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Examination of a Nomological Network of Team Leadership: A Construct Validation Study

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EXAMINATION OF A NOMOLOGICAL NETWORK OF TEAM LEADERSHIP: A CONSTRUCT VALIDATION STUDY

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ABSTRACT

EXAMINATION OF A NOMOLOGICAL NETWORK OF TEAM LEADERSHIP: A CONSTRUCT VALIDATION STUDY

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This study examined the construct-related validity evidence for team leadership measurement within the United States Navy. Drawing on literature from industrial/organizational, sport, and military psychology, the current research specified one nomological network for officer team leadership appraisal. The proposed model tested the idea that Naval team leaders engaging in transformational behaviors would be more likely to use and encourage the use of teamwork processes, increase cohesion among team members, and maintain superior mission readiness. The hypotheses were tested with performance appraisal data from 900 Commanders, Lieutenant Commanders, and Lieutenants from aviation, surface, and subsurface warfare communities. The relationships between the constructs were tested using path analysis. Multiple-group comparisons were conducted to identify differences in modeled relationships across the warfare communities. Results did not provide support to the argument that team leadership is more accurately defined and measured as a series of interrelated constructs. Discussion centered on the implications of the results for assessing team leadership.

Co-Directors of Advisory Committee: Dr. Terry L. Dickinson
Dr. Bryan E. Porter
Dr. Alan F. Nordholm

This effort is dedicated to my parents, Denis and Christine Strobel.

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INTRODUCTION

For over 2,000 years, Generals and Commanders-in-Chief have relied on teams to engage and defeat enemies in battle, recognizing that cohesive operational units with high quality leaders are more likely to achieve mission objectives (Siebold, 1999). For just as long, officers have sought to maximize these team and social processes to their advantage, motivated by the life-and-death nature of combat operations and the importance of the military to a nation's survival. Given the grave consequences of suboptimal unit performance, examination of teams and teamwork processes necessary for maximal performance within the military is essential.

The United States Armed Forces routinely touts team leadership and cohesion as necessary for optimal team development (Oliver, Harman, Hoover, Hayes, & Pandhi, 1999). A review of professional military education training curricula for company grade officers emphasizes the need for junior officers to develop and foster these team traits (Siebold & Lindsay, 1999). Officer training courses emphasize military team performance as largely dependent on effective leadership, personnel coordination, and interaction during all operational phases (Podsakoff, MacKenzie, Moorman & Fetter, 1990). Cohesion among troops facilitates these critical tasks, and also serves a variety of protective functions that are vital to achieving military team goals (Zaccaro, Gualtieri & Minionis, 1995).

Not unlike many organizations, the United States Navy currently assesses the extent to which their team leaders are effective at managing the team climate by soliciting

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and reinforcing correct and effective teamwork behaviors. Effective behaviors are needed to overcome barriers and provide opportunities for coordination among personnel to achieve unity of effort and organizational objectives; however, debate continues regarding the accuracy of team leadership measurement in applied settings. Schwab and Wichern (1983) argued that organizational behavior researchers have not paid enough attention to the issue of *construct validity* before using scales in substantive research, leaving researchers to question the adequacy and accurateness of job-related measures.

Construct Validity

Construct validity refers to the degree to which inferences can legitimately be made from the operational definitions of a study to the theoretical constructs on which those operationalizations are based (Cascio, 1998). To establish construct validity, researchers hypothesize relationships among a construct and other constructs, and then assess if actual relationships are similar to predicted ones (Schmitt & Chan, 1998; Cascio, 1998). The traditional approach to establishing a theoretical basis for construct validity is to identify a network of constructs within which the construct is embedded; this network is known as a "nomological network" (Cronbach & Meehl, 1955). The development of a nomological network includes a theoretical framework of the constructs to be assessed, an empirical framework for the measurement of the constructs, and specification of the connections among and between these two frameworks. Essentially, a nomological network links the conceptual/theoretical realm with the observable. Thus, construct-related evidence requires research that demonstrates that a measure is indeed assessing the proposed construct by relating a measure to measures of other theoretically-related constructs.

Drawing on literature from industrial/organizational, sport, and military psychology, the current research specified one nomological network of team leadership (a construct shown to be critical for successful team performance in the United States Navy) for U.S. Naval Officer team leadership appraisal. A nomological network predicting relationships among team leadership, teamwork, team cohesion, and team performance was examined with organizational data to determine if observed relationships adhere to the relationships posited by the nomological network, thereby establishing a basis for construct validity. The proposed model tests the idea that Naval team leaders engaging in transformational behaviors would be more likely to use and encourage the use of teamwork processes, increase cohesion among team members, and maintain superior mission readiness (see Figure 1)[1]. Thus, the closer the match between the hypothesized nomological network and the actual relationships found in the data, the stronger the evidence of construct validity.

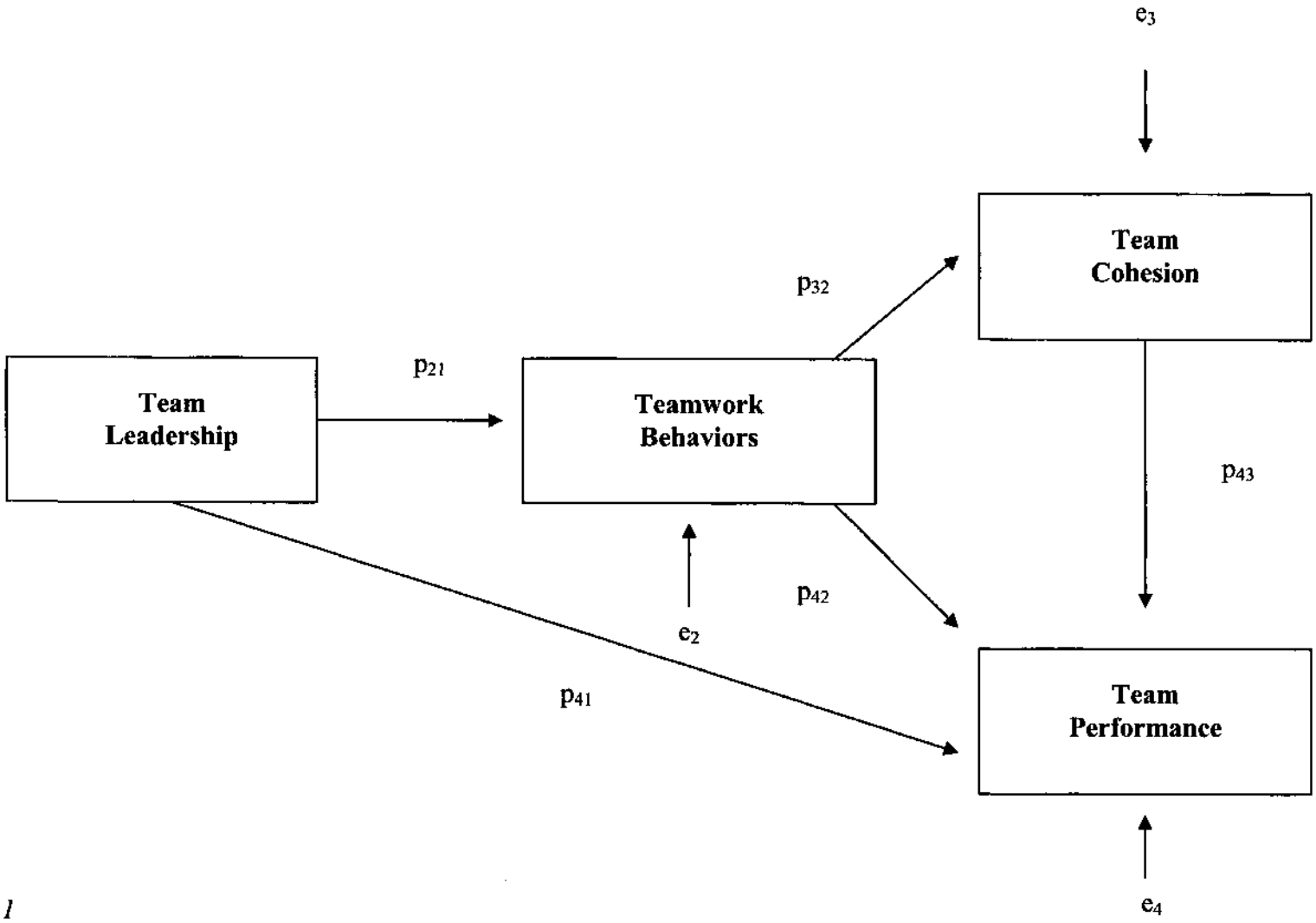


Figure 1

Nomological network predicting relationships between team leadership, teamwork, team cohesion and team performance.

Building a Nomological Network: Team Leadership, the Primary Construct of Interest

History of Team Leadership

Whereas numerous definitions have been offered for the general phenomenon of leadership, few definitions of *team leadership* exist. Team leadership has been broadly defined as any behavior that aids in the completion of team goals (Parker, 1991). Ginnett (1990) suggested that team leadership be defined as functional behaviors, rather than traits or skills inherent in any one individual. This ideology is consistent with Cannon-Bowers, Tannenbaum, Salas, and Volpe (1994), who defined team leadership as "the ability to direct and coordinate the activities of other team members; to assess team performance; assign tasks; motivate team members; plan and organize; and establish a positive atmosphere" (p. 43).

A review of the literature related to team leadership suggests that there are two general theoretical approaches to quantifying effective team leadership: the trait approach and the behavioral approach (Yukl, 2002; Muchinsky, 2000). The trait approach to team leadership focuses on stable characteristics of the leader, such as leadership style or orientation, personality, and general skills and abilities. Conversely, the behavioral approach to team leadership examines those specific behaviors associated with effective team leadership and effective team performance.

Trait Approach to Team Leadership

The trait approach to leadership emphasizes stable personal attributes of team leaders as necessary determinants of team performance and cohesion. Early leadership theories attributed success to the possession of innate abstract abilities such as energy,

intuition, and foresight (Yukl, 2002). Some differences were found between leaders and nonleaders on selected traits: however, the relationship between traits and leadership success did not reveal a particular set of universally relevant traits to be successful. Advances in trait research led to a change of focus from global personality traits to more recognizable attributes that can be related directly to behaviors required for effective leadership in a particular situation (Muchinsky, 2000). This directed approach revealed that some traits increase the likelihood of success as a leader, even though none of the traits guarantees success (Kirkpatrick & Locke, 1996).

After reviewing the relevant literature on team leader traits and team performance, Morgan and Lassiter (1992) suggest that the research results linking leader personality and team performance were inconclusive. They argued that the lack of consistent empirical support for team leader personality and team performance may result from methodological weaknesses, and is not indicative of the true nature of the phenomenon. Specifically, they contended that in most laboratory-based studies, leadership traits may not be strongly manipulated. As a result, they suggested that in operational settings, the leader's personality may have a greater influence on team processes, as evidenced by the fact that leadership in operational settings is relatively enduring and leaders posses the authority to control team behaviors and processes.

Despite the lack of consistent significant relationships, there is some evidence to suggest that there are aspects of personality related to leader effectiveness. It has been argued that leaders with high emotional maturity, integrity, and self-confidence are more likely to maintain cooperative relationships with team members, subordinates, peers, and superiors. Emotional maturity means that a leader is less self-centered, has more self-

control, has more stable emotions, and is less defensive. Integrity refers to a leader's behavioral consistency with expressed values and that the leader is honest and trustworthy. Self-confidence makes a leader more persistent in the pursuit of difficult objectives, despite initial problems and setbacks (Pinder, 2000).

Motivation is another aspect of personality that has been related to leader effectiveness. The classic research of McClelland and colleagues (McClelland & Boyatzis, 1982) identified three leader motives: need for power, need for achievement, and need for affiliation. Leaders with a high need for power enjoy influencing people and events and are more likely to seek positions of authority. Leaders with a high need for achievement enjoy attaining a challenging goal or accomplishing a difficult task, prefer moderate risk, and are more ambitious in terms of career success. Leaders with a high need for affiliation enjoy social activities and seek close, supportive relationships with other people. Berman and Miner (1985) confirmed these motives in another study on managerial motivation.

Team Leader Skills and Abilities. A related line of research addresses leader skills and abilities to demonstrate that enduring skill is required to implement the traits in leadership roles. Yukl (2002) described three basic categories of leader skills: technical, conceptual, and interpersonal. Technical skills include knowledge of work operations, procedures and equipment, and markets, clients, and competitors. Conceptual skills include the ability to analyze complex events and perceive trends, recognize changes, and identify problems. Interpersonal skills include an understanding of interpersonal and team processes, the ability to maintain cooperative relationships with people, and persuasive ability. In general, research supports the conclusion that technical,

conceptual, and interpersonal skills are necessary in most leadership positions. However, the relative importance of most specific leadership skills and the relationship between leader abilities and team performance varies depending on the situation or context. For example, evidence suggests that under stressful situations there is no relationship between general cognitive ability and team performance (Fiedler, 1987; Vecchio, 1990). Conversely, leader intelligence has been found to be related to team performance when the leader is directive, the team is supportive, and the situation is low stress (Fiedler, 1987) or when the leader possesses a high degree of motivation and experience (Fiedler & Leister, 1977).

According to Cohen (1990), strong directive leadership is often required in crisis situations, although a leader with a more participative style of leadership may be required once stability and harmony is achieved. Again, this supports the contention that effective team performance is contingent on specific leadership style in certain contexts or situations. However, Yukl (2002) argues that it may be extremely difficult to change leadership styles to meet appropriate situational demands.

In general, the trait approach offers the potential to explain why individuals seek leadership positions and provide a mechanism for understating their actions when they occupy these positions. It is now evident that certain traits and skills increase the likelihood of leadership success. However, despite this progress, the utility of the trait approach for understanding team leadership and leadership in general is limited.

Behavioral Approach to Team Leadership

What are the specific behaviors a team leader must exhibit in order to ensure the successful completion of desired team goals and objectives? A number of researchers

have identified a wide variety of effective leader behaviors. For instance, evidence suggests that there are several qualities of effective, trained team leaders that increase the performance of their teams: (a) the ability to recognize when to assume the leader position; (b) the ability to maintain their team's focus on team tasks; (c) the foresight to ask for input and discuss potential problems; (d) the ability to verbalize plans for achieving objectives and goals; (e) the practice of keeping the team informed about team performance; and (f) the ability to recognize the importance of task skills (Swezey & Salas, 1992; Dickinson, McIntyre, Ruggeberg, Yanushefski, Hamill, & Vick1992; McIntyre & Salas, 1995; Dickinson & McIntyre, 1997; Yukl, 2002).

Stevens and Campion (1994) assuage additional team leader qualities useful for understanding team leadership behaviors and facilitating overall team performance. These beneficial behaviors include effective interpersonal communication skills, conflict management and conflict resolution skills, and collaborative problem-solving skills characterized by encouraging group discussions, facilitating collective decision making, and considering the contributions made by all team members. Furthermore, they identified specific team leader self-management knowledge, skills, and abilities that have also been shown to improve the performance of teams. These self-management skills include goal setting, as well as performance management skills characterized by creating clearly defined and difficult goals, obtaining goal acceptance by team members, monitoring progress toward goal attainment, and possession of the ability to plan, coordinate, and integrate tasks and information.

Pratt and Jiambalvo (1981) investigated the relationship between leader behaviors and the performance of audit teams. The results identified a number of team leader

behaviors that related to team performance, including (a) allowing team member's to be innovative, (b) strategically providing positive and negative reinforcement, (c) providing timely feedback, (d) considering the personal needs of team members, and (e) managing task assignments to avoid work overload and maximize efficiency. Furthermore, each of these leader behaviors correlated positively with team member satisfaction, motivation, and the level of confidence and trust among members. In turn, team member satisfaction, motivation, and trust had a positive impact on overall team performance.

Larson and LaFasto (1989) examined team leadership in several different types of teams including student work teams, sports teams, and geographically dispersed corporate teams. As a result, their findings may be more generalizable. In sum, they found that effective team leaders act as change agents and engage in transformational leadership behaviors, promoting admiration, respect, and trust of the leader; motivation and commitment to shared goals and visions; innovation and creativity to solving problems; and tolerance to diversity, highlighting the unique needs and desires of individual followers (Bass,1985a, 1985b).

According to Larson and LaFasto (1989), effective transformational team leaders establish a vision of the future by providing their team with a clear, challenging, and worthwhile goal or objective. In addition, when engaging in change-oriented behaviors, effective team leaders help their teams move fluidly to the desired state or goal. In other words, they will have a plan or agenda, will take action to set the plan in motion, and will show members that the action or plan is attainable and that change is possible. Lastly, effective team leaders engaging in transformational leadership behaviors motivate their members into the desired action by giving team members the opportunity to use their

strengths and creativity to attain challenging goals and objectives.

Transformational Leadership. Transformational leadership refers to the process of influencing major changes in the attitudes and assumptions of organizations and team members and building commitment for major changes in the organization's or team's objectives and strategies (Yukl, 2002). Transformational leadership involves influence by a leader on subordinates, but the effect of the influence is to empower subordinates, who then become leaders in the process of transforming the organization or the team. Thus, transformational leadership is usually viewed as a shared process, involving the actions of leaders at different levels and in different subunits of an organization or team (Muchinsky, 2000).

Bass (1996) defined transformational leadership in terms of the leader's effect on followers. Leaders transform followers by making them more aware of the importance and value of task outcomes by inducing them to transcend self-interest for the sake of the organization or team. As a result of this influence, followers feel trust and respect toward the leader, and they are motivated to do more than originally expected. Transformational leaders achieve superior results by behaving as role models, motivating and inspiring those around them, providing meaning and challenge to their followers' work, encouraging followers' to be innovative and creative, and providing special attention to each follower's needs by acting as a coach or mentor. In return, followers identify with the leaders and work to emulate them (Bass, 1996).

Transformational Leadership and the Military. Recent research investigating the effects of transformational leadership behaviors on unit performance in the United States Air Force Academy suggests that cadets engaging in transformational leadership had

higher performing squadrons (Clover, 1990). Additionally, Lowe et al. (1996) conducted a meta-analysis examining 22 published and 17 unpublished studies investigating leader effectiveness and its relationship to transformational leadership behaviors. Results indicate that leader effectiveness was significantly predicted by transformational leadership. While encouraging, these findings highlight the limited number and range of subordinate outcomes examined in transformational leadership research to date. This was particularly true for the hypothesized effects of transformational leader behaviors on subordinate outcomes, such as unit (or work team) performance. For example, of the 22 published studies, 13 reported dependent measures of subordinate outcomes. Of these 13, 12 studies used satisfaction with the leader as the dependent measure. Nonetheless, results indicate that there were positive relationships between subordinates' perceptions of transformational leadership and the outcomes of leader effectiveness, satisfaction, and extra effort. The findings also suggest that transformational leadership had a positive effect on a range of subordinate outcomes that are conducive to team performance, suggesting a link, although indirect, between transformational leadership and team performance.

Kane and Tremble (2000) provide a follow-up investigation with an examination of subordinate outcomes of transformational leadership within the United States Army. Kane and Tremble's results were consistent with earlier research indicating that transformational leader behaviors uniquely predicted subordinate extra effort and job motivation after accounting for the variance in the dependent variable predicted by transactional (quid pro quo) behaviors.

Additional research has focused on subordinates' reported trust in their leaders to

determine the effects of transformational leadership on team performance (Podsakoff, MacKenzie, Moorman, & Fetter, 1990). According to Yukl (2002), trust in leadership is one means by which transformational leadership operates, and it has been suggested that trust is important if followers are to accept goals, beliefs, or vision of the leader (Bennis, & Nanus, 1985). Testing this theory, Podsakoff et al., (1990) demonstrated that transformational leader behaviors indirectly influenced whether subordinates' worked beyond their role expectations. Specifically, this relationship was mediated by followers' trust in their leaders.

Finally, Dirks (2000) discovered that trust in leadership was a direct predictor of team performance. Dirks' explanation for his findings was consistent with Bennis and Nanus (1985). He argued that trust in leadership was an important determinant of team performance because it allowed the team to be willing to accept the leader's activities, goals, and decisions, and work hard to achieve them. In particular, Dirks noted that the leader's role typically involved a number of activities related to team performance, such as determining team member roles, distributing rewards and motivating employees, developing team members, and setting the team's goals and strategies. Dirks concluded that when the team members did not feel they could rely on their leader or that the leader did not have the team's interests at heart, they were unlikely to carry out the roles specified by the leader or to work toward the performance-related objectives and strategies set by the leader.

Taken as a whole, transformational leadership research indicates that there is a strong positive relationship between transformational leadership and military unit performance. Not only do transformational leader behaviors result in subordinate

outcomes that are conducive to team performance, but trust in leadership has also been found to both directly and indirectly enhance team performance.

Building a Nomological Network: Team Cohesion as a Mediator

Although some argue that transformational team leaders are more likely to produce high performing teams, the variance in team performance is not fully explained by team leadership alone. The extent to which team leadership predicts team performance can be assessed in greater detail following an analysis of possible mediating situational variables. Research to date indicates that team leader traits operate through a behavioral mechanism, traits influence a leader's behavior, and this behavior interacts with other situational variables to influence team performance. These situational aspects are referred to as situational mediator and moderator variables, and help to explain why the effects of leader behavior on outcomes vary across situations. One such type of variable, team cohesion is argued to mediate the relationship between team leadership and performance, as cohesive teams consistently outperform their noncohesive counterparts (Strobel, 2001; Carron, Colman, Wheeler, & Stevens, 2002). Therefore, it is suggested that an analysis of cohesion within the nomological network of team leadership will help to explain the effects of team leadership on team performance in greater detail.

Team Cohesion

The concept of *team cohesion* has attained a central position in team dynamics theory, a field of inquiry dedicated to advancing knowledge about the nature of teams, the laws of their development, and their interrelations with individuals, other teams, and larger institutions. It is an important and consistent correlate of organizational effectiveness (Greene, 1989), and many presume its ability to facilitate or enhance group

productivity (Keyton & Sprinston, 1990). For example, in a meta-analysis of 372 groups taken from 16 published studies conducted between 1952 and 1988, Evans and Dion (1991) calculated a correlation of .42 between team cohesion and team performance. Furthermore, Carron, Colman, Wheeler, and Stevens's (2002) recent meta-analysis in which 46 studies containing 164 effect sizes were examined, revealed a significant moderate-to-large relationship between cohesion and performance. The moderate effect sizes support the contention that cohesive teams, on average, tend to be more productive than noncohesive teams.

Although it is recognized that cohesion is a crucial element of successful teams, the concept defies precise definition (Mudrack, 1989). Psychological research on cohesion stems from the early contributions of Moreno and Jennings (1937) and Festinger, Schacter, and Back (1950) who defined cohesion as a "force" acting on individuals, encouraging them to remain in the group. Unfortunately, this somewhat nondescript definition made scientific inquiry difficult because its elements could not be easily operationalized. By the mid-1960s, Lott and Lott (1965) more precisely defined this "force" as an interpersonal attraction to the group; a definition consistent with the burgeoning interpersonal relationship research being conducted at this time throughout the field of psychology (Hothersal, 1984; Leahey, 2000).

Multiple Dimensions of Cohesion. Subsequent research using these more definable terms eventually led to multidimensional models of cohesion that dominated the literature throughout the last part of the 20th century. For instance, measuring 61 team-related properties among members of women's university residence groups, Selvin and Hagstrom's (1963) centroid factor analysis yielded five interpretable factors: the first

two being distinctive features of cohesion that they labeled "social satisfaction" and "sociometric cohesion." High scores on social satisfaction described groups whose members were satisfied with their campus life's social aspects, including their own residence; this factor resembled the "attraction to the group" concept in group dynamics research of the time. The second factor, sociometric cohesion, was defined by items reflecting the extent to which members' friendships and interactions occurred within the group and reflected their length of group membership.

Another prominent framework supporting a multidimensional operationalization of cohesion distinguishes "social cohesion" from "task cohesion" (Carron, Widmeyer, & Brawley, 1985; Carron, 1988). Zaccaro and Lowe (1988) proposed a bidimensional conceptualization of cohesion that differentiates task and social cohesion. Social cohesion is principally a restatement of Lott and Lott (1965), and is primarily defined as an interpersonal attraction to the team or group. Task cohesion, conversely, de-emphasizes social aspects and focuses on affiliation for the purpose of achieving task-related outcomes (Craig & Kelly, 1999). In brief, social cohesion can be viewed as a description of pleasurable interpersonal interactions that produce a desire to maintain affiliation with the team, whereas task cohesion involves collective efforts with other team members for the purpose of achieving specific goals beyond that which could be accomplished alone by an individual.

Zaccaro and Lowe (1988) have shown that differentiating these two types of cohesion improves the prediction of team task performance. Specifically, they found that task cohesion more strongly facilitated team performance than did social cohesion on an "additive" task (see Steiner, 1972 for a typology of group tasks) that pooled individual's

independent performances. In another study that incorporated a "disjunctive" task requiring team interaction (i.e., a survival task in which team members ranked items important to group survival), the highest group performance was obtained only when high levels of both task and social cohesion existed (Zaccaro & McCoy, 1988).

In a study of a cadet corps at a large southwestern U.S. university, Zaccaro demonstrated the nonequivalent effects of these two dimensions of cohesion with regard to four outcomes: group performance processes, role uncertainty, absenteeism, and individual performance. Alternatively stated, he sought to support his multidimensional perspective of cohesion by showing differential patterns of relationships to this criterion set. He predicted that task cohesion would correlate more highly with these criteria on the premise that task cohesion heightens conformity to attendance norms and clarifies behavioral norms concerning role performance. Adjusting for group-level effects, Zaccaro found higher correlations between task cohesion and the criteria than for social cohesion. This stronger relationship for task cohesion remained even when interpersonal cohesion was partialed out.

One more example of the utility of task versus social cohesion is provided by Bernthal and Insko (1993), who applied the social-task cohesion distinction to the groupthink phenomenon. They proposed that Janis's (1982) groupthink model applies to groups in contexts in which social cohesion is especially prominent, and that cohesion is defined as attraction to other group members rather than in terms of the task. To test this contention, they experimentally and orthogonally manipulated high and low levels of both task and social cohesion in teams of undergraduate women who were given a concept-formation task to perform. For the postinteraction ratings that reflected

groupthink symptoms, the results supported their hypotheses that groupthink tendencies were least apparent when social cohesion was low but task cohesion was high. Alternatively stated, groupthink is less likely to occur when groups engage in purposeful task-oriented and problem solving behaviors than when they are solely interested in pursuit of social affiliation. Therefore, it is possible for teams to have high task cohesion without promoting groupthink tendencies. At present, the field of Industrial/Organizational Psychology focuses on refining these models and identifying both the number and nature of the core components associated with the cohesion construct (Siebold, 1999).

Team Cohesion in Applied Research. The recognition of the practical importance and theoretical significance of the cohesion construct has led to considerable research into its theorized antecedents and beneficial outcomes. These outcomes include a wide range of factors, such as loyalty to the team by team members (Polley, 1987), ability of the team to perform under pressure (Mudrack, 1989), and a team's proclivity to expend effort to achieve group goals (Greene, 1989). Cohesion is also thought to have positive influences on team processes, such as member participation in team tasks (Widmeyer & Martens, 1978), and team members placing the groups' needs before their individual needs and wants (Littlepage, Cowart & Kerr, 1989). Furthermore, cohesion positively affects group outcomes. Specifically, research has shown a positive relationship between cohesion and team performance (Widmeyer, Brawley & Carron, 1986).

The suspected antecedent variables contributing to team cohesion are numerous and varied. Some characteristics of team members thought to contribute to team cohesion include individual personality and attitudes (House, 1971), and feelings of

satisfaction with team members' abilities to achieve team goals (Kerr & Jermier, 1978). Group characteristics theorized to play a role in the development of a cohesive team include the size of the team (Isenberg & Ennis, 1981), clarity of members' roles (Evans & Dion, 1991), clarity of team goals (Mudrak, 1989), and mutual commitment to the task of the group (Zacarro & Lowe, 1986). In addition, researchers believe that certain situations experienced by the group contribute to team cohesion. These include external threats (Tziner, 1992), inter-group competition (Taylor, Doria & Tyler, 1983), and shared failures and successes (Zaccaro & Lowe, 1986).

As summarized by the previous paragraphs, the definition, conceptualization, and investigation of the team cohesion construct have been somewhat difficult to pinpoint, complicating efforts to create cohesive teams within organizations. This challenge has encouraged researchers to search for additional information associated with related phenomena. For example, teamwork performance models may provide insight into the development of cohesive teams, as productive teams tend to be more cohesive than their unproductive counterparts (Evans & Dion, 1991; Dion & Evans, 1992; Mullen & Copper, 1994; Gully, Devine, & Whitney, 1995). In accord with this line of thinking, it is argued that team leaders using and fostering teamwork process behaviors, as outlined in models of team performance, are more likely lead cohesive teams to successful task completion.

Building a Nomological Network: Models of Team Performance to Enhance the Understanding of the Effects of Team Leadership on Cohesion and Performance

Models of team performance generally assume mature teams that have completed a formative developmental process and are loosely formulated around an input-process-outcome (IPO) framework posited by McGrath (1964), where inputs are the primary cause of processes that in turn mediate the effect of inputs on outcomes. In greater detail, inputs represent various resources available to the team both internally (KSAOs), and externally (individual, group, organization), and processes represent mechanisms that inhibit or enable the ability of team members to combine their capabilities and behavior. The focus of team processes is on synergies that produce process gains, and outcomes represent criteria to assess the effectiveness of team actions (Wagner & Hollenbeck, 1998).

Synthesized Model of Team Performance

Militello, Kyne, Klein, Getchell, and Thordsen (1999) examined six models of teamwork and team performance and created what they refer to as a "Synthesized Model of Team Performance" with the primary goal to "create a comprehensive picture of the components that underlie the behaviors or processes that are contained in various team assessment tools" (Militello et al., 1999, p. 156). Synthesis included the following six models: (a) *The Team Evolution and Maturation (TEAM) Model* (Morgan, Glickman, Woodard, Blaiwes, & Salas, 1993, (b) *The Teamwork Model* (McIntyre & Dickinson, 1992), (c) *Team Performance Model* (Fleishman & Zaccaro, 1992), (d) *Model of Organizational Competence* (Driskell, Olmstead, & Salas, 1993), (e) *Crew Resource Management* (Helmreich & Foushee, 1993), and (f) *Advanced Team Decision Making*

(Zsambok, Klein, Kyne, & Klinger, 1992). The researchers determined that these models converged on a common set of four components of team performance.

1. Team Competencies – Team competencies reflect the proficiency of team members and the procedures used by the team and include member-leadership competence and shared practice competence. These competencies refer not only to the ability of members to perform their specific jobs, but also refer to the leader's competence in leading the team and the team's learned proficiency at handling both routine and nonroutine tasks effectively.
2. Team Identity – Team identity reflects the degree to which team members treat the team as an interdependent unit and take their membership in that team seriously. It involves understanding each member's responsibilities, expertise, and roles, as well as any resources needed for task completion. This dimension reflects the team's redistribution of resources in helping team members cover their roles and responsibilities.
3. Team Planning and Decision Making – Team planning and decision making reflects the degree to which the team effectively formulates plans and makes decisions concerning the completion of the task. Planning and decision making occurs through the identification of team goals and members' shared mental models of those goals. It is the team's ability to limit its planning to an appropriate amount of time and breadth.
4. Team Self-Management – Team self-management refers to how well the team watches for effective and ineffective teamwork behaviors. Adjusting

the team's skill and modifying its strategy as circumstances dictate, aids in the team's aptitude in meeting goals on time.

One prominent model of team performance examined by Militello et al. (1999), *The Teamwork Model*, describes the dimensions and principles of teamwork derived from Dickinson, McIntyre, Ruggeberg, Yanushefski, Hamill and Vick (1992), McIntyre and Salas (1995), and Dickinson and McIntyre (1997). The model concentrates on the critical processes and specific behaviors that lead to enhanced team coordination, one element of which is team cohesion.

The Teamwork Model

Theoretical underpinnings of *The Teamwork Model* stem from investigating the performance of Navy tactical teams. Dickinson et al. (1992) employed critical incident interviews to identify several effective team leadership behaviors. Specifically, they found that effective tactical team leadership involves encouraging team members to make appropriate decisions, providing support and direction for team members, clarifying team roles and expectations, monitoring working situations and the work environment, and taking action when members become unable to perform their tasks. Furthermore, effective team leaders will allow their members to function independently, and will interject only when problems arise. In addition, effective tactical leaders provide vital information to team members, giving them increased levels of responsibility in order to augment member autonomy, confidence, and skill.

Providing support to their findings, subsequent research on flight crews suggests that team leaders can create a climate for effective teamwork by correcting team member errors and providing backup behaviors when necessary. In other words, team leaders can

promote effective teamwork quickly by consciously managing the team climate by soliciting and reinforcing correct and effective teamwork behaviors (Smith, Salas, & Brannick, 1994).

The Teamwork Model provides a comprehensive framework for team performance based on a review of the literature and data. It is a superior model because it is one of the few models that emphasizes teachable teamwork skills. Most importantly, based on empirical data, the contributors to the theoretical model identified and described the core components of teamwork necessary for maximal team performance demonstrated by Naval tactical teams. The seven elements of this model are:

1. Communication - Communication is defined as the active exchange of information among team members using proper terminology, to clarify or acknowledge the receipt of information.
2. Team orientation – Team orientation refers to the attitudes of team members toward one another and the team task. It reflects the acceptance of team norms, level of group cohesiveness, importance of team membership, and self-awareness of each member as a team member.
3. Team leadership – Leaders provide direction, structure, and support for other team members. Team leadership does not necessarily refer to a single individual with formal authority, but can be shown by several team members.
4. Monitoring – Team performance occurs through the observation and awareness of the activities and performance of its members. Monitoring implies that team members are individually competent (have the necessary

skills) and can provide feedback and backup behavior.

5. Feedback - Feedback is defined as the giving, seeking, and receiving of information among group members. The term refers to providing information regarding other's performance.
6. Backup behavior - Backup behavior is defined as assisting other team members with the performance of their tasks. It implies that members have an understanding of other members' tasks and are willing and able to provide and seek assistance when needed.
7. Coordination – Coordination occurs when team activities are executed in response to the behavior of other members. Successful coordination indicates that other components of teamwork are functioning effectively. Coordination may be regarded as dependent on the remaining components of teamwork.

A recent study of training program efficacy based on this teamwork model demonstrated that teams whose members were taught these principles reported greater levels of cohesion than matched control teams (Strobel & McIntyre, 2001). That study followed 20 college student teams over the course of a semester. Each team received baseline measures of cohesion and approximately one week later, half the teams received a three hour training program based on the model elements and the other half were administered a placebo program. Immediately after the training, the experimental teams reported significant gains in cohesion ratings while their counterparts actually demonstrated significant declines over the initial time frame. At the end of the semester, the trained teams maintained their cohesion gains whereas the control teams only

managed to return to baseline levels (see Table 1). The experimental teams also significantly outperformed their control counterparts by 14% on the prime outcome of project grades. This research provided strong support for the Dickinson-McIntyre model's efficacy and demonstrated that training programs designed to develop cohesion are viable.

Table 1

Mean Differences on Task and Social Cohesion Dimensions Over Time

Friendly-Unfriendly Social Cohesion Dimension

	Baseline		One Week Follow-up		One Month Follow-up	
Condition	*Mean*	*sd*	*Mean*	*sd*	*Mean*	*sd*
Controls	11.67	10.20	3.54	13.83	5.29	14.77
Trainees	13.29	9.11	21.65	5.85	21.18	6.50

Dominant-Submissive Social Cohesion Dimension

	Baseline		One Week Follow-up		One Month Follow-up	
Condition	*Mean*	*sd*	*Mean*	*sd*	*Mean*	*sd*
Controls	2.32	5.48	6.44	4.91	6.50	6.04
Trainees	4.56	6.92	3.57	5.46	3.75	4.49

Task Oriented-Emotionally Expressive Cohesion Dimension

	Baseline		One Week Follow-up		One Month Follow-up	
Condition	*Mean*	*sd*	*Mean*	*sd*	*Mean*	*sd*
Controls	2.86	3.01	.96	5.38	1.93	5.44
Trainees	2.50	5.92	4.24	5.16	4.74	4.98

Strobel and McIntyre (2001) found support for the hypothesis that a brief but focused training program based on empirically derived teamwork principles can enhance social cohesion and task cohesion for newly established teams and ultimately improve performance as demonstrated by higher project grades. A manipulation check revealed that the training program's principles were adequately incorporated. These data are important because the prospective nature of the study, along with the experimental manipulation, allows us to draw stronger inferences about the causal relationship between cohesion and team performance.

The Teamwork Model may provide a framework for understanding the development of cohesive teams. However, substantial empirical questions remain unanswered. For example, Strobel and McIntyre (2001) and Strobel (2001) did not examine the effectiveness of each individual teamwork variable in their training program. Therefore, cohesion researchers therefore cannot say which of the teamwork components is primarily responsible for the creation and maintenance of team cohesion, although all may be equally responsible for the desired effect. Despite this lack of empirical evidence examining the mediational properties of the teamwork process behaviors, the literature suggests that team leadership may be one of the most critical ingredients in effective team performance, impacting all other team processes, both directly and indirectly (Swezey & Salas, 1992). Therefore, it is hypothesized that effective team leadership is critical to both successful team performance and increased team cohesion, and may be the driving force behind goal attainment.

Completing the Nomological Network: The Relationship Between Team Leadership and Cohesion

The relationship between team leadership and cohesion has received scant empirical attention. At a conceptual level, it has been proposed that leadership behavior is an important antecedent of cohesion (Carron, 1988). Subsequently, team leadership and team cohesion has been examined in several different contexts. In the therapeutic context, evidence suggests that team leaders who are less directive and exhibit more personal warmth have groups with higher cohesiveness (Antonuccio, Lewinsohn, & Steinmetz, 1982). Hurst, Stein, Krochin, and Soskin (1980) examined the relationship between leadership style determinants and cohesiveness in adolescent drug and alcohol recovery groups. Results indicate that caring and self-expressiveness in team leaders was positively related to team cohesion. High caring leaders who are self-expressive create trusting, supportive atmospheres where sharing and risk-taking becomes less threatening. Finally, in an organizational context, team cohesiveness has been shown to increase when team leaders reward team productivity (Podsakoff & Todor, 1985).

The issue of team cohesion in the context of team sports has received considerable attention (Widmeyer, Brawley, & Carron, 1986). The increased interest in the concept of cohesion stems, in part, from the belief that team cohesiveness plays an important role in team performance (Evans & Dion, 1991; Keyton & Springston, 1990). Recent research into the relationship between coaching behaviors, team behaviors, and team cohesion has measured the relationship between team leadership and team cohesion (Pease & Kozub, 1994; Westre & Weiss, 1991). Research in sport settings has tended to provide empirical support for this proposed relationship. It has been found with

basketball teams (Eichas, 1992; Pease & Kozub, 1994), football teams (Westre & Weiss, 1991), and softball-baseball teams (Gardner, Shields, Bredemeier, & Bostrom, 1996) that specific types of leadership behaviors are associated with increased levels of perceived team cohesiveness.

Westre and Weiss (1991) and Pease and Kozub (1994) found positive relationships between team leaders who engage in skill training and instruction, democratic behavior, positive feedback, and social support with both social and task cohesion. Similarly, Shields, Gardner, Bredemeier, & Bostro (1997) found that task cohesion was fostered by a leadership style that advocated training and instruction, increased social support, displayed purposeful democratic behaviors, gave positive feedback, and avoided autocratic decision making. The findings are less clear with regard to social cohesion, but it appears that a team leadership style accenting social support may be efficacious in supporting this form of team cohesion.

Carron (1982, 1988) and colleagues (e.g., Carron & Hausenbias, 1998) have considered leadership factors as an important interpersonal mediator of task and social cohesion. Coach leadership is defined as coaches' behavioral processes that influence team members toward performance accomplishments (Chelladurai & Reimer, 1998). It is speculated that one mechanism through which the complex interactions between a coach and his or her athletes are associated with performance is the athletes' sense of belongingness to the team. Four studies have examined the associations between coach leadership and team cohesion. Westre and Weiss's (1991) study was the first to investigate the relationship between perceived coaching behaviors and team cohesion in high school male football teams. They found that higher levels of coaches' training and

instruction, social support, positive feedback, and democratic decision-making behaviors were important for explaining the relationship with task cohesion. The relationship between coach leadership and social cohesion was not examined because the social cohesion subscales exhibited unacceptable reliability values.

Subsequently, Pease and Kozub (1994) measured the relationship of perceived leadership behavior and team cohesion in girls' high school varsity basketball teams. Their study revealed an overall significant relationship between leadership behaviors and task cohesion. Similarly, both training and instruction and democratic leadership behaviors were significantly related to task cohesion.

These two primary studies were followed by two further studies, Gardner, Shields, Bredemeier, and Bostrom (1996), and Shields, Gardner, Bredemeier, and Bostrom (1997), who examined the relationship between perceptions of leadership and team cohesion among all male baseball players and all female softball players at high school and junior college levels, respectively. Results indicated that coaches who were perceived as high in training and instruction, social support, positive feedback, and democratic behaviors had teams that were more cohesive in task-related variables, which replicate the results of the previous studies. Moreover, social cohesion was linked to coach social support behaviors, as well as training and instruction behaviors.

Leadership and Unit Cohesion in the Military Context. The cohesiveness of combat groups has been investigated in relationship to the behavior of unit leaders (Bartone & Kirkland, 1991). Results indicate that team leaders who engage in autocratic leader behaviors are more likely to increase task cohesiveness among team members. Alternatively, Siebold (1987a) argues that the concerned, competent, and honest

leadership facilitates unit cohesion. Likewise, other researchers have identified soldiers' perceptions of leaders as caring and competent as a potential influence on the development of cohesion (Kirkland, Bartone, & Marlowe, 1993; Manning, 1991).

Finally, Bartone and Adler (1999) collected longitudinal data during a military peacekeeping deployment to examine trends in unit cohesion over time. Results indicate that spending time together appeared to be a necessary, but not sufficient condition for the development of unit cohesion. Rather, the extent to which soldiers perceived their leaders as concerned for their welfare, as well as their confidence in their leader's abilities, was strongly correlated with cohesion throughout the deployment.

Evidently, there is a causal link between leader behaviors and level of military unit cohesion. Although few research studies have investigated the mechanisms underlying the leadership-cohesion relationship, the extant findings suggest that leader behaviors consistent with transformational leadership facilitate the development of highly cohesive military units. That is, the leadership-cohesion relationship is facilitated by a leadership style that demonstrates technical competence and concern for the welfare of unit members. Similarly, transformational leaders try to integrate their vision in order to have subordinates conceptualize and model the leader's behavior. Clearly, technical competence is a necessary component for subordinates to imitate their leader's behavior. Furthermore, transformational leaders are also characterized as individuals who care for subordinates' well-being. In other words, transformational leaders demonstrate concern for their followers. This relationship between leadership and cohesion, therefore, can be taken as additional support for the benefits of transformational leadership in the military context.

A Nomological Network of Team Leadership

Team leadership has long been considered an essential component in military operations and researchers have similarly considered leadership to be an important ingredient for combat effectiveness and performance. Given the focus of the military on leadership and the leader's ability to successfully direct their units to achieve mission objectives, insight into how leaders impact team performance is of critical importance to the United States Navy. Additionally, proper operational definition and measurement of this construct provides the fundamental basis for appropriate selection, training, and performance assessment.

At present, the Navy uses a team leadership measurement tool with no known validation research, raising questions to what construct this instrument assesses. Consequently, the present study reports on a prospective investigation designed to provide a theoretical basis for the construct validity for the Navy's team leadership performance appraisal tool, *The Fitness Report (FITREP) and Counseling Record E7-O6*. Specifically, a nomological network, predicting relationships among team leadership, teamwork, team cohesion, and performance was examined, with the primary goal to determine if actual relationships match the relationships within the proposed theoretical network.

It was hypothesized that team leadership is not defined by an isolated event, but rather by a series of interrelated constructs and their observables. The proposed network argued that those Naval team leaders engaging in transformational leadership behaviors would receive higher leadership scores and would be more likely to make use of and encourage teamwork processes, demonstrating elevated teamwork scores. In addition,

those high scoring leaders would also be more likely to increase cohesion among team members and maintain superior mission readiness, scoring higher on measures of team cohesion and team performance (see Figure 1). In the quest for improved prediction, a conceptual framework specifying the meaning of team leadership and how it relates and is distinct from other constructs will help to begin to provide the evidential basis for the interpretation of Navy *FITREP* scores.

Team Leadership Nomological Network

As indicated in Figure 1, the nomological network proposed a direct relationship between team leadership and team performance. Considerable theoretical and empirical findings exist to support the relationship between team leadership and performance. According to Bass (1985a; 1985b) follower outcomes promoted by transformational leader behaviors result in levels of performance beyond what is possible by other theories of leadership (e.g., transactional leadership). In particular, transformational leader behaviors not only result in subordinate outcomes that are conducive to team performance, but also result in subordinate outcomes (e.g., trust) that directly enhance team performance in the military.

Not surprisingly, transformational leadership is especially attractive to the United States Navy, in part, because Navy doctrine states that leadership is the primary function of all commissioned and non-commissioned officers, and it implies that leaders effectively contribute to unit performance by using a combination of inspiration and motivation. Moreover, transformational leaders are thought to promote admiration, respect, trust of the leader, and commitment to shared goals and visions, each of which are elements that contribute to effective military team performance (Ahronson &

Eberman, 2002). It is for this reason that leadership in the United States Navy is argued to be operationalized in terms of transformational leadership. Thus, it is proposed that Naval team leaders engaging in transformational behaviors are more likely to have higher performing units.

Furthermore, it was proposed that teamwork partially mediates the relationship between team leadership and team performance, such that transformational Naval team leaders would be more likely to apply and encourage the use of teamwork process behaviors, which in turn would lead to increased team performance. Recalling the work of Dickinson et al. (1992), McIntyre and Salas (1995), Dickinson and McIntyre (1997), and Strobel, McIntyre, and Koman-Stubbs (2004), findings suggest that heightened unit performance within the United States Armed Forces results from team leaders who monitor the work environment, provide backup when teammates are unable to perform their assigned tasks, encourage team members to seek and provide feedback, supply team members with vital information, and give members increased levels of responsibility in order to increase confidence and skill. Based on these findings, it is not implausible to put forth that as transformational leader behaviors enhance teamwork, teamwork enhances performance. It is for this reason that the mediational path from leadership to performance via teamwork was proposed.

Finally it was argued that team cohesion might also mediate the teamwork-performance relationship. Research previously noted suggests that teamwork process behaviors contribute highly to the creation and maintenance of cohesive teams. In fact, incorporating teamwork process variables when investigating cohesion and performance has provided consistent positive results with recent longitudinal and experimental data

demonstrating the efficacy of *The Teamwork Model* on the cohesiveness of both intact student work teams and military tactical teams (Dickinson et al., 1992; McIntyre & Salas, 1995; Dickinson & McIntyre, 1997; Strobel & McIntyre, 2001a; Strobel, 2001; Strobel, McIntyre, Koman-Stubbs, 2004).

In greater detail, it was suggested that the team leaders who engage in transformational leadership behaviors can directly influence team cohesion and ultimately increase performance (a) by enhancing communication - keeping the lines of communication open and ensuring that these lines are effective to aid both task work and teamwork; (b) by fostering teamwork orientation - building confidence in the team and expressing belief in its abilities to perform effectively thereby enhancing the importance of team membership; (c) by encouraging coordination – creating an environment that promotes teamwork and open discussion of team roles and expectations in order to integrate disparate actions; (d) by instructing team members to provide backup – assisting the team to provide its members with aid in the performance of their tasks, backup implies that members have an understanding of other members' tasks and are willing and able to provide and seek assistance when needed; (e) by developing team skills such as monitoring – fostering and encouraging the observation and awareness of the activities and performance of its members, this implies that team members are individually competent (have the necessary skills) and can provide feedback and backup when necessary; and/or (f) by providing feedback and practice – encouraging the giving, seeking, and receiving of information among group members, monitoring team performance and creating opportunities to apply knowledge and practice skills and abilities.

To this end, the research to date indicates that leaders who apply teamwork behaviors not only lead higher performing teams, but also lead teams with increased cohesion levels (cohesion to preceded performance). As a result, the mediational path from teamwork to performance via cohesion was hypothesized.

METHOD

Participants

United States Naval Officers served as research participants. Evaluations of officers holding an O3 (Lieutenant; LT), O4 (Lieutenant Commander; LCDR) and O5 (Commander; CDR) paygrade were selected from the Bureau of Naval Personnel (BUPERS) performance appraisal database. Standard military performance appraisal data from 900 male and female officers with no restriction on age, professional background, and/or communities served were retained for analysis.

Performance appraisal data were collected from 300 Naval Commanders, 300 Lieutenant Commanders, and 300 Lieutenants. The sample was comprised of 33.3% Aviation Warfighters, 33.3% Surface Warfighters, and 33.3% Undersea Warfighters. Demographic data including participant's age, sex, ethnicity, designation, and parent command were excluded from the analyses in order to protect officer anonymity. Extrapolating from the power analysis tables provided by Cohen and Cohen (1983), this sample size should have provided more than adequate power to locate effects and make meaningful comparisons between groups.

In the process of collecting data, guidelines for data selection were established to help ensure quality of performance appraisal information gathered. Specifically, data were retrieved for LTs, LCDRs, and CDRs who (a) had been on-station at command for at least one calendar year; (b) had been under the supervision of the same superior commander for at least six months; and (c) were not selected to promote within the appraisal year. Finally, officer performance data were separated by air, surface, and subsurface communities in order to examine between-group differences.

Using Lieutenants, Lieutenant Commanders, and Commanders as participants is warranted because these leaders are responsible for the completion of unit mission tasking as provided by their superiors. Therefore, these officers supervise teams within their commands, and their performance and the performance of their units are assessed by executive level Naval Officers and Civilians.

Measures

Demographics: Background information on individual officers were collected by means of *The Fitness Report (FITREP) and Counseling Record E7-O6* (Bureau of Naval Personnel, 2002) consisting of features such as officer rank and warfare community served. Demographic data including participant's age, sex, ethnicity, designation, and parent command were excluded from data collection in order to protect officer anonymity.

Team Leadership: *The Fitness Report (FITREP) and Counseling Record E7-O6* (Bureau of Naval Personnel, 2002) was implemented by commanding officers as the primary means of assessing team leadership (see Figure 2). The *FITREP* is a behaviorally anchored rating scale using a five-point Likert-type scale (1 = below standards, 2 = progressing toward stated standards, 3 = meets standards, 4 = above standards, and 5 = greatly exceeds standards). The measure consists of a leadership subscale that corresponds to transformational leadership. The *FITREP* is designed to measure the officer's ability to transform followers by making them more aware of the importance and value of task outcomes by inducing them to transcend self-interest for the sake of the team. For example, the *FITREP* assesses transformational leadership as evidenced by the fact that commanding officers evaluate the extent to which LTs,

LCDRs, and CDRs (a) stimulate the growth and development of subordinates, (b) set and achieve useful challenging goals that support command missions, (c) inspire, motivate, and train subordinates to reach highest level of growth and development, (d) persevere through the toughest challenges to encourage others, and (e) constantly improve the personal and professional lives of others. It is important to note that these traits and behaviors have been validated by other leadership researchers (Bass & Avolio, 1990; Ruggeberg, 1996), and can be identified in alternative measures of transformational leadership such as *The Multifactor Leadership Questionnaire* (Bass & Avolio, 1990).

Teamwork: *The Fitness Report (FITREP) and Counseling Record E7-O6* (Bureau of Naval Personnel, 2002) was used as the primary means of assessing teamwork principles (see Figure 3). The teamwork skills assessed by the *FITREP* reflect the teamwork processes behaviors Naval officers acquire throughout Teamwork Dynamics Training (TDT) during Officer Candidate School (OSC) (Naval Air Systems Command, 2003). The *FITREP* teamwork subscale is designed to measure the extent to which leaders use and foster the behaviors in which team taskwork is accomplished. For example, commanding officers measure the degree to which leaders (a) act as team builders, (b) inspire cooperation and progress toward goals, (c) and focus on teamwork techniques such as monitoring, feedback, backup, communication, and coordination. The teamwork skills measured by the *FITREP* are consistent with those teamwork behaviors found in substitute measures of teamwork processes such as *The Teamwork Skills Knowledge Test* (Strobel & McIntyre, 2001; Strobel, 2001).

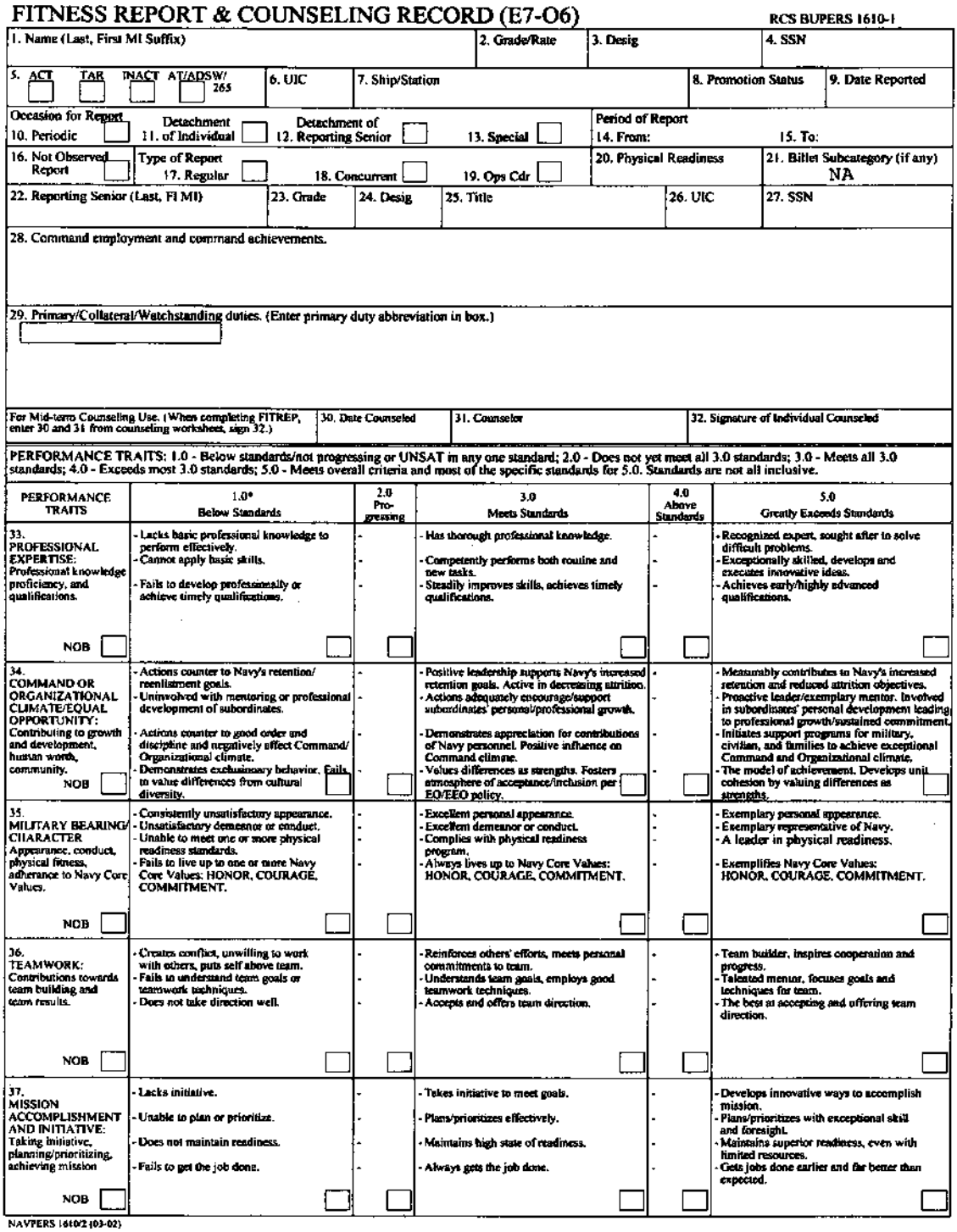
Team Cohesion: *The Fitness Report (FITREP) and Counseling Record E7-O6* (Bureau of Naval Personnel, 2002) was implemented by commanding officers as the

primary means of assessing unit cohesion (see Figure 2). The *FITREP* is designed to measure the evaluations that commanding officers make of a team leader's ability to strengthen and maintain unit cohesion, where cohesion is defined as team member's desire to remain in the unit in pursuit of either social affiliation or task related goals. The measure consists of an organizational climate subscale that assesses task and social cohesion. The *FITREP* evaluates the extent to which team leaders encourage their subordinates to engage in purposeful task-oriented and problem solving behaviors (Bales & Cohen, 1979; Isenberg & Ennis, 1981; Solomon, 1981; Wish, D'Andrade & Goodnow, 1980). Units are perceived to be cohesive by their commanding officers when team leaders encourage subordinates to make effective decisions in order to achieve unit goals through professional development.

In addition, the *FITREP* also assesses social cohesion, such that leaders are evaluated to the extent that their units display friendly, sociable, and warm behaviors (Bales & Cohen, 1979; Isenberg & Ennis, 1981; Solomon, 1981; Wish, D'Andrade & Goodnow, 1980). Units are perceived to be cohesive by their commanding officers when leaders (a) adequately encourage and support Sailor's personal growth, (b) demonstrate an appreciation for contributions of personnel, (c) value differences as strengths, and (d) foster an atmosphere of acceptance and inclusion within the unit.

Team Performance: *The Fitness Report (FITREP) and Counseling Record E7-O6* (Bureau of Naval Personnel, 2002) was implemented by commanding officers as the primary means of assessing team performance (see Figure 2). Teams are responsible for the successful completion of several administrative, tactical, and operational tasks, such as preparing a scenario debrief for a commanding officer, creating a strategic plan to

conduct surface warfare covert classification search tactics, or managing air assets effectively when searching for a subsurface threat or contact. The *FITREP* Mission Accomplishment subscale measures the performance of the leader's unit on these tasks through the leader's ability to find innovative ways to accomplish missions, plan and prioritize with exceptional skill and foresight, maintain superior readiness with limited resources and completing the job earlier and far better than expected.



FITNESS REPORT & COUNSELING RECORD (E7-O6) RCS BUPERS 1610-1

1. Name (Last, First MI Suffix)	2. Grade/Rate	3. Desig	4. SSN

5. ACT ☐ TAR ☐ INACT ☐ AT/ADSW/265 ☐	6. UIC	7. Ship/Station	8. Promotion Status	9. Date Reported

Occasion for Report: 10. Periodic ☐	11. Detachment of Individual ☐	12. Detachment of Reporting Senior ☐	13. Special ☐	Period of Report: 14. From:	15. To:

16. Not Observed Report ☐	Type of Report: 17. Regular ☐	18. Concurrent ☐	19. Ops Cdr ☐	20. Physical Readiness	21. Billet Subcategory (if any): NA

22. Reporting Senior (Last, FI MI)	23. Grade	24. Desig	25. Title	26. UIC	27. SSN

28. Command employment and command achievements.

29. Primary/Collateral/Watchstanding duties. (Enter primary duty abbreviation in box.)

For Mid-term Counseling Use. (When completing FITREP, enter 30 and 31 from counseling worksheet, sign 32.)	30. Date Counseled	31. Counselor	32. Signature of Individual Counseled

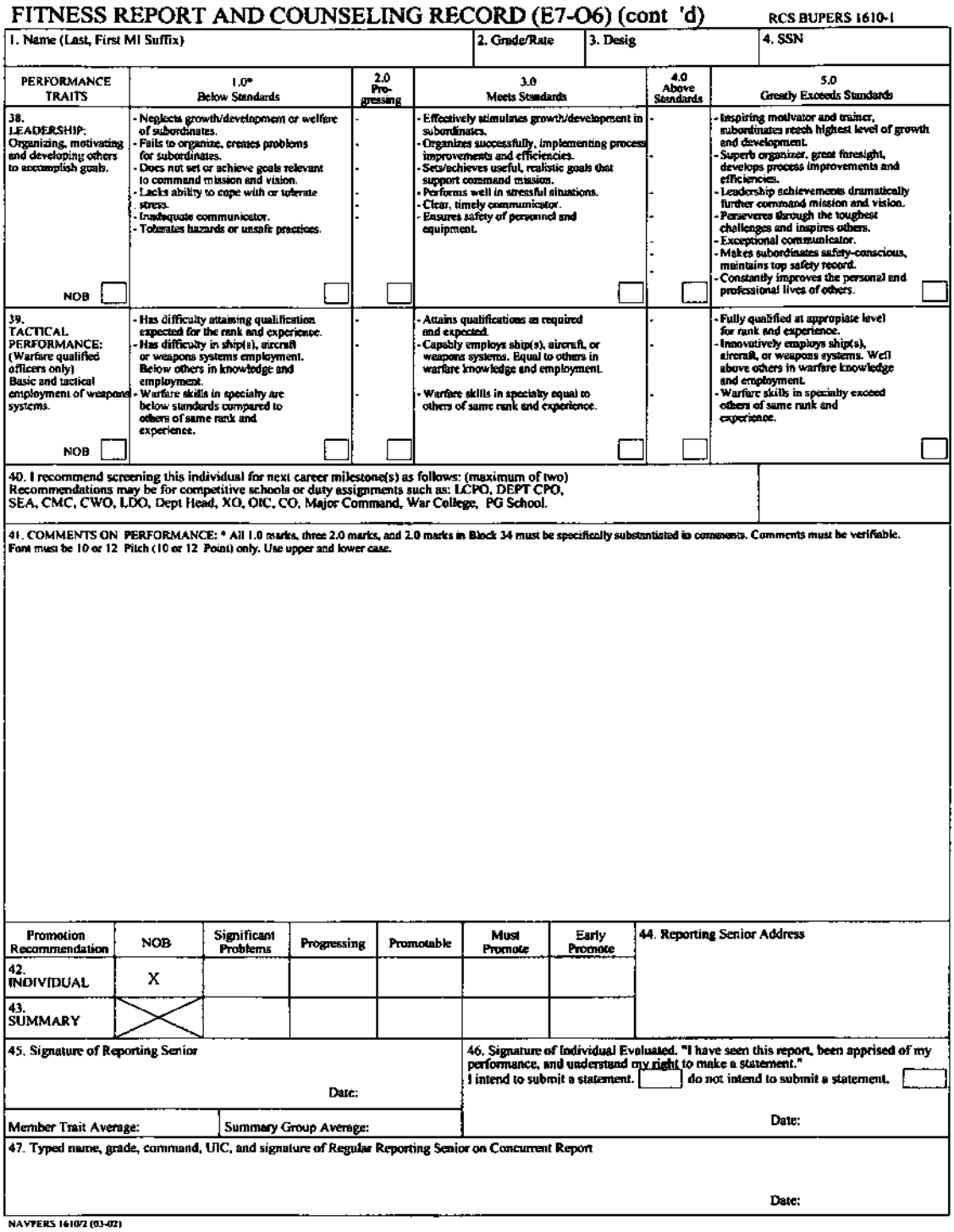
PERFORMANCE TRAITS: 1.0 - Below standards/not progressing or UNSAT in any one standard; 2.0 - Does not yet meet all 3.0 standards; 3.0 - Meets all 3.0 standards; 4.0 - Exceeds most 3.0 standards; 5.0 - Meets overall criteria and most of the specific standards for 5.0. Standards are not all inclusive.

PERFORMANCE TRAITS	1.0* Below Standards	2.0 Pro-gressing	3.0 Meets Standards	4.0 Above Standards	5.0 Greatly Exceeds Standards
33. PROFESSIONAL EXPERTISE: Professional knowledge proficiency, and qualifications. NOB ☐	- Lacks basic professional knowledge to perform effectively. - Cannot apply basic skills. - Fails to develop professionally or achieve timely qualifications. ☐	-	- Has thorough professional knowledge. - Competently performs both routine and new tasks. - Steadily improves skills, achieves timely qualifications. ☐	-	- Recognized expert, sought after to solve difficult problems. - Exceptionally skilled, develops and executes innovative ideas. - Achieves early/highly advanced qualifications. ☐
34. COMMAND OR ORGANIZATIONAL CLIMATE/EQUAL OPPORTUNITY: Contributing to growth and development, human worth, community. NOB ☐	- Actions counter to Navy's retention/reenlistment goals. - Uninvolved with mentoring or professional development of subordinates. - Actions counter to good order and discipline and negatively affect Command/Organizational climate. - Demonstrates exclusionary behavior. Fails to value differences from cultural diversity. ☐	-	- Positive leadership supports Navy's increased retention goals. Active in decreasing attrition. - Actions adequately encourage/support subordinates' personal/professional growth. - Demonstrates appreciation for contributions of Navy personnel. Positive influence on Command climate. - Values differences as strengths. Fosters atmosphere of acceptance/inclusion per EO/EEO policy. ☐	-	- Measurably contributes to Navy's increased retention and reduced attrition objectives. - Proactive leader/exemplary mentor. Involved in subordinates' personal development leading to professional growth/sustained commitment. - Initiates support programs for military, civilian, and families to achieve exceptional Command and Organizational climate. - The model of achievement. Develops unit cohesion by valuing differences as strengths. ☐
35. MILITARY BEARING/CHARACTER Appearance, conduct, physical fitness, adherance to Navy Core Values. NOB ☐	- Consistently unsatisfactory appearance. - Unsatisfactory demeanor or conduct. - Unable to meet one or more physical readiness standards. - Fails to live up to one or more Navy Core Values: HONOR, COURAGE, COMMITMENT. ☐	-	- Excellent personal appearance. - Excellent demeanor or conduct. - Complies with physical readiness program. - Always lives up to Navy Core Values: HONOR, COURAGE, COMMITMENT. ☐	-	- Exemplary personal appearance. - Exemplary representative of Navy. - A leader in physical readiness. - Exemplifies Navy Core Values: HONOR, COURAGE, COMMITMENT. ☐
36. TEAMWORK: Contributions towards team building and team results. NOB ☐	- Creates conflict, unwilling to work with others, puts self above team. - Fails to understand team goals or teamwork techniques. - Does not take direction well. ☐	-	- Reinforces others' efforts, meets personal commitments to team. - Understands team goals, employs good teamwork techniques. - Accepts and offers team direction. ☐	-	- Team builder, inspires cooperation and progress. - Talented mentor, focuses goals and techniques for team. - The best at accepting and offering team direction. ☐
37. MISSION ACCOMPLISHMENT AND INITIATIVE: Taking initiative, planning/prioritizing, achieving mission NOB ☐	- Lacks initiative. - Unable to plan or prioritize. - Does not maintain readiness. - Fails to get the job done. ☐	-	- Takes initiative to meet goals. - Plans/prioritizes effectively. - Maintains high state of readiness. - Always gets the job done. ☐	-	- Develops innovative ways to accomplish mission. - Plans/prioritizes with exceptional skill and foresight. - Maintains superior readiness, even with limited resources. - Gets jobs done earlier and far better than expected. ☐

NAVPERS 1610/2 (03-02)

Figure 2

Fitness Report (FITREP) and Counseling Record E7-O6 Page 1.



FITNESS REPORT AND COUNSELING RECORD (E7-O6) (cont 'd) RCS BUPERS 1610-1

1. Name (Last, First MI Suffix)	2. Grade/Rate	3. Desig	4. SSN

PERFORMANCE TRAITS	1.0* Below Standards	2.0 Pro-gressing	3.0 Meets Standards	4.0 Above Standards	5.0 Greatly Exceeds Standards
38. LEADERSHIP: Organizing, motivating and developing others to accomplish goals. NOB ☐	- Neglects growth/development or welfare of subordinates. - Fails to organize, creates problems for subordinates. - Does not set or achieve goals relevant to command mission and vision. - Lacks ability to cope with or tolerate stress. - Inadequate communicator. - Tolerates hazards or unsafe practices. ☐	☐	- Effectively stimulates growth/development in subordinates. - Organizes successfully, implementing process improvements and efficiencies. - Sets/achieves useful, realistic goals that support command mission. - Performs well in stressful situations. - Clear, timely communicator. - Ensures safety of personnel and equipment. ☐	☐	- Inspiring motivator and trainer, subordinates reach highest level of growth and development. - Superb organizer, great foresight, develops process improvements and efficiencies. - Leadership achievements dramatically further command mission and vision. - Perseveres through the toughest challenges and inspires others. - Exceptional communicator. - Makes subordinates safety-conscious, maintains top safety record. - Constantly improves the personal and professional lives of others. ☐
39. TACTICAL PERFORMANCE: (Warfare qualified officers only) Basic and tactical employment of weapons systems. NOB ☐	- Has difficulty attaining qualification expected for the rank and experience. - Has difficulty in ship(s), aircraft or weapons systems employment. Below others in knowledge and employment. - Warfare skills in specialty are below standards compared to others of same rank and experience. ☐	☐	- Attains qualifications as required and expected. - Capably employs ship(s), aircraft, or weapons systems. Equal to others in warfare knowledge and employment. - Warfare skills in specialty equal to others of same rank and experience. ☐	☐	- Fully qualified at appropriate level for rank and experience. - Innovatively employs ship(s), aircraft, or weapons systems. Well above others in warfare knowledge and employment. - Warfare skills in specialty exceed others of same rank and experience. ☐

40. I recommend screening this individual for next career milestone(s) as follows: (maximum of two) Recommendations may be for competitive schools or duty assignments such as: LCPO, DEPT CPO, SEA, CMC, CWO, LDO, Dept Head, XO, OIC, CO, Major Command, War College, PG School.

41. COMMENTS ON PERFORMANCE: * All 1.0 marks, three 2.0 marks, and 2.0 marks in Block 34 must be specifically substantiated in comments. Comments must be verifiable. Font must be 10 or 12 Pitch (10 or 12 Point) only. Use upper and lower case.

Promotion Recommendation	NOB	Significant Problems	Progressing	Promotable	Must Promote	Early Promote	44. Reporting Senior Address
42. INDIVIDUAL	X						
43. SUMMARY							

45. Signature of Reporting Senior Date:

46. Signature of Individual Evaluated. "I have seen this report, been apprised of my performance, and understand my right to make a statement." I intend to submit a statement. ☐ do not intend to submit a statement. ☐ Date:

Member Trait Average: Summary Group Average:

47. Typed name, grade, command, UIC, and signature of Regular Reporting Senior on Concurrent Report Date:

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Figure 3

Fitness Report (FITREP) and Counseling Record E7-O6 Page 2.

Procedure

Officer performance was assessed through written performance evaluations by each officer's immediate supervisor. Rating officers were senior in grade or rank to the rated officer with a requirement for review and/or additional comments from one or more senior officers or civilians in the chain of command. Appraisals consisted of brief written descriptions of the officer's job, notable accomplishments, overall performance and potential, and recommendations for subsequent career development.

Officers received a regular annual performance evaluation in the form of a fitness report (*FITREP*). The *FITREP* included a description of the officer's current duties and responsibilities, a physical readiness rating, a quantitative and qualitative performance description, a competitive ranking measuring the officer's performance in comparison to other officers being evaluated by the reporting senior supervisor, and a promotion recommendation.

The immediate supervisor's quantitative assessment of the officer's performance was analyzed in the current study. According to Cascio (1998), the supervisor is probably best able to evaluate each subordinate's performance in light of the organization's overall objectives. Because the supervisor is typically responsible for administrative decisions, such as pay, promotion, and discipline, he or she must be able to tie effective and/or ineffective performance to the employment actions taken. Therefore, research has shown that feedback from supervisors is more highly related to performance than from any other source (Becker & Klimoski, 1989).

General comments were also provided, and several guidelines were adopted to control the content and format. Primarily, comments must substantiate all scores given.

Forms were presented in standard format, prohibiting highlighted and handwritten comments. Finally, following the completion of the officers' evaluations, *FITREP*s were collected by command administrative staff and sent to the Bureau of Navy Personnel for data entry and retention. It should be noted that the procedures and materials used in this study were reviewed and approved by the U.S. Navy Institutional Review Board.

Analysis Plan

Factorial Analysis of Variance (ANOVA) was used to identify potential mean differences among Naval Warfare Communities and Officer Rank. Factorial ANOVA is a flexible data analytic technique that allows analysis between groups with two or more independent variables. There are several advantages to studying simultaneously the effects of two or more independent variables on a dependent variable. First, and foremost is the possibility of learning whether the independent variables interact in their effect on the dependent variable, indicating a joint effect on the dependent variable. Second, factorial designs afford greater error control, and consequently more sensitive statistical tests than designs with a single independent variable.

In addition, simple linear regression was used to confirm that the simple hypothesized relationships exist among the constructs of interest. Specifically, prior research has demonstrated that Team Leadership predicts Performance (Pratt & Jiambalvo, 1981; Larson & LaFasto, 1989; Oakland, 1989; Ginnett, 1990; Stewart & Manz, 1994; Stevens & Campion, 1994; Ruggeberg, 1996; Bass, 1998; Yukl, 2002), and Teamwork (Dickinson, et al., 1992; Swezey & Salas, 1994; McIntyre & Salas, 1995; Dickinson & McIntyre, 1997; Yukl, 2002). Additionally, research suggests that Teamwork predicts Performance (Dickinson et al., 1992; McIntyre & Salas, 1995;

Dickinson & McIntyre, 1997; Strobel & McIntyre, 2001; Strobel, 2001; Strobel, McIntyre, & Stubbs-Koman, 2004) and Team Cohesion (Carron, 1982; Weiss, 1991; Pease & Kozub, 1994; Bredemeier & Bostrom, 1996; Gardner, Bredemeier & Bostrom, 1997; Strobel & McIntyre, 2001; Strobel, 2001; Strobel, Stubbs-Koman & McIntyre, 2004). Finally, it is suggested that Teamwork predicts Team Cohesion (Carron, 1982; Pease & Kozub, 1994; Bredemeier & Bostrom, 1996; Gardner, Bredemeier & Bostrom, 1997; Strobel & McIntyre, 2001; Strobel, 2001; Strobel, Stubbs-Koman & McIntyre, 2004). Because these relationships have been supported in the literature, confirming these simple relationships with regression provides partial support for the validity of the *FITREP*.

Finally, path analysis was used to analyze the three warfare communities to determine if the estimated path model relationships were consistent across groups. Path analysis was also used to examine the overall nomological network of team leadership.

Path Analysis. A statistical technique used to examine predictive relationships between two or more variables (Pedhazur, 1997), path analysis is based upon a linear equation system first developed by Sewall Wright in the 1930s for use in phylogenetic studies (Alwin & Hauser, 1975). Path analysis was adopted by the social sciences in the 1960s, and has been used with increased frequency in an attempt to understand comparative strengths of direct and indirect relationships among a set of variables (Kline, 1998; Ullman, 1996). In this way, path analysis is unique from other linear equation models as an analysis of mediated pathways (variables acting through a mediating variable, i.e., "Y", in the pathway $X \rightarrow Y \rightarrow Z$) can be examined through the decomposition of total effects into direct and indirect paths.

Closely related to multiple regression, path analysis allows researchers to test theoretical propositions about prediction without manipulating variables (Cohen et al., 2003). Its purpose is to provide estimates of the independent contribution of hypothesized predictive relationships between sets of variables that are best explained by a *path diagram*. Paths in path models or diagrams represent causal hypotheses of researchers, and can not be statistically tested for directionality (Loehlin, 1991).

Path Diagrams. Hypothesized cause-and-effect relationships are displayed as a path model. A path model is a diagram relating independent, intermediary, and dependent variables (Ullman, 1996). Independent (X) variables are called exogenous variables, whereas dependent (Y) variables are called endogenous variables. An exogenous variable is one whose variation is assumed to be determined by causes outside the hypothesized model. Therefore, no attempt is made to predict or explain the variability of an exogenous variable or its relations with other exogenous variables (Pedhazur, 1997). Conversely, an endogenous variable is one whose variation is explained by exogenous or other endogenous variables in the model. Single arrows indicate hypothesized causation between exogenous or intermediary variables and the endogenous. Arrows also connect the error term with their respective endogenous variables. Double arrows indicate a correlation or unanalyzed relationships (Kline, 1998).

A path coefficient is typically reported as a standardized regression coefficient (β), and illustrates the effects of an independent variable on a dependent variable in the path model (Wright, 1934). Thus, when the model has two or more causal variables, path coefficients are partial regression coefficients that measure the extent of effect of one

variable on another in the path model controlling for other variables. In addition, indirect effects can be estimated as relationships of an IV on a DV through other predictor relationships (i.e., mediation). Path coefficients are written with two subscripts. A path from variable 1 to variable 2 is written p_{21}, where the endogenous variable is subscripted first (path to 2 from 1).

Path Analysis Assumptions.

Assumptions underlying the application of path analysis are as follows (Ullman, 1996; Pedhazur, 1997; Kline, 1998):

1. Relations among variables in the model are linear, additive, and causal.
2. Each residual is uncorrelated with the predictors. All relevant variables are included in the model being tested. When exogenous variables are correlated among themselves, these correlations are modeled but predictive pathways are not specified.
3. The causal flow is one-way (recursive). Reciprocal causation between variables is ruled out.
4. The variables are measured on an interval scale.
5. The variables are measured without error.

Some or all of these assumptions may not be tenable (i.e., perfectly reliable measurement). The assessment limitations of the current study preclude more advanced models that are used to include less restrictive assumptions.

Multi-Group Analysis. The general procedure used to test for significant differences among all three groups was to first fit the path model to each group separately, then to impose equality constraints on all of the path coefficients across

groups. If adding the constraints significantly decreases the model fit as compared to the unconstrained model, then one concludes that there is at least one significant group difference in the estimated path coefficients (Ullman, 1996). The chi-square difference test was applied to test for differences between the unconstrained and constrained path models.

The overall team leadership path model, aviation, surface and subsurface path models were assessed by examining the statistical significance of estimated path coefficients and several goodness of fit indices such as, chi-square, comparative fit index (CFI), the standardized root mean-square (SRMR), and the root mean squared error of approximation (RMSEA) following the recommendations of Hu and Bentler (1999; i.e., CFI $\geq$ .95, SRMR $\leq$ .10, and RMSEA < .05).

Hypotheses

As previously stated, this research reports on an investigation designed to assess the construct-related validity evidence of the Navy's performance appraisal instrument, the *FITREP*, as it relates to team leadership. Specifically, a series of nested models were tested to address the following hypotheses embedded within the nomological network:

Hypothesis 1a. Because of prior research, I hypothesized that Naval Officers reported as exhibiting higher Team Leadership would foster team principles and behaviors. This hypothesis was tested with regression.

Hypothesis 1b. Additionally, I hypothesized that Naval Officers reported as exhibiting higher Team Leadership would be predictive of increased Team Performance. This hypothesis was tested with regression.

Hypothesis 2a. I hypothesized that Naval Officers who foster the principles of Teamwork would have team members that exhibit increased Team Cohesion. This hypothesis was tested using regression.

Hypothesis 2b. Further, I hypothesized that Naval Officers who foster Teamwork would exhibit higher Team Performance. This hypothesis was tested with regression.

Hypothesis 3a. I hypothesized that team members that exhibit higher Team Cohesion would exhibit higher Team Performance. This hypothesis was tested with regression.

Additionally, mediational relationships within the network were assessed to address the following hypotheses:

Hypothesis 4a. I hypothesized that Team Cohesion will at least partially mediate the relationship between Teamwork and Team Performance, such that increased Teamwork should lead to increased Team Cohesion, which in turn leads to increased Team Performance. This mediation relationship was tested using path analysis.

Hypothesis 4b. Additionally, I hypothesized that Teamwork would at least partially mediate the relationship between Team Leadership and Team Performance, such that Naval Officers with increased Team Leadership lead to team members exhibiting increased Teamwork, which in turn relates to increased Team Performance. This hypothesis was tested simultaneously with Hypothesis 4a using the nomological network in Figure 1 using path analysis.

Finally, differences between aviation, surface, and subsurface path models were assessed.

The following hypothesis was proposed:

Hypothesis 5a. I hypothesized no difference between aviation, surface, and subsurface path models, such that Naval team leaders within each warfare community would engage in transformational leadership behaviors, would be more likely to use and encourage the use of teamwork processes, increase cohesion among team members, and maintain superior mission readiness, and that

these relationships would be consistent for all Naval communities. This hypothesis was tested with the chi-square difference test.

RESULTS

An alpha level of .05 was used for all statistical tests. Differences between groups on demographics were not examined because data including participant's age, sex, ethnicity, designation, and parent command were excluded from the data made available for this study to protect officer anonymity.

Normality

Skewness and Kurtosis. Standard SEM Maximum Likelihood estimation relies upon the assumption of multivariate normality for proper standard error estimation. Estimation of univariate normality is often a first step in identifying multivariate violations. Skew characterizes the degree of asymmetry of a distribution around its mean. Positive skew indicates a distribution with an asymmetric tail extending towards more positive values, whereas negative skew indicates a distribution with an asymmetric tail extending towards more negative values (Brown, 1996). Normal distributions produce a skew statistic around zero, and as the skew statistic departs from zero, positive values indicate the possibility of a positively skewed distribution, whereas negative values indicate the possibility of a negatively skewed distribution. Skew values of two standard errors or more (regardless of sign) are an indication that a distribution is skewed to a significant degree (Tabachnick & Fidell, 1996).

Additionally, kurtosis characterizes the relative peakedness or flatness of a distribution compared to the normal distribution. Positive kurtosis indicates a relatively peaked distribution, whereas negative kurtosis indicates a relatively flat distribution. Similar to the skew statistic, normal distributions produce a kurtosis statistic around zero. As the kurtosis statistic departs further from zero, a positive value indicates the

possibility of a leptokurtic distribution (tall distribution), and a negative value indicates the possibility of a platykurtic distribution (flat distribution; Brown, 1996). Kurtosis values of two standard errors or more (regardless of sign) are likely to differ from mesokurtic to a significant degree (Tabachnick & Fidell, 1996).

FITREP data were tested for normality. Skew and kurtosis statistics were generated for all primary variables of interest. Findings suggest significant negatively skewed distributions for team leadership, teamwork and team performance scores; however, team cohesion scores did not violate assumptions of normality. Moreover, kurtosis findings suggest significant platykurtic distributions for team leadership, teamwork, team cohesion, and team performance subscale scores (see Table 2 for item frequencies). Mardia's normalized estimate of -2.94 (indicator of multivariate normality violation) revealed only a slight violation of multivariate kurtosis. Results can be found in Table 3.

It is important to note that all variables were skewed in the same direction, because most general linear models (e.g., path analysis) tend to be robust to skew violations in the same direction; variables skewed in the opposite direction are more likely to lead to biased estimates in increase model misfit (Tabachnick & Fidell, 1996).

Table 2

Frequencies for Primary Variables

FITREP Scores	"2"	"3"	"4"	"5"
Team Leadership	43 (4%)	237 (26%)	344 (38%)	276 (32%)
Teamwork	102 (12%)	228 (25%)	337 (37%)	233 (26%)
Team Cohesion	32 (3%)	332 (37%)	423 (47%)	113 (13%)
Team Performance	37 (4%)	286 (32%)	273 (30%)	304 (34%)

Note: N= 900 for each item. *FITREP* scores derived from a five-point Likert-type scale (1 = below standards, 2 = progressing toward stated standards, 3 = meets standards, 4 = above standards, and 5 = greatly exceeds standards).

Table 3

Relevant Skewness and Kurtosis Values for Primary Variables

	Leadership	Teamwork	Cohesion	Performance
Mean	3.95	3.78	3.69	3.94
Median	4.00	4.00	4.00	4.00
Std. Deviation	.87	.96	.74	.90
Skewness	-.33*	-.32*	.03	-.21*
Std. Error of Skewness	.08	.08	.08	.08
Kurtosis	-.78*	-.85*	-.41*	-1.12*
Std. Error of Kurtosis	.16	.16	.16	.16

* Significant skew and kurtosis values.

Factorial Analysis of Variance (ANOVA)

Mean differences among Naval Warfare Communities and Officer Rank were examined. Factorial Analysis of Variance (ANOVA) was the statistical technique used to identify potential differences between Lieutenants, Lieutenant Commanders, and Commanders within Aviation, Surface, and Undersea Warfare communities on team leadership, teamwork, team cohesion, and team performance. Given the extremely large sample size (n = 300 per group), I expect many of the statistical tests to be significant because of my reduced standard errors. Therefore, more attention should be paid to the estimated effect sizes, which I hypothesize to be trivial in size.

Team Leadership. Team leadership scores were subjected to a 3 x 3 factorial ANOVA having three levels of officer rank (Lieutenant, Lieutenant Commander, and Commander) and three levels of community served (air, surface, and subsurface).

The three-way analysis of variance revealed a significant main effect for community served, $F(2, 897) = 3.96, p = .019, pr^2 = .009$, indicating at least one significant difference among the *FITREP* scores for team leadership between surface, undersea, and aviation warfare officers. The Games-Howell post-hoc test revealed that aviation warfare officers scored higher on team leadership than undersea warfare officers. However, the small effect size of $pr^2 = .009$, implies that the mean score for the aviation warfare community was similar to the mean score for the subsurface warfare community, indicating no meaningful differences among communities. Therefore, the significant difference is likely the result of the large sample size rather than any meaningful difference between warfare communities.

Furthermore, there were no significant differences on team leadership scores among aviators, surface warfare officers, and surface and subsurface warfare officers. The main effect of officer rank was non-significant, $F(2, 897) = 2.56, p = .078, pr^2 = .006$ (see Table 4). Similarly, the interaction effect was non-significant, $F(2, 897) = 1.32, p = .261, pr^2 = .006$.

Table 4

Means and Standard Deviations for Team Leadership across Officer Rank and Community Served

Community Served	Mean	Standard Deviation
Aviation	4.06_a	.86
Surface	3.91	.88
Subsurface	3.87_b	.87
Officer Rank	**Mean**	**Standard Deviation**
Lieutenant	3.97	.88
Lieutenant Commander	3.89	.87
Commanders	4.02	.85

Note: N = 300 for all groups. Means with different subscripts differ significantly from each other using the Games-Howell post hoc test. The Games-Howell post hoc does not assume equal variances.

Teamwork

Teamwork scores were subjected to a 3 x 3 factorial ANOVA having three levels of officer rank (Lieutenant, Lieutenant Commander and Commander) and three levels of community served (air, surface, and subsurface).

The three-way analysis of variance did not reveal a main effect for officer rank, F ratio of, $F\,(2, 897) = 1.22, p = .297, pr^2 = .003$. However, analysis indicated a

significant main effect for community served. The three-way ANOVA revealed at least one significant difference among teamwork scores as a function of community served, $F(2, 897) = 4.99, p = .007, pr^2 = .011$. The Games-Howell post-hoc test revealed that aviation warfare officers scored higher on teamwork than surface warfare officers. Again, the small effect size of $pr^2 = .011$ implies that the mean score for the aviation warfare community was not meaningfully different from the mean score for the surface warfare community, resulting in no "real" effect.

Moreover, there were no significant differences on teamwork scores among aviation, undersea warfare officers, and surface and undersea warfare officers (see Table 5). Finally, the interaction effect was not significant, $F(2, 897) = 1.64, p = .162, pr^2 = .007$, suggesting that the community served difference in teamwork did not interact with officer rank.

Table 5

Means and Standard Deviations for Teamwork across Officer Rank and Community Served

Community Served	Mean	Standard Deviation
Aviation	3.91_a	.97
Surface	3.67_b	.97
Subsurface	3.76	.96
Officer Rank	**Mean**	**Standard Deviation**
Lieutenant	3.73	.96
Lieutenant Commander	3.76	.95
Commander	3.85	.96

Note: N = 300 for all groups. Means with different subscripts differ significantly from each other using the Games-Howell post hoc test. The Games-Howell post hoc does not assume equal variances.

Team Cohesion

Team cohesion scores were subjected to a 3 x 3 factorial ANOVA having three levels of officer rank (Lieutenant, Lieutenant Commander, and Commander) and three levels of community served (air, surface, and subsurface).

The three-way analysis of variance revealed no effect for officer rank, F (2, 897) = 1.99, p = .137, pr^2 = .004. Furthermore, the main effect for community served was not

significant, F (2,897) =.91, p = .403, pr^2 = .002 (see Table 6). Finally, analysis revealed a non-significant interaction effect, F (2,897) = 1.53 p = .193, pr^2 = .007.

Table 6

Means and Standard Deviations for Team Cohesion across Officer Rank and Community Served

Community Served	Mean	Standard Deviation
Aviation	3.72	.72
Surface	3.64	.72
Subsurface	3.70	.77
Officer Rank	**Mean**	**Standard Deviation**
Lieutenant	3.72	.75
Lieutenant Commander	3.62	.72
Commander	3.72	.73

Note: N = 300 for all groups.

Team Performance

Team performance scores were subjected to a 3 x 3 factorial ANOVA having three levels of officer rank (Lieutenant, Lieutenant Commander, and Commander) and three levels of community served (air, surface, and subsurface).

The three-way analysis of variance revealed a main effect for officer rank, F ratio of, F (2,897) = 3.43, p = .033, pr^2 = .008, indicating at least one significant difference in team cohesion scores among Lieutenants , Lieutenant Commanders, and Commanders. The Games-Howell post-hoc test revealed that Commanders had significantly higher team performance scores than Lieutenants. However, the small effect size of pr^2 = .008, indicates that the mean score for Commanders was not meaningfully different from the mean score for Lieutenants.

Additionally, results suggest a significant main effect for community served. The three-way ANOVA revealed at least one significant difference among team performance scores as a function of community served, F (2,897) = 2.92, p = .045, pr^2 = .007. The Games-Howell post-hoc test revealed that aviation warfare officers scored higher on team performance than surface warfare officers, whereas no differences were found between surface and subsurface officers and aviation and subsurface warfare officers. However, the small effect size of pr^2 = .007 suggests that the mean score difference between warfare communities is not meaningful (see Table 7).

Finally, analyses revealed a significant interaction effect, F (2, 897) = 2.93, p = .020, pr^2 = .013. Pairwise comparisons indicate that the rank effect was greater in the aviation warfare community than in the surface warfare community. Nonetheless, the effect size of pr^2 = .013 suggests that the significant interaction effect is not meaningful.

In summary, ANOVA results suggest that aviation commanding officers viewed their officers as having higher levels of team leadership than subsurface warfare officers, and higher levels of teamwork than their surface warfare counterparts. Additionally, Commanders and their units significantly outperformed units lead by Lieutenants (as

observed by executive leaders), with the largest difference seen between aviation and surface warfare communities. However, the estimated effect sizes (ranging from .002 to .019) indicate that although these relationships are significant they are too small to represent meaningful phenomena.

Table 7

Means and Standard Deviations for Team Performance across Officer Rank and Community Served

Community Served	Mean	Standard Deviation
Aviation	4.04_a	.92
Surface	3.87_b	.87
Subsurface	3.91	.91
Officer Rank	Mean	Standard Deviation
Lieutenant	3.87_a	.86
Lieutenant Commanders	3.90	.86
Commanders	4.00_b	.88

Note: N = 300 for all groups. Means with different subscripts differ significantly from each other using the Games-Howell post hoc test. The Games-Howell post hoc does not assume equal variances.

Linear Regression

Simple linear regression was used to test the nested models within the overall team leadership path model. Based on two-tailed tests, all relationships were statistically significant. Specifically, team leadership predicting team performance was examined, with team leadership significantly predicting team performance, $B = .299$, $SE = .033$, $p < .001$. Findings suggest officers using transformational leadership behaviors were associated with higher performance by their respective units. In addition, the relationship between team leadership and teamwork was examined. Results suggest that officers using transformational leadership behaviors were more likely to engage in teamwork processes behaviors, $B = .279$, $SE = .035$, $p < .001$.

Moreover, the relationships among teamwork and team cohesion and team performance were analyzed. Analyses reveled that those officers who engaged in effective teamwork had teams with increased levels of cohesion, $B = .156$, $SE = .025$, $p < .001$, and higher performance scores, $B = .122$, $SE = .031$, $p < .001$. Finally, the relationship between team cohesion and team performance was examined. Findings suggest that officers who created and maintained cohesive teams had higher performing units, $B = .209$, $SE = .041$, $p < .001$. Results are summarized in Table 8.

Table 8

Linear Predictions within the Team Leadership Nomological Network

IV	DV	*B*	*SE*	*Beta*	*t*
Team Leadership	Team Performance	.299	.033	.251	6.220*
Team Leadership	Teamwork	.279	.035	.254	7.870*
Teamwork	Team Cohesion	.156	.025	.203	6.220*
Teamwork	Team Performance	.122	.031	.050	3.906*
Team Cohesion	Team Performance	.209	.041	.082	5.171*

*p <.001

Multiple Group Analysis

To confirm the generalizability of the estimated path relationships across aviation, surface, and subsurface warfare communities, a multi-group analysis was undertaken to identify significant differences across community. Path models were tested by using the statistical program EQS (Bentler, 1989). Path models were assessed by examining the goodness of fit index, model chi-square (χ^2). Differences between path models were assessed using the chi-square difference test.

The baseline invariance test of the three warfare communities was assessed with all of the parameters of the model being freely estimated as recommended by Benter (1995). Standard chi-square value was derived by computing model fit for the sample of all groups, χ^2 (6, N = 900) = 77.38, $p < .00$, as with the original analysis, this test

suggested the model fit was poor.

The estimated parameters in the path model were then constrained to determine if there were any differences in the estimate path coefficients. A chi-square value was again derived by computing model fit for the constrained model, χ^2 (14, N = 900) = 83.80, $p < .00$, this test also suggested the model fit was poor.

To compare the constrained model with the unconstrained model, the researcher examined the differences of chi-squares and determined whether the fit of the constrained model was significantly worse than that of the unconstrained. The chi-square of the unconstrained model was 77.38, df = 6, and the chi-square of the constrained model was 83.80, df = 14. Thus, 77.38 – 83.80 = 6.42, df = 14-6 = 8. The critical value of a chi-square distribution with 8 degree of freedom is 20.06 for al alpha of .01. Thus, we conclude that the constrained model does not differ significantly from the unconstrained model. Results can be found in Table 9.

Table 9

Invariance Testing of Multi-sample and Combined Sample Fit

Hypothesis	χ^2	*df*	Chi-Square Difference	CFI	SRMR	RMSEA
Baseline	77.38	6		.71	.09	.20
Constrained	83.80	14	6.42	.71	.09	.13

Path Analysis

Subsequent to findings suggesting no differences between warfare community path coefficients, the overall proposed path model and study hypotheses were tested by using the statistical program EQS (Bentler, 1989). Path models were assessed by examining the statistical significance of estimated path coefficients and several goodness of fit indices such as, model chi-square (χ^2), comparative fit index (CFI), the standardized root mean-square (SRMR), and the root mean squared error of approximation (RMSEA) following the recommendations of Hu and Bentler (1999; i.e., CFI $\geq$ .95, SRMR $\leq$ .10, and RMSEA < .05).

Team leadership was modeled as the exogenous variable. Teamwork and team cohesion were used as mediating variables, and team performance was modeled as the endogenous variable (see Figure 1). All paths from team leadership to teamwork, team cohesion, and team performance were freely estimated. Analyses confirmed that the hypothesized model represented a poor fit to the data, χ^2 (1, N = 900) = 72.54, p = .00: CFI = .72; SRMR = .09; and RMSEA = .28. Although the large sample size ensures that

the model χ^2 is significant, the other model fit statistics confirm that the theoretical model being tested does not describe the relationships in the data well.

In this model, being a transformational team leader, using teamwork process behaviors, and having cohesive teams were associated with team performance. The predictors explained 7% of the variance in teamwork, 4% of the variance in team cohesion, and 8% of the variance in team performance. Figure 4 represents the standardized solution for the final mediational model for all Naval warfare communities.

Modification indices were consulted to identify where adjustments might be made to improve overall model fit. The Lagrange Multiplier (LM) test suggested the insertion of a direct pathway between team leadership and team cohesion would decrease the χ^2 (29.02, $p < .00$). The premise that increased team leadership would lead to increased team cohesion appears reasonable given research findings suggest that leader behaviors facilitates the development of cohesive teams (Bartone & Marlowe, 1993). This pathway was added and post-hoc analyses resulted in a just identified model with a χ^2 of 0.00. Although model fit cannot be compared, adjustments to the path model explained 12% of the variance in team cohesion ($R^2 = .12$, an increase in 8 percentage points from 4% to 12%) and 9% of the variance in team performance ($R^2 = .09$, an increase in 1 percentage point from 8% to 9%).

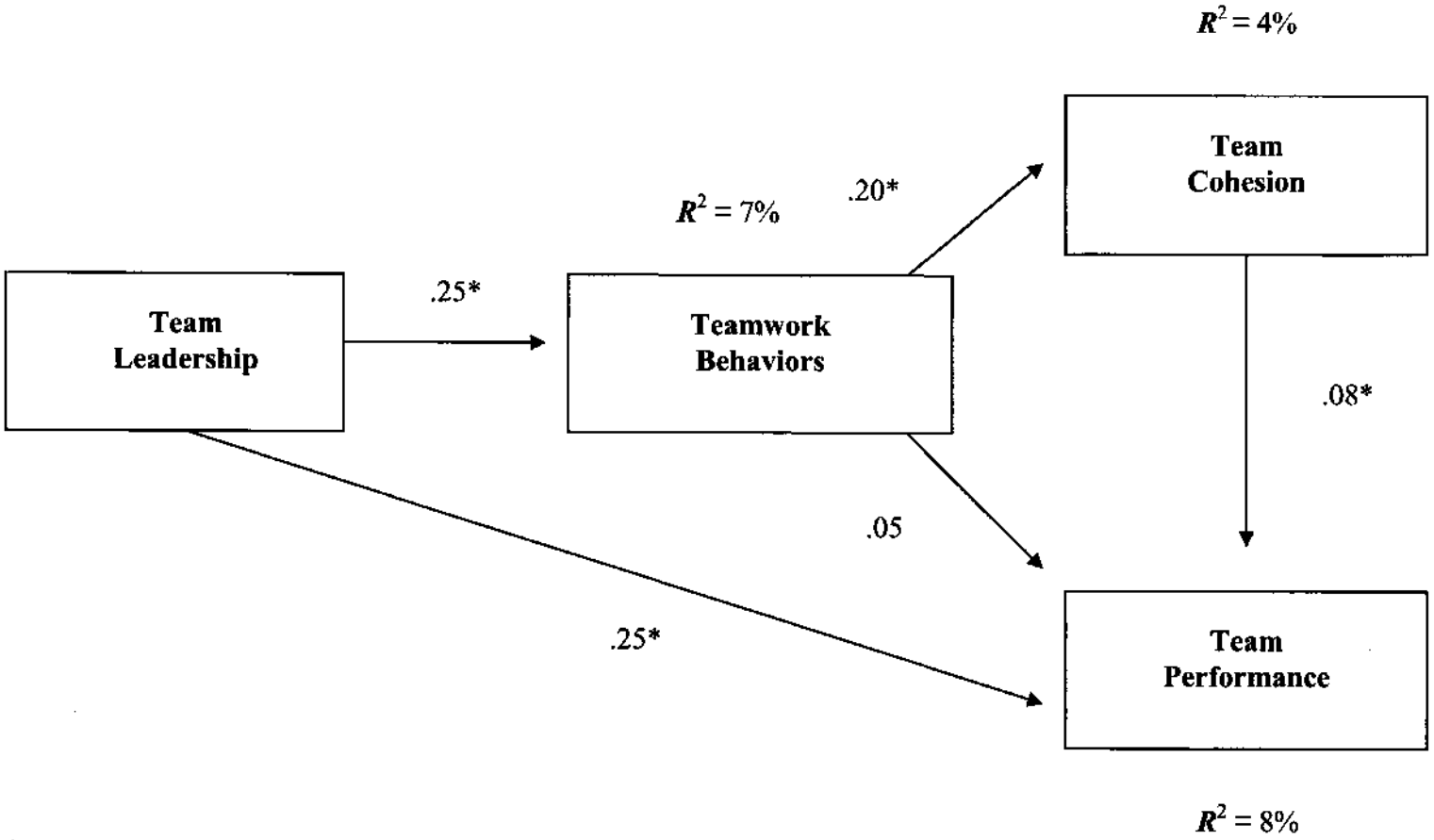

Figure 4

Path model of the effects of team leadership on teamwork, team cohesion, and performance. Standardized path coefficients are shown. * $p < .05$.

DISCUSSION

This study examined the construct-related validity evidence for team leadership measurement within the United States Navy. The current research specified one nomological network for officer team leadership appraisal. The proposed model predicted relationships among team leadership, teamwork, team cohesion, and team performance. Specifically, the proposed model tested the idea that Naval team leaders engaging in transformational behaviors would be more likely to use and encourage the use of teamwork processes, increase cohesion, and maintain superior mission readiness. The hypotheses were tested with performance appraisal data from 900 Commanders, Lieutenant Commanders, and Lieutenants from aviation, surface, and subsurface warfare communities. Results suggest that the nomological network did not provide an adequate framework for team leadership measurement. Although the hypothesized paths were significant, in general they did not account for the covariances/variances found in the data. Stronger relationships among the variables were needed in order to conclude that the network provided a basis for construct-related validity evidence for the *FITREP*.

Statistical and Measurement Limitations

Looking at the results in greater detail, relationships among variables were weak, effect sizes were small, and overall model fit was poor. The large sample size ensured that the model χ^2 was significant; however, additional fit indices confirmed that the vast majority of the variance and the shared variance in the data were not being explained by the theoretical model.

Several factors may have affected the magnitude of the correlations and overall model fit. First, the lack of variability among officer *FITREP* scores may have had an

impact on proposed relationships, making it difficult for the measure to differentiate among officers on team leadership, teamwork, and team performance (Schmit & Chan, 1998). The study focused only on those officers who attained higher levels of positions within the Navy. LTs, LCDRs and CDRs in all warfare communities are more likely to receive favorable scores from their commanding officers to ensure career progression, not necessarily because they are exceeding performance standards. This restriction of range may be responsible for weakening relationships between constructs, and decreasing the measure's validity. Model fit may improve by testing the model with data from both officer and enlisted Naval personnel.

Second, situational performance factors unrelated to the scores on the *FITREP* (criterion contamination) may have weakened model relationships. Criterion contamination may have occurred if situational factors that are unrelated to the *FITREP* affect scores on the *FITREP* and consequently, lower validity. For example, if factors such as availability of resources, quality of equipment, or commanding officer bias unduly influence commander ratings of officer performance, the validity of the *FITREP* will decrease (Schmitt & Chan, 1998). Therefore, we would no longer be measuring team leadership but we would be assessing differences in resources, equipment, and likeability in addition to leadership.

Furthermore, the model tested here incorporated data measured as individual-level constructs but observed as team-level phenomena. When measuring the effects of team leadership on team-level outcomes, it is recommended that the team constructs in question (teamwork, cohesion, and performance) be assessed at the team level (Klein & Koslowski, 2000).

Traditionally, team leadership within the Navy has focused on the evaluation of individual level performance. Logically, it is easiest to conceptualize individual-level performance as it is easier to change individual-level behavior. However, even when the appraisal is focused on the level of the individual, other levels of phenomena should also be considered (i.e., team levels and/or organizational levels), depending on the purpose of the appraisal. In fact, Cleveland, Murphy, and Williams (1989) found it useful to classify appraisal purposes into between- and within-persons decisions. Of these, only within-person decisions result in appraisals that exist only at the individual level of analysis, for decisions are concerned with identifying the strengths and weaknesses of a given individual (and even these appraisals may not be totally independent of performance at other levels of analysis).

In the case of between-persons decisions (includes such decisions as which officer should be promoted or receive a pay increase), the real focus is at the level of the team. Clearly, an officer's team leadership performance may not be outstanding, and that officer may still receive a promotion if no one else in the team has a performance as good. Therefore, between-persons decisions can more correctly be characterized as examples of cross-level effects. Here, the performance of the other team members serves as a contextual variable that is part of the decision about whether an officer is tapped for promotion. The assessment of Naval team leadership should be classified as a cross-level effect.

For the purpose of the present investigation, concern over how to properly assess both the performance of the team leader and that of his/her team must be addressed. For future model assessment, it may be reasonable, in some cases, to obtain information

about team performance by simply appraising the performance of individual officers and/or enlisted personnel, and then aggregating this information at the team level. In such a case, team performance may be nothing more than the sum of individual-level performance. However, aggregation is not recommended, as research on teams has indicated that the nature of performance in a team is dependent on such factors as the cohesiveness of the team (Keyton & Springston, 1990; Evans & Dion, 1991), and the critical behaviors for team effectiveness such as willingness to contribute and communicate among team members (Dickinson et al., 1992; McIntyre & Salas, 1995; Dickinson & McIntyre, 1997). All of this suggests that team performance is determined by a complex set of factors, and that appraisals focused at the level of the team must do more than simply combine individual-level appraisals.

Recalling the extremely small relationships found among team-level constructs including teamwork and team performance ($r = .05$) and team cohesion and team performance ($r = .08$), these findings may provide insight into the difficulty rating officers may have had observing both individual- and team-level behaviors and making inferences about performance from these multi-level observations. Accuracy in appraisal may diminish when individual-level decisions are made from team-level observations and vice versa. These errors of misspecification make it difficult for rating officers to draw meaningful individual-level conclusions about their officers from team-level phenomena. These errors may have also been responsible for the data being a poor fit to the model.

Along this line of thinking, the weak correlations found between the constructs at the team-level also indicate that we may not be assessing team cohesion or team performance as defined by the path model. For example, when assessing a team leader's

ability to create and maintain the cohesiveness of his/her unit, using the *FITREP* as a road map, it is hard to know, as a rating officer, what particular behaviors he/she needs to focus on at the team-level to make accurate performance assessments at both the level of the leader and the team. Specifically, if we focus solely on the cohesion construct, we find that the construct is embedded in the organizational climate subscale, is not adequately defined and does not have a majority of relevant team-level task-related and social-related behaviors anchored to the construct. As a result, rating officers may not be assessing team cohesion at all, but rather other organizational-level constructs such organizational culture or climate. Moreover, in examining the definition of cohesion in greater detail, it appears that if the *FITREP* is assessing cohesion, its focus is on that of social cohesion at the expense of task-related behaviors. This distinction is important as small-group research has shown highest team performance is obtained only when high levels of both task and social cohesion exist (Zaccaro & McCoy, 1988). The omission of many task-related cohesion behaviors from the *FITREP* may have impacted the predictive ability of the team leadership model.

In order to test the assumption that the *FITREP* is not fully assessing the constructs it intends to assess, reliability estimates of the four sub-scales would also need to be determined; unfortunately, *FITREP* reliability estimates cannot be computed given that internal consistency indices (typically, Cronbach's alpha) can only be estimated with measures that have more than one item. With the purpose of controlling for measurement error, argued to be present in the data, alpha levels for all four sub-scales were computed to .60 (acceptable reliability estimate in exploratory research; Schmitt & Chan, 1998), and .80. Given an alpha of .60, post-hoc analyses revealed that the predictors explained

59% of the variance in teamwork, team cohesion, and team performance. Moreover, with reliability estimates at .80, post-hoc analyses revealed that the predictors explained 80% of the variance in teamwork, team cohesion, and team performance. These findings suggest that when measuring Naval team leadership, it is desirable to have reliable scores for each sub-scale, giving us greater confidence that the observed scores derived from the *FITREP* reflect true levels of team leadership, teamwork, team cohesion, and team performance.

An additional measurement issue pertains to the skew of the *FITREP* data. Following normality tests, results displayed negatively skewed distributions, with the majority of scores on all four subscales being threes, fours, and fives ("meets standards", "above standards" and "greatly exceeds standards") for LTs, LCDRs, and CDRs within all warfare communities. One possible reason for the negative skew may be judgmental biases in officer rating. In the traditional view, judgmental biases result from systematic measurement error in the part of the rater (Cascio, 1998), and as such they are easier to deal with than errors that are unsystematic or random. There are certain biases that are apparent in the *FITREP* data and deserve to be highlighted.

The use of ratings rests on the assumption that the commanding officer is capable of some degree of precision and some degree of objectivity. Their ratings are taken to mean something accurate about certain aspects of the officer rated. "Objectivity" is the major hitch in these assumptions, and it is the one most often violated (Guilford, 1954). Commanding officers (as with any rater) subscribe to their own set of assumptions (that may or may not be valid), and the negative skewed data suggests that the commanding officers may be been inordinately easy or lenient in the ratings of their team leaders.

Although it is procedure to have commanding officers rank-order their team leaders, it is apparent leniency still exists in practice. In order to control or eliminate leniency bias, it is recommended that commanding officers allocate ratings into a forced distribution, in which officers are apportioned according to an approximately normal distribution.

Although the idea of a normal distribution of job performance is often assumed, a lenient distribution may be accurate. This may be the case with lenient ratings of officer performance. Possibly, the extensive officer selection program that the Navy incorporates may have succeeded in weeding out most of the poorer applicants prior to the appraisal of performance out in the field. Consequently, it may be more appropriate to speak of a leniency effect, rather than a leniency bias. Even so, senior managers recognize that leniency is not to be taken lightly. Seventy-seven percent of sampled Fortune 100 companies reported that lenient appraisals threaten the validity of their appraisal systems (Bretz, Milkovich, & Read, 1990).

The negatively skewed data may also suggest a halo bias (Thorndike, 1920). A commanding officer who is subjected to the halo bias assigns ratings on the basis of a general impression of the lower ranking officer. An officer may be rated either high or low (high in the case of the ratings retrieved from the *FITREP*) on specific factors because of the commanding officer's general impression (good in this case) of the officer's overall performance (Lance, LaPointe, & Stewart, 1994). According to this theory, it may have been difficult for commanding officers to distinguish among levels of performance on different *FITREP* dimensions. For instance, our commanding officers may have observed the team leader engaging in transformational leader behaviors, motivating and inspiring those around them, providing meaning and challenge to their

followers' work, encouraging followers' to be innovative and creative, and providing special attention to each follower's needs by acting as a coach or mentor and thus, gave high ratings to the leader on teamwork, team cohesion, and team performance, although the team leader may not have used and fostered effective teamwork behaviors, was unable to create and/or maintain cohesion among his/her team members, and ultimately failed to accomplish the stated mission. In sum, rating officers may tend to rate their team leaders high or low in all categories because he or she is high or low in one or two areas.

However, research on halo bias has led to three conclusions: (1) halo is not as common as believed (2) the presence of halo does not necessarily detract from the quality of ratings and (3) it is difficult to separate true halo (real overlap among performance dimensions being rated) and illusory halo (irrelevant factors including deficiencies in measurement, observation, and memory errors on the part of the rater) in most field settings (Murphy, Jako, & Anhalt, 1993). Therefore, although halo bias is argued to be present in the *FITREP* data, it is difficult to determine why it has occurred (is it due to the commanding officer or to contextual factors unrelated to the officer's judgment), or what to do about it. However, frame-of-reference training for commanding officers may help to (a) improve the observational skills of commanders by teaching them what to attend to (b) reduce or eliminate judgmental biases and (c) improve the ability of commanders to communicate appraisal information in an objective, constructive manner with officers.

Particularly, research has demonstrated reliably that frame-of-reference training is most effective at improving the accuracy of performance appraisals (Day & Sulsky, 1995). Following procedures developed by Pulakos (1984, 1986), it is argued that the

quality of data gathered using the *FITREP* would be increased subsequent to commanding officers receiving training that provides a performance-based schema to help them process performance information. This schema appears to guide the encoding, storage, and retrieval of performance judgments as well as specific behavioral information (Woehr, 1994). The performance standards and behavioral examples you find in frame-of-reference training appear to be responsible for the improvement in rater accuracy at both individual and team levels. For example, the use of target scores in performance examples (watching team's engage in effective communication, monitoring, backup, feedback, and social- and task-related cohesion behaviors) and accuracy feedback on practice ratings allows commanding officers to learn, through direct experience, how to use different rating standards. In essence, the frame-of-reference training includes an efficient model of the process by which performance-dimension standards would be acquired.

Moreover, quality of *FITREP* ratings can be improved if the criteria for the selection of rating officers are carefully laid out to ensure that commanding officers have had time to observe subordinate officers' team leadership performance. Additionally, explanation of the importance of ratings provided on both organizational and personal levels may help to improve *FITREP* ratings. Finally, explaining the nature of common rating errors to commanding officers and how they can be avoided will help to improve performance ratings (McIntyre, Smith, & Hasset, 1984; Pulakos, 1991). It is recommended that commanding officers acknowledge both the strengths and the weaknesses of their team leaders, to consider only performance-related information, and to evaluate performance over time, not just single instances of outstanding or poor

performance.

Additionally, model fit may be improved by introducing a direct path from team leadership to team cohesion. Referring to the Lagrange Multiplier (LM) test results, team leadership was a significant determinant of team cohesion. This alternative model suggests that team leaders directly impact team cohesion to affect unit performance. This alternative model was tested using path analysis. Post-hoc findings suggest that the addition of this direct path explained more of the variance in team cohesion and team performance . More importantly, this structural path makes theoretical sense given extant research findings suggest that leader behaviors consistent with transformational leadership facilitate the development of highly cohesive military units (Bartone & Kirkland, 1991; Kirkland, Bartone, & Marlowe, 1993).

Finally, future examination of the Naval team leadership network incorporating situational awareness (the extent to which a team leader is able to keep track of, interpret, and deal with large amounts of information on an ongoing basis) and shared mental model (conceptualization of the team task shared by all team members) constructs may help to explain more of the model's variance, as both have found to be related to increase team performance among military units (Wickens, 1992).

Specifically, research on military tactical teams suggests that mission success in a complex, dynamic task environment (like that of the Navy) requires appropriate and timely decisions of the team leader which, in turn, require maintaining a grasp of the total situation and a shared understanding of the team task (Dickinson & McIntyre, 1997; Ahronson & Eberman, 2002). It is not unlikely that an effective team leader who is aware of his or her surroundings, the surroundings of his or her unit, and have clarified

team member roles and responsibilities are more likely to engage in appropriate teamwork behaviors in order to enhance the cohesiveness of their units in completion of unit mission tasking. Further investigation of these constructs and their relationships among team leadership, teamwork, team cohesion, and performance is recommended.

Naval Practical Limitations

Looking back at the statistical and measurement limitations of the study, principally the negative skew of the data, and the concern over potential judgmental biases in *FITREP* ratings, it was previously mentioned that frame-of-reference training for commanding officers may help to improve rater observational skills, thereby reducing appraisal errors. It is important to note that this recommendation is viewed as a short-term solution to improving rater accuracy, and that a longer-term approach is necessary to ensure accurate Naval team leadership assessment. Although the short-term approach may be easier to implement given no changes to the *FITREP* would be required, a long-term strategy including frame-of-reference training, subsequent validation research, and scale re-construction, would provide Naval personnel with a valid measurement tool predictive of present and future team leadership performance. The following paragraphs highlight this long-term approach.

Bear in mind the purpose of the present investigation attempted to provide construct validity evidence for the *FITREP*. Although the creation of a nomological network is the first step in establishing a theoretical basis for construct validity, it does not provide practicing researchers a way to actually establish whether or not a measure *has* construct validity. To argue that a measure is construct valid, convergent and discriminant validity must also be confirmed. Convergent validity is demonstrated when

researchers can show that measures that are supposed to be highly interrelated are, in practice, highly interrelated; discriminant validity is demonstrated when measures that should not be related to each other, in fact, are not (Cascio, 1998).

Campbell and Fiske (1959) propose a systematic experimental procedure for analyzing convergent and discriminant validities. They argue that any measurement procedure is a "trait-method unit", a test measuring a given trait by a single method. Therefore, because we want to know the relative contributions of trait and method variance to test scores, we must study more than one trait, and more than one method to examine traits. Such studies are possible using a multi-trait-multi-method (MTMM) matrix.

An MTMM matrix is simply a table displaying the correlations between (a) the same trait measured by the same method, (b) different traits measured by the same method, (c) the same trait measured by different methods, and (d) different traits measured by different methods (Cascio, 1998). The procedure can be used to examine any number and variety of traits measured by any method. It is recommended that the *FITREP*'s construct-related validity be investigated using the MTMM approach. Convergent and discriminant validities would be best examined by gathering team leadership, cohesion, teamwork, and team performance data from at least two different appraisal methods that include field observations, peer assessments, self-assessments, and/or assessment centers. If the results obtained using these different methods are highly correlated, the measures are assessing the intended construct(s); if the methods are not related, it is likely they are assessing different constructs. Future research examining both convergent and divergent validity data will provide greater insight into the

FITREP's utility and the inferences made from the measure's scores.

It is important to note that validity is an evolving property and validation a continuing process, and thorough knowledge of the interrelationships between scores from a particular procedure and other variables require many investigations. The present investigation began the process of establishing construct-related validity, taking aim at answering the question: Does the Navy's *Fitness Report and Counseling Record E7-O6*, measure team leadership? However, in order to further examine the extent to which the *FITREP* is measuring team leadership, it is suggested that future research focus on establishing content-related validity evidence by investigating the extent to which the team leadership measure reflects the specified intended domain of content (i.e., what class of constructs are necessary for effective team leadership performance) and criterion-related validity evidence by determining if the *FITREP* is predictive of present and future team leadership performance.

To properly evaluate the *FITREP* from a content-validation perspective, it is recommended that the Navy "re-construct" the measure beginning with re-defining the subscales highlighted in the nomological network. Although the behaviors anchored to the team leadership, teamwork, cohesion, and performance subscales mirror those of transformational leadership, infer effective teamwork processes, cohesion, and performance, they may not fully constitute significant aspects of the job, and are not adequately operationally defined, leaving researchers to question the legitimacy of *FITREP* research findings.

The content validation process would begin with establishing a Navy content evaluation panel {comprising an equal number of officers, commanding officers, and

senior civilian staff specializing in workplace performance (i.e., Industrial/Organizational Psychologists)} to (a) establish operational definitions of the attributes to be measured, (b) identify the categories or dimensions of the attributes to be measured, (c) decide the relative importance of each attribute, and (d) determine whether the knowledge and skill measured by each *FITREP* attribute is essential, useful but not essential, or not necessary to the performance of being an effective team leader.

Responses from all panelists would be pooled and essential subscales would be determined. Simple mathematical computation would be used to identify and perceived overlap between capability to function as a team leader on the *FITREP*. Once this is accomplished, the *FITREP* can then be augmented for examining the appropriateness of inferences based on the measures of this construct (Tenopyr, 1977; 1984). Following an in-depth content analysis of the four highlighted *FITREP* subscales and subsequent examination of the construct-related validity evidence incorporating the MTMM approach, we can then determine if the *FITREP* can be used to make accurate predictions and/or decisions regarding current and future team leadership performance.

Research Implications

Although the results of the study did not provide support for the team leadership path model, a small number of research implications exist. As previously stated, the primary purpose of this research was to test a team leadership nomological network predicting relationships among team leadership, teamwork, team cohesion, and team performance in order to provide a basis for construct validity for the Navy's team leadership appraisal tool, *The Fitness Report (FITREP) and Counseling Record E7-O6* (Bureau of Naval Personnel, 2002). Given the strength of theory behind the model,

subsequent research should be conducted to determine the extent to which the nomological network might possibly explain team leadership in other military contexts such as maintenance, support, and/or logistics commands. More importantly, it would be interesting to re-analyze the augmented network examining the overall fit of the model with a direct path leading from team leadership to cohesion.

The model tested here did not take into consideration the degree to which teams in all warfare communities may be co-located while accomplishing mission objectives. More of the model's variance may be explained by examining the extent to which technology alters a team leader's ability to engage in transformational behaviors, make use of and encourage team processes, create and maintain cohesion, and complete team tasks. As an example, consider the "virtual workplace", in which surface warfare officers and team members operate remotely from each other. Without information and knowledge, officers in virtual environments may become disconnected and ineffective. Fortunately, technology and enlightened management practices (managing based on results) can ensure that this does not happen; however, with the increasing reliance on the internet and other electronic communication modalities, it would be worthwhile to know if these types of technology impact effective team leadership as described in the nomological network, ultimately impacting accurate assessment of the team leadership construct.

Lastly, several Naval administrative and developmental initiatives as well as human resource initiatives may benefit form the theory and initial results provided in this study. For example, in officer selection, the positions for which Sailors are chosen are examined to determine what tasks and responsibilities will be required (Cascio, 1998).

The specification of the domain of job tasks is followed by the generation of hypotheses concerning the knowledge, skills, abilities, and other characteristics (KSAOs) required of the individual who must perform these tasks (Schmitt & Chan, 1998). Because the Navy has a history of using teams to complete mission objectives, logic would suggest that the ability to work within a team would need to become part of those KSAOs. This network of team leadership, the strong theory behind it, the suggestions recommended from these initial results to improve the *FITREP*, and proposed future research may potentially provide practicing I/O psychologists and Naval personnel with specific behaviors on which to assess potential Naval Officers.

CONCLUSIONS

It is hoped that this study will serve as a catalyst for additional validation research for the Navy's team leadership appraisal tool *The Fitness Report and Counseling Record E7 – O6.* Researchers and practitioners should capitalize on these findings to improve their understanding of this leadership construct and how it might be accurately assessed. The current research effort provided a foundation from which further advancements can be made in the area of Naval team leadership measurement.

NOTES

[1] The views expressed in this dissertation are the author's and are not to be construed as reflecting the official views of the United States Navy, Department of Defense, or any other United States government agency.

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