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The contribution of leadership experience and self-efficacy to group performance under evaluation apprehension

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The Contribution of Leadership Experience and Self-Efficacy

to Group Performance Under Evaluation Apprehension

by

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Abstract

The Contribution of Leadership Experience and Self-Efficacy to Group Performance Under Evaluation Apprehension

by Susan Elaine Murphy

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This study explored the role of leadership experience, defined both as a content-based activity and a time-based measure, on group performance and leadership self-efficacy. The content-based experiences of task-relevant experience and small group leadership experience were manipulated in Phase 1 of a laboratory study of 140 three-person groups by giving leaders and followers practice in the task-content and/or leadership requirements of the task. In Phase 2, leaders' groups performed under conditions of relatively low or high stress. In addition to manipulated leadership experiences, all subjects indicated their number months of experience in leadership positions to provide a time-based measure of leadership experience.

According to Cognitive Resource Theory (Fiedler & Garcia, 1987), it was hypothesized that stress resulting from evaluation apprehension in Phase 2 would differentially moderate the relationship between the two types of experiences and group performance. That is, leaders with task-relevant experience would have lower group performance under stress than leaders not under stress. Conversely, leaders given an opportunity to practice leading a small group (manipulated leadership experience) would have better group

performance under stress than leaders not under stress.

The results showed that groups in the stress condition generally performed less well than groups not in the stress condition. Also, groups with leaders who had received task-relevant practice performed better than groups with leaders who did not. Additional analyses showed that under stress, months of leadership experience were related to performance when leaders received neither leadership or task-relevant practice.

A second set of hypotheses concerned the role of leadership self-efficacy. In general, the results showed only minimal enhancement of self-efficacy from the experience manipulations. As hypothesized, however, stress decreased group performance of leaders with low self-efficacy, but had less of an impact on the performance of groups led by leaders with high self-efficacy. The role of leadership self-efficacy in the Cognitive Resource Theory is discussed.

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Dedication

This dissertation is dedicated to my mother, Patricia J. Murphy, my father Arthur L. Murphy, Jr., whose love and support have helped me in this accomplishment, and to the memory of my brother Todd Michael Murphy.

CHAPTER 1

INTRODUCTION

Job experience is a major criterion used in making human resource decisions. In the area of leadership, managerial activities such as managing groups of subordinates, making complex decisions, and developing technical skills and abilities are all thought to be the result of years of experience. These types of experiences are thought to lead to successful on-the-job performance.

Many leadership training and development programs attempt to substitute training for on-the-job experience by teaching leaders many of the skills and abilities they learn on the job. However, as McCall, Lombardo, and Morrison (1988) point out, the money and resources spent on leadership training may not be justified because typical training does not give leaders the experiences that translate to the actual skills necessary to become a successful leader. According to McCall et al., the major reason behind the inadequacy of training programs is that the short duration of training programs is outweighed by the vast amount of time spent on the job and the diversity of experiences gained on the job that cannot be taught through training. Nonetheless, research on the relationship between experience and leadership performance has not provided much evidence that more experienced leaders actually perform better in all situations (Bass, 1990). In fact, one line of research by Fiedler and his colleagues has found that a leader's experience is sometimes negatively related to performance.

According to Fiedler and Garcia (1987), a leader's experience is one type of cognitive resource on which the leader can draw to successfully lead his or her subordinates. Other cognitive resources include leader intelligence and creativity. Research on Cognitive Resource Theory finds that the extent to which a cognitive resource contributes to performance is determined by conditions present in the situation. In particular, situations that cause stress can moderate the potential effects of a cognitive resource. Research shows that under low stress more intelligent leaders perform better than less intelligent leaders, whereas under high stress, more intelligent leaders perform worse than less intelligent leaders. These findings have been replicated in a number of studies (e.g. Fiedler, & Leister, 1977; Fiedler, Potter, Zais, & Knowlton, 1979; and Borden, 1980).

In addition, research on Cognitive Resource Theory has addressed the effects of stress on the relationship between leadership experience and performance. This research has shown that under stress more experienced leaders perform better than less experienced leaders, while under low stress, more experienced leaders perform worse than less experienced leaders. A recent review of the research on leadership experience by Fiedler (1991) proposes that a number of different types of experiences could result in the type of learning necessary to lead successfully in stressful conditions. Fiedler asks what type of knowledge is learned from experience; what knowledge is stored and how is it stored; and under what specific conditions is this

knowledge retrieved? His list of skills learned from experience include:

1. Cognitive skills or learning how to solve problems.
2. Learning emotional responses to human relations problems as well as one's own reactions to the job.
3. Learning self-confidence.
4. Learning how to satisfy one's own needs.

Although these explanations for the role of leadership experience make intuitive sense, little research has examined the outcomes of increased leadership experience. In fact, much research on leadership experience has blurred the distinction between experience as measured by time in service, or even the amount of relevant experience, and the knowledge and learning that takes place when an individual has the opportunity to engage in an activity such as leadership. This paper summarizes the literature relating to leadership experience and performance and describes the contribution of self-related measures such as self-esteem and self-efficacy to leader performance.

CHAPTER 2

REVIEW OF RELEVANT LITERATURE

Leadership and Leadership Effectiveness

The quest to improve the effectiveness of leaders has been pursued for many years. Research in the 20th century has focused on many characteristics and behaviors associated with successful leaders. Before one can discuss the outcomes of effective leadership, a definition of the concept of leadership must be given. As Bass (1990) and many others point out, there are various conceptualizations of leadership. In his most recent review Bass makes reference to 12 different conceptualizations of leadership. These conceptualizations range from leadership as personality to leadership as an emerging effect of interaction. Bass' most recent definition of leadership is as follows:

> Leadership is an interaction between two or more members of a group that often involves a structuring or restructuring of the situation and the perceptions and expectations of the members. Leaders are agents of change -- persons whose acts affect other people more than other people's acts affect them. Leadership occurs when one group member modifies the motivation or competencies of others in the group (p.20).

The large number of conceptualizations is also reflected in the many different definitions of leadership effectiveness. For the most part, leadership effectiveness is often defined as an outcome of interest that is closely related to the chosen conceptualization. For instance, if motivated employees are an outcome of interest, leadership effectiveness is defined as tactics or behaviors used to increase the effort of these employees. Alternatively, an effective leader is defined as someone who is facilitative in order to allow group

members to contribute their creativity and come up with an appropriate solution to a problem.

Leadership effectiveness in much of the traditional research on leadership is determined most often by the performance of the group. An effective leader is one who uses any means available (within ethical and legal bounds) to improve the performance of the group over performance that would have been achieved in the absence of a leader.

To improve the effectiveness of leaders through training and experience, much of the research has focused on personal characteristics, behaviors, or knowledge about effective leadership that helps leaders improve their subordinates' or group's performance. Leaders with particular education types or levels, abilities or competencies, and experiences are sought to fill various management roles. Although these criteria are used for job requirements, the evidence of their direct relationship to leadership performance has not always been demonstrated in research. Many intervening variables can explain the low relationship between leadership selection criteria and leadership performance. However, it makes intuitive sense to expect experienced leaders to be better performers than less experienced leaders. The next section reviews relevant research on leadership experience that illustrates that more experienced leaders are not always more effective.

Review of Related Literature on Experience

General Experience and Learning Theories

Before specifically addressing the concepts of job or leadership experience, a basic discussion of the meaning of the word experience and the concept of experience as described in the literature on learning is in order. According to Webster's (1987) dictionary, experience is defined as "practical knowledge, skills, or practice derived from direct observation of or participation in a particular activity" (p. 437). This definition suggests that not all experience leads to knowledge or skills as indicated by the use of the term *derived*, in other words, experience (or practice) with a particular task may only provide an opportunity to learn or acquire a certain skill level. The amount actually learned will vary from person to person, depending on the circumstances surrounding the learning. For example, early experiences with a task or activity often allow for more learning, and as a person becomes highly experienced very little learning occurs. This phenomenon is demonstrated in a typical learning curve. Alternatively, some experiences may be so different from anything the person has done before that they may result in a large amount of knowledge acquisition, or the experiences may be so different that they are beyond comprehension so that learning cannot occur.

Another outcome associated with increased experience is that it exposes people to different types of tasks that may have similar features. A person is then given the opportunity to understand how one task is related to another and

therefore develops task or problem schemas that allow quick problem recognition in future situations (cf. Eysenck, 1984).

The usefulness of experience for skill acquisition is also determined by the feedback a person receives regarding his or her task performance. Research has shown that a person's repeated practice with a task will not lead to appropriate skills acquisition if the person is uncertain whether the task is being performed correctly because feedback is unavailable (Larson, 1984).

Increased experience also has an effect on a person's confidence in his or her capability to perform the task. Task failures are discouraging for many people, whereas for others, failure provides a challenge (Bandura & Cervone, 1983), as evidenced in the anecdote "people learn more from their mistakes..." However, increased experience with a particular task will not lead to increased performance if the outcomes associated with the task become so negative or nonreinforcing that individuals are no longer learning, or if individuals feel that their actions will do nothing to affect their performance (Seligman, 1975).

Job Experience and Performance

In the area of work and organizations, a number of studies have examined the relationship of job experience to job performance. In these studies job experience is defined as time spent in a particular job. A review of 425 validity studies by Hunter and Hunter (1984) found that the mean validity of experience as a predictor of job performance was .18. Even studies that attempted to look at relevant training and experience found a correlation of .14

with supervisory ratings of performance (McDaniel & Schmidt, 1985). One exception in the small relationship between job experience and job performance was found by McDaniel and Schmidt (1985) who identified a correlation of .37 with job experience and supervisory ratings of performance.

A major difference between the sample reported by Hunter and Hunter (1984) and that reported by McDaniel and Schmidt (1985) was the mean number of months on the present job. In the Hunter and Hunter study the mean was 5.08 years versus 3.58 years (reported in Schmidt, Hunter, & Outerbridge, 1986). Schmidt, Hunter, and Outerbridge (1986) hypothesized that job experience may have a greater effect on job performance when mean experience level is low.

Using a sample of 16,058, McDaniel, Schmidt, and Hunter (1988) found that the correlation between job experience and job performance was moderated by two variables: length of experience and job complexity. When the mean level of job experience was low, job experience correlated more highly with job performance than when the mean level of job experience was high. In other words, job experience was found to be useful in early stages of a job but seemed to have little relationship to performance in latter stages. This relationship is similar to what one would expect in examining the shape of the typical learning curve. In early stages of learning, the slope of the curve is much steeper; later the curve reaches an asymptote and flattens out. McDaniel et al. (1988) also found that job experience was more important when job

complexity was low. The authors explained that for many jobs that are low in complexity, education is not available to substitute for length or experience as is often the case for jobs that are higher in complexity. For jobs high in complexity, education is substituted for years of experience, and therefore job experience becomes less important. For example, in many government entry-level managerial jobs, which are high in complexity, a person's bachelor's degree can be substituted for two years of managerial experience. However, a more technical and specialized yet less complex job requires years of on-the-job experience that often cannot be gained through education.

In other related research, Schmidt et al. (1986) developed a model of the relationship of job experience, cognitive abilities, job knowledge, and job performance. They found that the primary effect of job experience was on the acquisition of job knowledge. However, they also found evidence for some relationship to job performance, as measured by work samples, independent of increases in job knowledge.

This line of research has indicated that job experience, as measured by amount of time on the job, has both a direct and indirect effect on job performance. In other words, job experience increases job knowledge, which leads to performance (indirect effect), and that job experience also directly affects job performance.

Summary

The discussion of experience thus far has focused on the outcomes

associated with increased experience as defined by repeated practice or observation of a particular task, as well as the outcomes associated with increased experience as measured by time in grade or position. Figure 1 provides an overview of the factors in experience that contribute to the relationship between amount of experience and job outcomes discussed thus far. From the research on job experience, it is apparent that length of experience, relevancy of the experience, and whether feedback is available during the experience are some of the critical factors of a person's experience on a task. The task in this case refers to either a job or to more specific tasks contained in a job.

This section also discussed the types of factors gained from experience. From the Webster definition both skills and knowledge are outcomes of experience. Other gains from experience include actual feedback regarding ability level and how this feedback may affect a person's belief that he or she will be able to engage in the task at another time. The last component of the experience-outcome relationship is the different outcome measures used to examine the effects of experience. These outcomes include work samples, productivity measures, and supervisory ratings of performance.

In the next section, the role of leadership experience, as measured by both type of experience and time in leadership positions, in predicting performance will be discussed.

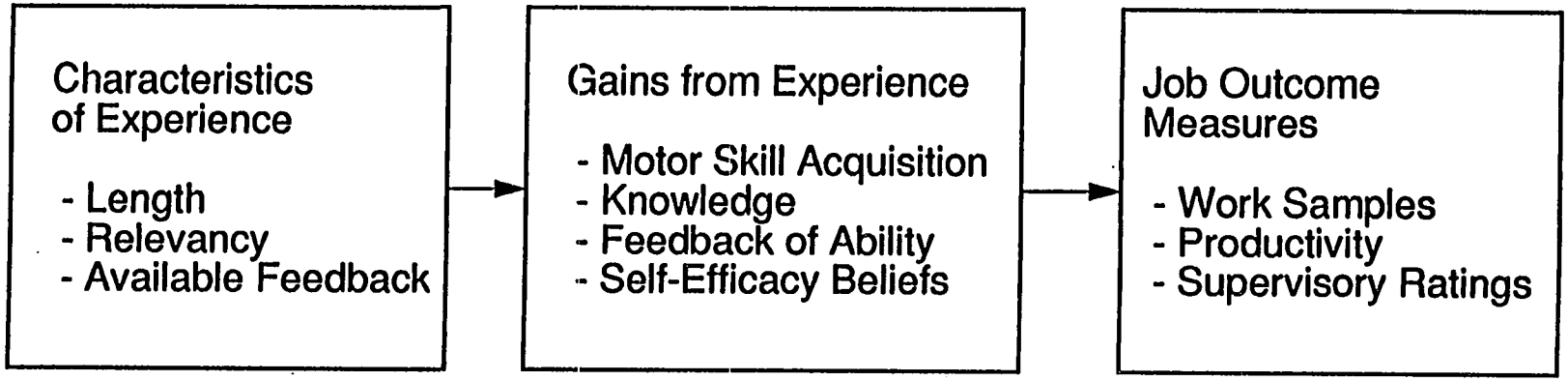

Figure 1. Overview of job experience

Leadership Experience and Performance

Recent research in managerial effectiveness by a number of authors has attempted to identify the types of experiences that lead to successful managerial performance. In an innovative approach on the impact of leadership experience, McCall et al. (1988) summarized and interpreted information gathered from managers regarding their managerial experiences (Lindsey, Homes, & McCall, 1987). Using a structured interview format, the authors first asked managers to identify at least three "key events" in their careers; key events were defined as things that made a difference in the way the managers manage presently. The managers were asked to provide details about what happened and what they learned from the experience. Then the authors asked structured questions relating to rites of passage, failures, and the role of other people in the managers' careers. Finally, the authors asked general questions regarding the managers' experiences as managers.

The interviews were conducted with 191 successful executives from six major corporations and resulted in descriptions of 616 key events and 1,547 corresponding lessons. The lessons were categorized into five types of leadership experiences from which leaders can gain skills and abilities. These experiences are as follows:

1. Setting and Implementing Agendas
2. Handling Relationships
3. Understanding Basic Values

4. Developing Executive Temperament

5. Increasing Personal Awareness

Setting and implementing agendas entails many of the technical skills associated with management positions, including innovative problem-solving methods and strategic thinking. *Handling relationships* includes those aspects of the managerial job that require dealing with people in the organization at many levels and include, for example, motivating people, dealing with conflict, and handling political situations. *Basic values* include those aspects of the managerial job related directly to the job of management and may be organizationally specific. *Executive temperament* includes coping skills, self-confidence, and uses of power. The last type of experiences relate to *personal awareness* and include realizing limitations and knowing what really excites individuals about their jobs.

In order for leaders to acquire these experiences, Lindsey et al. (1987) and McCall et al. (1988) report that significant developmental events usually occur 1) during early work experiences, especially during the first supervisory job; 2) when managers are required to lead by persuasion, thereby convincing others of their expertise; 3) when leading start-up groups, whether these are new groups or new large operations; 4) during experiences that require managers to realize that other people such as bosses, peers, and subordinates are needed to accomplish goals; and 5) during experiences that create hardships that the managers have to overcome.

Although the McCall et al. study provided very useful material regarding the role of experience, the reliability of these accounts may be questionable given that they rely on personal recollection and could be distorted. What is important, however, is that the study highlights a number of learning experiences that occur during the development of leaders. Additionally, these authors' conceptualization of experience is a departure from the usual measures of time in grade or time in job that Hunter and his colleagues (eg. Hunter & Hunter, 1984) have used for predicting job performance.

In another area of research, Sternberg (1988) has found that experience (i.e., time on the job) actually increases a specific type of intelligence rather than merely providing the opportunity to acquire skills. One such type of intelligence gained from experience is what Sternberg calls practical intelligence which he defines as "responding appropriately in terms of one's long-range and short-range goals, given the actual facts of the situation" (p211). He has more recently expanded the concept and refers to practical knowledge as "tacit knowledge". Sternberg finds three categories of tacit knowledge:

1. Managing self
2. Managing tasks
3. Managing others

Sternberg's research has found then that it is not how much training or experience a person has but how much the person has learned from experience in these areas that leads to success.

Cognitive Resource Theory and Leadership Experience

Fiedler and his colleagues have conducted a number of studies that have examined the relationship between the amount of leadership experience and performance. Many of the studies have found little evidence for a direct relationship between the two variables. This is not surprising given the broad nature of most measures of leadership experience and even for that matter, the imprecise measures of leadership performance. However, Fiedler and his colleagues found that leadership experience did predict performance when the leader was in a stressful situation. These findings were incorporated into Fiedler's (1986) Cognitive Resource Theory. As mentioned previously, Cognitive Resource Theory outlines the conditions in which a leader's particular skills, abilities, and experiences contribute to group performance.

A sample of the studies that examined the relationship of experience under stressful and non-stressful conditions are presented in Table 1. In the first study, Fiedler and Leister (1977) examined the relationship between leadership experience, as measured by time in service, and rated performance for U.S. Army squad leaders. The measure of stress was rated boss stress. For those squad leaders who reported very high boss stress (more than one standard deviation above the others), the correlation between experience and performance was $\underline{r} = .40$ ($\underline{n}=27$, $\underline{p}<.05$). For those who reported low boss stress, there was no correlation between length of experience and performance ($\underline{r} = .09$, $\underline{n}=28$, n.s.).

Table 1. Summary of Studies Investigating Contribution of Leadership Experience to Performance

Study	Subjects	Stress Measure	Experience Measure	Performance Measure	Correlation Between Performance and Experience	
					High Stress	Low Stress
Fiedler & Leister (1977)	55 Army Squad Leaders	Rated Boss Stress	Months in Service	Individual as Rated by Superior	.40*	.09
Fiedler, Potter, Zais, & Knowlton (1979)	21 Company Commander-First Sergeant Dyads	Rated Boss Stress	Time in First Sergeant Position	Dyads as Rated by Battalion Commander	.66*	-.09
Borden (1980)	136 Platoon Sergeants	Rated Boss Stress	Time in Service	Individual rated by a Minimum of Two Supervisors	.59*	-.25*
	97 Platoon Leaders				.53*	-.05
Potter & Fiedler (1981)	130 Officers and Petty Officers Coast Guard	Rated Double -Bind Boss Stress	Time in Coast Guard	Individual Rated by Superior	.44*	.03
Frost (1981)	110 Fire Lieutenants	Boss Stress & Job Stress	Time in Present Unit	Individual Rated by Battalion Chief	.39* .57*	.17 .00

The second study reported the relationship between experience and performance for company commander and first sergeant dyads (Fiedler, Potter, Zais, & Knowlton, 1979). The amount of time the first sergeant held that position served as the experience measure. Rather than the performance of the first sergeant, the performance measure used was that for company commander-first sergeant dyads. The amount of stress perceived by both the first sergeant and the company commander was used to separate dyads into high and low stress. Experience again correlated highly with performance when the dyads reported high stress, but did not correlate when stress was low.

The third study again used a military sample of combat infantry battalions (Borden, 1980). The subjects, platoon sergeants and platoon leaders, were at lower levels in the organization than the groups described previously, but the results showed the same effects for experience in stressful conditions. Data in Table 1 show that for both platoon sergeants and platoon leaders, experience correlated positively with performance when stress was high, but did not correlate when stress was low.

The final two studies did not use army personnel but instead examined the effects of experience and stress for coast guard personnel and fire fighters. Potter and Fiedler (1981) examined the effects of stress for a sample of officers and petty officers in the U.S. Coast Guard. Instead of using the boss stress measure described previously, this study found that a measure of "double-bind stress" moderated the relationship between experience and performance. High

double-bind stress with a boss was characterized by a boss from whom the subordinates felt production pressure but who withheld support, guidance, and information. Using this measure of stress, Potter and Fiedler found that experience correlated positively with rated performance under high stress, but did not correlate with performance under low stress.

The study of fire fighters conducted by Frost (1981) examined the effects two types of stress. The first type was a boss stress measure and the second type was a measure of job stress based on the number of hours at the scene of a fire. Fire fighters who had more hours at a fire were categorized as having high job stress, and those who logged fewer hours at a fire were categorized as having low job stress. For those fire lieutenants under high job stress, experience correlated with performance but did not correlate for those under low job stress. Taken together, these studies conducted by Fiedler and his colleagues consistently show that experience predicts rated performance only under stressful relations with the boss.

In summary, the literature on experience, particularly leadership experience, provides evidence of a relationship between experience and performance when the effects of stress level, mean experience level, job complexity, and type of experience are considered. Although many of the studies by Fiedler and his colleagues present evidence that increasing leadership experience increases performance, many studies have not specifically investigated the processes and outcomes that explain why

experience levels predict performance under stress.

Self-Efficacy Estimates of Ability

The research by Fiedler and his colleagues, as well as by Sternberg (1988) and McCall et al. (1988), indicates that thing that leaders gain from experience is a level of self-confidence based on their ability for performing many aspects of the leadership role. A concept that has direct applicability to research in leadership experience is that of self-efficacy. Self-efficacy is defined by Bandura (1986) as "judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391).

Although the concept of self-efficacy resembles the linkage between effort and performance in expectancy theory of motivation (Vroom, 1964), Bandura says that "self-efficacy is a much wider concept than effort-performance expectancy in that it is determined by many factors other than effort such as ability to function under stress, ingenuity, and adaptability" (Locke, Frederick, Lee, & Bobko, 1984, p. 239). Bandura explains that individuals can believe that a particular course of action will produce certain outcomes (expectancy that effort leads to performance of a certain level), but if individuals entertain serious doubts about whether they can perform the necessary actions, expectancy information does not influence behavior. Furthermore, research on self-efficacy versus expectancies shows that self-efficacy predicts performance in contrast to the consistent failure of effort-

performance expectancy to show positive effects (Mento, Cartledge, & Locke, 1980).

The concept of self-efficacy is part of Bandura's Social Cognitive Theory of behavior. According to Social Cognitive Theory, behavior is a function of the triadic reciprocality among behavior, the environment, and cognitive and personal factors (Bandura, 1986). In addition, Bandura (1986) outlines five basic capabilities that describe that basic nature of human behavior. They are:

1. Symbolizing Capability: The ability to use symbols to guide future action and to give meaning to experiences.

2. Forethought Capability: The ability to anticipate consequences and plan actions for cognized futures.

3. Vicarious Capability: The ability to learn by observation of others.

4. Self-Regulatory Capability: The ability to change behavior based on internal standards and self-evaluative reaction to one's own actions.

5. Self-Reflective Capability: The ability for reflective self-consciousness, which involves people's judgments of their capabilities to deal with different realities (pp. 18-21).

These capabilities that form the basis for Social Cognitive Theory also suggest four major methods to change a person's self-efficacy.

1. Enactive mastery: Repeated performance accomplishments are the most effective way to enhance self-efficacy. Positive mastery experiences increase self-efficacy, whereas repeated negative experiences decrease self-efficacy.

2. Vicarious learning: This is learning that occurs when another person (or model) is seen accomplishing a task. Research shows that modeling is more effective when the model succeeds after overcoming difficulty rather than when the model is shown to accomplish the task easily.

3. Persuasion: Persuasion is used to convince a person of his or her capability of performing a task.

4. Emotional arousal: Altering a person's perceptions of his or her physiological state may be used to affect assessment of performance capabilities. For example, a person who feels apprehension or anxiety to perform a task will not perform well unless his anxiety is relieved.

These methods work only to the extent that they provide information that is selected, weighted, and integrated into self-efficacy judgments. High self-efficacy has been shown to lead to increased performance. Differences in levels of self-efficacy also explain individual reactions to discrepancies between personal standards and attainments. For those individuals low in self-efficacy, failure is seen as discouraging, whereas those individuals high in self-efficacy find the discrepancy motivating (Bandura & Cervone, 1983). An investigation by Bandura and Cervone (1986) tested the effects of different magnitudes and directions of discrepancy between selected standards and attainments on three forms of self-reactive mechanisms: Self-set goals, self-efficacy, and self-satisfaction. Self-efficacy was again found to be predictive of motivation for goal attainment. Of particular interest were individual differences in the resiliency of self-efficacy due to failure to meet a challenging goal. Some individuals maintained their level of self-efficacy, others had slightly lower perceptions, while others showed a large drop in self-efficacy.

A person's overall self-esteem could be one cause of differential reactions to negative feedback or negative leadership experiences. Self-

esteem and self-efficacy are not directly related. Self-efficacy is an evaluation of capabilities, whereas self-esteem pertains to evaluations of self-worth. It is conceivable, however, that for those individuals with low self-esteem the resiliency of their self-efficacy estimates may not be the same as those with high self-esteem when exposed to negative feedback. A study by Hollenbeck and Brief (1987) compared the effects of self-efficacy and self-esteem on performance for self-set and assigned goals. Their study found that when goals were self-set, individuals with higher perceptions of task-specific ability set more difficult goals, but self-esteem was not related to the level of the goal. In conditions in which goals were assigned, individuals low in self-esteem performed better when assigned easy goals rather than difficult goals, indicating that attainment of the easy goals may have helped to build confidence for these individuals.

Leadership Experience and Self-Efficacy

Up to now, there has been no published research on the role of the leader's self-efficacy in the leadership process, although transformational theories of leadership advocate increasing the self-efficacy of subordinates to improve performance and claim that charismatic leaders have more self-confidence (Bass, 1985). Gist (1987) points out that self-efficacy is related to Boyatzis' (1982) conception of job competency. Job competency can be thought of as being made up of perceived and actual competencies (performance). Perceived competencies are similar to self-efficacy estimates of

one's abilities. According to Katz (1955) three categories of managerial competencies exists: technical, conceptual, and human relations. The relationship between the perceived competencies and actual competencies in each of these areas can be affected by the amount and types of experiences a leader has in these areas. The type of experiences a leader might have in each area of managerial competencies could be either positive or negative. Whether an experience is positive or negative can shape the leader's self-efficacy for leading a group.

The use of self-efficacy estimates for specific leadership competencies is a much broader use of the concept of self-efficacy than is found in the existing literature. In the past, the relationship of self-efficacy estimates to performance has been investigated in the contexts of specific abilities such as creativity problems (Locke, Frederick, Lee, & Bobko, 1984) and physical exertion (Bandura & Cervone, 1983). In the clinical area, self-efficacy estimates have been used to increase approach behaviors in phobic patients (Bandura, Taylor, Gauthier, & Gossard, 1987) and to increase pain tolerance (Litt, 1988). In all of these studies, self-efficacy estimates of ability have had virtually a one-to-one relationship with the outcome of interest. In other words, individuals estimated their self-efficacy by indicating whether or not they could perform a specific task at a specified level.

More recent studies on the effects of self-efficacy have used relatively complex tasks. Self-efficacy has been found to be related to weight control

(Glynn & Ruderman, 1986), academic performance (Lent, Brown, & Larkin, 1984; Wood & Locke, 1987;), sales performance (Barling & Beattie, 1983), and managerial decision making (Wood & Bandura, 1989). The application of self-efficacy concepts to leadership ability calls for development of slightly different self-efficacy measurement scales. For example, Katz's (1955) three competencies could be used to develop leadership self-efficacy scales that measure estimates of ability for tasks relating to the technical, conceptual, and human relations components of leadership.

Alternatively, a slightly different concept, that of task-specific self-esteem, may be an outcome of increased experience. Task-specific self-esteem as first conceptualized by Korman (1970) is a measure of self-worth related to a specific task. Rather than asking people how they feel about themselves in general (as is done in a general self-esteem scale), task-specific self-esteem asks people to evaluate their abilities related to different facets of the task in question. Task-specific self-esteem has been used by Ellis and Taylor (1983) to study the job search process. It was found to be a better predictor of job search motivation and satisfaction than overall self-esteem, while self-esteem was a better predictor than task-specific self-esteem of job search behaviors and outcomes involving participants' social skills. No assessment of self-efficacy was made in the study.

The main difference between self-efficacy and task-specific self-esteem is in their level of specificity relating to task performance as evidenced by the

methods used to measure the two constructs. Estimates of self-efficacy are traditionally measured by having subjects indicate whether they can attain specific levels of task performance and their confidence in attaining these levels (Bandura, 1986). Task-specific self-esteem measures ask subjects to evaluate their ability for a task not related to levels of performance, but in more general terms. A measure such as task-specific self-esteem may be more appropriate to examine as an outcome of increased leadership experience. It may be that self-efficacy is a concept that is only useful for assessing capabilities mostly under one's own control, or that self-efficacy is too specific to be related to a general ability such as leadership. However, a modified form of self-efficacy assessment that uses aspects of both task-specific self-esteem and self-efficacy may capture the task specificity necessary to produce an adequate measure of self-efficacy for leadership.

The Role of Stress in Leadership Experience

McGrath (1976) defines stress as the gap between the actual demands of a situation and the person's ability to meet those demands. The term stress is often used imprecisely in popular management and health literature. Many articles frequently fail to distinguish stress from its determinants (stressors) and its consequences (reactions). According to well-regarded models of stress (cf., Lazarus, 1966, or McGrath, 1976), the stress reaction process begins when a factor in the environment acts as a stressor. At work, a number of factors related to organizational characteristics and working conditions, as well as to life

conditions act as potential sources of stress or stressors. The stress reaction then can be either physiological or cognitive, or both. Once the stressor is present, there is a cognitive or physiological appraisal regarding whether the person has the capability to cope with the stressor, and therefore, whether the stressor is a threat. This appraisal is based on an evaluation of the gap between perceived threat and perceived capabilities to deal with the threat. Next, depending upon the appraisal, the person has short-term and long-term behavioral, psychological, or physiological reactions. Figure 2 presents this conceptualization of stress.

In the linkages between the source of stress and the appraisal of stress and between the stress reaction and the final consequences, a person has many factors that can help either the stress appraisal or the stress reaction. Another definition of stress emphasizes the importance of coping responses. Lazarus (1966) says that stress arises when one appraises a situation as threatening or otherwise demanding and does not have an appropriate coping response. For many people, a person's feelings of control provide a means of coping with a stressor. For example, a study of 4,800 men by Karasek and his colleagues (Adler, 1989) found that heart disease was less likely to appear in success-oriented managerial or professional occupations. The researchers instead found that most heart disease occurred for workers in low-echelon jobs such as assembly-line worker, garment stitcher, waiter, and cook; these are high-strain occupations involving high demand and low control.

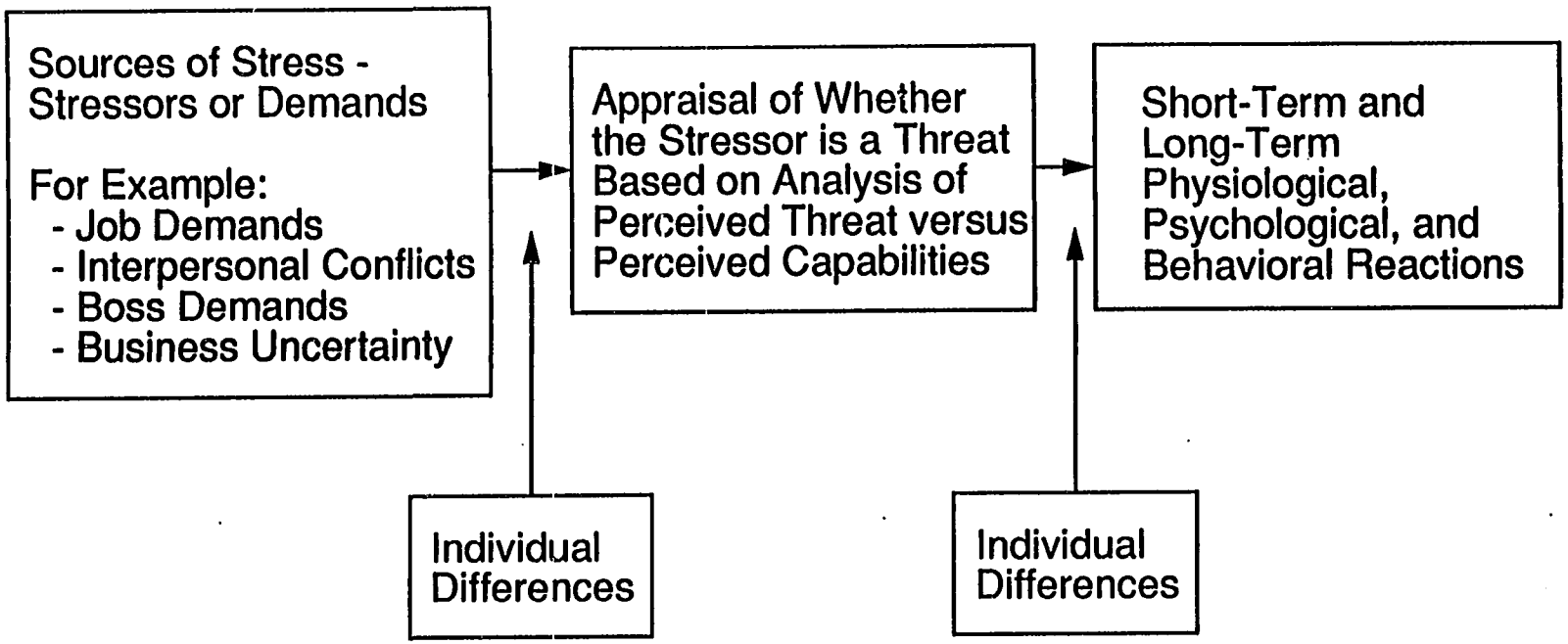

Figure 2. Overview of stress at work (adapted from McGrath, 1970 and Mitchell and Larson, 1987)

Other variables that affect whether a person views the stressor as threatening or has a physiological or psychological response to the threat include Type A/B personality (Friedman & Rosenman, 1974), hardiness (Maddi & Kobasa, 1984), social support (e.g. Cobb, 1976; Caplan, Cobb, French, Harrison, & Pinneau, 1975), and locus of control (Rotter, 1966).

The threat of evaluation is one potential source of stress. The presence of an evaluative other can serve to distract a person who is performing a task by creating apprehension. However, the effects of evaluation apprehension on performance depends on whether the task is novel or overlearned. One of the first experiments in social psychology found that performance on the overlearned or easy task of winding a fishing reel was facilitated in the presence of others (Triplett, 1897). In other words, performance improved when another person was present.

Zajonc (1965) adopted concepts from the Hull-Spence drive theory of behavior to explain social effects on task performance. In drive theory behavior is seen as a multiplicative function of habit strength and generalized drive. Zajonc asserted that the presence of others enhances the emission of dominant responses. Therefore, if a person's dominant response is good performance because he or she has practiced the task many times, the presence of others brings about this dominant response. If a person is unsure of himself or herself, then performance as affected by self-consciousness, or self-doubt is the dominant response.

Sources of Stress for Leaders

Many types of stressors exist for leaders in their jobs. There are the demands associated with tasks such as time pressures, quality standards, and coordination pressures. Additionally, leaders face the demands put forth by their bosses and their work groups. The effect of a workplace stressor on a leader's performance depends on many factors. Under Zajonc's theory (1965), the stress a leader feels in the form of evaluation apprehension can either work to facilitate or to interfere with the performance of the job by eliciting the dominant response. If through repeated experience under stress the leader is able to cope with the demands of the stressful situation, then the dominant response works to enhance performance. However, if the leader's dominant response is one that results in ineffective leadership or increased stress for his subordinates, his performance will decline. Some research has indicated that stress interferes with a leader's ability to behave appropriately. For example, under stressful situations, some leaders become less likely to delegate and they become very directive (Lowin, 1968).

Useful leadership experiences should provide leaders with exposure to various conditions so that under stress leaders know what responses work well to lead to good group performance. As pointed out by McCall et al. (1988), trial by fire were types of leadership experiences that led a leader to realize that he or she had learned from stressful circumstances. Leaders learned how to label the threat as less threatening (or even challenging), how to realize that they

know how to cope with an experience they have seen before (self-efficacy), third, how to perform the task because of repeated exposure so that the task becomes easy, and how to use the people around them to reduce the pressures on themselves.

The responses gained through experience may work in the same manner that social support helps alleviate the effects of stress. A leader's experience over time may provide two types of effects similar to those found in the social support research. First, increased experience in stressful leadership situations may affect the appraisal of stress, and second, experience in stressful leadership situations may facilitate the use of counter responses. As Bass (1990) points out in the leadership literature, increased preparedness and overlearning are ways of helping individuals cope with anticipated stressful situations.

Explanations for the Effects of Stress in Cognitive Resource Theory

Within the context of work on Cognitive Resource Theory by Fiedler and his colleagues, a number of explanations have been proffered for the relationship between leadership experience and performance under stressful and nonstressful conditions. The relationship of other cognitive resources to performance under stress may point to some explanations for the CRT findings for experience. Fiedler, Meuwese, and Oonk (1961) found that more intelligent leaders talked more under stress, and that too much talking was negatively related to successful group performance.

Recent studies have found some evidence for the explanation of the effects of stress on the relationship between leader creativity and group performance. Reanalysis of data from a study conducted by Meuwese and Fiedler (1965) was undertaken by Gibson, Fiedler, and Daniels (1990). Meuwese and Fiedler had found that leader intelligence and creativity correlated positively with performance (r=.42 and r=.30, respectively); however, under high stress the correlations were close to zero. Gibson et al. found that under high stress, creative leaders produced fewer original ideas than those leaders who were less creative. Thus indicating that stress interfered with the expression of creativity.

Taken together these studies demonstrate that under stressful conditions, creativity and intelligence do not contribute to leader performance. Therefore, under stressful circumstances, a leader must rely on what he or she has learned from experience. However, it is unclear whether the findings related to leadership experience can be wholly explained by Zajonc's (1965) theory of social facilitation, i.e., that stress seems to facilitate the performance of experienced leaders by encouraging the use of the person's dominant response.

Summary

This chapter reviewed some of the relevant research related to the topic of leadership experience and its relationship to performance. Two major conceptualizations of leadership experience were examined. The first, which

views experience in terms of the total amount of experience gained by a person usually in the role of leader or manager, has been examined extensively by many researchers. This conceptualization identifies many of the conditions that moderate the relationship between experience and performance.

The second conceptualization of experience regards experience as being gained from a given activity or a given experience. As pointed out by many researchers, particular experiences seem to be more meaningful than others and affect later on-the-job performance. In addition, these experiences can lead to many types of coping responses and may be specifically related to a leader's belief in his or her ability.

Therefore, taken as a whole, this research provides evidence that leadership experience may enhance a leader's ability to cope with stressful situations effectively for a number of reasons. First, experience may affect the appraisal of a stressful event. Even though Fiedler (personal communication, 1992) does not find a correlation between perceived stress and experience, leaders with a great deal of experience may have such a large amount of time on the job that they have been exposed to many different types of stressful situations. In other words, another stressful situation may seem like less of a threat because of the familiarity with similar situations.

Second, experience may lead to performance of a dominant response and, therefore may act to facilitate performance as explained by Zajonc (1965). However, this facilitation effect might be only short-lived. It may be difficult for

experience to produce a facilitative effect in a long-term situation that may result from a stressful job or a stressful relationship with the boss.

And third, experience may work to increase a leader's belief in his or her ability to cope with a stressful situation and, therefore, the leader may actually work more effectively under stressful situations. In other words, a leader may see that a particular situation has the potential to be stressful, but the leader's belief in his or her ability to overcome any difficulties in the situation will lead to effective performance.

There are three issues to address regarding the role of experience in Fiedler's Cognitive Resource Theory. First, the measures of experience used in the past have been relatively broad. They often focus on years of experience as time in service. So it is not surprising that years of experience do not correlate highly with performance under non-stressful conditions. Usually only total amount of experience as measured in years of service or total amount of time in managerial positions is examined. Other studies have examined the number of months of particular job-relevant experience. For example, Bettin and Kennedy (1991) found that job-relevant experience correlated more highly with performance than time-in-service measures.

Second, many of Fiedler's measures have examined the effects of leadership experience on rated leader's performance, rather than the actual behavior of the leader, which in these stressful circumstances, can be counterproductive for the group and lead to poor group performance. As

research has shown, leaders often do a very good job of projecting a favorable impression to their superiors even when their subordinates hold an unfavorable impression (Wayne & Ferris, 1988). Group performance, rather than leadership performance alone, is a very important outcome measure in examining the moderating effects of stress on the relationship between experience and performance. And third, the mechanisms behind the effect of stress on the relationship between experience and performance have not yet been fully explained.

The next chapter describes a study designed to investigate the effects of leadership experience both as a content-based resource and as a time-based measure. In addition, the role of self-evaluative measures such as self-efficacy will be explored in the relationship between leadership experience and group performance.

CHAPTER 3

PURPOSE OF THIS STUDY

The first focus of the present study was to identify the role of self-efficacy and stress in the relationship between the type and amount of leadership experience and group performance. Specifically, this study examined the effects of two types of experience gained by leaders on a leader's level of self-efficacy and on the manner in which leadership self-efficacy is related to group performance. The first type of experience manipulated in this study was experience gained from performing a particular task. This type of experience is practice that relates to knowledge about how to accomplish a task, or task-relevant practice/experience. The second type of experience manipulated in this study was human relations or leadership role experience. This type of experience is related to the knowledges and abilities required to lead a group to perform well.

This present study differed from previous experience research in that the type of experience a leader receives was manipulated by allowing the leader to have practice in a particular task and role, rather than using only a measure of years of experience. Clearly one opportunity of leading a group or working on a novel task is not equivalent to years of training and experience, but in an attempt to differentiate the effects of human relations leadership experiences from task-relevant experiences on group performance, this manipulation was intended to provide leaders with an occasion to gain experience through practice while allowing the precision of a laboratory study.

In addition to manipulating the types of experiences for this study, a measure of a leader's amount of leadership experience was gathered to examine the effects of stress on this time-based measure of experience.

To examine the effects of stress in this study, leader stress levels were manipulated by the presence of an evaluative other. The performance of leaders in the stress condition were monitored. Therefore, stress reactions presumably were the result of evaluation apprehension. This type of manipulation had been used in previous cognitive resource research (Meuwese & Fiedler, 1965; McGuire, 1987; Gibson, 1990). As predicted by Cognitive Resource Theory, the stress that results from evaluation apprehension will moderate the relationship between experience and group performance in the following manner (see Figure 3 for a portrayal of these relationships):

> **Hypothesis 1**: For the condition in which leaders receive task-relevant practice, groups with leaders under stress will not perform as well as groups with leaders under no stress. Stress will interfere with the use of the newly acquired information.
>
> **Hypothesis 2**: For leaders receiving leadership practice, which gives them short-term experience in the role of leader, groups with leaders under stress will perform better than groups whose leaders are not under stress. Stress will not interfere with the use of this type of experience and will actually lead to better performance than when not under stress.

The second focus of this study examined the relationship between leadership self-efficacy and performance under stressful and non-stressful situations. Research in other areas has shown that subjects with high self-efficacy exhibit little stress reaction, whereas subjects with low self-efficacy experience a high level of stress and autonomic arousal (Bandura, Cioffi,

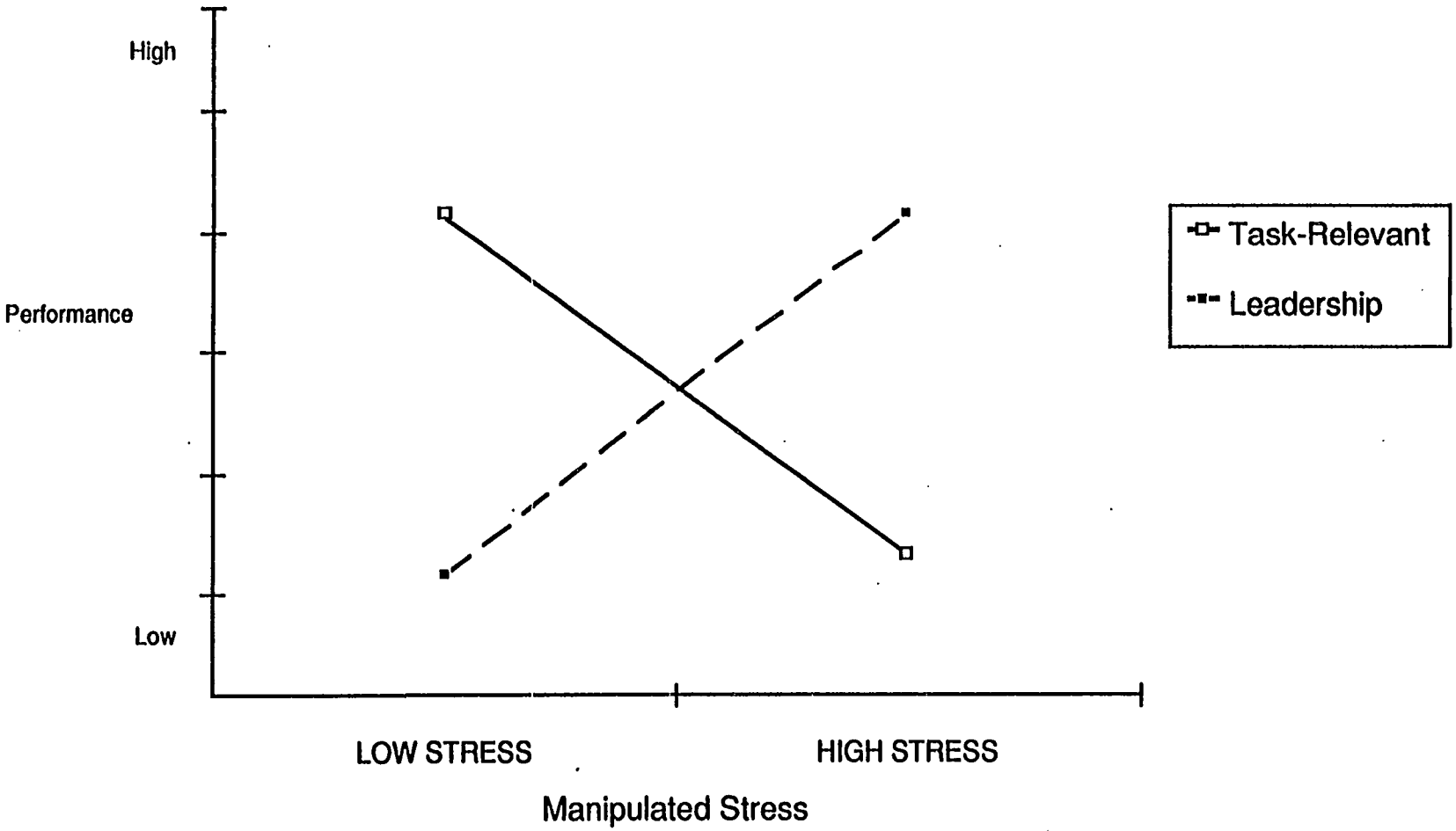

Figure 3. Hypothesized relationships between experience and performance

Taylor, & Brouillard, 1988). Increased self-efficacy for leadership should increase a leader's ability to succeed under stressful circumstances. Self-efficacy was predicted to mediate the relationship between different types of experience and performance. These relationships are depicted in Figure 4.

> **Hypothesis 3**: Either task-relevant practice or leadership practice alone will increase a leader's self-efficacy for leadership. However, the effect is anticipated to be greater for leadership practice. Self-efficacy will be greatest for leaders receiving both types of practice.
>
> **Hypothesis 4**: Leaders with high levels of self-efficacy will perform better than leaders with low self-efficacy across both conditions of stress. In addition, leaders with low self-efficacy who are under stress will perform less well than leaders with low self-efficacy who are not under stress.

These hypotheses were examined in a laboratory study in which leaders of small groups were randomly chosen to receive one of four types of practice in Phase 1 of the experiment: leadership practice, task-relevant practice, both leadership and task-relevant practice, or neither type of practice by completing a group consensus task. In Phase 2 of the experiment, half of the groups performed the task under high stress (evaluation apprehension) conditions, and half of the groups performed under low stress (evaluation apprehension) conditions. Figure 5 summarizes the manipulations in the experiment. Additionally, three types of scales measuring leaders' perceptions of their leadership ability were used to identify which was most affected by different types of leadership practice. These scales included leadership self-efficacy for the leadership role requirements, leadership self-efficacy for the task requirements, and leadership task-specific self-esteem.

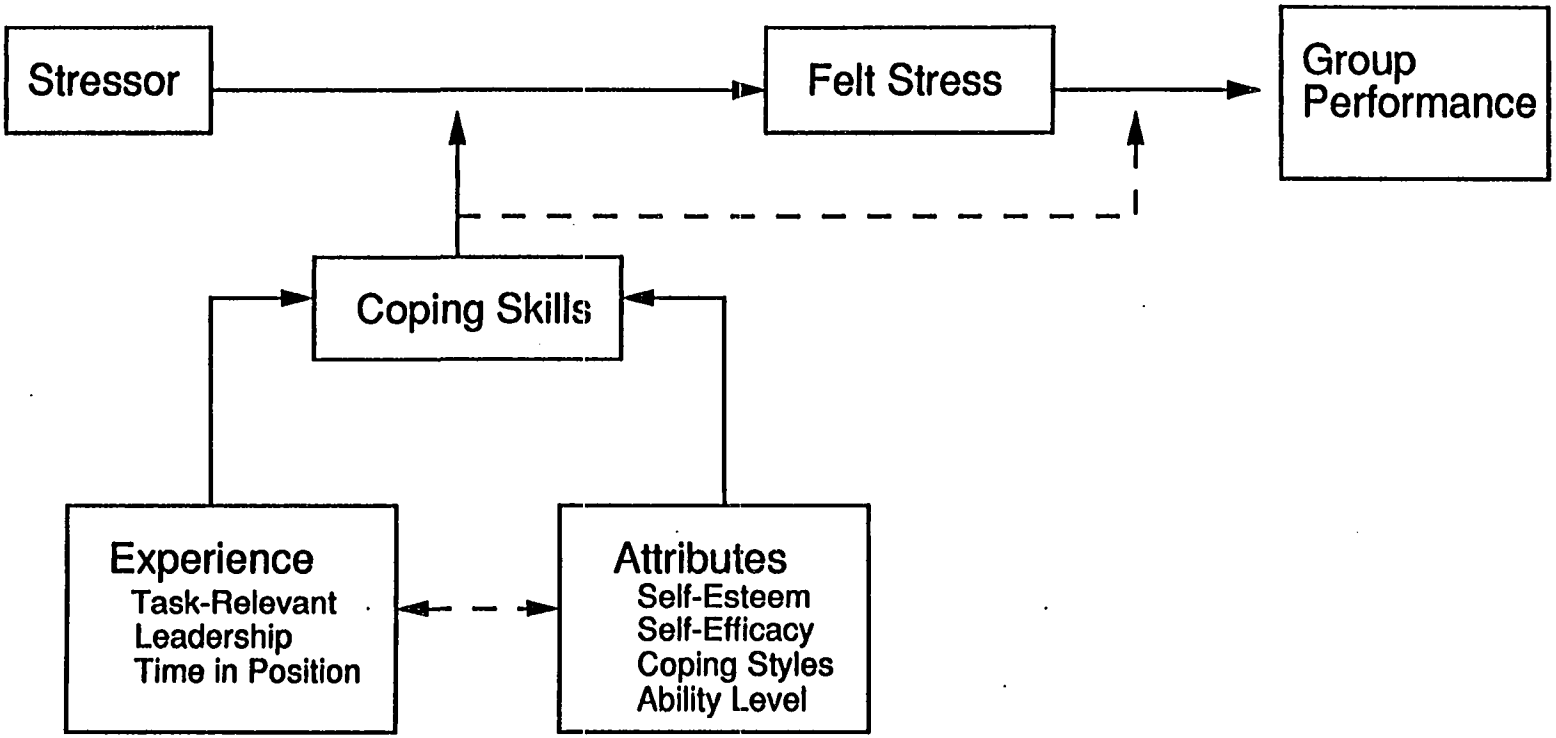

Figure 4. Overview of hypothesized relationships

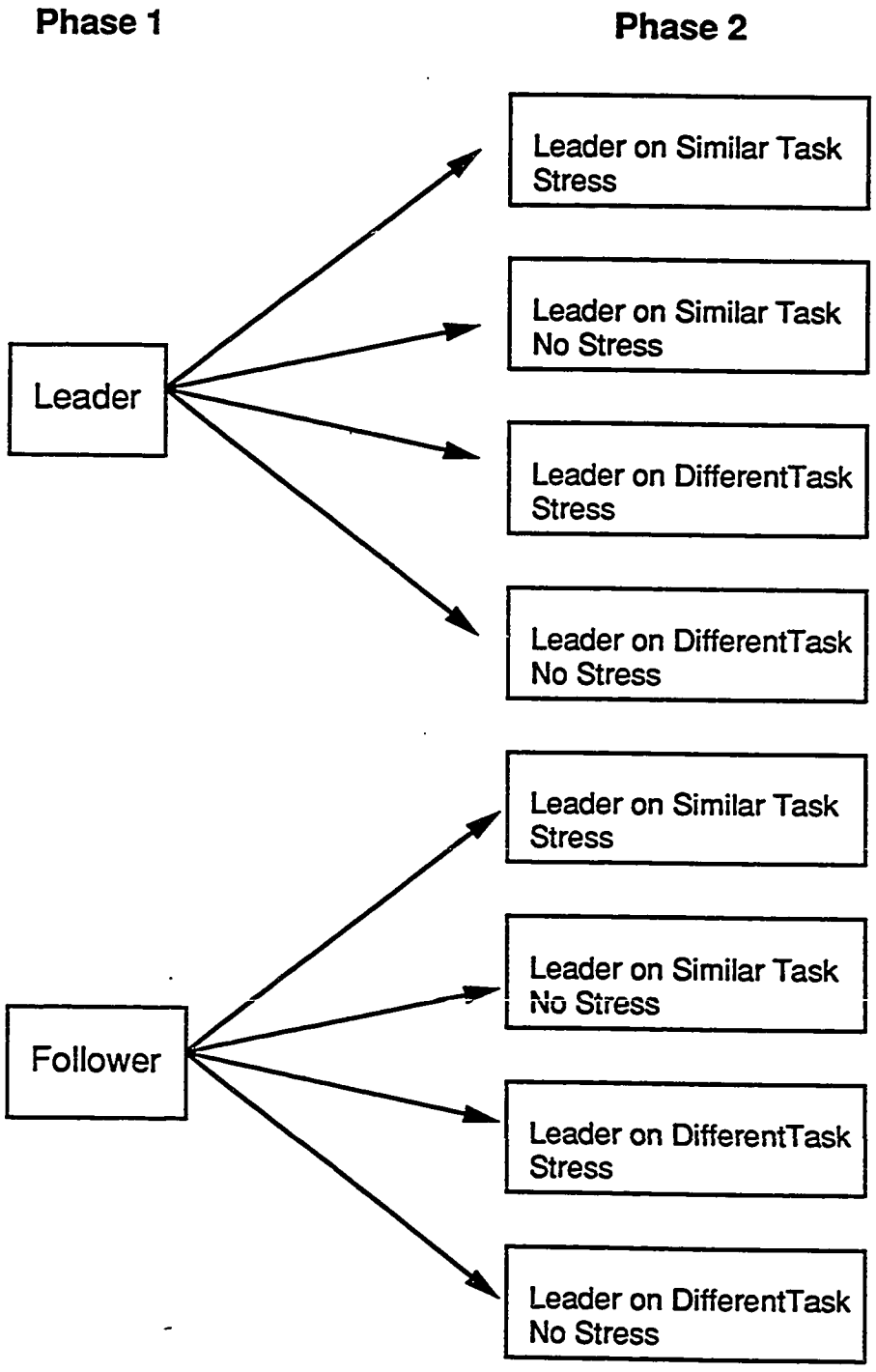

Figure 5. Overview of experimental conditions

CHAPTER 4

METHOD

Subjects

Psychology students, enrolled in a subject pool for course credit, were randomly assigned to 163 three-person mixed-gender groups, with one person randomly chosen as the leader. Of the 653 subjects, 318 were females. The average subject was 19.9 years old. The final sample for analysis included 140 groups, 67 of which were led by males and 72 of which were led by females. Data for two leaders were discarded because their spoken English was not easily understood. Data from leaders in two control conditions containing 6 groups each were not included in the final analysis, nor were data for 7 leaders in which experimenter error occurred.

Tasks

Groups engaged in one of three tasks for each of the two phases of the experiment. The use of three tasks was necessary to manipulate task-relevant practice/experience[1]. Subjects who worked on a survival task, either Desert or Mountain, in both Phase 1 and Phase 2 received task-relevant practice. Those who worked on the Project Planning Task and a survival task in Phases 1 and 2 were in the no task-relevant practice condition. These three tasks are described in more detail below.

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[1]The term practice/experience is used to describe the experience manipulations which gave subjects practice in the task-relevant and leadership aspects of the task.

One of the survival tasks was the Desert Survival Problem (Lafferty & Pond, 1974), which tells participants that they have crash-landed in a desert area in the southwestern United States in mid-August. All but 15 items of equipment have been destroyed, and these remaining items must be ranked in order of survival values. The groups' rankings are compared with those of survival experts to score group performance. This type of task has been found to generate extremely high levels of ego involvement on the part of subjects (Hall & Watson, 1970). The second task used was the Mountain Survival Problem. The task was developed by Kast and Rosenzwieg (1976) and was patterned after the Desert Survival Problem. For this task, subjects are to imagine that their plane has crash-landed in the mountains in a blinding snow storm, and they are to rank 15 items in order of importance for survival. A third task used in this experiment was the Project Planning Situation. This task was developed by Human Synergistics (1985) and uses a similar group process to that of the Desert and the Mountain Survival Problems. Participants are to determine the rank ordering of 20 steps used to set up and implement a business project.

The three tasks selected for this study are not usually used for groups in which a leader has been assigned. However, because successful performance on the task requires choosing strategies, facilitating group input, facilitating consensus, and decision making, an assigned leader can be helpful in accomplishing these activities in his or her role as leader. As demonstrated by

Murphy, Blyth, and Fielder (in press), assigning a leader to the group does not change the mean performance scores of the groups as compared to published national norms for the Desert Survival or the Mountain Survival Problem unless the leader's ability level is substantially lower or higher than the group. This is not surprising given that in most groups of this type an informal leader does emerge who takes on the leadership role as described above.

The underlying rationale for choosing these three tasks was that they required similar group processes, but contained different content. To ensure that this was the case, an individual's Phase 1 performance was correlated with his or her individual Phase 2 performance for two situations. When an individual completed a survival task (Desert or Mountain) in one of the two phases and the project planning task in the other phase, performance on the two tasks correlated $\underline{r} = -.01$. It was more difficult, however, to determine the content similarity of the survival tasks because all subjects who completed a survival task in the first phase received feedback that was designed to increase their performance. In other words, if individuals performed poorly in Phase 1, they should also perform poorly in Phase 2, but we changed this relationship by giving subjects feedback designed to increase their performance. Nonetheless, an individual's performance in Phase 1 correlated with his or her individual performance in Phase 2 ($\underline{r} = .33$. $\underline{n}=67$, $\underline{p}<.01$) indicating that the survival tasks had similar content.

Procedure

To manipulate the two different types of practice/experience in this study, there were two phases in the study.

Phase 1

Phase 1 required one leader and two followers to engage in solving one of the three tasks. After completing pre-test measures, leaders were chosen at random. However, the two followers and the leader were told that the leader was chosen because he or she had the most leadership experience. This procedure required the experimenter to ostensibly score a measure of past leadership experience each subject had completed earlier. Leaders received written instructions that told them confidentially that they did not actually have the most leadership experience and in fact they had been chosen at random. Although there was no measure of whether or not the group members believed that the leader actually had the most experience, saying that the assigned leader had experience was used to give the leader some amount of legitimate authority.

After the groups were given instructions for the task, they were given 10 minutes to rank the items in order of importance as individuals before they began to work on the problem as a group. This initial ranking by individuals leads to higher involvement in the task as well as serves as a pre-measure of task ability. Before the groups began working on the task as a group, they were given the following instructions:

> *"Remember that the group leader is responsible for coordinating the group, soliciting input from group members, and choosing the most appropriate strategy in order to increase the group's performance. Remember this is a group task, but the group leader is responsible for the group's work. If there are any disputes about possible solutions to the problem or how to proceed, the leader has final approval over the course taken."*

Each group was given 15 minutes to come to a consensus on ranking the items for the Desert Survival Problem, or Mountain Survival Problem (20 minutes were allowed for completing the Project Planning task). When the group was finished, its performance was scored by computer in an adjacent room while group members completed additional questionnaires. Subjects were given their group's actual score on the task; however, they were also given false feedback regarding their group's performance level. False feedback was given to ensure that all groups perceived similar levels of performance. All groups during Phase 1 were told that they had performed at the 75th percentile compared to all other groups who had participated in the task over the years. The groups told that many different groups had participated in this task, ranging from high school students to managers, as well as personnel from the armed services. In addition to the feedback regarding the group's performance, group members also were given some information relating to the task. Groups who had completed either one of the survival tasks were told the following:

> *"One common error that occurs in survival situations is ignoring the importance of signaling for help. Many devices that were listed could be used for this purpose. Another critical element that may be overlooked is that of protection against the elements. It is important in survival situations that both signaling for help and protecting one's self from overexposure to the weather are of paramount importance."*

For groups completing the Project Planning task, they were told the following:

> *"Normally in planning tasks a logical flow of events must be determined. Sometimes group members get caught up in the "what ifs" of the project background rather than think about how the planning steps apply to any type of project. Thinking of a specific case often helps the group work through the steps, rather than thinking abstractly about the components of the planning task."*

After the groups received this feedback, Phase 1 leaders who were to serve as leaders in Phase 2 of the experiment were given feedback regarding their performance in the role of leader during Phase 1. This feedback was given to leaders for two reasons. First, leaders may have been uncertain in Phase 2 regarding the appropriateness of their behavior as leader. This feedback told them that their performance was adequate. Second, for the practice to be at all meaningful it needed to cue leaders as to what they should have learned from their practice. To ensure that this cuing occurred, leaders were told about two important components of leadership that would increase their group's performance. Specifically, the feedback consisted of the following:

> *"Before you lead the next group, I would like to give you some hints for leading the group in the next session. Research on these kinds of tasks has found that a productive group is one in which the leader allows the group to contribute. This can be accomplished through active listening and clarifying, and showing concern for others' ideas and feelings. On the other hand, a leader must also explore group members' ideas in order to separate the facts from assumptions and direct the group activities to reach a solution. As I was watching your group I noticed that you did a pretty good job at encouraging the group members to contribute to the task at hand. You spent some time clarifying the things you heard and it also looked like you kept the group on task."*

This completed Phase 1 of the study.

Phase 2

For Phase 2, subjects participated in one of the following conditions to give them practice in the types of experience described previously:

No Practice/Experience: Subjects participated in Phase 1 of the study as group members. In Phase 2 of the study, subjects assumed the role of leader on a different type of task (i.e., if they worked on Project Planning in Phase 1, they worked on Desert Survival in Phase 2). Therefore, subjects were not given a chance to gain either leadership experience or task-relevant experience through either type of practice.

Leadership Practice/Experience Only: Subjects participated in Phase 1 of the study as leaders. In Phase 2 they continued as leaders but worked on a different task with different content. For example, if they worked on the Project Planning task in Phase 1, then they either worked on the Desert Survival or Mountain Survival Problem in Phase 2. Therefore, the tasks in Phase 1 and Phase 2 required the same group process but contained a different technical content.

Task-Relevant Practice/Experience Only: To give the subjects task-relevant experience, subjects who were group members in Phase 1 became leaders in Phase 2 but worked on a similar task in both phases (i.e., they worked on both survival tasks).

Leadership and Task-Relevant Practice/Experience: Subjects in the leadership experience condition took the role of leader on similar tasks in both

phases to produce this condition. Therefore, subjects worked on a survival task (Desert or Mountain) in Phase 1 and Phase 2. Often this condition is referred to as the "Both" condition.

To summarize, in Phase 1 a leader had two followers. In Phase 2, the Phase 1 leader was always a leader again but may have participated in a similar or different task. In Phase 2, a person who was a follower in Phase 1 was a leader who worked on either a similar or different type of task. A person who was not a follower or a leader in Phase 1 served as a follower in Phase 2 after waiting in a separate room during Phase 1. The experimental sessions lasted two hours.

Stress Manipulation

To induce stress (i.e., the stress or anxiety that results from evaluation apprehension) subjects were told that they would be observed by a researcher in leadership effectiveness and that they would be asked to present the rationale for their group's rank ordering of the items to the director of the Organizational Research Lab, Dr. Fred E. Fiedler. The goal of the stress manipulation was to produce a level of stress comparable to moderate amounts of stress that are shown to produce a performance facilitation rather than extreme amounts of stress associated with a performance decrement. The stress manipulation occurred in Phase 2 only. Half of the groups from each of the four conditions were assigned randomly to the high stress condition, and the other half of the groups were assigned to the low stress condition.

Perceived stress measures were taken to evaluate the effects of the stress manipulation. As in Phase 1, groups were told the following:

> *"Now you are to work on the task together as a group. You will have 15 minutes to come to consensus on the rank order of the items. Again, Subject X has the most leadership experience and will lead the group. The group leader is responsible for coordinating the group, soliciting input from group members, and choosing the most appropriate strategy, in order to increase the group's performance. Remember this is a group task, but the group leader is responsible for the group's work. If there are any disputes about possible solutions to the problem or how to proceed, the leader has final approval over the course taken."*

In addition, leaders in the high stress condition were told that their performance would be observed and that they would need to provide a rationale for their group's decision to an expert in the field of leadership. The entire group was read the instruction used in Phase 1 in addition to the following:

> *"Remember you are being videotaped, and observed in order to assess the leader's leadership abilities. The leader will have to give a presentation of your results. He/she will have to provide rationale and explanations of your rankings to Dr. Fred E. Fiedler, the head of the organizational research group. He has been a leader in leadership research for 30 years."*

At this time, the experimenter introduced the monitor to the group.

> *"This is Mr./Ms. _____ who is a researcher from a local research institute. She/He will be observing you today. She/He is interested in looking at leadership behavior and effective group processes."*

The monitors were trained to observe the group process attentively by focusing on the leader. They observed from across the room, took copious notes, and were instructed to peer over the shoulders of the leader approximately 3-4 times during the group session. (A manipulation check

revealed no significant differences in group performance or reported stress for group monitored by each of the four monitors.)

Design

Experimental manipulation of task-relevant practice, leadership practice, and stress resulted in a 2 X 2 X 2 design with eight experimental groups:

1) Leadership practice, task-relevant practice, stress
2) Leadership practice, task-relevant practice, no stress
3) Leadership practice, no task-relevant practice, stress
4) Leadership practice, no task-relevant practice, no stress
5) No leadership practice, task-relevant practice, stress
6) No leadership practice, task-relevant practice, no stress
7) No leadership practice, no task-relevant practice, stress
8) No leadership practice, no task-relevant practice, no stress

In addition to the eight fully crossed conditions, two additional conditions were run to serve as control groups. Because the nature of the experiment required that some students would participate twice, we wanted to ensure that the experience of participating in both phases of the experiment did not alone increase a group's performance even if the subjects were merely waiting in another room during Phase 1 of the study. The two additional conditions contained subjects who did not participate in Phase 1, but who moved directly into Phase 2. During Phase 2, half of the subjects were in a stress condition and half were in a non-stress condition. (Although a comparison between

Phase 1 performance with Phase 2 performance in the neither type of practice condition would have provided a test for this effect in the no-stress condition, this alternative method was devised because there was no manipulated stress in Phase 1 of the study.) An analysis of variance revealed no difference in performance for these control groups as compared to the 8 conditions of interest. This result indicated that participation in both phases did not increase performance over performance achieved when only participating once. The data from these two conditions were not used in further analyses.

Measures

A number of pre-experimental instruments were given to all subjects participating in the experiment.

Global Self-Esteem: Rosenberg's (1965) short 10-item self-esteem scale was used to measure global self-esteem and to examine the relationship of self-efficacy and self-esteem. Responses were summed across the 10 items to come up with a total score. Internal consistency was measured using coefficient alpha and was .85. Weiss (1977) and Weiss and Knight (1980) report internal consistency reliability coefficients of .75 and .76.

Ways of Coping Scale: Self-efficacy is related to coping behavior in that individuals with high self-efficacy are better able to overcome difficult situations. Research in the area of coping and stress has indicated that individuals can use many different forms of coping behaviors to overcome a stressful event. Vitaliano, Russo, Carr, Maiuro, and Becker (1985) developed a scale based on

the original Ways of Coping Scale (Folkman & Lazarus, 1980) to measure a person's various responses to a difficult situation. The original scale used six subscales. This present experiment used four subscales of the original six: Seeking Social Support, Problem-Focused Coping, Avoidance Coping and Wishful Thinking. The first two behavioral styles, Problem-Focused Coping and Seeking Social Support indicate a more active style of coping. The last two, Avoidance and Wishful Thinking, indicate a more passive style of coping. These four subscales were used rather than the six subscales because past research has shown these four subscales to be more internally reliable (Vitaliano, Russo, Carr, Maiuro, & Becker, 1985).

For this experiment, the revised ways of coping scale was used to investigate the construct validity of the two types of leadership self-efficacy. Self-efficacy measures should correlate positively with active styles of coping and negatively with passive styles of coping. The coping scale was used with minor modifications to the instructions. Usually the instructions ask subjects to think of an event/person/experience that is currently of concern to them. For this study, the instruction asked subjects to think of an example of a social situation that is currently of concern to them. Each subscale was scored using the technique of relative scoring by first obtaining the mean item score for each scale, that is, obtaining raw scores and dividing each by its respective number of items. This number was then divided by the sum of the mean for each scale, resulting in true proportions.

A factor analysis of the 39-item scale (raw scores) was forced into four factors. These factors were virtually identical to those reported by Vitaliano, Maiuro, Russo, and Becker (1987).

Task Specific Self-Esteem: An 8-item task-specific self-esteem scale was used as a pre-measure of a leader's confidence in his or her leadership ability. The task in this case was leading a group. This scale was modeled after one developed by Ellis and Taylor (1983) to measure job search behavior. The task-specific self-esteem scale was used in addition to self-efficacy described below because of the difficulty associated with developing a self-efficacy scale for the concept of leadership that resembles those used in more traditional experiments on self-efficacy. Internal consistency for this measure as measured by Cronbach's alpha was .85.

Actual Past Leadership Experience: A short 6-item past leadership questionnaire was developed to measure each subjects' recall of their months of experience in particular leadership situations including groups in high school, college, committees and managerial positions, as well as their own assessment of their overall leadership ability compared to others their age. Cronbach's alpha was calculated for the first four items of the scale and resulted in an coefficient of .68 and for the second portion of the scale the coefficient was .79.

Self-Efficacy: Leaders and group members were asked to rate their own self-efficacy for two types of tasks, first for their role as a group leader, and second for attaining a particular level of performance. For both measures,

magnitude and strength of self-efficacy were measured.

Two types of leadership activities were used to develop a self-efficacy measure for the leadership role. First, subjects were asked to indicate to what extent they could influence a group to accomplish a task as a leader. Second, subjects were asked to what extent could they work to facilitate a group discussion as a leader of the group. These two types of leadership activities represent two major roles for leaders in the type of group problem solving required by the tasks used in this experiment.

For each of these two activities in the leadership role, there were three to four levels of performances that varied in difficulty. For each level, subjects were asked whether they could perform the particular task, and if so, what their level of confidence for performing this aspect of the task was from "0" being "not confident" to "100" indicating "extremely confident." This format was adapted from Gist, Schwoerer, and Rosen (1989) who found it useful for predicting the performance of subjects trained in the use of a computer software package. This scale was given to leaders after Phase 1, and again after Phase 2 if they participated as leaders in Phase 2.

The leadership self-efficacy scale was scored using two methods. The first method used a summation strategy. The confidence level for each item on the leadership scale was multiplied by either a zero for "no" or a one for "yes", and these products for each item were summed and divided by seven to give the subject a total leadership self-efficacy score. The scores using this method

had an average of 63.01 and ranged from 0 to 100 for those who completed the scale before Phase 1 (n=646). The coefficient alpha for this scale for Phase 1 was .82. This large coefficient alpha indicates that subjects did not view the two components of leadership self-efficacy, leader influence and facilitation, as distinct competencies.

The summation method did not take into account the level of difficulty for each item. Therefore, the second method for combining scores used a weighted sum. The mean confidence rating for each item was calculated for all subjects (n=646). These confidence ratings gave the relative difficulty for each of the seven different situations of leadership. Each confidence rating for the total population was subtracted from the total number of points available (100), and the resulting number was divided by 100 to give the item the appropriate difficulty weight. The more difficult an item, the larger weight it was given. A subject's confidence rating for each item was multiplied by a difficulty rating for each item, was summed, and was divided by seven to produce a total weighted score. The format and mean confidence ratings and difficulty weights for each item on the leadership self-efficacy scale are shown in Figure 6. Scores for the weighted scale ranged from 0 to 37.11 with a mean score of 19.8.

Instructions: Now that you have had a chance to serve as leader, we would like you again to think about your leadership ability. Below are some of the skills required for leaders in different groups. None of these behaviors is better than the others but are different ways of achieving good group performance. Please indicate whether you can exhibit this skill in a leadership role (Y for yes, N for no) and if yes, indicate how confident you are in your rating (1 indicates not at all confident and 100 indicates totally confident). (Do not include a confidence rating if you answered "no".)

Influencing group members involves directing them to accomplish a task while persuading them to perform well. I am capable of influencing a group...

	Confidence (1-100)	Difficulty Weight
When the group has as much knowledge as I do and no one has actually been chosen as leader.	61.5	.385
When I know more than the rest of the group about the task at hand.	81.8	.182
When the group has been told to defer to me because I am the leader of the group or supervisor.	65.2	.348

Facilitating a group discussion involves keeping a group on task while allowing the group members to contribute their knowledge. I am capable of facilitating a group discussion...

	Confidence (1-100)	Difficulty Weight
When the group members do not get along with each other.	45.7	.543
When the group refuses to cooperate because they are not interested in the task.	28.0	.720
When I know more than the rest of the group about the task at hand.	72.0	.280
When the group is enthusiastic about the task and willing to cooperate.	86.0	.140

Figure 6. Mean confidence ratings and difficulty ratings for leadership self-efficacy scale.

Leader's Group Performance Self-Efficacy Scale

The group performance self-efficacy scale shown in Figure 7 was scored by taking the confidence level for each performance level and multiplying it by the percentile level described. Then the products were summed over the 10 levels. For example, persons who said that with a confidence level of 50 they could perform at the 10th percentile would score a 50.

Group Member and Leader Ratings of Leader and Group Process

Group members were asked to rate the group interaction and the leader for general group outcomes on seven items. Coefficient alpha for the scale was .77 and average interrater agreement between the two group members for the items was .37. A factor analysis done on the 7-item scale resulted in two factors with eigenvalues greater than 1.00. The first factor contained four questions regarding the group's satisfaction with the decision the group made and the process (Cronbach's alpha =.78). The second factor contained three items that assessed the leader's behavior in the group (Cronbach's alpha =.64).

The leader also provided ratings of his or her own behavior and his or her satisfaction with the group's decision. The format of the questionnaire was almost identical to that of the scale given to the group members. A factor analysis revealed two factors with eigenvalues greater than 1.00. The first factor contained questions regarding the leader's satisfaction with the group decision (Cronbach's alpha =.71), and the second factor contained ratings of specific leader behaviors (Cronbach alpha =.40).

In my role as leader, I am capable of getting my group to perform....

	Can Do Y/N	If Yes, Confidence (1-100)
Better than 10% of all other groups on the same task.	_____	_____
Better than 20% of all other groups on the same task.	_____	_____
Better than 30% of all other groups on the same task.	_____	_____
Better than 40% of all other groups on the same task.	_____	_____
Better than 50% of all other groups working on the same task.	_____	_____
Better than 60% of all other groups on the same task.	_____	_____
Better than 70% of all other groups on the same task.	_____	_____
Better than 80% of all other groups on the same task.	_____	_____
Better than 90% of all other groups on the same task.	_____	_____
Better than 99% of all other groups working on the same task.	_____	_____

Figure 7. Group performance self-efficacy scale

Perceived Stress

A six-item stress scale was developed to measure subjects' perception of stress. The scale asked general questions regarding how nervous or anxious the subjects felt, whether the videocamera or the observer made it difficult to concentrate on the task, and how stressful the activity was in general. A factor analysis of the scale using varimax rotation revealed that the six items loaded on one factor, accounting for 62.3% of the variance. Coefficient alpha for the scale was .88.

Dependent Measures

The correct solution to each of the three tasks was based on rankings by a panel of experts. Group performance was the sum of the absolute differences between the ranking of items for the correct solution and the item rankings of the group's solution. A lower score indicated better performance.

CHAPTER 5

RESULTS

Manipulation Checks

Three manipulation checks were used to examine the effects of the stress manipulation and the two practice/experience manipulations.

Stress Manipulation

A perceived stress measure was given to all leaders after Phase 2 to determine whether leaders in the evaluation apprehension conditions experienced more stress than those in the no evaluation apprehension conditions. Because of the different practice/experience manipulations, we expected that there would be more perceived stress in the stress condition than in the no stress condition when leaders received no leadership practice or task-relevant practice. The practice/experience manipulations were expected to reduce perceived stress in the manipulated stress conditions.

A 2x2x2 ANOVA was used to examine perceived stress for each of the eight experimental conditions. The results using the entire six-item scale produced no significant main effects but there was a significant stress by task-relevant practice by leadership practice three-way interaction ($F(1, 127)=4.34$, $p<.05$). Table 2 shows the means and standard deviations for the entire scale for each of the eight conditions.

The lowest reported stress was for the condition in which the leader had both leadership practice and task-relevant practice and no manipulated stress (Mean =12.08). However, leaders in the manipulated stress condition under the

Table 2. Means and Standard Deviations for the Six-Item Perceived Stress Measure for Each of the Eight Experimental Conditions

	Manipulated Practice/Experience			
	Leadership and Task-Relevant	Leadership Only	Task-Relevant Only	Neither
Stress				
Mean	17.79	15.27	14.89	15.06
S.D.	7.80	6.31	7.02	6.26
	n=14	n=15	n=18	n=17
No Stress				
Mean	12.08	15.93	18.23	16.43
S.D.	5.87	5.41	5.36	7.71
	n=12	n=14	n=13	n=14

*A higher score indicates more perceived stress.

Overall Mean = 15.70
S.D. = 6.58
Range = 6 to 31
Average Scale Value = 2.62

same leadership/task-relevant practice condition, reported the most perceived stress for leaders under stress (Mean =17.79). The means for these two conditions, however, did not differ significantly as indicated by a Newman-Keuls post hoc pairwise comparison test (Newman, 1939; Keuls, 1952).[2] Further, perceived stress was relatively similar in conditions in which leaders had received only leadership practice and in conditions in which the leadership received neither type of leadership practice. Multiple ANOVAs using one-item of the stress scale did not reveal that the response on any one item from the perceived stress scale differed by condition except for the significant three-way interaction described above.

From analysis of the perceived stress measure the effects of the stress manipulation are not clear. In the stress condition, leaders receiving neither type of practice actually reported less stress than leaders who were in the no stress condition. We were trying to produce moderate amounts of stress by using monitors to create evaluation apprehension. The scale that we used asked general stress questions, such as "overall how stressful was this activity," and "how anxious did it make you feel." The perceived stress scale also asked other questions related to the presence of the videocamera and the observer. In both conditions of stress and no stress, the videocamera and an observer were present. For the no stress condition, the term "observer" merely referred

[2]The Newman-Keuls method was used because, as outlined by Klokars and Sax (1988), it provides a conservative test that protects against Type I errors, but is powerful enough to avoid Type II errors. Because of unequal n's, the harmonic mean was used to calculate the test statistic.

to the person conducting the experiment. Therefore, leaders in the no-stress condition reported that even this source of evaluation made them feel somewhat anxious. This lack of perceived stress in the stress condition as compared to the no stress condition may be the result of pre-experimental differences as evidenced in measures of self-efficacy. However, as will be discussed in the analysis of performance results, the stress manipulation did affect performance in the hypothesized direction.

Leadership Practice/Experience Manipulation

To determine whether leaders felt that the leadership practice they were given was meaningful, at the conclusion of Phase 2 leaders were asked to rate whether they thought that being a leader in the first group was helpful when they were asked to act as leaders in the second group. Two five-point items assessed whether the leaders thought this occurred. One item specifically asked whether being a leader during both phases of the experiment helped the leader in leading the group. The mean for this item was 3.32 out of five points. This item was completed only by leaders who were leaders in both phases. The results indicated that leaders felt they had learned something about leadership. Additionally, because leadership practice was hypothesized to increase a leader's self-efficacy, the effects of the leader practice/experience manipulation were more fully tested in the analysis of changes in self-efficacy.

The second item asked subjects whether they thought they learned something about leadership as a function of participating in the group during the

first session. This item had a mean of 3.55 for those who served as leaders in both phases and a mean of 3.14 for those who served first as followers in Phase 1 and then as leaders in Phase 2. These means were significantly different ($t(137) = 2.76$, $p<.01$). Therefore, those who served as leaders in both phases reported that they learned more about leadership than those who only served as leaders once but participated in both phases. Although the difference between these two groups was statistically significant, the difference was slightly less than one half of a scale point. The leadership practice/experience manipulation may not have been as meaningful as we had hoped. Secondly, because we used followers in Phase 1 to serve as leaders in Phase 2, they may have vicariously learned about the appropriate leadership skills, even though they did not serve as leaders.

Task-Relevant Practice/Experience Manipulation

The leader's individual performance was compared in Phase 1 and Phase 2. Leaders who worked on survival tasks in Phase 1 and Phase 2 were expected to perform better in Phase 2 than those leaders who did not work on survival tasks in both phases. The success of the manipulation was examined by using the leader's Phase 2 individual performance for those leaders completing a survival task as the dependent variable in a t-test. To compare the performance of groups on the three different tasks used in Phase 2, the performance scores were standardized with a mean of 50 and a standard deviation of 1.0. The manipulation check revealed that leaders who had worked

in a group completing a survival task in Phase 1 had somewhat higher scores on a survival task in Phase 2 than leaders who worked on the planning task ($t(148) = -1.61$, $p=.11$). This is not conclusive evidence that the manipulation worked. One caveat for these results, however, is that this comparison for the task-relevant practice/experience manipulation used only a leader's individual performance. Because leaders were given only 10 minutes to complete the task as individuals, it is conceivable that any learning related to the task may have been applied later when the leader got together with the group members to work on the problem rather than during the short time the leader had to work on it alone. Subsequent analysis of group performance for leaders receiving or not receiving task-relevant practice will help determine whether this was the case.

Intercorrelations of Pre-test Measures

All measures taken at the beginning of the experimental session were correlated. The intercorrelations and descriptive statistics for each measure are presented in Table 3. As noted in the table, all correlations are significant unless otherwise indicated.

Self-esteem and the two types of measures of leadership self-efficacy were intercorrelated. The global self-esteem measure correlated .46 with task-specific self-esteem for the task of leadership. This result is comparable to the correlation of .54 found by Ellis and Taylor (1983) between global self-esteem and their task-specific measure. In addition, the alternative measure of

Table 3. Intercorrelations Among Pre-Measures

	Rosenberg Self-Est.	Task Sp. Self-Est.	Self-Efficacy	Actual Exper.	Perceived Exper.	PF Coping	SS Coping	WT Coping	AV Coping
Mean	33.95	30.03	63.01	31.05	5.20	.32	.25	.24	.19
Standard Dev.	4.22	4.24	18.65	30.13	2.30	.08	.08	.08	.07
Number of Items	10	8	7	4	2	15	6	8	10
Range	20-40	12-40	0-100	0-216	0-10	.12-.66	.0-.52	.0-.52	.0-.48
Cronbach's Alpha	.85	.85	.88	.67	.79	.77	.71	.79	.75
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Rosenberg Self-Esteem	1.00								
2) Task Specific Self-Esteem	.46	1.00							
3) Leadership Self-Efficacy (Summated)	.37	.57	1.00						
4) Actual Total Experience	.16	.35	.28	1.00					
5) Perceived Total Experience	.37	.64	.51	.44	1.00				
6) Problem-Focused Coping	.38	.25	.24	.08	.21	1.00			
7) Social Support Coping	.25	.14	.12	.13	.11	.07	1.00		
8) Wishful Thinking Coping	-.34	-.19	-.21	-.11	-.18	-.62	-.57	1.00	
9) Avoidance Coping	-.33	-.22	-.17	-.12	-.16	-.48	-.59	.20	1.00

All Correlations presented are significant, n = 535.
Correlations between .07 and .10, $p < .05$
Correlations between .11 and .13, $p < .01$
Correlations between .14 and 1.00, $p < .001$

leadership self-efficacy correlated .37 with global self-esteem. The two self-ratings of leadership ability, task specific and self-efficacy, correlated .57.

Even more encouraging are the correlations of the two self-ratings of leadership with actual estimates of leadership experience. Task-specific self-esteem and leadership self-efficacy correlated .35 and .28 (respectively) with actual total leadership experience. Global self-esteem correlated .16 with actual leadership experience. As expected, subject's ratings of their perceived leadership experience as compared to others their age was highly correlated with both self ratings of leadership. Perceived leadership experience correlated .64 with task-specific self-esteem and .51 with leadership self-efficacy. Additionally, perceived leadership experience correlated .44 with actual reported leadership experience.

The correlations between actual reported leadership experience and measures of task-specific self-esteem and self-efficacy show that although general self-esteem is unrelated to actual leadership experience, the measures of task-specific self-esteem and leadership self-efficacy may be tapping into the more specific constructs that assess a person's ability in the leadership role.

The pattern of correlations among the four coping scales were as expected. Problem-focused coping was minimally related to social support ($\underline{r}$ = .07) and highly negatively related to wishful-thinking coping ($\underline{r}$ = -.62) and Avoidance coping ($\underline{r}$ = -.48). Social support coping style was highly negatively related to wishful-thinking ($\underline{r}$ = -.57) and avoidance coping ($\underline{r}$ = -.59). Wishful-

thinking and avoidance coping were positively related to each other (r = .20).

In addition to the intercorrelations among these four coping scales, the correlations between the coping scales and the measures of self-esteem and self-efficacy were examined. In general, the pattern of correlations revealed that subjects higher in self-esteem, task-specific self-esteem, and leadership self-efficacy were more likely to have higher scores on the problem-focused coping scale and social support scale, and lower scores on the wishful thinking scale and the avoidance coping scale. This result indicates that the scales developed for this experiment relating to leadership self-efficacy were related to behavioral coping styles. However, the correlations among the two leadership self-efficacy scales and coping scales were no greater than those among general self-esteem and the coping scales indicating that the constructs of leadership self-efficacy and general self-esteem were highly related.

Task Performance Analysis

Hypothesis 1 stated that, in general, leaders given task-relevant practice would perform better than leaders not given task-relevant practice in the no or low stress condition, and that in stressful conditions leaders given task-relevant practice would not perform as well as leaders not given task-relevant practice. In other words, a significant interaction between stress and task-relevant practice was expected. Hypothesis 2 stated that stress would facilitate the use of leadership practice, and therefore, better performance was expected under stress than not under stress for leaders with leadership practice. Therefore, a

significant interaction between manipulated leader practice/experience and stress was expected.

To test Hypotheses 1 and 2, group performance on the three tasks was measured by comparing the rank ordering of items with the rank order of experts in mountain survival, desert survival, and principles of project planning. The closer the score was to zero, the better the group's performance. The unstandardized means, standard deviations, and ranges for performance for the three tasks during Phase 1 are presented in Table 4. According to Lafferty and Eady (1973), the average individual score on the Desert Survival Problem is 67.7 based on results for 68 teams of college students (usually about 4 to 5 students per team). The average group score for this same sample is 59.6. They also report that another sample of 28 college teams have an individual average of 69.4 and a group average of 66.7. Both sets of scores are very comparable to the means found in the present study of college students.

An earlier study using the Mountain Survival Problem (Blyth, 1987) found comparable means to those found in this study. The means for Project Planning were higher than what are usually found. In other words, performance was worse than has been found for other groups. The published mean for individual performance based on information from 50 teams (246 participants on five-person teams) is 58.6 (Human Synergistics, 1985). Average team score for these same teams is 39.7. In the present study, the higher means could be the result of a couple of factors. First, data were unavailable for performance of a

Table 4. Unstandardized Means, Standard Deviations, and Ranges for Individual and Group Performance in Phase 1

	Individual Performance	Group Performance
Desert Survival Task		
Mean	69.77	64.09
S.D.	12.58	10.34
Range	36-98	38-82
Mountain Survival Task		
Mean	61.14	51.51
S.D.	13.55	13.30
Range	28-96	30-84
Project Planning Task		
Mean	86.10	63.19
S.D.	31.52	28.68
Range	32-162	26-144

*Lower scores indicate better performance than higher scores. A perfect score would be zero.

college sample on the Project Planning task. Second, in this study we gave subjects only about 20 minutes to complete this task while the task recommends about 40 minutes. Given more time, our sample of subjects may have performed better.

A 2x2x2 ANOVA using Phase 2 performance as a between-subjects variable showed a marginally significant main effect for stress ($F(1, 132) = 2.94$, $p<.10$) with groups under stress performing slightly worse than groups under no stress and a main effect for task-relevant practice ($F(1, 132) = 3.19$, $p<.10$) with groups receiving task-relevant practice performing better than groups receiving no task-relevant practice. However, there were no other significant effects or interactions. Table 5 contains a summary of the analysis of variance. Table 6 contains the means and standard deviations for the performance measure for each of the eight conditions. As mentioned previously, the groups' performance scores were standardized for the three different tasks used in Phase 2 with a mean of 50 and a standard deviation of 1.0 to compare the groups on the three different tasks used in Phase 2. Therefore, a difference of one point indicates a difference equal to one standard deviation. Figure 8 portrays these means graphically. A Newman-Keuls pairwise comparison test revealed however, that none of the eight means differed significantly from each other.

Because the results for the stress manipulation was not as powerful as had been expected, the perceived stress scale was split at the median (median = 14) into groups of high and low perceived stress and used in an 2x2x2

Table 5. ANOVA Summary Table for Group Performance by Experimental Condition

	SS	df	MS	F	p	eta^2
Main Effects						
Leadership Practice	.00	1	.00	.00	.99	.00
Task-Relevant Practice	3.19	1	3.19	3.47	.07	.03
Manipulated Stress	2.94	1	2.94	3.20	.08	.02
2-Way Interactions						
Leader Prac. by Task Prac.	.27	1	.27	.30	.58	.00
Leader Prac. by Stress	.00	1	.00	.00	.99	.00
Task Prac. by Stress	1.09	1	1.09	1.19	.28	.01
3-Way Interaction						
Leader Practice by Task Practice by Stress	.03	1	.03	.848	.00	.00
Explained	7.65	7	1.09			.06
Residual	112.11	132	.918			
Total	128.76	139	.926			

Table 6. Means and Standard Deviations for Group Performance by Experimental Condition

	Manipulated Practice/Experience			
	Leadership and Task-Relevant	Leadership Only	Task-Relevant Only	Neither
Stress				
Mean	50.00	50.36	49.89	50.49
S.D.	.96	.95	.91	.95
	n=16	n=17	n=18	n=18
No Stress				
Mean	49.86	49.93	49.80	49.99
S.D.	.83	1.18	.84	1.02
	n=18	n=18	n=18	n=17

Note: These are standardized scores. The mean is 50 and the standard deviation is 1.0. A low score indicates better performance than a high score.

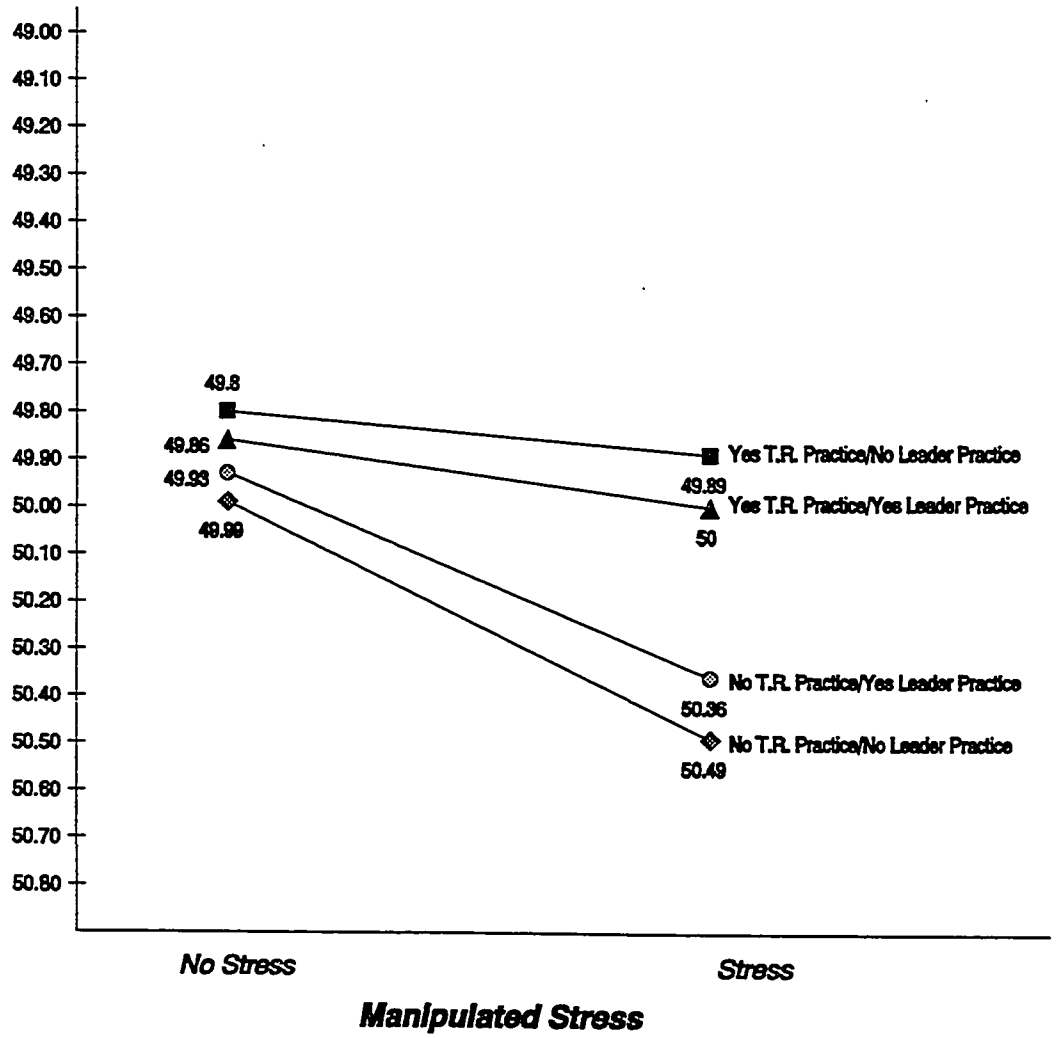

Figure 8. Group performance by experimental condition

(perceived stress substituted for manipulated stress) ANOVA to predict group performance. There was a significant main effect for perceived stress ($F(1, 109) = 4.56$, $p<.05$), however, no interactions were significant. Those who perceived more stress performed significantly worse than those who perceived less stress across all conditions. When the stress measure was added to a regression equation for performance with leadership practice and technical practice as categorical variables, there was no significant main effect for perceived stress. The implications of this finding will be discussed later.

Group Members' Ratings of Satisfaction and Leader Behavior

Group ratings of satisfaction and leader behavior were taken to provide some information regarding the group's reactions to the group process. Although no specific hypotheses were made regarding group ratings, the average group member rating for the five-item group satisfaction scale was compared among conditions. The ANOVA revealed a main effect for leader practice: Leaders who had practice had group members who reported slightly less favorable group ratings than did the those group members who had inexperienced leaders ($F(1, 156) = 4.12$, $p<.05$). Also, there was a main effect for stress ($F(1, 156) = 3.93$, $p<.05$). Groups who had leaders under stress were less satisfied with the group process than groups with leaders not under stress. Examination of each of the items as a dependent variable revealed a similar pattern.

Relationship of Months of Leadership Experience to Group Performance

Because there was concern that the leadership practice/experience manipulation may be too short-lived to be meaningful, all subjects were asked to complete a pre-measure that required them to report the number of months they had participated in various leadership activities. The means, standard deviations, and ranges are presented for each of these categories in Table 7. Table 8 contains the intercorrelations for these different experience measures. Also included is a sum of the number of months for each of the various categories of leadership experience. A 2X2X2 ANOVA using the total number of months of reported experience revealed that leaders did not differ significantly on this variable by condition.

To examine the relationship between actual self-reported leadership experience and performance, mutiple regression analysis was used with group performance as the dependent variable; actual leadership experience measure as a continuous variable, and manipulated leadership practice/experience, task-relevant practice, and stress were used as categorical variables. The main effects (manipulated leadership practice, task-relevant practice, and stress) and reported months of total leadership experience were entered into the regression equation first as a block, then the two-way interaction terms, then the three-way interaction terms, and finally the four-way interaction.

Table 7. Descriptive Statistics for Items on the Leadership Experience Measure

Months of Leadership Experience in High School
Mean = 13.73
Standard Deviation = 13.04
Range= 0 to 48

Months of Leadership Experience in College
Mean = 2.51
Standard Deviation = 6.66
Range = 0 to 40

Months of Leadership in Committees
Mean = 13.69
Standard Deviation = 15.63
Range = 0 to 90

Months as Manager of Others
Mean = 7.52
Standard Deviation = 14.49
Range = 0 to 99

Total Number of Months
Mean = 34.92
Standard Deviation = 28.68
Range = 0 to 100*

Percentage of Time Assume Leadership Role (5-point scale)
Mean = 2.71
Standard Deviation = 1.29
Range = 0 to 5

General Leadership Experience (Rating on 5-point scale)
Mean= 2.49
Standard Deviation = 1.27
Range = 0 to 5

*Note: These are descriptive statistics for the sample of leaders (n=140). It does not include followers. Responses for 5 leaders who had extreme scores (more than 2 standard deviations) were recoded to 100 for the total number of months experience. The correlations between modified total months of leadership scores and the other pre-tests measures are virtually the same as those for the unmodified distribution of total months of leadership scores.

Table 8. Intercorrelations Among Different Types of Self-Reported Leadership Experience

	1	2	3	4	5
1. Total months	1.00				
2. Highschool	.70	1.00			
3. College	.55	.32	1.00		
4. Committee	.82	.43	.32	1.00	
5. Managerial	.75	.27	.30	.47	1.00

Table 9 summarizes the results of the regression analysis. As shown before, there were main effects for task-relevant practice and stress. Leaders under stress performed worse than leaders not under stress, and those leaders receiving task-relevant practice performed better than those leaders not receiving this type of practice. There was no main effect for actual months of leadership experience. The task-relevant practice by actual leadership practice interaction was significant ($F(1, 130) = 6.39$, $p<.05$).

The distribution of actual months of experience was split at the median (median= 27 months) to examine the pattern of means.[3] Figure 9 shows the graph of means for the significant two-way interaction. Group performance for leaders receiving no task-relevant practice was the same regardless of level of actual leadership experience. Nonetheless, actual experience did make a difference when the leader was given task-relevant practice. Those with more months of leadership experience actually performed slightly worse than those with fewer months of leadership experience in this condition. More appropriate however, is the interpretation of the significant stress by task-relevant practice by actual experience interaction ($F(1, 126) = 4.99$, $p<.05$) which shows how the stress manipulation adds precitive power to the equation.

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[3]This method of splitting the continous variable into high and low groups for months of experience was used to investigate the significant interactions in the regression analysis for months of experience and later analyses for self-efficacy. The same significant interactions were shown in analyses of variance using the dichotomized variables. Also, regression plots of the significant interactions revealed the same pattern of effects as those found in examination of the means. A more appropriate technique, the Johnson-Neyman technique (Huitema, 1980) can be used to determine regions of significance and non-significance for a disordinal interaction.

Table 9. Regression Analysis for Effects of Months of Total Experience on Group Performance

Effect	Total R^2	Increase in R^2	F for Increase	df	p
Main Effects					
Months of Leadership Experience	.010	.010	1.40	1 & 135	.239
Leadership Practice	.010	.000	.02		.898
Task-Relevant (TR) Practice	.035	.025	3.61		.059
Stress	.058	.026	3.74		.055
Two-way Interactions					
Stress by Leader Practice	.058	.000	.00	1 & 130	.986
Stress by TR Practice	.062	.014	2.09		.151
Stress by Months of Leader Experience	.062	.000	.03		.854
TR Practice by Months of Leader Experience	.104	.042	6.39		.013
Leader Practice by Months/Experience	.120	.016	2.41		.123
Three-way Interactions					
Stress by Leader Practice by TR Practice	.121	.001	.325	1 & 126	.570
Stress by Leader Practice by Months/Experience	.132	.011	1.88		.170
Stress by TR Practice by Months/Experience	.165	.033	4.99		.027
TR Prac. by Leader Prac. by Months/Exp.	.179	.014	2.13		.147
Four-way Interaction					
Stress by Leader Practice by TR Practice by Months/Experience	.179	.000	.07	1 & 125	.795

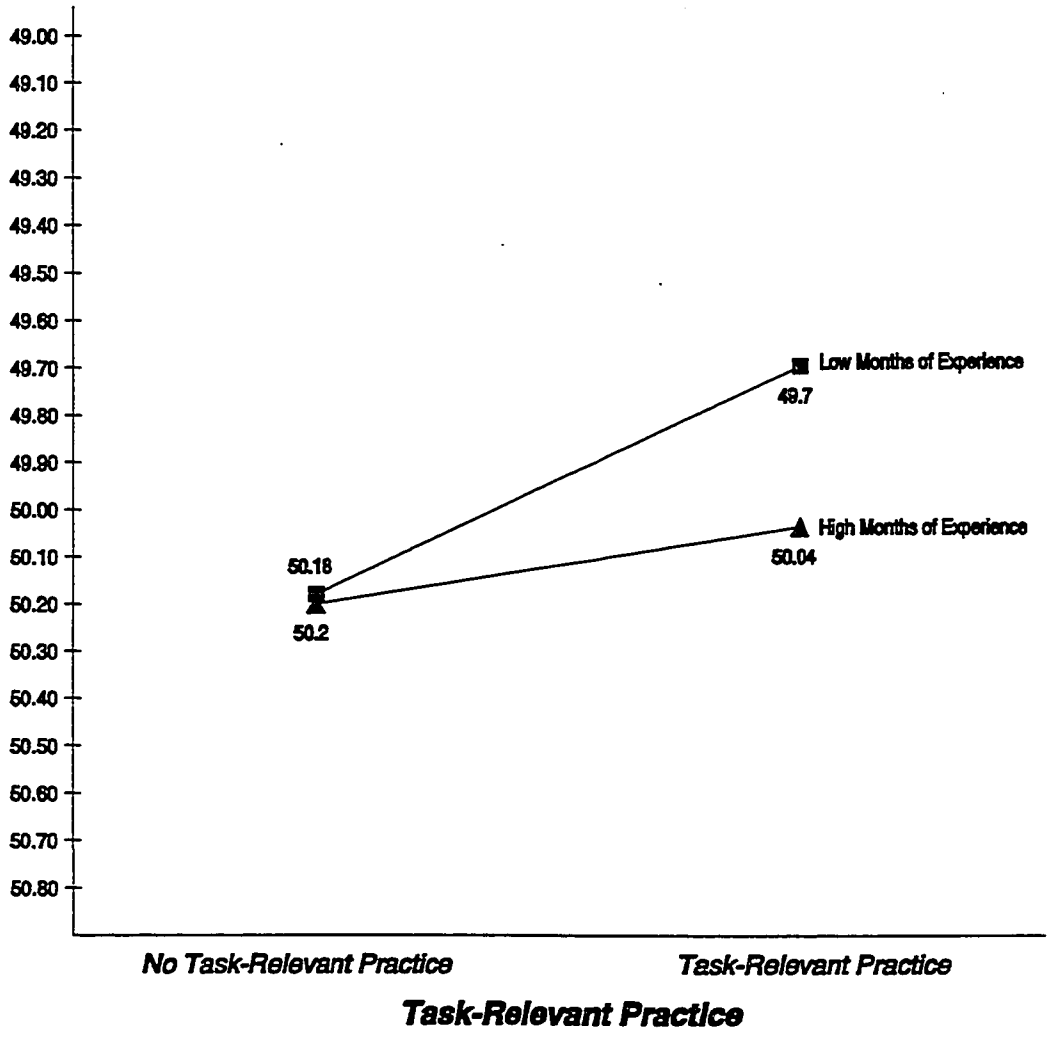

Figure 9. Significant two-way interaction for group performance: Task-relevant practice by total months of leadership experience

Figure 10 shows the pattern of means for the 3-way interaction. For those leaders who had fewer months of leadership experience, whether or not they received task-relevant practice determined how well they performed. Under manipulated stress, this group of leaders performed better if they had received task-relevant practice/experience than if they did not. However, under no stress, months of experience were unrelated to performance. The overall R^2 for performance with the addition of total months of leadership experience as a predictor to the model was .179.

In addition to the regression analysis, another method for understanding the relationship between months of experience and performance is shown in the pattern of correlations for each of the eight conditions. Figure 11 presents these relationships. (Note: Because a lower score actually indicates better performance than a higher score, the correlations have been reversed so that a positive correlation indicates that as months of experience increases performance increases.)

For the most basic condition, that in which leaders received neither task-relevant practice nor leadership practice, we find the usual relationship between experience and performance. Under stress, experience and performance correlate $r = .35$ ($p=.08$, $n=18$). Under no stress, leadership experience and performance correlate $r = -.31$ ($p=.11$, $n=17$). The difference between these correlations was significant ($z = 1.84$, $p<.05$).

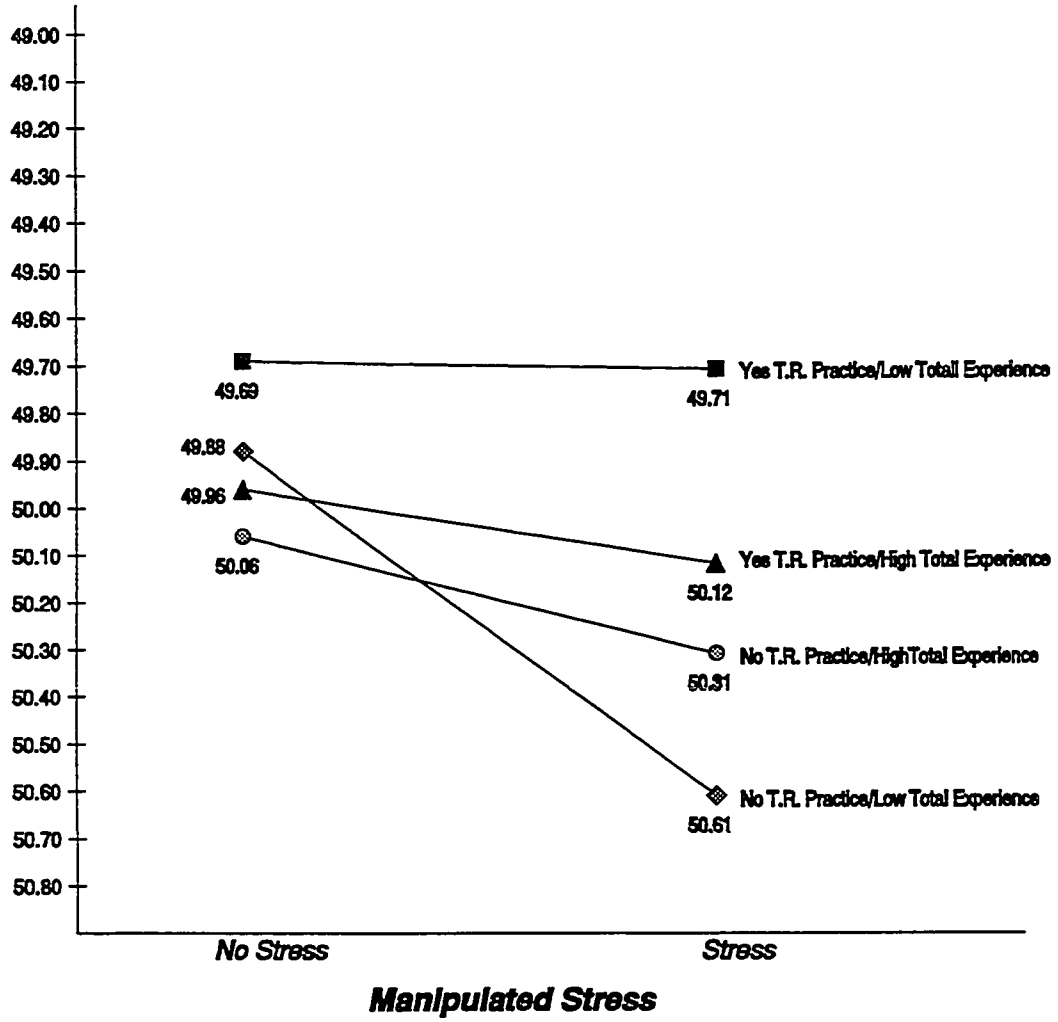

Figure 10. Significant three-way interaction for group performance: Manipulated stress by task-relevant practice by total months of experience

For leaders given leadership practice during the course of the study, there was no difference in the correlation between their actual self-reported leadership experience and performance in the stress as compared to the non-stress condition. The correlation between actual experience and performance in the stress condition was r = .52 (p=.02, n=17) and was r = .47 (p=.02, n=18) in the no stress condition. Therefore, when leaders were given brief leadership practice, stress did not moderate the relationship between their months of experience and performance. Regardless of stress, the more experienced leaders had better group performance than the less experienced leaders.

Somewhat unexpected, however, are the results for conditions in which the leader either received only task-relevant practice or both leadership and task-relevant practice. Under the no stress conditions, total months of experience and performance were not correlated. For those leaders receiving task-relevant practice, the correlation between total months of experience and performance was r = .06 (n.s., n=18) and for those leaders receiving both types of practice, the correlation was r = .06 (n.s., n=18). The pattern of correlations was the same for the task-relevant practice condition and the both task and leadership practice conditions when the leaders were in the stress condition. Actual experience and performance were negatively correlated r = -.42 (p=.04, n=18) in conditions in which leaders received only task-relevant practice and also for leaders receiving both types of practice r = -.35 (p=.09, n=16).

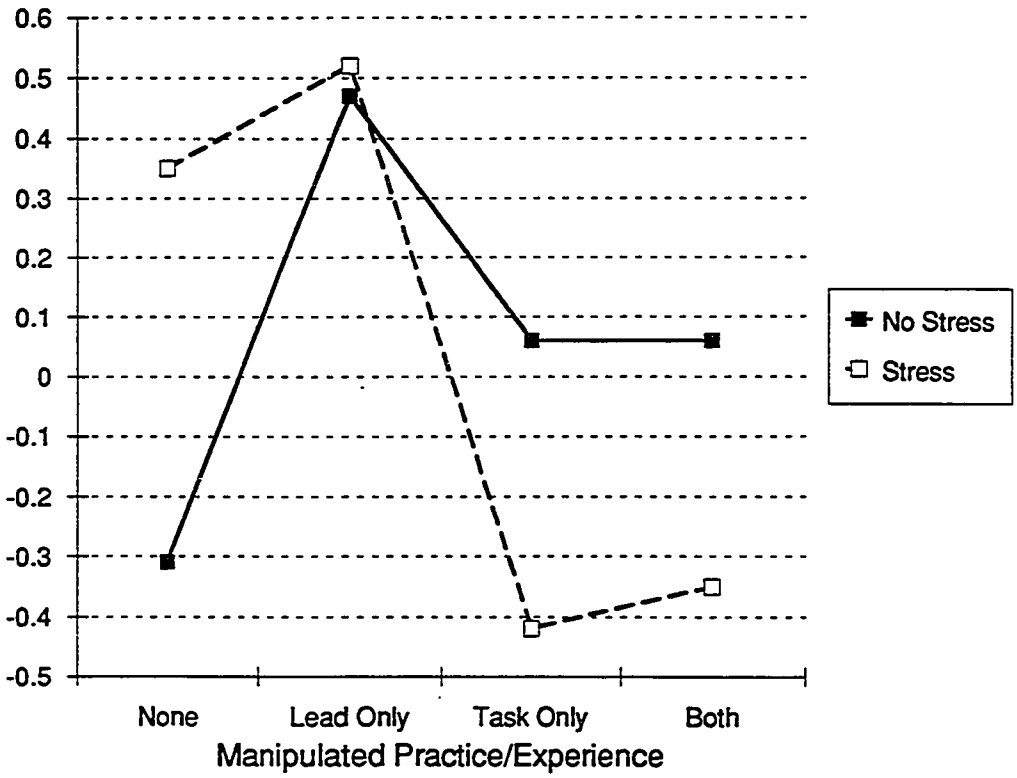

Figure 11. Correlations between leader's reported total months of experience and performance

Therefore, manipulated leadership practice in this condition did not affect the relationship between months of experience and performance; the major effect was task-relevant practice.

Effects of Practice/Experience on Enhancement of Self-Efficacy

Three types of self-evaluative measures were taken during the course of the experiment to investigate which measure most closely resembled the construct of self-efficacy for the leadership role. To review, during the initial pre-measure phase of the experiment (Time 1) all group members and leaders completed a *Task-Specific Self-Esteem Scale* that was specifically designed to assess a person's belief in his or her abilities related to the task of leadership, and a *Leadership Self-Efficacy Scale*. These scales differed quite markedly in format and moderately in content. The task-specific self-esteem scale contained eight items that were rated on a five-point Likert scale. The leadership self-efficacy scale had subjects indicate whether they could perform a particular leadership behavior and their confidence in their performance. After subjects participated in Phase 1 of the study, leaders completed the leadership self-efficacy scale again (Time 2) and another self-efficacy scale directly related to the task at hand, which is referred to as the *Leader's Group Performance Self-Efficacy Scale*. On this scale leaders were asked to indicate whether they could get their group to perform at various percentile levels and to indicate their confidence in attaining that particular level of performance. After Phase 2 (Time 3), leaders filled out the task-specific self-esteem measure again, the

leadership self-efficacy measure, and the group performance task-efficacy scale.

It was hypothesized that leadership and task-relevant practice would affect the leader's self-efficacy scores. In general, manipulated leadership practice/experience was expected to increase self-efficacy. More specifically, leaders receiving both task-relevant practice and leadership practice would have the highest increase in self-efficacy, followed by those receiving only leadership practice, followed by those receiving task-relevant practice. The lowest increase in self-efficacy would be found for those receiving neither type of practice. To take into account pre-experimental differences by condition, repeated measures ANOVAs were used for each measure of self-efficacy.

Leadership Self-Efficacy as a Dependent Variable

Analysis for Summated Leadership Self-Efficacy Scale. A 2X2 (leadership practice by task-relevant practice) repeated measures ANOVA using the final measure of leadership self-efficacy (summated score) as the Time 3 dependent variable and initial leadership self-efficacy taken as the Time 1 dependent variable revealed no effects for leadership practice, or task-relevant practice. However, there was a significant effect for time ($F(1, 64) = 26.39$, $p<.001$), indicating that across all conditions leaders' self-efficacy scores were higher in Time 3 than in Time 1. The mean leadership self-efficacy score for Time 1 (pre-experimental), for Time 3 (after Phase 2), and the difference between the two measures are shown for all eight conditions in Table 10.

Planned comparisons on self-efficacy difference scores[4] revealed that leaders receiving both types of leadership practice had slightly higher self-efficacy at Time 3 than leaders receiving any other type of practice or no practice ($t(64) = 1.83$, $p<.10$).

Although it was hypothesized that the practice/experience manipulation in the experiment would produce changes in self-efficacy, the final measure of self-efficacy (Time 3) may have been affected by how a subject thought they performed (although all leaders received identical feedback) and additionally by the results of the stress manipulation. Therefore, a 2X2 repeated measures ANOVA, which again excluded the stress factor, was conducted to examine differences in the leader's rating of his or her initial leadership self-efficacy (Time 1) and after Phase 1 (Time 2). There was again a main effect showing an increase in self-efficacy across all conditions ($F(1, 65) = 8.52$, $p<.01$), but no other significant main or interaction effects. Leaders who served as leaders in Phase 1 did not have higher leadership self-efficacy than leaders who had served as followers in Phase 1. The means for Time 2 and the difference between Time 2 and Time 1 are also included in Table 10.

Analysis for Weighted Leadership Self-Efficacy Scale. As mentioned previously, a leader's score on the leadership self-efficacy scale also was calculated by using a weighting method that gave more value to ratings for the

[4]Change scores were used to make planned comparison tests. A more conservative approach would have used the adjusted means to test this hypothesis. Because adjusted means were unavailable, the results of the planned comparisons must be interpreted cautiously.

Table 10. Mean Summated Self-Efficacy Ratings by Experimental Condition

	Manipulated Practice/Experience			
	Leadership and Task-Relevant	Leadership Only	Task-Relevant Only	Neither
Stress				
Time 3	70.21	66.48	69.08	69.92
Time 2	65.49	63.97	64.67	69.49
Time 1	67.33	61.89	62.69	69.21
Mean T3-T1	2.40	4.59	6.39	.71
	n=14	n=17	n=18	n=18
No Stress				
Time 3	75.06	74.37	62.68	53.96
Time 2	70.63	73.37	59.89	53.76
Time 1	65.38	69.42	58.22	51.25
Mean T3-T1	9.98	4.95	4.65	5.13
	n=17	n=18	n=17	n=16

Mean Time 3 = 67.84, S.D.= 19.32, n=135
Mean Time 2 = 65.25, S.D.= 18.18, n=131
Mean Time 1 = 63.21, S.D.= 18.48, n=140

more difficult items on the scale. The Time 1 measure of the weighted self-efficacy scale and Time 3 weighted self-efficacy were used as dependent variables in a 2X2 repeated measures ANOVA. Weighted scale means for Time 1, Time 3, and their difference are shown in Table 11. The repeated measure ANOVA showed no significant main effects for manipulated practice/experience on the change in weighted leadership self-efficacy. There was a significant increase in weighted self-efficacy from Time 1 to Time 3 ($F(1, 64) = 25.53$, $p<.001$. A planned comparison showed again that leaders receiving both types of practice had a larger increase in self-efficacy from Time 1 to Time 3 than leaders in any of the remaining experimental conditions ($t(64) = 2.22$, $p < .05$).

Task-Specific Self-Esteem as a Dependent Variable

A 2x2 repeated measures ANOVA using the post measure (Time 3) of task-specific self-esteem and the pre-measure (Time 1) of task-specific self-esteem as dependent variables revealed a significant main effect for time ($F(1, 66) = 17.87$, $p<.05$), indicating that the Time 3 measure of task-specific self-esteem was higher across all conditions. A planned comparison on task-specific self-esteem showed no significant hypothesized differences among conditions. Table 12 contains the means for Time 1 and Time 3 measures of task-specific self-esteem.

Table 11. Mean Weighted Self-Efficacy Ratings by Experimental Condition

	Manipulated Practice/Experience			
	Leadership and Task-Relevant	Leadership Only	Task-Relevant Only	Neither
Stress				
Time 3	22.97	20.72	22.97	22.88
Time 2	20.74	19.59	21.02	21.93
Time 1	21.36	18.84	19.98	21.98
Mean T3-T1	1.40	1.88	2.99	.90
	n=14	n=17	n=18	n=13
No Stress				
Time 3	25.46	24.74	20.11	16.35
Time 2	23.45	24.10	19.65	16.19
Time 1	20.52	22.70	18.20	15.31
Mean T3-T1	4.94	2.04	2.17	2.07
	n=17	n=18	n=17	n=13

Overall Mean T3 = 22.08, S.D.= 8.21, n = 135
Overall Mean T2 = 20.91, S.D.= 7.62, n = 131
Overall Mean T1 = 19.88, S.D.= 7.81, n = 140

Table 12. Mean Task-Specific Self-Esteem by Experimental Condition

	Manipulated Practice/Experience			
	Leadership and Task-Relevant	Leadership Only	Task-Relevant Only	Neither
Stress				
Time 3	32.50	32.29	31.39	32.11
Time 1	30.75	30.59	31.06	31.94
Difference	1.75	1.71	.33	.17
	n=16	n=17	n=18	n=18
No Stress				
Time 3	32.67	33.33	29.76	29.47
Time 1	31.39	31.44	29.06	28.35
Difference	1.28	1.89	.88	1.12
	n=18	n=18	n=17	n=17

Overall Mean Time 1 = 30.59, S.D.= 3.96, n = 140.
Overall Mean Time 3 = 31.71, S.D.= 3.78, n = 139.

Leader's Group Performance Self-Efficacy as a Dependent Variable

The final type of self-efficacy measure was that which used specific task performance levels. (Previously displayed in Figure 7.) Leaders were asked to indicate the level at which they could encourage their groups to perform on the task. This measure was taken only at Time 2 and Time 3. A 2X2 repeated measure ANOVA with the leader's group performance self-efficacy Time 2 and Time 3 was used to examine changes in these measures by condition. Table 13 presents the change scores. Again, leaders reported higher group performance self-efficacy at Time 3 than Time 2 ($F(1, 65) = 23.80$, $p<.001$), but the planned comparison did not reveal that leaders given both leadership and task-relevant practice had a larger increase in group performance self-efficacy than did leaders in other conditions. This finding may have been influenced by the violation of homogeneity of variance for group performance self-efficacy. For this measure there was a significant difference in variance for each condition. This was not the case for the other measures of self-efficacy.

Summary of Enhancement of Self-Efficacy Measures

The purpose of the analyses contained in this section was to determine which method of self-efficacy measurement appeared to be enhanced by the practice/experience manipulations as measured by changes in self-efficacy. The analysis of these various measures as a dependent variable revealed that the largest enhancement effect was found leadership self-efficacy and group performance self-efficacy when leaders had been given both task-relevant and

Table 13. Mean Leader Group Performance Self-Efficacy by Experimental Condition

	Manipulated Practice/Experience			
	Leadership and Task-Relevant	Leadership Only	Task-Relevant Only	Neither
Stress				
Time 3	24.64	23.82	27.09	27.57
Time 2	21.38	20.72	23.59	26.83
Difference	1.42	2.71	4.66	1.49
	n=12	n=16	n=16	n=13
No Stress				
Time 3	27.52	30.89	20.71	18.49
Time 2	24.28	28.57	16.54	17.80
Difference	3.25	2.32	4.17	1.85
	n=18	n=18	n=18	n=15

Overall Mean Time 2= 22.45, S.D.=11.88, n=129
Overall Mean Time 3= 25.20, S.D.=12.57, n=136

leadership practice. In general, a leader's self-efficacy for leadership was greater at Time 3 than at Time 2 or Time 1 across all experimental conditions.

The correlations between the measures of self-efficacy taken at Time 1, Time 2, and Time 3 are shown in Table 14. The pattern of correlations reveal the same measures taken at different times were highly correlated, indicating a great deal of stability within the phases of the study. The correlations ranged from .77 for task-specific self-esteem (Time 1 and Time 3) to .90 for group performance self-efficacy (Time 2 and Time 3).

The two Time 1 measures, leadership self-efficacy and task-specific self-esteem, correlated .57 as was found for the full sample of subjects. More importantly, these two measures taken at Time 3 correlate .51, indicating that they might be differentially affected by the experimental conditions. Although .51 and .57 are not significantly different, the two scales may be measuring different dimensions of a leader's ratings of his or her leadership ability. The leadership self-efficacy scale contained behaviorally-oriented items and ratings that leaders gave themselves and may be less likely to change if the leader did not have the opportunity to perform a leadership influence or facilitation episode as described in the scale. The task-specific self-esteem scale was a more general and global rating of a leader's feeling regarding his or her leadership ability.

The correlation of the group performance self-efficacy scale with other measures of self-efficacy taken at Time 2 and Time 3 indicate that this may be

Table 14. Intercorrelations Among All Measures of Self-Efficacy

	1	2	3	4	5	6	7
1. Leadership Self-Efficacy (Time 1)	--						
2. Leadership Self-Efficacy (Time 2)	.89	--					
3. Leadership Self-Efficacy (Time 3)	.81	.85	--				
4. Task-Specific Self-Esteem (Time 1)	.57	.52	.50	--			
5. Task-Specific Self-Esteem (Time 3)	.46	.48	.51	.77	--		
6. Group Perf. Self-Efficacy (Time 2)	.49	.58	.55	.47	.58	--	
7. Group Perf. Self-Efficacy (Time 3)	.49	.55	.65	.48	.61	.90	--

(All correlation coefficients are significant $p<.001$, $n = 126\text{-}140$)

measuring a slightly different component of leadership. It has the lowest correlation at Time 3 with Time 3 task-specific self-esteem (r = .48), a moderate correlation at Time 2 with Time 2 (r = .58), and the highest correlation at Time 3 with Time 3 leadership self-efficacy (r = .65).

Relationship Between Self-Measures and Perceived Stress

Implicit in the hypotheses concerning the effects of self-efficacy in this study was that self-efficacy should predict the amount of stress a leader perceived in the experiment. Those higher in self-efficacy would be expected to have lower perceived stress than those lower in self-efficacy. The six-item perceived stress scale was used as a dependent variable in regression analysis for the 2X2X2 design of the study and the self-efficacy measure of interest. In addition, this scale was correlated with the various measures of leadership self-efficacy (including self-esteem) as rated by the leader during the different collection points for each conditions to show the pattern of correlations for each condition. (See Table 15).

Examining the relationship between perceived stress and those measures taken during the pre-experimental portion of the study (Time 1), there appears to be a general trend that leaders with higher self-efficacy perceive less stress in the final phase of the experiment as compared to those with lower self-efficacy. The regression analysis showed a main effect for leadership self-efficacy across all eight experimental conditions ($F(1, 112) = 11.98$, $p<.001$). There were no significant interactions between any of the conditions and

Table 15. Correlation Between Perceived Stress Rating and All Self-Evaluative Measures

	Manipulated Practice/Experience			
	Leadership and Task-Relevant	Leadership Only	Task-Relevant Only	Neither
Manipulated Stress				
Leadership Self-Efficacy				
Time 1	-.22	-.04	-.49*	-.25
Time 2	-.37	-.20	-.49*	-.14
Time 3	-.27	-.27	-.63**	-.12
Task-Specific Self-Esteem				
Time 1	-.62**	-.10	-.33	-.22
Time 3	-.58**	-.33	-.34	-.18
Group Performance Efficacy				
Time 2	-.47*	-.33	-.14	.02
Time 3	-.43	-.35	-.38	-.08
Actual Leadership Experience	-.29	-.19	-.12	-.30
Rosenberg Self-Esteem	-.55*	-.39	-.47*	-.15
No Manipulated Stress				
Leadership Self-Efficacy				
Time 1	-.17	-.25	-.71**	-.32
Time 2	-.13	-.15	-.56*	-.33
Time 3	-.09	-.16	-.74**	-.21
Task-Specific Self-Esteem				
Time 1	-.34	-.33	-.51*	-.68**
Time 3	-.66**	-.51*	-.61*	-.88**
Group Performance Efficacy				
Time 2	-.46	-.06	-.33	-.45
Time 3	-.49*	-.11	-.37	-.77**
Actual Leadership Experience	-.13	-.06	-.36	-.04
Rosenberg Self-Esteem	-.24	-.49*	-.64**	-.58*

*p<.05
**p<.01

leadership self-efficacy. The amount of variance accounted for in perceived stress in the entire model (R^2) was .17.

Multiple regression analysis using task-specific self-esteem (Time 1) as an independent variable showed a main effect for task-specific self-esteem ($F(1, 112) = 19.82$, $p<.001$). There were also two significant interactions. The first was for task-relevant practice by leadership practice by task-specific self-esteem ($F(1, 103) = 7.18$, $p<.01$). The second significant interaction was for stress by task-relevant practice by task-specific self-esteem ($F(1, 103) = 4.08$, $p<.05$). The total R^2 for the entire model was equal to .26. The final set of regression analyses used group performance self-efficacy taken at Time 1. The results showed a main effect for this measure and also the task-relevant practice by leadership practice by group performance self-efficacy interaction. The R^2 for this equation was equal to .20.

In addition to these measures of leadership self-efficacy, it was also expected that a leader's level of general self-esteem might also affect her perception of stress. Therefore, self-esteem was included into a regression analysis on perceived stress. There was a significant main effect for self-esteem ($F(1, 112) = 22.11$, $p<.001$) with an R^2 for the model of .27.

In addition to the effects of self-efficacy measures on perceived stress, we examined the relationship between total months of experience in leadership positions and perceived stress. As Fiedler and his colleagues have demonstrated, total months of leadership experience was unrelated to

perceived stress. There was no significant main effect for months of leadership experience as shown in the pattern of correlations presented in Table 15 and multiple regression analysis.

The results of these analyses indicate that leaders' ratings of perceived stress were highly related to their perception of their leadership ability taken in the pre-experimental phase. The higher a person's self-efficacy or self-esteem the lower the amount of stress he or she perceived in a given experimental condition. These analyses also indicate that the experimental manipulations had an effect on this relationship. In particular, task-relevant practice and manipulated stress significantly interacted with task-specific self-esteem. The pattern of correlations for this interaction revealed for all conditions, except for the condition in which the leader had received no task-relevant practice and was under stress, a leader's task-specific self-esteem correlated significantly in a negative direction with perceived stress. In the no-task-relevant practice and stress condition the correlation was near zero. Therefore, if the leader was under stress and had no task-relevant practice, the leader's task-specific self-esteem did not predict how much stress he or she would perceive in the situation.

The three-way interaction showed a similar effect, although it was more pronounced for those leaders receiving leadership practice as compared to those not receiving leadership practice. In other words, there was a high correlation between perceived stress and task-specific self-esteem for those

leaders with no small group leadership practice across both conditions of task-relevant experience and for those with both leadership practice and task-relevant practice, but not for those receiving only leadership practice.

Leadership Self-Efficacy as a Predictor of Group Performance

Another focus of this study was to examine the relationship between self-efficacy and performance. As stated in Hypothesis 4, a leader's level of self-efficacy would predict his or her performance as a leader and, therefore, the group's performance. To test this hypothesis, multiple regression analyses were used to evaluate the predictive power of each of the various measures of self-efficacy taken during the study. These analyses used group performance as the dependent variable; one measure of leadership self-efficacy as a continuous variable; and leadership practice, task-relevant practice, and stress as categorical variables.

Summated Leadership Self-Efficacy Scale

The results of the multiple regression analysis for the summated leadership self-efficacy scale (Time 2) showed no main effect for leadership self-efficacy, although the pattern of effects for stress and task-relevant practice were similar (although non-significant) to those found without leadership self-efficacy in the model. (See Table 16). There was, however, a significant leadership practice by self-efficacy interaction ($F(1, 126) = 3.99$, $p<.05$) and a marginally significant stress by self-efficacy interaction ($F(1, 121) = 2.65$, $p<.15$). Those in the leadership practice condition performed better if they were

Table 16. Regression Analysis for Effects of Summated Leadership Self-Efficacy (Time 2) on Group Performance

Effect	Total R^2	Increase in R^2	F for Increase	df	p
Main Effects					
Leadership Self-Efficacy (Summated Time 1)	.000	.003	.35	1 & 126	.555
Leadership Practice	.003	.000	.03		.867
Task-Relevant (TR) Practice	.020	.017	2.16		.144
Stress	.043	.023	2.96		.088
Two-way Interactions					
Stress by Leader Practice	.046	.003	.39	1 & 121	.535
Stress by TR Practice	.050	.004	.48		.489
Stress by Self-Efficacy	.070	.020	2.65		.106
TR Practice by Self-Efficacy	.080	.010	1.40		.239
Leadership Practice by Self-Efficacy	.108	.030	3.99		.048
Three-way Interactions					
Stress by Leader Practice by TR Practice	.110	.002	.334	1 & 117	.574
Stress by Leader Practice by Self-Efficacy	.110	.000	1.06		.810
Stress by TR Practice by Self-Efficacy	.169	.059	8.32		.005
TR Practice by Leader Practice by Self-Efficacy	.176	.016	2.26		.136
Four-way Interaction					
Stress by Leader Practice by TR Practice by Self-Efficacy	.176	.000	.04	1 & 116	.842

high in leadership self-efficacy; however, when they had not been given leadership practice, then those low in leadership self-efficacy performed better. The manipulated stress by self-efficacy interaction was in the hypothesized direction. Manipulated stress did not moderate the relationship between leadership self-efficacy and performance for those leaders high in leadership self-efficacy. Stress did moderate this relationship for those leaders low in self-efficacy. Low self-efficacy leaders performed worse under stress than when not under stress.

There also was a significant three-way stress by task-relevant practice by self-efficacy interaction ($F(1, 117) = 8.32$, $p<.01$). For those high in leadership self-efficacy, stress provided a facilitative effect. Leaders in the manipulated stress condition who had task-relevant practice performed better than those who were in the no stress condition. The biggest effect in the interaction appeared for those leaders low in self-efficacy who had no task-relevant practice. Their performance was much worse under stress than when not under stress.

Weighted Leadership Self-Efficacy Scale

The regression analysis using the weighted method of scoring the leadership self-efficacy scale (Time 2) showed a pattern of results almost identical to that found for the unweighted summated leadership self-efficacy scale but a higher proportion of total variance was accounted for by weighted self-efficacy ($R^2=.20$). As shown in Table 17, one minor difference was that the

Table 17. Regression Analysis for Effects of Weighted Leadership Self-Efficacy (Time 2) on Group Performance

Effect	Total R^2	Increase in R^2	F for Increase	df	p
Main Effects					
Leadership Self-Efficacy (Weighted Time 1)	.005	.005	.60	1 & 126	.442
Leadership Practice	.005	.000	.03		.874
Task-Relevant (TR) Practice	.022	.017	2.28		.134
Stress	.045	.023	3.06		.083
Two-way Interactions					
Stress by Leader Practice	.048	.002	.40	1 & 121	.528
Stress by T.R. Practice	.050	.003	.41		.523
Stress by Self-Efficacy	.086	.036	5.00		.027
TR by Self-Efficacy	.092	.006	.92		.339
Leader Practice by Self-Efficacy	.118	.028	3.88		.051
Three-way Interactions					
Stress by Leader Practice by TR Practice	.120	.002	.269	1 & 117	.603
Stress by Leader Practice by Self-Efficacy	.120	.000	.00		.974
Stress by TR Practice by Self-Efficacy	.195	.059	10.92		.001
TR Practice by Leader Prac.by Self-Efficacy	.202	.016	2.53		.115
Four-way Interaction					
Stress by Leader Practice by TR Practice by Self-Efficacy	.202	.000	.10	1 & 116	.753

stress by leadership self-efficacy interaction was significant ($F=(1, 121) = 5.00$, $p<.05$). Again, there was no difference in the relationship of self-efficacy to performance for those high in self-efficacy in the stress versus the no stress condition. Stress moderated this relationship for those low in self-efficacy. These leaders performed worse under stress than when not under stress (See Figure 12).

The significant interactions described in this analyses for the summated and weighted self-efficacy measure are plotted in Figures 12 through 14 using the means of the weighted self-efficacy measure split at the median (median = 21.59).

Task-Specific Self-Esteem

Because the measure of task-specific self-esteem was not given at Time 2, the Time 1 pre-measure was used as the independent variable in the regression equation. The regression analysis summarized in Table 18 revealed no significant two-way interactions, but unlike the results for the leadership self-efficacy scale, there was a marginally significant stress by leadership practice by task-specific self-esteem interaction ($F(1, 126) = 3.78$, $p<.10$). Figure 15 shows this three-way interaction using a median split for task-specific self-esteem (median = 31). The results indicate that leadership practice was more useful for those leaders high in task-specific self-esteem who were under stress than for leaders low in task-specific self-esteem.

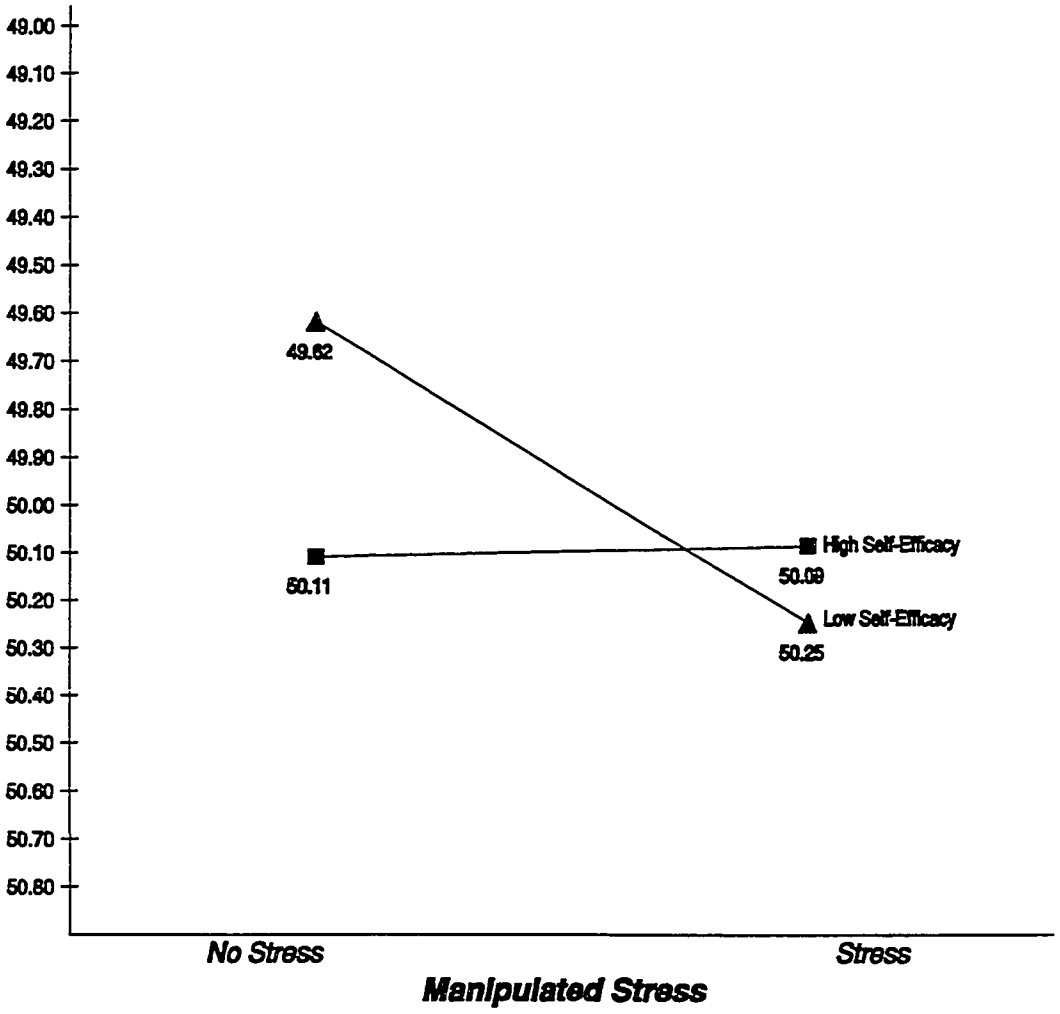

Figure 12. Significant two-way interaction for group performance: Manipulated stress by weighted self-efficacy

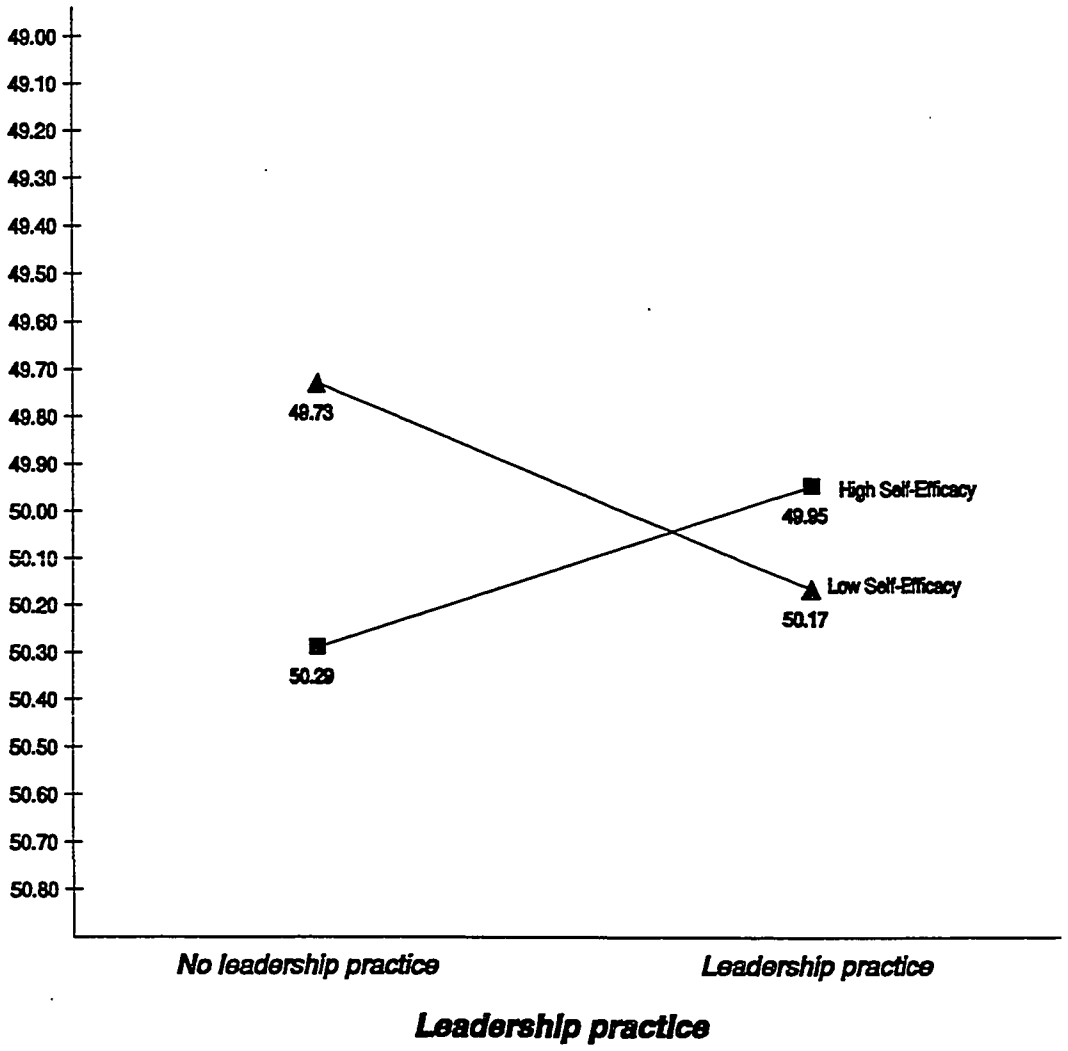

Figure 13. Significant two-way interaction for group performance: Leadership practice by weighted self-efficacy

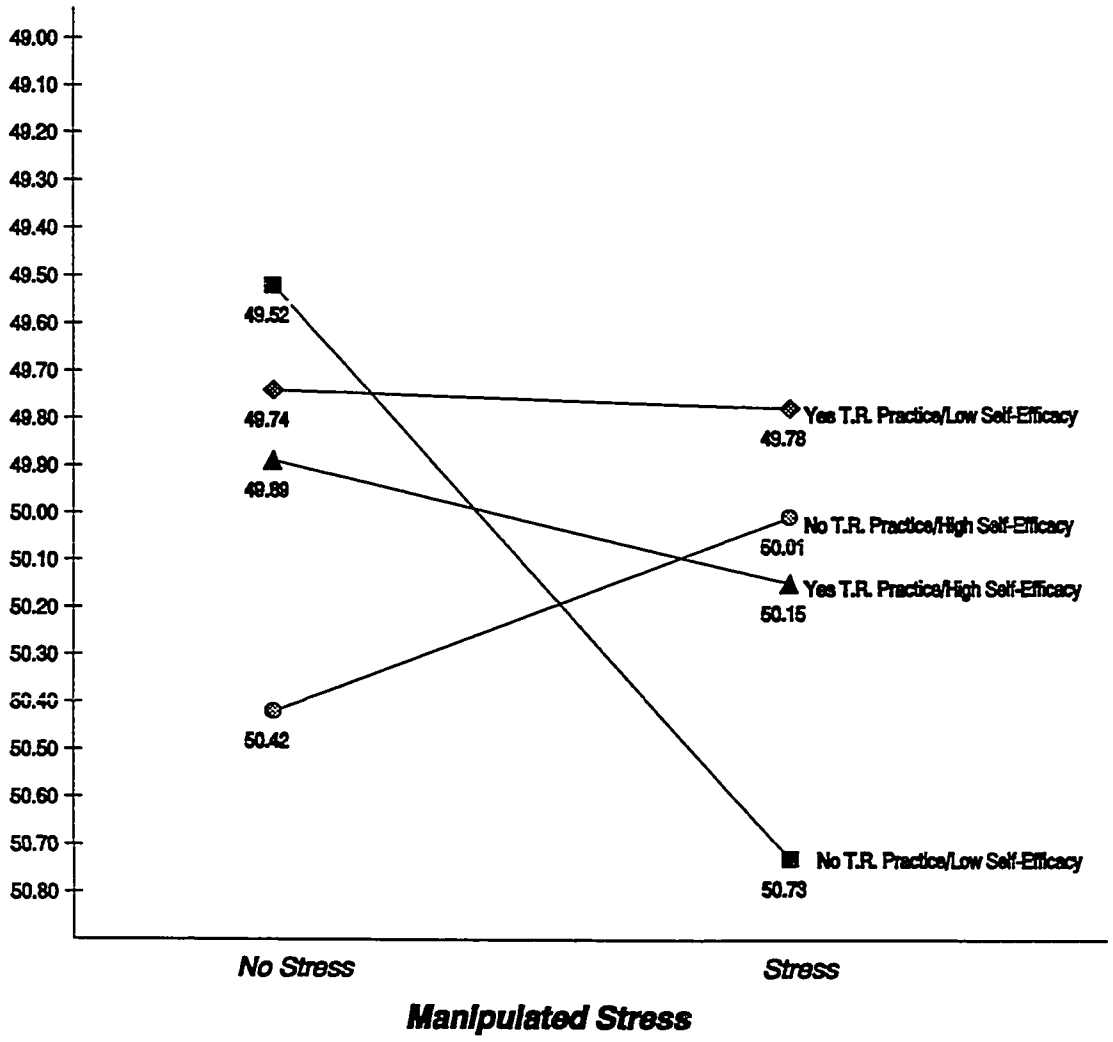

Figure 14. Significant three-way interaction for group performance: Manipulated stress by task-relevant practice by weighted self-efficacy

Table 18. Regression Analysis for Effects of Task Specific Self-Esteem (Time 1) on Group Performance

Effect	Total R^2	Increase in R^2	F for Increase	df	p
Main Effects					
Task-Specific (TS) Self-Esteem (Time 1)	.007	.007	1.04	1 & 135	.311
Leadership Practice	.007	.000	.01		.922
Task-Relevant (TR) Practice	.031	.024	3.55		.062
Stress	.056	.025	3.71		.056
Two-way Interactions					
Stress by Leader Practice	.057	.001	.05	1 & 130	.823
Stress by TR Practice	.066	.009	1.23		.269
Stress by TS Self-Esteem	.066	.000	.01		.911
Task Relevant by TS Self-Esteem	.066	.000	.41		.921
Leader Practice by TS Self-Esteem	.066	.000	.05		.831
Three-way Interactions					
Stress by Leader Practice by TR Practice	.066	.000	.004	1 & 126	.951
Stress by Leader Practice by TS Self-Esteem	.093	.027	3.78		.054
Stress by T.R. Practice by TS Self-Esteem	.097	.005	.89		.346
TR Prac. by L. Prac. by TS Self-Esteem	.103	.001	.35		.555
Four-way Interaction					
Stress by Leader Practice by TR Practice by TS Self-Esteem	.104	.001	.69	1 & 125	.409

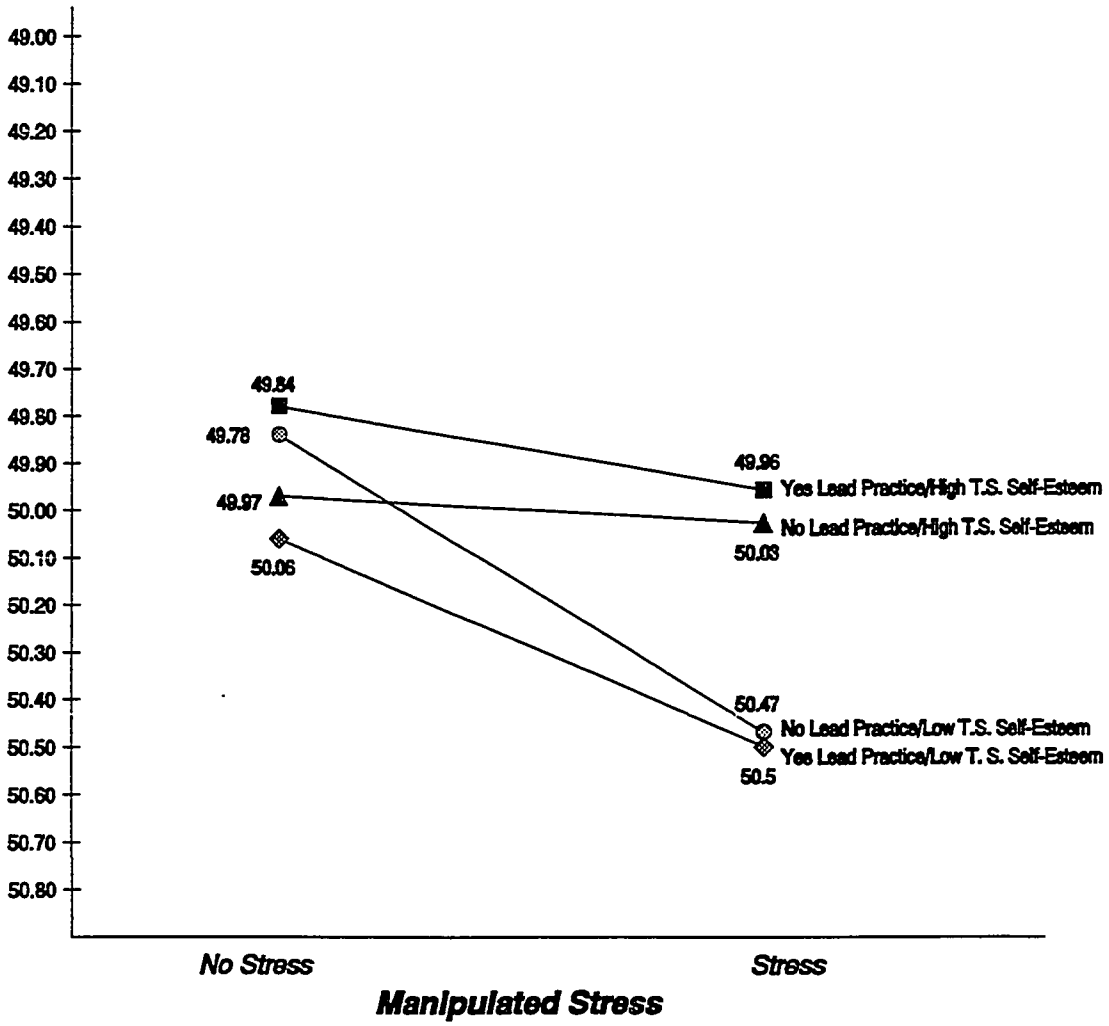

Figure 15. Significant three-way interaction for group performance: Manipulated stress by leadership practice by task-specific self-esteem

Leader's Group Performance Self-Efficacy

The final measure of self-efficacy analyzed as an independent variable was the leaders' rating of how well they thought they could get their groups to perform. The Time 2 measure of this scale was used in the analysis. (See Table 19). For this scale there were no significant two-way interactions. However, similar to the results for the leadership self-efficacy analysis, a significant three-way interaction was found between stress, task-relevant practice, and group performance self-efficacy ($F(1, 115) = 9.31$, $p<.01$). This interaction is shown in Figure 16 using a median split (median = 22.59) to plot high and low group performance self-efficacy. There is a large effect for manipulated task-relevant practice/experience for leaders low in group performance self-efficacy. Stress severely affected their performance if they did not receive task-relevant practice. Task-relevant practice may have provided a buffer for those leaders low in group performance self-efficacy.

Rosenberg General Self-Esteem

The final measure examined in multiple regression analysis on group performance was Rosenberg's general self-esteem. Although the total equation resulted in an R^2 of .12, there were no significant main effects or interactions. The stress by self-esteem interaction shown for other self-efficacy measures approached significance ($F(1, 130) = 3.28$, $p<.10$) as did the four-way interaction ($F(1, 125) = 2.96$, $p<.10$).

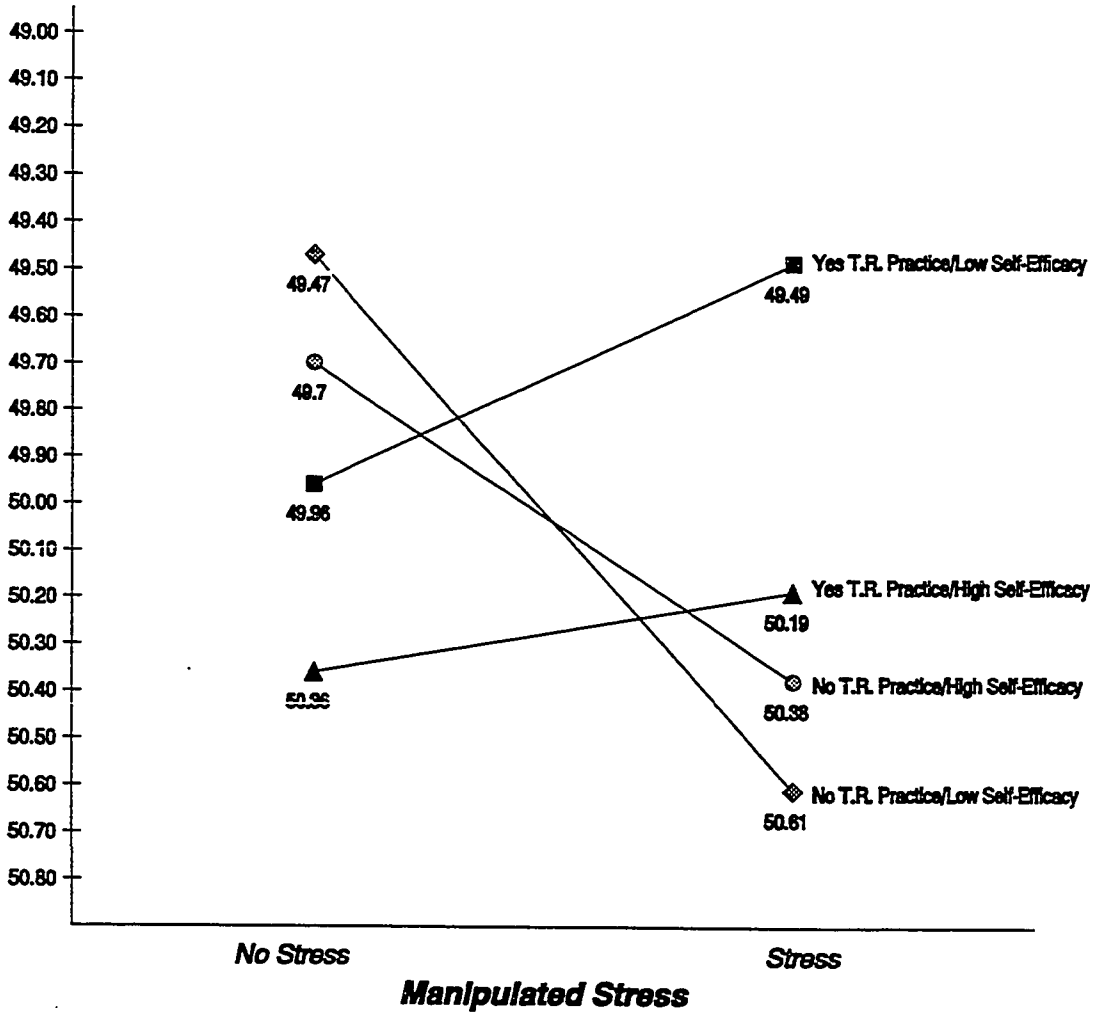

Figure 16. Significant three-way interaction for group performance: Manipulated stress by task-relevant practice by group performance self-efficacy

Table 19. Regression Analysis for Effects of Leader's Group Performance Self-Efficacy (Time 2) on Group Performance

Effect	Total R^2	Increase in R^2	F for Increase	df	p
Main Effects					
Group Performance (GP) Self-Efficacy (Time 2)	.000	.003	.00	1 & 124	.968
Leadership Practice	.001	.001	.12		.726
Task-Relevant (TR) Practice	.018	.018	2.28		.133
Stress	.042	.024	2.92		.090
Two-way Interactions					
Stress by Leader Practice	.042	.000	.04	1 & 119	.840
Stress by TR Practice	.051	.009	1.05		.309
Stress by GP Self-Eff.	.051	.000	.01		.942
TR Practice by GP by GP Self-Efficacy	.051	.000	.00		.980
Leadership Practice by GP Self-Efficacy	.051	.000	.00		.971
Three-way Interactions					
Stress by Leader Practice by TR Practice	.051	.000	.158	1 & 115	.692
Stress by Leader Practice by GP Self-Efficacy	.054	.003	.77		.383
Stress by TR Practice by GP Self-Efficacy	.124	.070	9.31		.003
TR Practice by Leader Practice by GP Self-Eff.	.125	.001	.26		.615
Four-way Interaction					
Stress by Leader Practice by TR Practice by GP Self-Efficacy	.126	.001	.18	1 & 114	.676

Correlational Analyses

To interpret the results of the regression analyses, self-efficacy was correlated with performance for each condition. Figures 17 and 18 show the correlations of Time 1 and Time 2 weighted leadership self-efficacy with performance. Note that information gathered at Time 1 occurred during the pre-manipulation phase. The pattern of correlations is virtually identical, as indicated in the results of the regression equations for both Time 1 and Time 2, although the Time 2 measure explained more variance in group performance.

Figures 19 through 22 show the correlation of three self-efficacy measures with performance in each of the manipulated experience conditions. The purpose of these figures is to examine whether each of the measures of leader self-efficacy produced similar patterns of results. *Weighted Leadership Self-Efficacy* is the initial measure of self-efficacy taken during pre-measure administration Time 1. *Task Specific S.E.* is the Time 1 measure of task-specific self-esteem, and *Group Performance S.E.* is the measure of a leader's ability to help the group perform at a particular level (taken at Time 2). The pattern of correlations show that the relationship of three measures to performance varied. In other words, in some conditions weighted self-efficacy correlated with performance in a manner consistent with the correlations of task-specific self-esteem and performance. In other conditions, task-specific self-esteem and group performance self-efficacy seemed to have similar patterns of correlations.

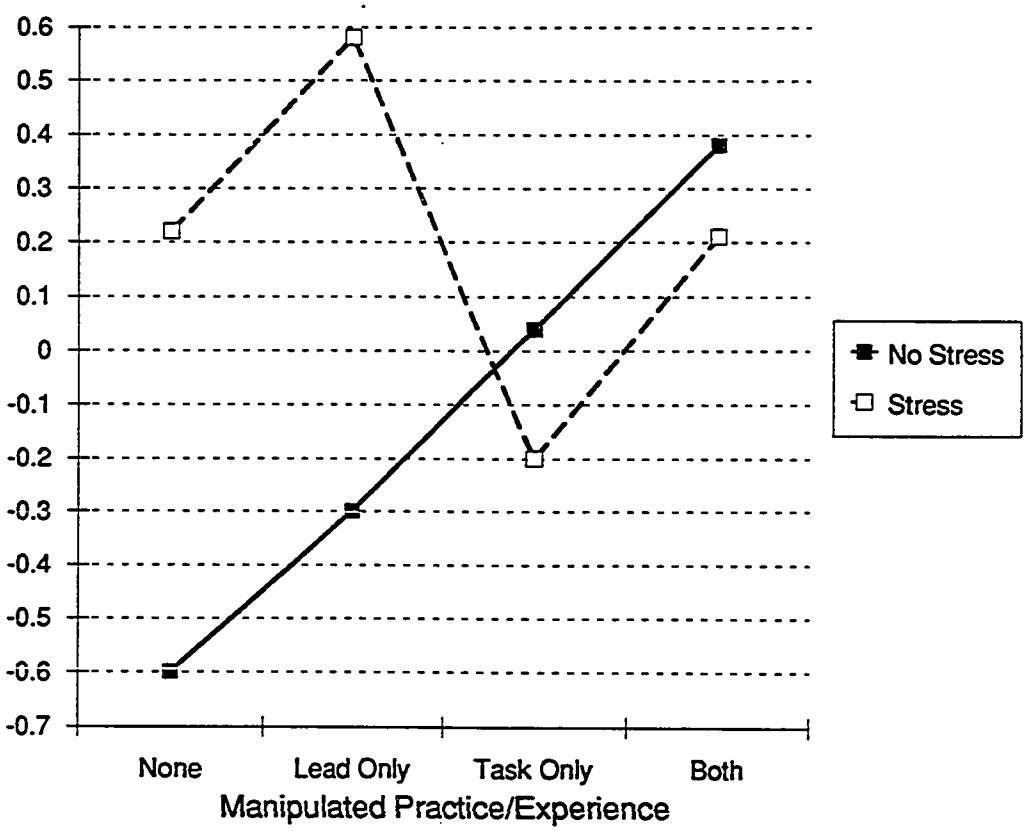

Figure 17. Correlations between leaders' weighted leadership self-efficacy score at Time 1 and group performance in each condition

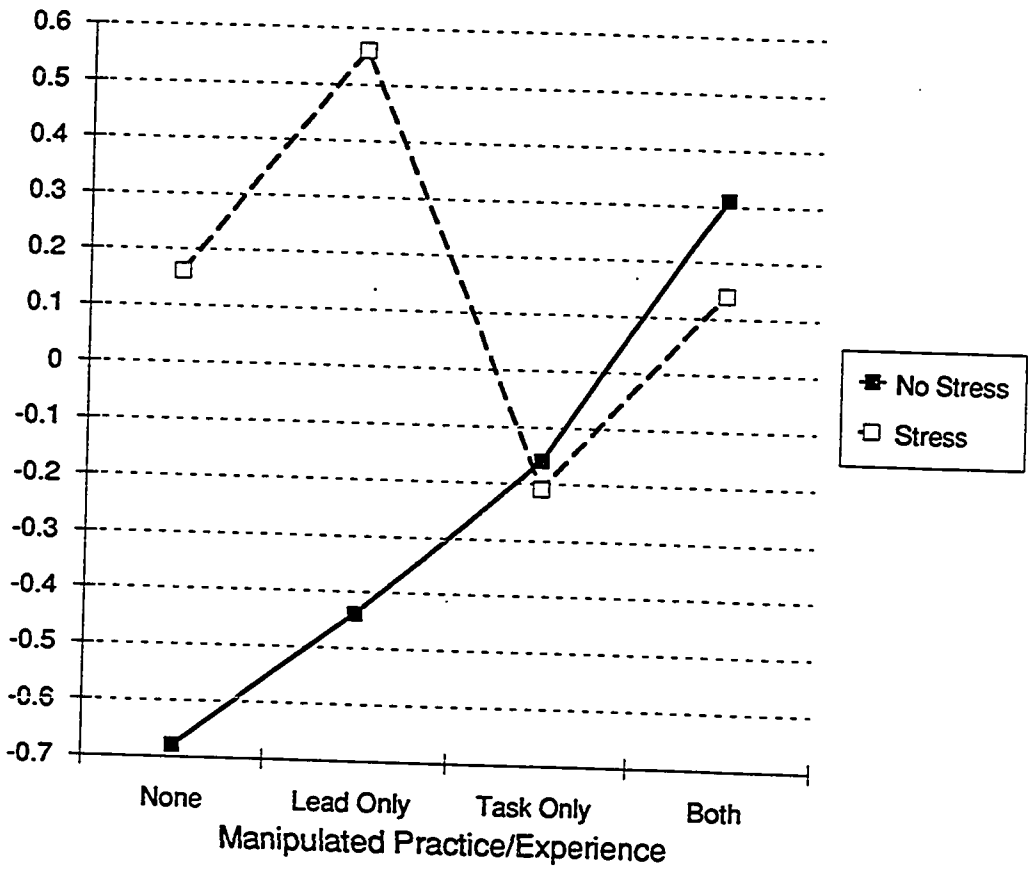

Figure 18. Correlations between leaders' weighted leadership self-efficacy score at Time 2 and group performance in each condition

As shown in Figure 19, for the condition in which leaders received neither type of practice, weighted leadership self-efficacy was negatively correlated with performance (r = -.69, n=15, p<.01) when a leader was in the no manipulated stress condition. These same negative correlations for task-specific self-esteem and group performance self-efficacy were less extreme (r = -.31, n.s. and -.28, n.s. respectively) when the leader was not under stress, but were more positively correlated when the leader was in the manipulated stress condition (r = .41, n=18, p<.05 and r = .38, n.s. respectively).

When leaders had an opportunity to practice their leadership in Phase 1, weighted self-efficacy was highly correlated with group performance when the leader was in the manipulated stress condition (r = .56, n=17, p<.01), but negatively related to group performance when not under manipulated stress (r= -.44, n=18, p<.05). As shown in Figure 20, task-specific self-esteem and group performance self-efficacy were not significantly correlated with group performance but their pattern of correlations suggest some differential effects of manipulated stress on their relationship to performance.

For leaders receiving only task-relevant practice, the three types of leadership self-evaluations were only moderately related to group performance (see Figure 21). Also, there appeared to be no moderating effects for manipulated stress. The correlations for weighted leadership self-efficacy and task-specific self-esteem were virtually identical for the stress and no stress conditions. There was, however, a slight difference for group performance self-

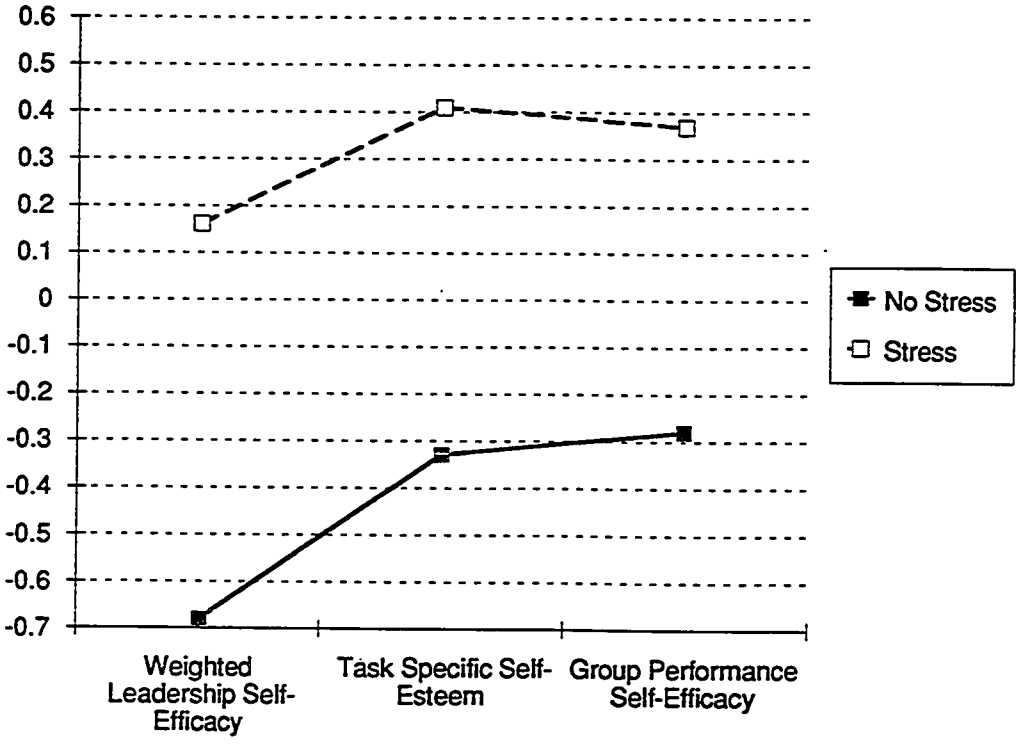

Figure 19. Correlations between leaders' self-efficacy scores and performance for leaders who received neither type of practice

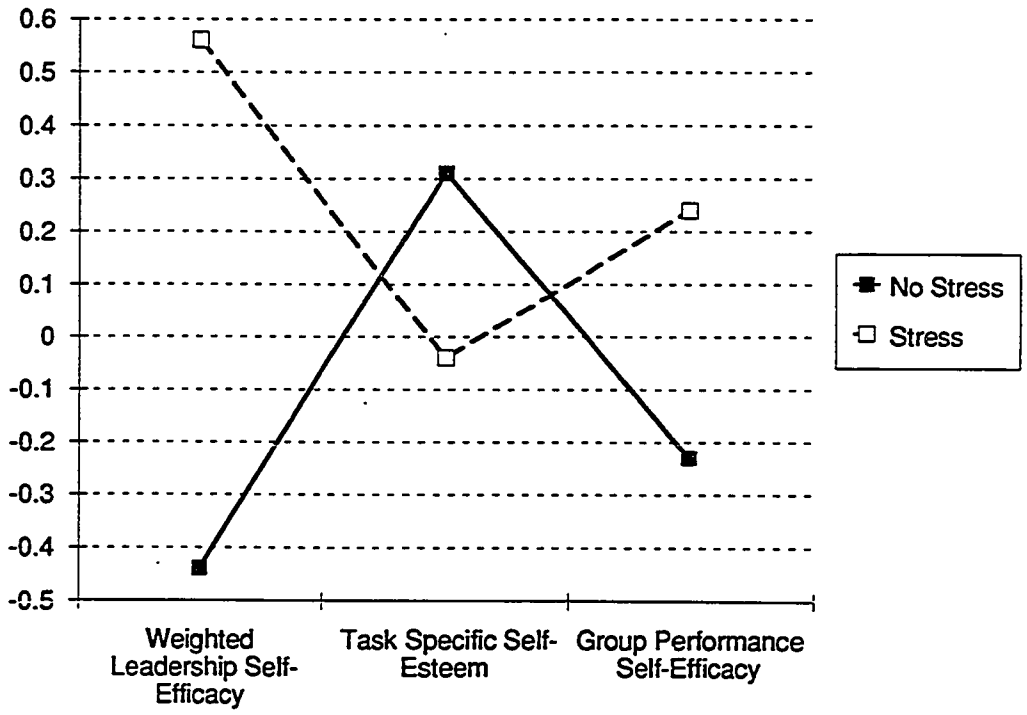

Figure 20. Correlations between leaders' self-efficacy scores and performance for leaders who received only leadership practice

efficacy. It was unrelated to performance under no stress, and there was a small non-significant negative correlation under manipulated stress (r = -.27, n=17, p<.15). When leaders received practice in both leadership and task-relevant content, weighted self-efficacy and task-specific self-esteem were similarly related to group performance (see Figure 22). Group performance self-efficacy was somewhat negatively related to group performance when leaders were in the manipulated stress condition (r = -.35, n=14, p=.11), but somewhat positively related when the leader was not under stress (r = .35, n=18, p=.07).

In summary, the correlational analysis of the relationship between three measures of self-appraisal of leadership ability indicate that in some conditions, these measures correlate in a manner consistent to the effects for months of experience. However, as shown in the regression analyses, the relationship of these measures to performance seems to be most affected by the manipulation of task-relevant practice/experience.

Summary of Relationship Between Leadership Experience, Self-Efficacy, and Performance

In general, a leader's belief in his or her ability to lead a group was related to group performance. There was no main effect for leadership self-efficacy as hypothesized. Leadership self-efficacy was not related to performance across all conditions. However, there were a number of interactions between manipulated leadership experience and task-relevant

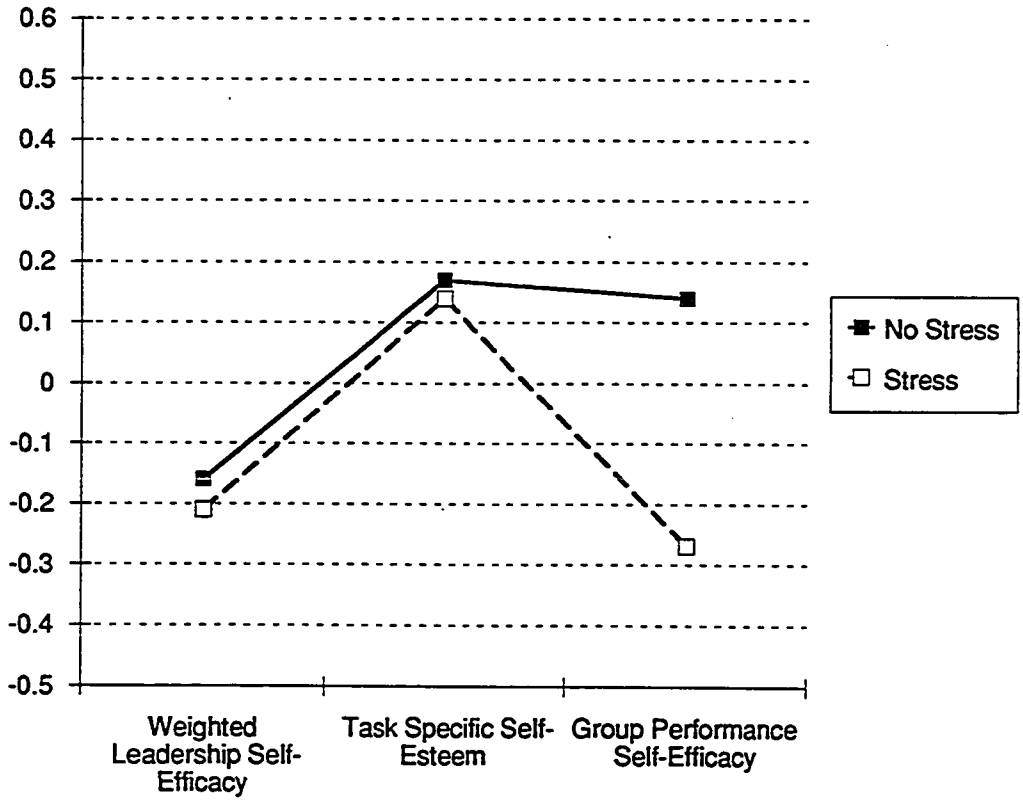

Figure 21. Correlations between leaders' self-efficacy scores and performance for leaders who received only task-relevant practice

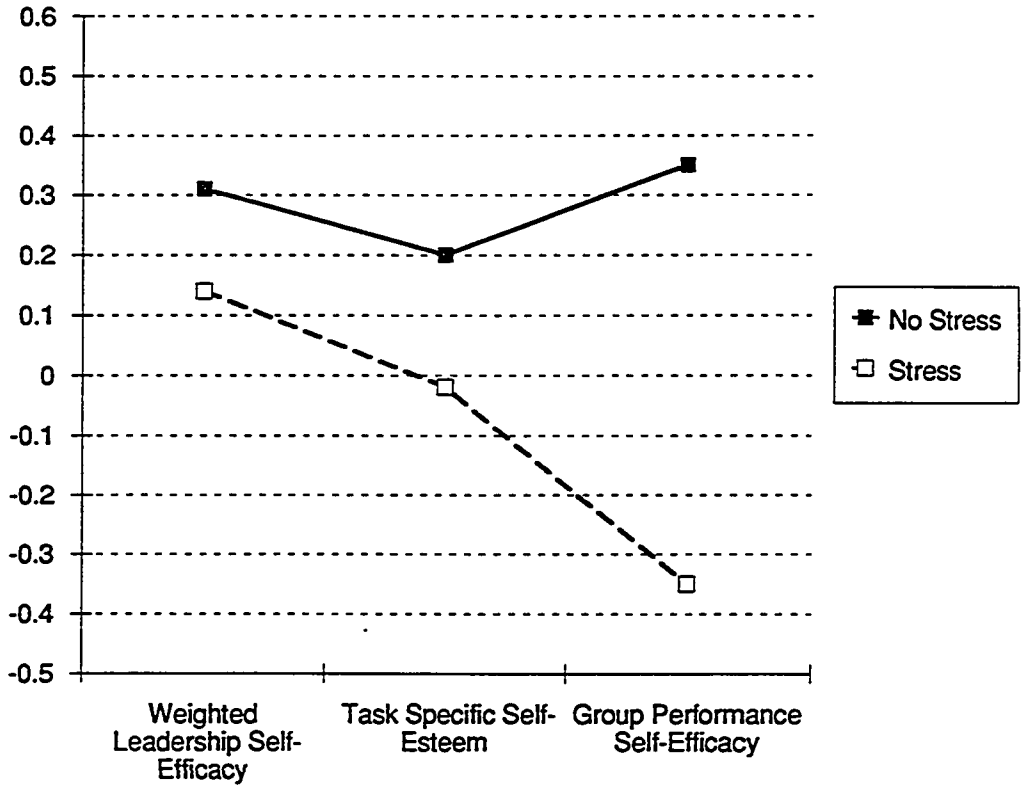

Figure 22. Correlations between leaders' self-efficacy scores and performance for leaders who received both leadership and task-relevant practice

experience, stress, and leadership self-efficacy. As predicted, stress was found to affect leaders low in leadership self-efficacy. The strongest finding for this effect was for the weighted self-efficacy scale.

Table 20 summarizes the findings for self-efficacy measures, actual total experience, and perceived stress for predicting performance. The interaction between these variables and the experimental manipulations are included. Weighted self-efficacy has the highest R^2, while perceived stress has the lowest. The Rosenberg scale of general self-esteem was also related to group performance (R^2=.12).

It is also important to note that months of leadership experience accounted for as much variance in group performance as did weighted leadership self-efficacy. However, the pattern of results was slightly different. Both weighted self-efficacy and months of leadership experience interacted with stress and task-relevant practice. In fact, comparing Figure 10 and 14 earlier in this chapter, the pattern of means under manipulated stress are virtually identical. Leadership practice, however, interacted differentially with self-efficacy than with months of leadership experience, as indicated by the significant interactions between leadership practice and self-efficacy.

Mediation Effects for Self-Efficacy on the Relationships Between Months of Leadership Experience and Group Performance

To test the mediating effects of a variable, the first assumption that must be met is that the independent variable is to be correlated with the dependent

Table 20. Regression Summary Table for Group Performance: Description of Significant Interactions

	VARIABLES AND SIGNIFICANT FINDINGS	R^2	DESCRIPTION
1.	Total Months of Leadership Experience	.18	
	- Task-Relevant Practice by Months of Experience		• For leaders given task-relevant practice, leaders with more experience tended to perform worse than those with less experience.
	- Manipulated Stress by Task-Relevant Practice by Months of Experience		• There was little difference in performance for leaders in no stress conditions. Those with low leadership experience performed worse under stress if they had no task-relevant practice.
2.	Summated Leadership Self-Efficacy	.18	
	- Leadership Practice by Self-Efficacy		• Giving high self-efficacy leaders practice in leadership increased their performance, but tended to decrease the performance of low self-efficacy leaders.
	- Manipulated Stress by Task-Relevant Practice by Leadership Self-Efficacy		• Similar to the three-way interaction described for months of leadership experience, those high in self-efficacy who had no task-relevant practice performed worse than those with task-relevant practice under stress.
3.	Weighted Leadership Self-Efficacy	.20	
	- Manipulated Stress by Leadership Self-Efficacy		• Low self-efficacy leaders performed better under no stress than under stress. The performance of high self-efficacy leaders was not affected by stress.
	- Leadership Practice by Self-Efficacy		• Same pattern as described for summated scale.
	- Manipulated Stress by Task-Relevant Practice by Leadership Self-Efficacy		• Same pattern as described for summated scale.

Table 20. Regression Summary Table for Group Performance: Description of Significant Interactions

	VARIABLES AND SIGNIFICANT FINDINGS	R^2	DESCRIPTION
4.	Task-Specific Self-Esteem	.10	
	- Manipulated Stress by Leadership Practice by Task-Specific Self-Esteem		• Leaders low in task-specific self esteem performed worse under stress regardless of whether they received leadership practice. • There was little difference in performance between leaders with high and low task-specific self-esteem under no stress.
5.	Group Performance Self-Efficacy	.13	
	- Manipulated Stress by Task-Relevant Practice by Group Performance Self-Efficacy		• Similar to three-way interaction described for summated leadership self-efficacy, except performance was more varied in the no stress condition.
6.	Rosenberg General Self-Esteem	.12	
	- No significant interactions		• Although not significant, the pattern of two interactions were similar to those found for leadership self-efficacy.
7.	Perceived Stress	.07	
	- No significant interactions		• No main effect in regression analysis, but had a main effect in a 2x2x2 ANOVA.

variable. Additionally, Barron and Kenny (1986) outline three regression equations to test for mediation. First, the mediator variable is regressed on the independent variable; second, the independent variable is regressed on the dependent variable; and finally, both the independent variable and mediator variable are used to predict the dependent variable in the third equation. Perfect mediation exists when the independent variable has no effect when the mediator is controlled and both the mediator and the independent variable are used to predict the dependent variable. Partial mediation occurs if the regression coefficient for the independent variable remains significant.

As shown previously in Figure 4 on page 39, in general leadership self-efficacy is expected to mediate the relationship between years or measures of leadership experience and performance. In other words, length of leadership experience alone should contribute to performance under stress; however, leaders with high experience should perform even better if they have high self-efficacy. Because the weighted leadership self-efficacy measure was related to group performance in a manner similar to the relationship of leadership experience to group performance for conditions in which the leaders had received no practice, self-efficacy was first used as the mediator variable in multiple regression analyses between months of leadership experience and group performance only in the condition in which leaders received neither type of practice, but were under manipulated stress.

The correlation between total experience and weighted self-efficacy for

this experimental condition was .34 (n=18, p<.10). Therefore, mediation could not be shown for the no leadership practice, no task-relevant practice, manipulated stress condition. In further analyses, the mediation relationship was explored condition by condition for the remaining seven cells of the experiment. This was done rather than submitting the full 2X2X2 model to regression analysis because the correlations between total experience and weighted leadership self-efficacy showed large differences by condition. There were no significant mediation effects in the remainder of the analyses.

The implications are these analyses are unclear. It appears that leadership self-efficacy provided no more predictive power than that found for months of leadership self-efficacy. As mentioned previously, the instability of the correlation of leadership self-efficacy and months of leadership experience by condition make these analyses difficult. More specifically, in some conditions leadership self-efficacy was correlated more highly with performance than was months of experience. In other conditions the opposite was true. Therefore, it is impossible to determine in this study whether or not self-efficacy has a mediating effect on the relationship of months of leadership experience and group performance.

CHAPTER 6

DISCUSSION

This study sought to extend Cognitive Resource Theory (Fiedler & Garcia, 1987) by examining the effects of two types of manipulated leadership experience on group performance and the moderating effects of stress. In addition, the role of leadership self-efficacy in Cognitive Resource Theory was explored. There was some support for the hypothesized relationships between the two types of leader experience and group performance; however, the effects of self-efficacy on group performance were not as hypothesized. These findings are discussed in detail below.

Effects of Manipulated and Reported Experience on Group Performance

The first focus of this study was to examine how leadership experience, defined both as a content-based construct and as a time-based measure (months of experience), would contribute to group performance. We expected that leaders given exposure to the technical aspects of the task (task-relevant practice/experience), would perform less effectively when being evaluated by others than when not evaluated by others. In other words, stress that was a result of evaluation apprehension was expected to interfere with the application of task-relevant knowledge. Subjects gained this knowledge by completing a similar task in both Phase 1 and Phase 2 of this study. As predicted by Cognitive Resource Theory, task-relevant practice/experience was expected to function much like intelligence, creativity, or expertise. In Cognitive Resource Theory, the amount of stress a leader reports tends to diminish the relationship

between these resources (task-relevant knowledge, intelligence, creativity) and group performance. Therefore, stress is said to interfere with the application of these resources.

In addition, we expected leaders given experience in the leadership role (group leadership practice) to perform better under stress than under no stress. In this case, stress was expected to facilitate performance. This prediction was based on the premise that the skills required to lead a group might be cued when subjects served as leaders in both phases of the study. And more specifically, the presence of an evaluative other would provide arousal to facilitate the application of this type of leadership experience as predicted by Cognitive Resource Theory.

In this study, the results showed that task-relevant practice led to increased performance, and stress led to decreased performance. There was no interaction between the task-relevant practice/experience manipulation and stress. A significant main effect for both stress and task-relevant practice indicates that not only did stress tend to interfere with the application of newly acquired information, but it also interfered with the use of other pre-experimental task-relevant knowledge. In other words, any knowledge that leaders had before participating in either phase of the experiment, or knowledge that group members had to contribute, was not utilized when the groups were under stress. Therefore, the leader's task ability was impacted by stress, as

Fiedler and others have found for such cognitive abilities as creativity, intelligence, and leader expertise (cf. Fiedler & Garcia, 1987).

The effects for manipulated stress were not as strong as intended; therefore, we examined the effects of perceived stress on group performance. Leaders were split into two groups: (1) those reporting relatively high perceived stress; (2) those reporting relatively low perceived stress. Results from ANOVA showed that a leader's reported level of perceived stress was significantly related to his or her group's performance. This relationship of perceived stress to performance did not appear, however, when the stress score was represented as a continuous variable in a regression analysis. Cohen and Cohen (1983) point out that splitting a continuous variable into a high and low group usually causes loss of information and power. This does not appear to be the case for the perceived stress measure, but the fact that the regression analysis results differ from the ANOVA results causes some concern. An examination of the distribution of perceived stress scores reveals a somewhat flat (or platykurtic) distribution. In other words, there are quite a few scores on the left and right ends of the distribution that may produce significant findings in an ANOVA but introduce deviation from normally significant enough to fail to predict group performance in regression analysis.

It is also important to remember when interpreting the effects of perceived stress that it is most likely highly related to how well a leader thought he or she performed. If leaders thought they were not performing well, they

may have attributed their poor performance to stress caused by the monitor in the room. Further, research reveals that stress reactions may be predicted by particular personality characteristics. For example, Spielberger, Gorsh, and Lushene (1970) found that subjects who score high on measures of trait anxiety are more reactive to stressors than those who score low on this measure. Other research has identified the construct of negative affectivity as a predictor of a person's stress reactions (Watson & Clark, 1984). Individuals high in negative affectivity have been shown to focus on the negative aspects of life and show distress even in the absence of objective stressors. In support of these findings, Eysenck (1989) proposed that constructs such as trait anxiety work to alter perceptions of the environment so that individuals high in trait anxiety and negative affectivity perceive their environments as more stressful.

The implications of these constructs are important in Cognitive Resource Theory and should be explored further. Although Fiedler and his colleagues do not exclusively rely on perceived measures of stress (e.g., Frost's fire fighter study used objective measures of job stress), the role of perceived stress in the experience-to-performance linkage should be examined more carefully. If perceived stress is highly influenced by personality traits, how then does leadership experience allow these people to perform well? What have the leaders learned over time that has helped them overcome the decrements in performance associated with adverse reactions to stress?

In the present study, leadership practice did not improve the groups' performance. The implications of this finding are not clear. First, it may be that the practice session was too short-lived to be meaningful as we described earlier. Second, the feedback provided to all groups may not have helped correct poor performance. In other words, leaders who did not perform well in Phase 1 were told that they had done fairly well with regard to their performance as leaders and their performance on the task (all groups were told that they performed at the 75th percentile after Phase 1). Therefore, these leaders may have continued behaving in the same manner for Phase 2 because they believed their behavior was effective. Third, vicarious learning may have occurred for those subjects who participated as followers in Phase 1 and who then became leaders in Phase 2. It may be that this confound diluted the effects that the leadership practice/experience manipulation may have had. However, a comparison of the mean group performance score in Phase 1 compared to mean group performance in Phase 2 for those leaders who had served as followers in Phase 1 on a different task indicated that the two did not differ significantly. This comparison shows that Phase 2 leaders who had a chance to observe their leader perform in Phase 1 did not have better group performance than newly appointed leaders in Phase 1. Thus, the effects of this manipulation remain unclear.

In addition to the analyses that examined the effects of manipulated practice/experience, the actual reported number of months of leadership

experience was used to predict performance. Multiple regression analysis revealed no main effect for total months of experience, but showed a significant task-relevant practice by months of experience interaction, and a three-way interaction between manipulated stress, task-relevant practice and months of experience. The three-way interaction indicated that stress affected the utilization of task-relevant knowledge and months of experience. More specifically, under stress the higher a leader's months of experience, the higher his or her group's performance when no task-relevant practice was given. However, when a leader had been given task-relevant practice, the lower his or her total months of leadership experience, the higher his or her group's performance.

To more clearly understand the effect of months of experience on performance, correlation coefficients were computed between months of leadership experience and group performance for each of the eight experimental conditions. These correlations displayed the cognitive resource effect for this time-based measure of experience for leaders receiving neither type of leadership practice; months of experience correlated positively with performance when leaders were under manipulated stress but correlated negatively with performance when not under stress.

Correlations between months of experience and performance for the remaining conditions were somewhat unexpected. For example, a strong positive correlation appeared between months of experience and group

performance for leaders who were given leadership practice regardless of whether they performed in the stress or no stress condition. A number of questions arise regarding what was happening in this condition that either cued leaders to use their past leadership experience, or that may have increased their stress levels to the levels felt in the stress condition to cause the leaders to use their experience. Although the manipulation check for stress showed that there was no difference in the amount of stress perceived by leaders in the manipulated stress condition as compared to those in the no-stress condition, leadership practice may have increased the leaders' arousal enough to cause them to draw on past leadership experience to lead their groups more effectively. This increase may not have been reflected in the leaders' ratings of perceived stress.

Leadership practice did not buffer leaders against the effects of stress when they had received task-relevant practice. Total months of leadership experience were unrelated to group performance when leaders were given task-relevant practice and leadership practice. Specifically, months of experience correlated negatively with performance for leaders who were given either task-relevant practice or the combination of both task-relevant practice and leadership practice. Leaders with more months of experience may have ignored the task feedback because they felt more confident in their abilities.

Taken together, this set of results are congruent with Cognitive Resource Theory. Manipulated stress appears to affect the application of months of

leadership experience. In this study, leaders with fewer months of experience performed somewhat better in many of the no-stress conditions than did those with more experience, as evidenced by high negative correlations between months of experience and group performance and by the mean scores for leaders with high and low experience. Because this was a study of ad hoc groups, many leaders in the no-stress conditions may have not perceived that they were in fact responsible for the group's performance. It may have been that only when the leaders had a chance to participate in both phases did they became sufficiently motivated to apply their leadership experience. As discussed later, the results for self-efficacy partially support this assertion.

Relationship Between Self-Efficacy and Performance

The second main focus of this study was to determine the role of leadership self-efficacy in the relationship between experience, stress, and performance. One of the outcomes of increased experience that could cause more experienced leaders to perform better under stress than less experienced leaders may be increased self-efficacy. In this study self-efficacy and months of experience correlated about r=.31. This is not an extremely high correlation and may indicate that some leaders with many months of experience may rate their leadership ability low. Questions arise then as to what happens if experienced leaders have high self-efficacy? How does high self-efficacy affect performance? Are leaders with high self-efficacy less aroused in stressful conditions and is their performance worse than leaders with low self-efficacy?

Or do leaders with high self-efficacy perform better because they know how to cope with the stress and therefore accomplish the task at hand?

First, it was hypothesized that self-efficacy would be increased or enhanced by specific types of practice or experiences. Leadership practice was expected to raise self-efficacy because it is directly related to the task at hand of leading a group together to reach consensus, while the highest post-experimental self-efficacy was expected for those leaders who participated as leaders twice (leadership practice) and who participated in a similar task in both phases (task-relevant practice). For both practice conditions, leaders received positive feedback in order to increase their self-efficacy. Bandura (1986) and Gist and Mitchell (1992) report that experiences in which individuals receive positive feedback should work to increase self-efficacy.

A repeated measure analysis of variance did not reveal any significant main or interaction effects of manipulated practice/experience on leaders' ratings of their leadership self-efficacy. However, planned comparisons on the leadership self-efficacy measure that consisted of the traditional self-efficacy scale format, showed that leaders receiving both leadership practice and task-relevant practice had larger increases in self-efficacy than leaders given any other type of practice.

Second, we expected that estimates of self-efficacy for leadership ability would also increase the ability to cope with stressful situations. In conditions of stress, we expected that subjects who were high in self-efficacy would report

less stress than subjects who were low in self-efficacy. Results showed that self-efficacy was highly related to perceived stress. Leaders high in either self-efficacy or task-specific self-esteem or general self-esteem reported significantly lower amounts of perceived stress than those low in self-efficacy.

Third, analyses of self-efficacy as an independent variable produced some interesting and unexpected results. It was hypothesized that there would be a main effect for self-efficacy. Leaders with higher self-efficacy were expected to perform better across all conditions. Also expected was a stress-by-self-efficacy interaction. Stress was expected to have a debilitating effect on performance only for leaders with low in self-efficacy. Results showed no main effect for self-efficacy. Those leaders with higher self-efficacy did not perform better than those with low self-efficacy. However, there was a significant interaction between manipulated stress and self-efficacy with leaders low in self-efficacy performing worse under stress than when not under stress. Self-efficacy also interacted with task-relevant practice and stress. The debilitating effect of stress for leaders low in self-efficacy was removed when they were given task-relevant practice.

Finally, additional multiple regression analyses were used to understand the role of self-efficacy in the leadership experience and performance relationship. Self-efficacy was expected to mediate the relationship between experience and performance in stressful conditions. In other words, we know that experience predicts performance under stress from other research on

Cognitive Resource Theory. In this study, as one would expect, years of experience was moderately related to leadership self-efficacy, indicating the amount of leadership experience a person has does affect his or her level of self-efficacy for leadership. Self-efficacy estimates were also related in some conditions to performance. However, once the effects of experience were controlled, self-efficacy did not have an effect on performance in any of the conditions.

There could be a number of explanations for the lack of strong findings for self-efficacy as an overall predictor of performance. Gist and Mitchell (1992) outline four such reasons. First, self-efficacy may not be strongly related to performance on particular tasks. These authors use the example of a task in which luck plays a part, such as gambling. The task used in the present study was group performance for which the leader had only moderate control over the group members insofar as they listened to his or her direction on the task. Rather than relying only group performance as an outcome, a measure of the leader's performance along the dimensions of facilitating and influencing may have produced a larger effect for the predictive power of self-efficacy.

Second, the measure of self-efficacy might be inadequate. One way we tried to alleviate this problem was to use three alternative self-efficacy measure formats to find a self-efficacy measure that had predictive validity for performance on the group task. Nevertheless, Gist and Mitchell (1992) claim that inadequacies in self-efficacy measures may be the result of weak

differentiation between levels of performance on the self-efficacy measure, or alternatively, because the self-efficacy measure does not capture the task's complexity (Bandura, 1988). In this study, self-efficacy was applied to the task of small group leadership. There are a number of subtasks involved in small group leadership that may have not been adequately captured by the measures we developed.

In post-hoc analyses to explore the predictive effects of subtask self-efficacy, the facilitation and influence components of the leadership self-efficacy measure were separated to produce two measures of leadership self-efficacy. But as expected from the high internal reliability for this scale (Cronbach's alpha =.82), the facilitation and influence components did not differentially affect group performance. It is possible that these components would predict performance if a more precise dependent measure such as actual facilitative behaviors or influence attempts and successes were used.

Third, Gist and Mitchell point out that there are instances in which it is difficult to assess self-efficacy accurately; an example is when the task is new to the subject. In the present study, the two subtasks for group performance would not be considered necessarily novel. The first subtask was application of skills required by the leadership role, and the second subtask was the actual task content and process. Most individuals in this study reported some leadership experience, and many noted that they had worked on similar tasks at one time. However, taken together in the experimental context, some

subjects may have considered the task to be fairly novel and, therefore, had difficulty making accurate estimates of their self-efficacy.

And finally, according to Gist and Mitchell, self-efficacy may not predict performance because the theory related to self-efficacy and performance is wrong. In no sense did this experiment either prove or disprove the theory surrounding self-efficacy; however, there are some issues that need further clarification. For example, the finding that general self-esteem also tended to predict in the same manner as did self-efficacy may be problematic to the theory. Many researchers argue that there is a distinct difference between self-esteem and self-efficacy, but many do not include measures of self-esteem along with self-efficacy to determine the ability of self-esteem to predict performance.

It may be the case that self-esteem and self-efficacy interact in some way to increase performance. For example, individuals high in self-esteem may respond differently to feedback as compared to individuals low in self-esteem, and these differential reactions may in turn predict changes in self-efficacy. In this study, self-esteem predicted performance almost as well as leadership task-specific self-esteem. This relationship needs to be investigated further. It may be that the sample of students in this study relied more on their general self-esteem to make judgments about their leadership ability rather than their actual leadership self-efficacy because of somewhat limited leadership experiences. It also may be the case that each measure of a leader's self-

concept, including self-esteem, has some implications for performance under stress. Self-evaluative measures that are more specific to the task of interest should be more highly related to performance. Therefore, refining the self-efficacy measure for leadership by increasing its task specificity should result in an instrument that has increased predictive validity.

In this study, the manipulations of leadership and task-relevant practice enhanced self-efficacy somewhat. The type of practice/experience given may have been too short-lived to increase a leader's self-efficacy. As discussed by Gist and Mitchell (1992), the malleability of self-efficacy depends on many factors. Additionally, there is some research that indicates that individuals low in self-efficacy will be more likely to change their self-efficacy estimates. For example, Brockner (1988) reports that individuals with low self-esteem exhibit more behavioral plasticity. Brockner defines behavioral plasticity as "the extent to which individuals' actions are susceptible to influence by external and, particularly, social cues" (Brockner, 1988, p.27). Individuals low in self-efficacy might also exhibit more behavioral plasticity compared to those high in self-efficacy. It is also suggested that there may be ceiling effects for individuals high in self-efficacy and, therefore, it is difficult to increase their self-efficacy. Brief training or experience may not be expected to increase an individual's self-efficacy. A post-hoc analysis for the behavioral plasticity relationship was not found. Leaders who were initially low in self-efficacy did not have higher self-efficacy as the result of the two types of manipulated experience.

Even though all groups received the same type of feedback, basic attribution theory contends that individuals will make different attributions regarding the causes of successful performance (cf. Weiner, 1985). In research on self-efficacy and attributions, Silver, Mitchell, and Gist (1991) found that individuals high and low in self-efficacy attribute successful performance to their ability. Individuals low in self-efficacy attribute unsuccessful performance to lack of ability, while those high in self-efficacy attribute unsuccessful performance to insufficient effort or bad luck. In the present study, different leaders receiving the same task feedback may have seen performance in the 75th percentile differently than each other. For some, the 75th percentile was seen as adequate performance, while for others it was seen as substandard. Some research suggests that helping subjects focus more on the positive aspects of their practice experiences can lead to increased self-efficacy. For example, Sarason, Potter, and Sarason (1986) found subjects who were told to recall positive experiences had increased coping effectiveness. It may have been useful in the present study to ensure that feedback was delivered in a consistent manner to help subjects focus on the positive aspects of their performance.

Theoretical Implications and Future Research

Implications for the Construct of Self-Efficacy

The relationship of self-efficacy to leadership experience is very important for the development of training programs. As Gist (1987) points out,

training pedagogy that enhances self-efficacy will increase the amount of information learned and may in turn transfer back to performance the work place. This type of training may also consist of methods that change the way in which failures and stress are perceived. Gist and Mitchell (1992) propose a number of additional strategies to increase self-efficacy. These include the following:

- Giving individuals a thorough understanding of task attributes, complexity, task environment, and the way in which these factors can be controlled.
- Improving training in abilities or how to apply the abilities.
- Increasing an individual's understanding of the behavioral, analytical, or psychological performance strategies, or effort expenditures required for task performance.

A measure of self-efficacy also becomes useful in evaluating training effectiveness. Rather than relying on behavioral change or performance measures that are often costly and time-consuming to collect, training effectiveness could be evaluated using measures of self-efficacy. Self-efficacy measures would also help trainers to understand what aspects of the task require additional emphasis to increase a person's self-efficacy and eventually his or her on-the-job performance.

Although the present study has provided some evidence that leadership self-efficacy may be a useful construct for predicting performance, the relationship of self-efficacy to leadership performance will require further

research and construct validation to ensure that leadership self-efficacy is a construct different than general self-esteem.

Implications for Cognitive Resource Theory

Findings from the present study suggest that the construct of experience in Fiedler's Cognitive Resource Theory should be expanded and specified in more detail. The effects he reports rely primarily on time-in-service measures, although some research has examined diversity and relevance of experience. It is reasonable to conclude, however, that certain types of experiences, as outlined by McCall and his colleagues (1988) could compensate for knowledge and skills that come from the number of years of experience obtained by a leader. Further, many organizations would be interested in determining specific experiences that can substitute for length of experience.

This research also suggests that the role of self-efficacy should be explored further in Cognitive Resource Theory. Although there was no support for the mediating effects of self-efficacy in the relationship between months of leadership experience and group performance, a mediating relationship still may exist. Unfortunately, in this study there were only a few subjects in conditions in which they received no other type of leadership practice to test this hypothesis.

Results of this research also indicate that it is important to determine the outward manifestations of leaders who have gained both self-confidence and self-efficacy. We found that in some conditions, leaders with high self-efficacy

actually performed worse than those with low self-efficacy. This finding may indicate that overconfidence produced low group performance. Experiences and training in leadership should be structured in such a way to ensure that overconfidence does not negatively affect performance.

Another important finding from these results that has implications for self-efficacy is that perceived stress seemed to have very little to do with manipulated stress. This finding is not surprising because perceived stress is probably measuring the ability to cope with a given situation and may be influenced largely by a person's level of self-efficacy. The relationship between self-efficacy and perceived stress found in this study should be considered when interpreting the role of perceived stress in additional research on Cognitive Resource Theory.

Future Research

Additional research should be done in a field setting to examine how specific types of experiences, as pointed out by McCall and his colleagues (1988), as well as how outcomes identified by Fiedler, affect performance. As pointed out previously, McCall's reliance on self-reports of learning experiences is questionable. Alternatively, retrospective analysis of recent company history could hold information about a leader's recent experience. That is, did the leader take charge of a unmotivated group and turn it around? Did the leader actually make a mistake that taught him or her a valuable lesson? How did that mistake affect his or her level of leadership self-efficacy?

Other information could be gathered in a field experiment in which initial measures of leader self-efficacy and managerial experience could be taken and their relationship to a stressful situation examined. More research needs to be conducted to examine the role of leadership self-efficacy in leadership performance. Although the present study indicated that there is some validity for the measure developed, its validity can be improved in future studies.

Problems and Limitations

As discussed in the introduction to this paper, brief exposure to the technical content of the task and to the leadership role in the group were used as means to increase subjects' experience in these areas. However, leadership practice did not act in the same manner as long-term leadership experience. In addition, although subjects' knowledge of the task was enhanced, many subjects have found it difficult to use this new knowledge working with or leading a group of strangers.

The manipulation check for perceived stress in the two stress conditions was not significant, although a main effect for stress did occur with groups under stress performing worse than groups not under stress. This finding can be investigated further through examination of videotapes of the sessions. For example, this study did not examine the reactions of the group members, nor the actual physical reactions of the leaders in the stress condition. From participating in the experiment, there were many cases in which the leaders seemed to be very uncomfortable in the presence of the observer. These

leaders spent much of their time in the early minutes of the session looking up at the observer to see if the observer was watching them. Although these subjects seemed distressed, whether or not they reported this distress on the perceived stress measure is unknown.

There is also a problem with reliance on self-report measures of experience that cannot be verified. The measure used in this study asked subjects to recall the number of months they spent in various leadership positions. There was no way of verifying the accuracy of these reports. In a subsequent study, it would be useful to understand how accurate these self-reports might be by verifying the months spent in various leadership positions through former employer or school records.

Another limitation of this study is one that is of concern to all researchers who study the phenomenon of self-efficacy. First, demand effects in experiments designed to increase self-efficacy because of the repeated administration of the self-efficacy questionnaire. Second, the self-efficacy enhancements that take place in a study may be strong enough to produce short-term increases, but may not lead to internalization of the increased self-efficacy level. In other words, a person may have felt more self-efficacious if he or she had been given both types of leadership practice, but the enhancement was not enough to help him or her perform well in the second phase of the study. And third, as mentioned previously, the construct of leadership self-

efficacy examined in this study was developed to measure that of small group leadership and may not generalize to other more broader requirements of leadership.

One additional confound that may have introduced variance results from differences by gender. In this study slightly over half of the leaders were women. The gender composition of the groups also varied; there were same-gender groups and mixed-gender groups. An analysis of differences by leader gender on group performance revealed no main effects or interaction effects for gender. Although much of the research on gender differences finds mixed results for a number of dimensions such as leadership emergence, leadership influence, and leadership effectiveness (cf. Bass, 1990), it is possible that in the present study gender did play a role in some of the higher order interactions that included self-efficacy. One piece of evidence for this speculation is that men and women subjects had significantly different scores on a few of the pre-experimental measures. For example, males had significantly higher scores on the general self-esteem measure ($t(645) = 2.69$, $p<.01$). However, females reported more total months of leadership experience ($t(649) = -3.67$, $p<.001$). Female leaders tended to report slightly more perceived stress across both conditions of manipulated stress ($t(139) = -1.71$, $p<.10$). In future studies the implications of these differences within Cognitive Resource Theory should be addressed.

In addition to these limitations, there are also some problems with generalization inherent in this study. The three most obvious threats to external validity to consider are the following: 1) using an undergraduate student sample; 2) using ad hoc groups; and 3) using tasks such as the survival tasks to measure performance.

Because experience was manipulated in this study by giving subjects practice, it was desirable to use subjects who had relatively little leadership experience prior to the study. Thus, college students are an appropriate sample and do not necessarily threaten external validity. In addition, college students also have an opportunity to serve as real leaders both in classroom activities and in activities outside school, such as jobs and committees. The types of skills leaders learn from experience should be the same for business leaders, military leaders, and student leaders. Thus, these results are generalizable to the greater population of leaders.

The criticism that these results are less generalizable because the groups were ad hoc is valid to a certain extent. In most real world situations, leaders will be working with well established groups. However, many leadership situations arise in which a leader is asked to lead a group that has no previous experience of working together. Examples such as leading a committee or a newly formed project group within in a matrix organization still represent examples of leadership, even though it is leadership of ad hoc groups. Thus, although the use of ad hoc groups is a constraint on the

generalizability of this study to certain leadership situations, it is not an overwhelming constraint.

Lastly, there is some question as to the generalizability of the tasks. Do real leaders in real situations deal with consensus tasks and survival tasks? Clearly, business groups rarely spend time working on survival tasks; however, groups do spend a good deal of time prioritizing items and coming to consensus. The Project Planning task is the type of task that a new group that needs to complete a project is likely to go through. So, while these tasks may not exactly reflect tasks that work groups face every day, the tasks do contain the group process elements with which many groups are familiar.

Summary and Conclusions

The ability to cope with stressful situations is important to those who find themselves in leadership roles. The research on Cognitive Resource Theory has identified how the presence of stress affects the contribution of leader's resources to his or her performance and ultimately to the group's performance. More specifically, Cognitive Resource Theory has illustrated that leadership experience provides a buffer against the debilitating effects of stress. An alternative resource that a leader possesses to buffer against stress is a positive belief in his or her ability. In this study, a leader's self-efficacy for his or her leadership ability reduced the debilitating effects of stress.

Continued refinement of the concept of leadership experience, either as a time-based measure or as a content-related construct, will assist in improving

methods for selecting, training, and promoting leaders in many organizations. Further, adding the construct of leadership self-efficacy to a leader's collection of a cognitive resources and delineating the role of leader self-efficacy in the concept of leadership experience provides additional insight for determining training requirements for leaders.

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APPENDIX A: Task Instructions

LEADER TASK INSTRUCTIONS (LOW STRESS CONDITION)

The group will be told that you were selected leader based on having the most leadership experience, as indicated by the Past Leadership Experience Questionnaire you filled out earlier today. THIS IS NOT TRUE. You have been chosen at random to be the group leader, as most students have relatively similar levels of leadership experience. In order to increase the amount of authority you have in the eyes of your followers, we have lead them to believe that you are the most experienced. Please do not let them know that you were selected at random.

The task you will do is one we are thinking about using to train managers in group problem solving skills. There are some bugs we have to work out on this task. To help us with this project, we need you to work on this task as if it were a real group problem solving exercise. The group with the best performance at the end of the quarter will win $75 (that's $25 for each person in the group). We think you'll find the problem interesting and enjoyable. Relax and have fun with the task, but try to come up with the best solution. Right now we're interested in both how you go about the task and in outcome, so we are going to use the video camera to record the process. You will have 5 minutes to rank the items by yourself. Then your group will have 15 minutes to come to consensus on the rankings.

Remember as group leader that you are responsible for coordinating the group, soliciting input from group members, and choosing the most appropriate strategy, in order to increase your group's performance. Remember this is a group task but you, as the group leader, are responsible for the group's work. If there are any disputes about possible solutions to the problem or how to proceed, you have final approval over the course taken.

Please speak up a bit so we can record your voices.
Do you have any questions at this point?

LEADER TASK INSTRUCTIONS: (STRESS CONDITION)

The group will be told that you were selected leader based on having the most leadership experience, as indicated by the Past Leadership Experience Questionnaire you filled out earlier today. THIS IS NOT TRUE. You have been chosen at random to be the group leader, as most students have relatively similar levels of leadership experience. In order to increase the amount of authority you have in the eyes of your followers, we have lead them to believe that you are the most experienced. Please do not let them know that you were selected at random.

The task you will do is a well known group problem solving task which assesses leadership effectiveness. Your performance on this task will indicate your leadership ability. To help us with this project, we need you to work on the task as if it were a real group problem solving exercise. The group with the best performance at the end of the quarter will win $75 (that's $25 for each person in the group). We think you'll find the problem interesting and enjoyable.

Because this task is an accurate measure of leadership potential, we are videotaping each group as they do the task. These tapes will record the words and actions of each member, and will be played back later so we can assess the performance of each leader. Each group's performance will be compared to national norms. An observer from a local leadership research institution will be assessing and evaluating your leadership ability and your group's interactions. These ratings will supplement the information we get from the tapes and help us determine the effectiveness of each leader. You will have five minutes to rank order the items by yourself. Then your group will have 15 minutes to come to consensus on the rankings.

Remember as group leader that you are responsible for coordinating the group, soliciting input from group members, and choosing the most appropriate strategy, in order to increase your group's performance. Remember this is a group task but you, as the group leader, are responsible for the group's work. If there are any disputes about possible solutions to the problem or how to proceed, you have final approval over the course taken.

Because as leader you are responsible for the final group solution, you must be ready to give a short presentation after the session describing the solution the group reached and why that solution was decided upon. This briefing will also be videotaped and be scored to help evaluate your leadership ability.

Please speak up a bit so we can record your voices.
Do you have any questions at this point?

Revised 4/12/90

GROUP TASK INSTRUCTIONS (STRESS AND NO STRESS CONDITION)

The task you will do is one we are thinking about using to train managers in group problem solving skills. There are some bugs we have to work out on this task. To help us with this project, we need you to do the task like it was a real group problem solving exercise. The group with the best performance at the end of the quarter will win $75 (that's $25 for each person in the group). We think you'll find the problem interesting and enjoyable. Relax and have fun with the task, but try to come up with the best solution.

Right now we're interested in both how you go about the task and in outcome, so we are going to use the video camera to record the process. You will have 5 minutes to rank the items by yourself. Then your group will have 15 minutes to come to consensus on the rankings.

Please speak up a bit so we can record your voices.
Do you have any questions at this point?

APPENDIX B: Tasks

PROJECT PLANNING PROBLEM

THE SITUATION

Your organization has just assigned you to a newly formed task team which is to take over a secret Project presently being handled by Research and Development. Your entire team has been assigned responsibility and authority to first design a plan for managing the project and then, after top management has reviewed and accepted your plans, carry out the project.

None of you have been told anything about the project, so far, other than that it is expected to grow to sizeable proportions requiring additional people.

YOUR TASK

Despite the lack of information regarding the project, your team must now design a preliminary plan for managing the project. On the next page is a list of 20 Management Activities (A through T) arranged in random order. Your task is to rank order these activities according to the sequence you would follow in planning, organizing, implementing, and controlling the project, starting with "1" the most important, to "20" the least important. This sequence will be reviewed by top management before you are given the go-ahead to begin work on the project.

You may assume --

1. The number of people in your workgroup is the same as the number in your group today

2. You are the actual people in the situation

You have 20 minutes to come up with a group ranking of the items. At the end of 20 minutes the experimenter will ask the leader for the final group ranking. Although the leader of the group has the final say concerning the ranking of the items, you should try to make each decision one which all group members can at least partially agree. In other words, the final group ranking should be acceptable to each group member. Only the leader's group rating sheet will be counted as the group's solution, so make sure you have written the rankings on the leader's sheet before time expires.

ITEMS	Individual Ranking	Group Ranking
Find qualified people to fill positions	_____	_____
Measure progress toward and/or deviation from the project's goals	_____	_____
Identify & analyze the various job tasks necessary to implement the project	_____	_____
Develop strategies (priorities, sequence, timing of major steps)	_____	_____
Develop possible alternative courses of action	_____	_____
Deliver appropriate consequences for individual performance	_____	_____
Assign responsibility/accountability/authority	_____	_____
Set project objectives (desired results)	_____	_____
Train and develop personnel for new new responsibilities/authority	_____	_____
Gather and analyze the facts of the current project situation	_____	_____
Establish qualifications for new positions	_____	_____
Take corrective action on project (recycle project plans)	_____	_____
Coordinate day-to-day activities	_____	_____
Determine the allocation of resources (including budget, facilities, etc.)	_____	_____
Measure individual performance against performance objectives and standards	_____	_____
Identify the negative consequences of each course of action	_____	_____
Develop individual performance objectives which are mutually agreeable to the individual and his/her manager	_____	_____
Define scope of relationships, responsibilities, and authority of new positions	_____	_____
Decide on a basic course of action	_____	_____
Determine when and how overall progress will be measured	_____	_____

DESERT SURVIVAL PROBLEM

THE SITUATION

It is approximately 10:00 a.m. in mid August and you have just crash-landed in the Sonora Desert in the southwestern United States. The light twin-engine plane, containing the bodies of the pilot and co-pilot, has completely burned. Only the airframe remains. None of the rest of you have been injured.

The pilot was unable to notify anyone of your position before the crash. However, he indicated before impact that you were 70 miles south-southwest from a mining camp which is the nearest known habitation, and that you were approximately 65 miles off the course that was filed in your VFR Flight Plan. The immediate area is quite flat and, except for occasional barrel and saguaro cacti, appears to be rather barren. The last weather report indicated the temperature would reach 110 that day, which means the temperature at group level will be 130 degrees Fahrenheit. You are dressed in lightweight clothing: short-sleeved shirts, pants, socks and street shoes. Everyone has a handkerchief. Collectively, your pockets contain $2.38 in change, $85.00 in bills, a pack of cigarettes, and a ballpoint pen.

YOUR TASK

Before the plane caught fire your group was able to salvage the 15 items listed on the next page. Since survival depends on reaching the mining camp the most critical items available must be chosen for the trip. Your task is to rank these items according to their importance to your survival, staring with "1" the most important, to "15" the least important.

You may assume--

1. the number of survivors is the same as the number in your group today.
2. you are the actual people in the situation;
3. the team has agreed to stick together; and
4. all items are in good condition.

You have 15 minutes to come up with a group ranking of the items. At the end of the 15 minutes, the experimenter will ask the leader for the final group ranking. Although the leader of the group has the final say concerning the ranking of the item, you should try to make each decision one with which all group members can at least partially agree. In other words, the final group ranking should be acceptable to each group member. Only the attached group rating sheet will be the group's solution, so make sure you have written the rankings on this sheet before time expires.

Items	Individual Ranking	Group Ranking
flashlight (4 battery size)	_____	_____
jackknife	_____	_____
sectional air map of the area	_____	_____
plastic raincoat (large size)	_____	_____
magnetic compass	_____	_____
compress kit with gauze	_____	_____
.45 caliber pistol (loaded)	_____	_____
parachute (red and white)	_____	_____
bottle of salt tablets (1000 tablets)	_____	_____
1 quart of water per person	_____	_____
a book entitled "Edible Animals of the Desert"	_____	_____
a pair of sunglasses per person	_____	_____
2 quarts of 180 proof Vodka	_____	_____
1 top coat per person	_____	_____
a cosmetic mirror	_____	_____

MOUNTAIN SURVIVAL PROBLEM

THE SITUATION

Your charter flight from Seattle to Banff and Lake Louise (Alberta, Canada) has crash-landed in the North Cascades National Park area somewhere near the United States-Canada border, and then burst into flames. It is approximately 12 noon in mid-January. The twin-engine, 10-passenger plane, containing the bodies of the pilot and one passenger, has completely burned. Only the airframe remains. None of the rest of you has been seriously injured.

The pilot was unable to notify anyone of your position before the plane crashed in a blinding snowstorm. Just before the crash, you noted that the plane's altimeter registered about 5,000 feet. The crash site is in a rugged and heavily wooded area just below the timberline. You are dressed in medium- weight clothing and each of you has a topcoat.

YOUR TASK

After the plane landed and before it caught fire, you group was able to salvage the 15 items listed on the separate sheet. Your task is to rank these items according to their importance to your survival. Write "1" next to the most important item, "2" next to the second most important item, and so one to "15" next to the least important item.

You may assume--

1. the team has agreed to stick together; and
2. all salvaged items are in good condition.

You have 15 minutes to compete this task and record the results on the blanks labeled "group rankings" on the separate sheet. Although the leader of the group has the final say concerning the rankings of the items, you should try to make each decision one with which all group members can at least partially agree. In other words, the final group ranking should be acceptable to each group member. Only the attached rating sheet will be the group's solution, so make sure you have written the rankings on this sheet before time expires.

I.D. # ____

ITEMS	Individual Ranking	Group Ranking
sectional air map of the area	_____	_____
flashlight (4 battery size)	_____	_____
four wool blankets	_____	_____
one rifle with ammunition	_____	_____
one pair of skis	_____	_____
two fifths of liquor	_____	_____
one cosmetic mirror	_____	_____
one jackknife	_____	_____
four pairs of sunglasses	_____	_____
three books of matches	_____	_____
one metal coffeepot	_____	_____
first aid kit	_____	_____
one dozen packages of cocktail nuts	_____	_____
one clear plastic tarpaulin (9' X 12')	_____	_____
one large, gift-wrapped decorative candle	_____	_____

APPENDIX C: Pre-Experimental Forms and Questionnaires

ORGANIZATIONAL RESEARCH GROUP
DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF WASHINGTON
SEATTLE, WA 98195

A group process investigation of leadership experience

Dr. Fred. E. Fiedler
Professor of Psychology and of
Management and Organization
(206) 543-2314

Susan E. Murphy
Department of Psychology
(206) 543-2314

Consent Form

Investigator's Statement

You have been asked to participate in research on group problem solving. As part of this research, we are examining the conditions under which groups make effective decisions.

You will be asked to complete a series of confidential questionnaires. Some questions on these scales may be considered sensitive; for example, several questions ask about how you view your own self-worth and leadership ability. Other questions will ask about your past leadership experience. Completion of these questionnaires should take about 25 minutes. You will then participate in two group problem solving exercises, each of which will take approximately 25 minutes. You will fill out a short questionnaire between problem-solving exercises. Finally, you will be asked to complete another short questionnaire concerning your impressions of the experiment. The entire experiment will take two hours and all participants will receive two hours credit. Some of these sessions will be videotaped and attended by observers. This study will be conducted in two phases. Subjects will be randomly assigned in Phase 1 to either leadership or follower positions. In Phase 2, the positions will be reassigned according to a pre-determined plan.

All information you provide will be kept in strict confidence and will not be communicated to anyone outside the research group. The videotapes and all questionnaires, except the one asking you to estimate the amount of past leadership experience you have, will be coded but the code will not be linked to your name, and thus we will not be able to tell which subject completed which questionnaires. If you are videotaped, you will of course be identifiable in the videotapes. However, only the experimenter will view the tapes, and then only to make a note of specific behaviors of importance to the study. These notes will then be transferred to the written data file and will no longer be linked to you. Nevertheless, you will be given the opportunity to review the tapes and delete any portion(s) you feel appropriate. The videotapes will be retained for 2 years.

It is your privilege to withdraw from the study at any time without penalty or loss of benefits to which you are otherwise entitled. You may omit any questions

you do not care to answer. We hope, however, that you will indicate your willingness to participate by signing in the space provided on the next page.

If you have any questions or desire further information about this study in the future, you may call Professor Fred E. Fiedler or Susan E. Murphy at the numbers listed above. Thank you in advance for your cooperation.

Subject's Statement

The study described above has been explained to me, and I voluntarily consent to participate in this research project. I have had an opportunity to ask questions and understand that future questions I may have about the research or about subjects' rights will be answered by one of the investigators listed above.

_____

Signature of Subject Date

Copies to: Subject
Investigator's File

TASK SPECIFIC SELF-ESTEEM

Instructions: Please read each statement carefully. Then indicate on the scale the extent to which you agree or disagree with each of the statements.

1. I know a lot more than most students about what it takes to be a good leader.

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	2	3	4	5

2. I know what it takes to make a group accomplish its task.

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	2	3	4	5

3. In general, I'm not very good at leading a group of my peers.

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	2	3	4	5

4. I am confident of my ability to influence a group I lead.

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	2	3	4	5

5. I have no idea what it takes to keep a group running smoothly.

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	2	3	4	5

6. I know how to encourage good group performance.

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	2	3	4	5

7. I am able to allow most group members to contribute to the task when leading a group.

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	2	3	4	5

8. Overall, I doubt that I could lead a group successfully.

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	2	3	4	5

LEADERSHIP SELF-EFFICACY SCALE (TIME 1)

Instructions: Below are some of the skills required for leaders in different groups. None of these behaviors is better than the others but are different ways of achieving good group performance.

Even though you might not be asked to serve as the leader for this group, please indicate whether you can exhibit this skill in a leadership role (Y for yes, N for no) and if yes, indicate how confident you are in your rating (1 indicates not at all confident and 100 indicates totally confident). (Do not include a confidence rating if you answered "no".)

Influencing group members involves directing them to accomplish a task while persuading them to perform well. I am capable of influencing a group...

	Can Do Y/N	Confidence (1-100) (Not at all-Totally)
When the group has as much knowledge as I do and no one has actually been chosen as leader.	____	____
When I know more than the rest of the group about the task at hand.	____	____
When the group has been told to defer to me because I am the leader of the group or supervisor.	____	____

Facilitating a group discussion involves keeping a group on task while allowing the group members to contribute their knowledge. I am capable of facilitating a group discussion...

	Can Do Y/N	Confidence (1-100) (Not at all-Totally)
When the group members do not get along with each other.	____	____
When the group refuses to cooperate because they are not interested in the task.	____	____
When I know more than the rest of the group about the task at hand.	____	____
When the group is enthusiastic about the task and willing to cooperate.	____	____

PAST LEADERSHIP EXPERIENCE

Please read each question carefully fill in the blanks or circle the response that most closely resembles your answer.

1. For how many months during high school or college did you hold an elected office in either school government or organized clubs?

   Number of Months in High School _____
   Number of Months in College _____

2. For how many months that you spent involved in clubs or committees did you assume a leadership role? This question does not refer to elected leadership positions but situations in which you volunteered to lead.

   Number of Months in Leadership Role _____

3. For how many months that you spent working either as a paid worker or volunteer did you manage other workers?

   Number of Months as Manager of others _____

4. For group situations during classroom activities, what percentage of the time would you say that you assume the leadership role?

0----------1----------2----------3----------4----------5

None 1-20% 21-40% 41-60% 61-80% 81-100%

5. In general, how much leadership experience do you have compared to others your age?

0----------1----------2----------3----------4----------5

None	More than 20% of the people my age	More than 40% of the people my age	More than 60% of the people my age	More than 80% of the people my age	More than 99% of the people my age.

LEADERSHIP SELF-EFFICACY SCALE (TIME 2 and TIME 2)

Instructions: Now that you have had a chance to serve as leader, we would like you again to think about your leadership ability. Below are some of the skills required for leaders in different groups. None of these behaviors is better than the others but are different ways of achieving good group performance. Please indicate whether you can exhibit this skill in a leadership role (Y for yes, N for no) and if yes, indicate how confident you are in your rating (1 indicates not at all confident and 100 indicates totally confident). (Do not include a confidence rating if you answered "no".)

Influencing group members involves directing them to accomplish a task while persuading them to perform well. I am capable of influencing a group...

	Can Do Y/N	Confidence (1-100) (Not at all-Totally)
When the group has as much knowledge as I do and no one has actually been chosen as leader.	____	____
When I know more than the rest of the group about the task at hand.	____	____
When the group has been told to defer to me because I am the leader of the group or supervisor.	____	____

Facilitating a group discussion involves keeping a group on task while allowing the group members to contribute their knowledge. I am capable of facilitating a group discussion...

	Can Do Y/N	Confidence (1-100) (Not at all-Totally)
When the group members do not get along with each other.	____	____
When the group refuses to cooperate because they are not interested in the task.	____	____
When I know more than the rest of the group about the task at hand.	____	____
When the group is enthusiastic about the task and willing to cooperate.	____	____

GROUP PERFORMANCE SELF-EFFICACY

In my role as leader, I am capable of getting my group to perform....

	Can Do Y/N	Confidence (1-100) (Not at all-Totally)
Better than 10% of all other groups on the same task.	_____	_____
Better than 20% of all other groups on the same task.	_____	_____
Better than 30% of all other groups on the same task.	_____	_____
Better than 40% of all other groups on the same task.	_____	_____
Better than 50% of all other groups working on the same task.	_____	_____
Better than 60% of all other groups on the same task.	_____	_____
Better than 70% of all other groups on the same task.	_____	_____
Better than 80% of all other groups on the same task.	_____	_____
Better than 90% of all other groups on the same task.	_____	_____
Better than 99% of all other groups working on the same task.	_____	_____

APPENDIX D: Post-Measures

PERCEIVED STRESS MEASURE

Instructions: The questions on this page ask you about your feelings and thoughts during the exercise you just completed. The best approach is to answer each question fairly quickly. For each question, circle one number to indicate how you felt during the last exercise.

1. **How much stress did you feel in your role as a leader?**

1----------2----------3----------4----------5----------6----------7
No Stress Moderate Stress Extreme Stress

2. **How anxious did you feel as a result of being videotaped?**

1----------2----------3----------4----------5----------6----------7
Not Anxious Moderately Anxious Extremely Anxious

3. **How nervous did you feel as a result of the presence of the observer?**

1----------2----------3----------4----------5----------6----------7
Not Nervous Moderately Nervous Extremely Nervous

4. **Did the presence of the observer make it difficult to concentrate on the task?**

1----------2----------3----------4----------5----------6----------7
Not Difficult Moderately Difficult Extremely Difficult

5. **Did the presence of the videotape make it difficult to concentrate on the task?**

1----------2----------3----------4----------5----------6----------7
Not Difficult Moderately Difficult Extremely Difficult

6. **Overall, how stressful was the activity?**

1----------2----------3----------4----------5----------6----------7
Not Stressful Moderately Stressful Extremely Stressful

LEADER POST QUESTIONNAIRE

Please circle the number that corresponds to your answer for the following statements.

1. In general, did you feel that you learned something about being a leader in the first group tasks that you could use in the second session?

very little	little	some	quite a bit	very much
1	2	3	4	5

2. If you worked on two survival tasks for the two sessions, did you feel that you learned knowledge from the first task that you could apply to the second survival task?

very little	little	some	quite a bit	very much
1	2	3	4	5

3. If you were a leader for both sessions, did you feel that you learned specific leadership skills to help you lead the group in the second session?

very little	little	some	a bit	quite much	very
1	2	3	4	5	

4. To what extent did the you actively seek contributions from others?

very little	little	some	quite a bit	very much
1	2	3	4	5

5. How good do you think your team's decision was?

very little	little	some	quite a bit	very much
1	2	3	4	5

6. What percent of the time did you lead the group by

   a. contributing information

   0%-------20%-------40%-------60%-------80%-------100%

   b. helping the group work together?

   0%-------20%-------40%-------60%-------80%-------100%

In a few words, briefly describe what you thought this experiment was testing?

_____

_____

_____

GROUP POST QUESTIONNAIRE ID# _____

1. To what extent did others in the group pay attention to your ideas?

very little	little	some	quite a bit	very much
1	2	3	4	5

2. How frustrated did you become while reaching the team decision on the final rankings?

very little	little	some	quite a bit	very much
1	2	3	4	5

3. How responsible and committed do you feel for the decision that was made?

very little	little	some	quite a bit	very much
1	2	3	4	5

4. To what extent did the leader actively seek contributions from others?

very little	little	some	quite a bit	very much
1	2	3	4	5

5. How good do you think your team's decision was?

very little	little	some	quite a bit	very much
1	2	3	4	5

6. What percent of the time did the leader lead the group by

   a. contributing information

   0%-------20%-------40%-------60%-------80%-------100%

   b. helping the group work together?

   0%-------20%-------40%-------60%-------80%-------100%

In a few words, briefly describe what you thought this experiment was testing?

_____

_____

_____

_____

ORGANIZATIONAL RESEARCH GROUP
DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF WASHINGTON
SEATTLE, WA 98195

A group process investigation of leadership experience

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(206) 543-2314

Susan E. Murphy
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Debriefing Statement

Thank you for participating in our study. We would like to take a moment now to tell you more about the experiment we are conducting.

Our research indicates that leaders who are experienced do not always perform better than leaders who do not have experience on a job. We are trying to determine why this occurs. One factor seems to be the level of stress or apprehension the leader experiences. This is an important question because the results may help us to explain how leaders can best use the cognitive resources at their disposal, even under conditions of stress. To look more closely at this issue, we tried in this experiment to vary somewhat the level of apprehension you felt.

We were interested in how the leader of each group behaved in the various conditions. In the first problem solving session, Phase I, all groups worked on the problem under normal circumstances. In the second problem-solving session or Phase 2, groups performed in one of two stress conditions. If you were in the low stress condition, your group was allowed to perform the task alone with no special conditions or constraints. If you were in the apprehension condition, we informed you that the session was videotaped, and that observers would be taking notes concerning group leader's performance on the task. We also hinted that your performance was to be compared to others. Actually, both task sessions in this study were videotaped. We intend to review the videotapes and look at how the behaviors and performance of your group were affected by the presence of videocameras and observers. Also, the observers were not actually evaluating the leader's performance. Your group was led to believe this to cause the leader some evaluation apprehension. (Please realize that the use of deception in psychology experiments is not common, and it is used only when subjects' responses would be biased as the result of prior information about the nature of the study.)

In addition to the stress conditions, we also varied the type of experience received by the leader. Different types of experience are thought to lead to better performance under mild stress. We were investigating both leadership experience, that which is gained from acting as a leader of a group, and technical or task experience, that which is gained from knowledge of a specific task. To manipulate leadership experience, some leaders were asked to lead groups in both Phase I and Phase 2. No leadership manipulation occurred

when group members in Phase I became leaders in the Phase 2. The assignment of leader and group member roles was done randomly. It was not based on your performance in the first task session, or on your responses to the first or second set of questionnaires you completed. To increase the level of technical or task experience, some leaders and followers worked on similar tasks in Phase 1 and Phase 2. Those given a different task in Phase 2 did not receive technical experience.

Group performance on both task sessions will be compared in all the various conditions. In addition, performance of group leaders will be evaluated on the videotapes. Specifically, we will look at the strategies the group leader used to affect group performance. During the experiment, all groups were told their actual scores on the two tasks they performed. However, we also told all groups that they performed in the 75th percentile on the task in Phase I and in the 80th percentile on the task in Phase 2. This feedback was not accurate. All subjects were told they performed at these levels to ensure that groups felt they performed moderately well.

The results of this study will be available in draft form in about two months. If you would like to know how this experiment turned out, please contact the investigators at the top of this form. In the meantime, we ask that you not discuss this study with others who might be eligible to participate, until the end of the quarter. The reason we make this request is that sometimes when participants know ahead of time the purpose of a study, they do not act naturally, and when people do not act naturally, experiments are not as valid as they might be.

Thank you again for helping us conduct this study. If you have any questions about what happened today, or what we just told you, we would be happy to answer them for you now.

VITA

Susan Elaine Murphy

Birthdate: January 7, 1960
Vancouver, Washington

Education:

1980-1992 University of Washington,
Seattle, Washington.

Degrees:

1984 Bachelor of Science (Psychology)
University of Washington
Seattle, Washington

1988 Master of Science
University of Washington
Seattle, Washington

1989 Master of Business Administration
University of Washington
Seattle, Washington

1992 Doctor of Philosophy
University of Washington
Seattle, Washington

Professional Experience:

1991 to Present Senior Research Associate, Battelle Human Affairs Research Centers, Seattle, WA.

1989-1991 Research Assistant, Battelle Human Affairs Research Centers, Seattle, WA.

1984-1989 Research Assistant and Teaching Assistant, Organizational Research Group, University of Washington, Seattle, WA.

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