001$), group affect (beta=.20, $t=1.78$, $p<.05$) and collectivism (beta=-.19, $t=-1.72$, $p<.05$) were significant predictors of group efficacy. Altogether 27% of the variance in group efficacy was predicted ($R^2 = .27$, $F=5.94$ (4,66), $p<.001$). These findings support H1 concerning the positive relationship between self-efficacy and group efficacy and H2 concerning the positive relationship between group affect and group efficacy. Again, although significant, the relationship between collectivism and group efficacy was opposite to what was predicted, offering no support for H4. And again, no support was obtained for H3 concerning the relationship between status differential and group efficacy. As per the first study, a hierarchical regression was run to explore the effects of collectivism alongside country, and similar results were obtained.

Insert Table 4 About Here

DISCUSSION

This research has investigated collective cognitive products by examining factors related to the emergence of group efficacy, a group's collective belief in its ability to perform a task objective. The findings extend previous research, which focused primarily on the function of group efficacy in terms of the role that it plays in predicting group outcomes, by investigating the structure of the construct. Specifically, the approach here emphasizes the importance of understanding the origin of group efficacy and the features that shape the emergence of the construct. Based on existing studies of Social Cognitive

Theory at the individual level and theories of group information processing, factors hypothesized as related to the emergence of group efficacy included self-efficacy, group affect, status differential, and collectivism. These factors were investigated using two methodologies (simulation and field study); each of these studies was conducted in two distinct cultural contexts.

Summary of Findings and Implications for Theory and Research

In answer to the question, “What factors are related to group efficacy?” the findings suggest that self-efficacy, group affect, and collectivism are significant correlates. Across the studies, these three factors combined explained between 27 and 49 percent of the variance in group efficacy. As proposed, group efficacy was higher the higher the average level of self-efficacy. This extends and confirms Bandura’s (1997) speculation that group efficacy is rooted in self-efficacy and that member attributes are related to collective cognitive products. The relationship was strong and positive in both studies, and the perceiving, filtering and storing capacity of the group during the accumulation phase of collective cognition may describe the process by which these individual beliefs are incorporated into collective cognitive products. However, the underlying mechanism for the relationship was likely different in the simulation than in the field study. In the simulation study, group members had no discretion in group membership. They were randomly assigned a group by the researcher. Thus, self-selection mechanisms cannot explain this finding. Instead, the high level of group efficacy in these groups probably stemmed from the cognitive tendency for members high in self-efficacy to accentuate the positive attributes of their group and derogate the negative during the process of collective cognition, thus resulting in a negotiated group level belief that was strong and confident (Erez & Earley, 1993; Tajfel, 1982). This provides some preliminary support for a social persuasion mechanism in the formation of group efficacy.

In the field study, this same explanation may have also been true. However, in addition, nurses had more discretion over group membership (e.g., they could request to be assigned to certain teams and requests were often granted). Furthermore, groups were ongoing, allowing them time to establish a history and reputation for performance which become part of the collective long-term group memory. Thus, high self-efficacy nurses may have self-selected high group efficacy groups to join. This makes sense, given

the basic human need for self-consistency (Markus & Wurf, 1987). High self-efficacy nurses may have sought out groups with high group efficacy in order to maintain a certain stability and continuity in life (Erez & Earley, 1993) and to maintain collective cognition consistent with their own individual cognitive processes. Extending research at this individual level on self-efficacy, this suggests a variety of learning mechanisms in the formation of group efficacy.

To investigate these mechanisms further, it is important that future research continue to examine collective cognition over time in the manner of that used by Lester et al. (2002) to study newly formed groups. Moving beyond this, future research should begin with group formation and extend over the entire lifecycle of the group. Following changes in group membership, attributes of members who come and go (and of those who come and stay) and corresponding changes in group attributes such as group efficacy will shed more light onto the relationships between member attributes and collective cognition. It is anticipated that these relationships have important implications for group outcomes. Specifically, it is anticipated that groups with certain configurations of member attributes and collective cognition will be more effective than other configurations. The notion of “fit” between group members and groups is analogous to the person-organization fit theory that has received some support in the organizational literature (Chatman & Barsade, 1995). Investigations at the group level would extend this theory to help explain relationships between individual and group attributes. It will also provide guidance for managers hoping to compose groups in such a manner to maximize group efficacy.

In addition to self-efficacy, group affect was also a significant correlate of group efficacy. The higher the level of positive affect within a group, the higher the level of group efficacy. Extending and contributing to an information-processing view of groups, it is expected that this relationship occurs because groups experiencing a positive affective state often limit their search in long-term memory to positive information about their capabilities, progress and performance. Thus, with only positive information accessible, the group believes it can perform well, and the group efficacy beliefs are higher. This extends previous research by providing support for a physiological and psychological arousal mechanism in conjunction with the formation of group efficacy. The finding also implies the importance

of managing affect in groups, potentially through team building, assessment, and interpersonal relationships, or strengthening the organizational context so as to improve the affective experience in teams (Mohrman, Cohen & Mohrman, 1995). Future research might investigate this causal sequence by examining the information retrieval, exchange, and structuring processes (Gibson, 2001a) in positive affective groups as opposed to negative affective groups.

Finally, group efficacy was higher the lower the level of collectivism within a group. This finding is opposite to what was predicted, given that group members in collectivistic societies are often motivated to perceive their own group (or in-group) in positive terms. Instead, collectivists had lower levels of group efficacy. One possible explanation for this finding may pertain to the concept of “face.” Face refers to the evaluation of a person based on internal and external social judgments (Earley, 1999b). A person’s behavior in organizations reflects, in part, his or her attempt to establish and maintain face across a range of social settings and research suggests that people high and low in collectivism behave differently to maintain face (Earley & Randel, 1997). Collectivists (e.g., members of a kibbutz) often establish goals sufficiently low enough to ensure that all group members achieve them, thus ensuring that face is not be threatened. Similarly, collectivists also tend to exhibit greater humility (Earley & Gibson, 1998). In contrast those low in collectivism (e.g., members of U.S. work teams), set quite high goals for themselves, in part due to a desire to appear competent in front of others. For the latter, face is maintained and strengthened by stretching and challenging the group, invoking competition. Based on these findings, it is plausible that collectivists have modest performance beliefs in order to maintain face or as an expression of humility. For these groups, to have high efficacy and then perform less than expected would be a threat to face and humility. On the other hand, for those low in collectivism, expecting the highest levels of performance, expressed as high group efficacy beliefs, helps to maintain face.

A second plausible explanation for the negative relationship between collectivism and group efficacy in this study is that characteristics of the organizations or set of tasks that participants were engaged in may have cued among the collectivists deviation from more traditional modes of operating,

such that the drive to maintain self-identity through a positive group image did not exist. Recent reviews of the construct of collectivism have argued that both low collectivism (i.e., individualistic orientations) and high collectivism can be found simultaneously within any given culture (Schwartz, 1990) or situation (Triandis, 1995). This marks the most significant shift in thinking concerning individualism-collectivism that has occurred since Hofstede's (1980) popularization of the construct in the organizations literature. Viewing the construct as bi-dimensional (individualism and collectivism rather than individualism versus collectivism), helps to explain anomalous behavior (e.g., a "collectivistic group" that fails to display collectivistic behavior in a given situation) (Earley and Gibson, 1998).

These issues should be investigated further, in terms of potential outcomes of group efficacy. As reported earlier, numerous researchers have demonstrated that group efficacy is related to group effectiveness. However, group efficacy likely produces other desired outcomes, such as face, reputation, or commitment; and these outcomes, in turn, may subsequently interact with cultural characteristics or task characteristics, motivating groups to form different levels of group efficacy beliefs in future cycles of behavior. Investigations such as these would provide additional guidance to managers attempting to implement teams across cultures.

In summary, this research extends Gibson (1999) by exploring the structural features of group efficacy that are related to the emergence of the construct, such as the role of self-efficacy, affect and status differential. These variables were not examined previously. Furthermore, the findings across the two research efforts indicate a dual role of collectivism as having both a direct impact on the formation of group efficacy, and a moderating impact on the efficacy-effectiveness relationship.

Limitations

The conceptual framework offered here implies a causal relationship in which specific variables cause changes in the level of group efficacy. Yet, due to the experimental design only the findings from the simulation study involving the manipulated variable (status differential) allow for causal claims. Therefore, alternative explanations for the relationships between the correlates and group efficacy should be explored. Perhaps the relationships are reciprocal. For two of the four factors investigated here (status

differential and collectivism) it truly doesn't make sense to think about reverse causality. That is, it is highly unlikely that a given level of group efficacy results in certain status assignments to a group. It is equally implausible that a given level of group efficacy could impact the level of collectivism prevalent in a cultural context. However, it does seem feasible that group efficacy subsequently impacts both self-efficacy and affect, and so the relationships among these variables may indeed be reciprocal. As mentioned earlier, recent empirical evidence obtained from Feltz and Lirgg (1998) and Fernandez-Ballesteros et al. (2002) suggests this is not the case. It appears that self-efficacy is a stronger predictor of group efficacy than the reverse. Yet, it should be noted that the current design doesn't allow for strong claims about causality, and future research should investigate this issue further.

A key potential threat to the validity of these studies is that use of the group discussion method for measuring group efficacy may actually be *creating* the phenomenon of group efficacy rather than simply measuring it. Analyses of various approaches to measuring group efficacy has demonstrated consistency across techniques, including both the group discussion approach (collective measure) and aggregating individual members' ratings (individual measure) (Gibson et al. 2000). Furthermore, one might argue that rather than creating the phenomenon, the group discussion method simply causes the group belief to come to the consciousness of the members, and does so in a manner that mimics actual group collaboration.

A stringent test of the notion that the group discussion method actually creates the efficacy belief where none existed would involve investigating other, less obtrusive measures of efficacy beliefs. For example, normal daily workgroup conversations should be analyzed in an attempt to trace the development of expectations concerning group efficacy. The phrases and norms recorded in these conversations may better capture the emergent aspects of group beliefs. Furthermore, applying techniques from social network analysis to these conversations would shed light on the patterns of interconnections between members and the factors influencing the way in which information is "retrieved," weighted, and combined.

Finally, also of concern with regard to internal validity, was the strength of the status differential manipulation in the simulation study. The manipulation check suggests that although statistically significant, the difference in perceptions across the high and low status conditions was small (*mean difference*=.43). It is likely that the null findings regarding status differential are due to this small difference. Reviewing the videotaped interactions of the simulation teams suggested that the proposed mechanisms for status differential did indeed occur. The participant playing the vice president role in the high status differential groups tended to dominate the conversations and function as a “time keeper,” keeping the group on track and ensuring that they made progress toward accomplishing the assigned objectives. This seemed to result in a belief within the group that the objectives would be accomplished. However, the measures were apparently not sensitive enough to detect this qualitative finding.

On a practical note, it should be noted that under some circumstances, having a strong group leader or facilitator (e.g., a high status differential) could have detrimental effects on groups' expectations. Empirical research suggests that if strong identification with a leader produces dependent, immature followers, then the early successes of the group nourish unrealistic expectations, both within the leader and within the followers (Musser, 1987). If the problems become too great, the group's expectations may eventually surpass the leader's own beliefs, resulting in unrealistic expectations, groupthink symptoms, and ultimately causing the group's downfall (Heifetz & Sinder, 1987).

It is also expected that the relationship between status differential and group efficacy is moderated by cultural variables not addressed in this study. In addition to individualism-collectivism, Hofstede (1980) suggests that power-distance is an important cultural value orientation that influences organizational behavior. It is expected that a high status differential within a group will increase group efficacy in groups that operate in high power distance contexts; whereas a high status differential will decrease group efficacy in low power distance contexts. Asian cultures are typically characterized as high in power distance and U.S. culture is characterized as low to moderate in power distance (Hofstede, 1980). As previously discussed, preliminary evidence related to this effect was demonstrated by Earley (1999), who examined the relationship between the status of a given member and his or her contributions

to the formation of group efficacy. To truly test the proposition that power distance moderates the impact of *status differential* (as opposed to individual member status) on group efficacy, one would need to directly measure power distance and investigate status differential and group efficacy in cultures that vary with regard to this value orientation. In conducting this research, it will be important to capture the levels of self-efficacy of each member and consider this as a possible moderator or contributor to the impact of status differential. This suggests several avenues for future research.

Conclusion

Understanding the formation of group efficacy is important specifically due to three business realities: (a) the movement toward the formation of temporary consortia among organizations in order to share product development or distribution concerns; (b) the use of matrix-type organizational structures that allow workers to join teams temporarily in order to complete particular projects; and (c) an increased reliance on part-time workers, temporary workers, and subcontractors. Each of these trends has resulted in a much more dynamic conceptualization of what constitutes a team. Whether we refer to a task force, a cross-departmental work group, or a semi-permanent collective effort, it is becoming more commonplace to see teams and groups with shorter life cycles.

We know very little about how these trends will impact work group performance, collective cognition, and the group members within groups. In order to further investigate these phenomena, a cross-sectional study might be conducted within an organization that contains both temporary project task forces as well as on-going teams to determine whether the determinants of cognitive products such as group efficacy vary by type of team. Longitudinal studies are also crucial in this regard in that they would allow us to monitor the determinants of group efficacy throughout the life cycles of groups, whether these life cycles be short or long. Although challenging, a longitudinal comparison of efficacy formation in temporary versus on-going groups would most clearly reveal whether the formation processes are different. Such studies would also help to highlight which variables are key determinants of collective cognition in each type of group.

Overall, the findings of the two studies conducted here extend previous functionally-focused approaches to indicate that the structure of group efficacy is an intriguing aspect of groups, albeit difficult to capture using common research methods, and indeed may be heavily dependent upon the composition of the group and several additional characteristics of the cultural context in which the team operates. Furthermore, the correlates of group efficacy may interact in complex ways. These findings call for subsequent research that investigates the collective cognition involved in group efficacy formation using creative and novel approaches in order to fully capture the determinants and consequences of the construct.

NOTES

1. In conjunction with a multi-year, multi-method longitudinal project, Gibson (1999) investigated functionally focused hypotheses regarding the relationship between group efficacy and group effectiveness. Specifically, she proposed that this relationship is complex and moderated by several contingency factors. Related but distinct data sets were utilized in Gibson (1999) and the current manuscript, in that respondents were the same, but different group efficacy estimates were used in the two manuscripts. The current study utilized group efficacy measures obtained early in the project; Gibson (1999) utilized estimates obtained later in the project. Thus the only variable that overlaps the two studies is the assessment of the average level of collectivism in the groups. Findings from Gibson (1999) regarding the function of group efficacy supported the contingency approach to the function of group efficacy. When task uncertainty was high, team members worked independently, and collectivism was low, group efficacy was not related to group effectiveness. In contrast, when groups knew what was required to perform a task, worked interdependently, and valued collectivism, the relationship between group efficacy and group effectiveness was positive.
2. As a preliminary measure of group efficacy, participants completed an individual survey patterned after the survey used to measure self-efficacy. In this survey, the group was the referent, and individuals rated their certainty that the group could achieve five levels of performance. Scores on this survey were averaged across levels, and then averaged across individuals within groups to arrive at a score for the group. This measure was used as a second test of the hypotheses. That is, all analyses were conducted using both the collective group efficacy survey in which group discussion was used to arrive at a collective estimate and the individual group efficacy survey. Coinciding with the findings of Gibson, Randel and Earley (2000), results were essentially identical. Because it best reflects collective cognition, results of analyses reported here used the collective group efficacy measure.
3. Dansereau et al. (1984: 169) provided a test of the practical significance of an E ratio (the ratio of between-group to within-group η^2 s). Since an E ratio is a cotangent of an angle between 0 degrees to 90 degrees, they defined three intervals, 0 degrees, 15 degrees, and 30 degrees, with 30 degrees being the most stringent test. To meet the 0 degree test for inferring group-level constructs, the E ratio must simply be greater than 1. To meet the 15 degree test, the E ratio must be greater than 1.30. To meet the 30 degree test, the E ratio must be greater than 1.73. Used in conjunction with the tests of statistical significance, these intervals provide additional evidence about whether an obtained E ratio indicates a group-level construct. When results of statistical and practical tests differ, results of statistical significance are given more weight in making decisions about whether a construct is indeed group-level.

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FIGURE 1
HYPOTHESIZED MODEL

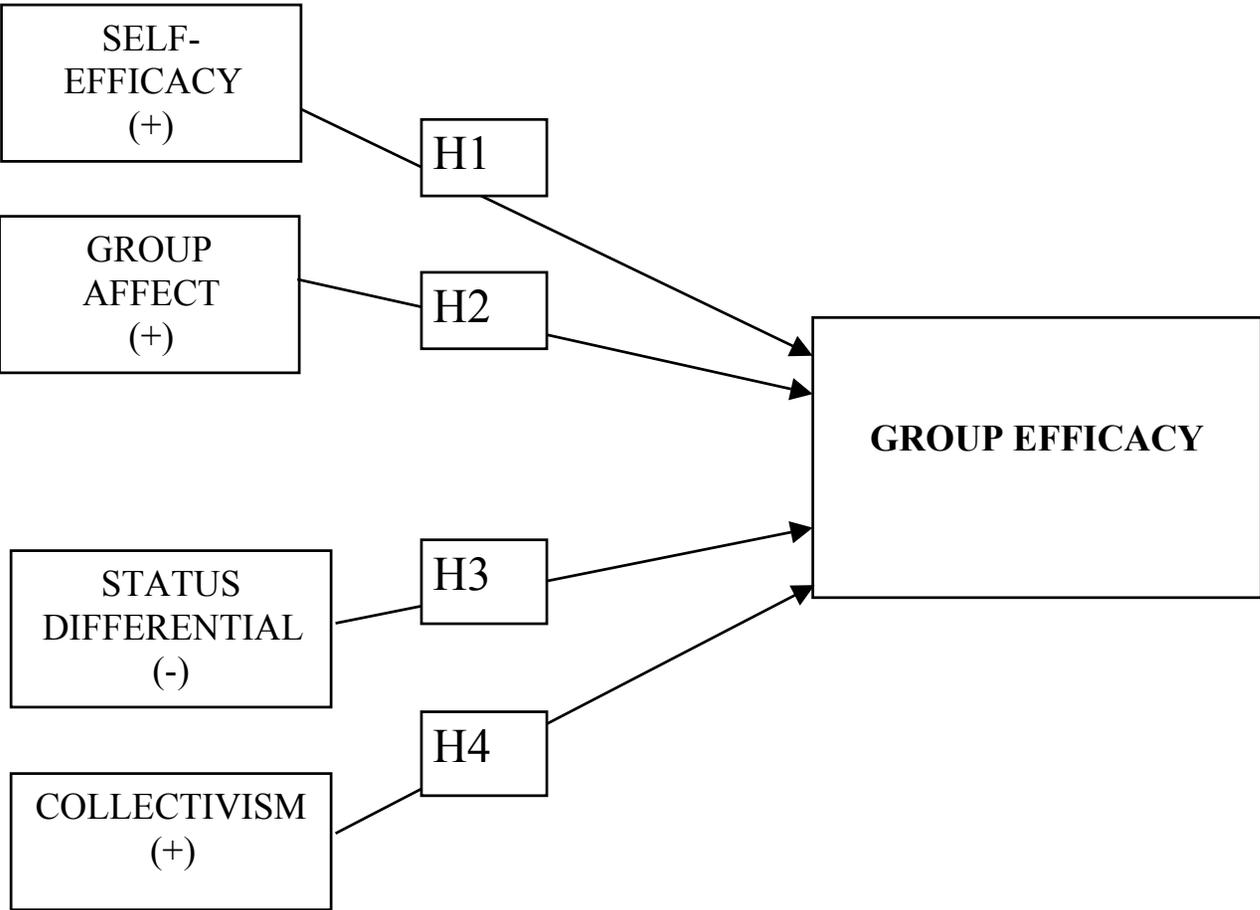


TABLE 1
CORRELATION MATRIX FOR SIMULATION STUDY

Group Level (<i>n</i> =60)	<i>Mean</i>	<i>S.D.</i>	1	2	3	4	5
1. Group efficacy	57.77	26.33	1.00				
2. Self-efficacy	72.37	9.10	.59**	1.00			
3. Group affect	3.72	.67	.45**	.35	1.00		
4. Status differential ^a	.50	.50	.18†	.06	.05	1.00	
5. Collectivism	2.93	.53	-.28*	-.01	-.07	.04	1.00

†*p*<.10 **p*<.05 ***p*<.01

^aNote this variable is dichotomous; 1=high and 0=low. Correlation coefficients for this variable are point biserial.

TABLE 2
REGRESSION ANALYSES FOR GROUP EFFICACY
SIMULATION STUDY

N=60 groups		
	<i>Beta</i>	<i>t for beta^a</i>
Self-efficacy	.49	4.78**
Group affect	.25	2.46*
Status differential	.15	1.56
Collectivism	-.24	-2.53*
<i>R</i> ²		.49
<i>F</i>		13.29**
<i>df</i>		4,55

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

^aOne-tailed tests were utilized to test the specific directionality proposed in the hypotheses.

TABLE 3
CORRELATION MATRIX FOR FIELD STUDY

Group Level (<i>n</i> =71)	<i>Mean</i>	<i>S.D.</i>	1	2	3	4	5
1. Group efficacy	75.23	24.94	1.00				
2. Self-efficacy	84.69	9.70	.40**	1.00			
3. Group affect	4.07	.55	.24	.02	1.00		
4. Status differential	1.63	.61	-.05	.21	.13	1.00	
5. Collectivism	3.02	.71	-.19*	.10	-.23	.04	1.00

p*<.05 *p*<.01

TABLE 4
REGRESSION ANALYSES FOR GROUP EFFICACY
FIELD STUDY

N=71 groups		
	<i>Beta</i>	<i>t for beta</i> ^a
Self-efficacy	.45	4.10**
Group affect	.20	1.78*
Status differential	-.16	-1.48
Collectivism	-.19	-1.72*
<i>R</i> ²		.27
<i>F</i>		5.94**
<i>df</i>		4,66

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

^aOne-tailed tests were utilized to test the specific directionality proposed in the hypotheses.