

EVALUATING TEAM EFFECTIVENESS: EXAMINATION
OF THE TEAM ASSESSMENT TOOL

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The present study evaluates the psychometric properties of the TEAM Assessment Tool. The assessment was developed to evaluate work team effectiveness as a basis for providing developmental feedback for work teams. The proposed TEAM Assessment Tool includes 12 dimensions of work team effectiveness with 90 items total. The dimension names are (a) Communication, (b) Decision-Making, (c) Performance, (d) Customer Focus, (e) Team Meetings, (f) Continuous Improvement, (g) Handling Conflict, (h) Leadership, (i) Empowerment, (j) Trust, (k) Cohesiveness/Team Relationships, and (l) Recognition and Rewards. Data were collected from employees of a large aerospace organization headquartered in the United States who are participating in work teams ($N= 554$). Factor analysis guided development of six new scales of team effectiveness as follows: (1) Teamwork, (2) Decision-Making, (3) Leadership Support, (4) Trust and Respect, (5) Recognition and Rewards, and (6) Customer Focus. Reliability of scales was demonstrated using Cronbach's coefficient alpha. Construct validity was demonstrated through subject matter expert (SME) input, exploratory factor analysis, and scale reliability analysis. Criterion validity was demonstrated by significant correlations at the $p<.01$ level comparing two measures of team member opinion of team performance and level of performance as indicated by the six subscale scores and overall scale scores of the final TEAM Assessment Tool.

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CHAPTER 1

INTRODUCTION

Groups in organizations became a focal point of interest in the 1940s, shortly after the Hawthorne Studies (Mayo, 1933) were conducted and revealed the effects of informal groups in an organization. Since that time, and especially throughout the 1990s, the use of formal work groups and work teams in organizations has increased dramatically. Eighty percent of organizations with over 100 employees report that half of their employees are a member of at least one team (Beyerlein & Harris, 1998). What exactly defines a work team? A work team is a group of interdependent individuals who have complementary skills and are committed to a shared, meaningful purpose and specific goals. They have a common, collaborative work approach, clear roles and responsibilities, and hold themselves mutually accountable for the team's performance (Katzenbach 1993; Dyer, 1984; Guzzo & Dickinson, 1996) in the same way a traditional supervisor would—establishing methods for insuring work is completed as well as offering support as needed and appropriate. Guzzo (1986) elaborates that the presence of interdependency is a key characteristic of work teams and is what distinguishes a work team from a work group.

What are the reasons that organizations seek to use work teams? In most cases, teams can achieve more than individuals working on their own (Ray and Bronstein, 1995). They can produce better quality decisions than individuals working alone (Manz & Sims, 1993) likely due to the fact that teams bring a wider range of skills and

experience to solve a problem (Kernaghan & Cooke, 1990; Mennecke & Bradley, 1998). Furthermore, when a team has been working on a problem, they have a sense of commitment to the common solution (Hick, 1998). This likely links with findings that most employees feel better about decisions they make themselves and are more likely to stick to the implementations they have created for themselves than to those that are forced upon them (West et al., 1998). Additionally, many organizations implement work teams as a means of increasing workplace efficiency (Ancona, 1990; Orsburn, Moran, Musselwhite & Zenger, 1990). Effective work teams can benefit both employers and employees by increasing quality (Cohen & Ledford, 1994; Manz & Sims, 1993; Wellins et al., 1990), flexibility (Mohrman, Cohen & Mohrman, 1995), coordination (Harrington-Mackin, 1994), and productivity (Cohen & Ledford, 1994; Ray & Bronstein, 1995). Organizations have also reported improvements in safety (Cohen & Ledford, 1994; Beyerlein & Harris, 1998), absenteeism, and employee attitudes after effective work teams were implemented (Beyerlein & Harris, 1998).

With so many recognizable benefits, why aren't all organizations structured in teams? There are many reasons. One major reason is that not all tasks are appropriate for team work because they do not require interdependency (Guzzo, 1986; Wageman, 1995). If a group of workers does not rely upon each other in order to accomplish common tasks or goals, it may be difficult to foster the collaborative spirit that teams need to work effectively. We can see this same concept in the world of sports. Some activities are geared for individual contributors (e.g., the 50-yard dash) and others are centered on teams (e.g., 4x100 meter relay race). It is more logical to conceive of the relay team collaborating to accomplish their common goal than a group of sprinters who

are individually competing in a dash. A second major reason that all organizations are not structured in work teams is that not all organizations are properly structured to effectively support the work team design. In my 10 years of experience in academic and professional application of work team principles, I have identified a few of the major structural elements that contribute to a successful team-based organization as: (a) the recruiting and hiring process to ensure employees have necessary skills to collaborate in a team environment; (b) a compensation system that addresses rewards and recognition from a team perspective as well as an individual perspective; (c) a learning and development system that focuses on developing teaming skills as well as technical skills, and; (d) a leadership approach that supports and fosters an empowered team environment. The fact that work teams are often difficult to implement (Orsburn et al., 1990) because of the effort that goes into structuring or restructuring organizational systems accordingly is likely a major reason, as well.

Measuring Team Effectiveness

For those organizations that do implement teams, measuring their effectiveness is necessary, yet challenging. The reasons teams need an effective measurement system are varied. One important reason is based on the likelihood that the more effectively a team functions, the more benefits they are likely to realize from the work team structure—the structure alone does not produce the improvements in workplace efficiency, quality, productivity and employee attitudes. Another reason that effective measurement is necessary is that, oftentimes, key stakeholders in an organization are looking for a return on investment (ROI) for the costs associated with supporting the work team structure.

Effective team measurement techniques help produce data that is used to demonstrate ROI. Furthermore, there are many challenging aspects of measurement. One is developing and using a psychometrically sound assessment. This process is laborious, time-consuming, and can be expensive. The investment for developing a sound assessment is worth it, however, when considering the benefits that result from team effectiveness, including improvements in quality (Manz & Sims, 1993), productivity (Ray & Bronstein, 1995) safety, absenteeism, and employee attitudes (Beyerlein & Harris, 1998). Another challenge is ensuring that teams take the time to fill out the assessments. With all of the core work and responsibilities workers are responsible for, even taking 20 minutes to fill out an assessment is sometimes a challenge. A third challenge is analyzing and using the data in a valuable way. Again, this is a time-consuming step that requires time away from core work responsibilities. Organizational leaders should allow the time needed and encourage employees to focus on team development activities. Even if organizations can successfully address these issues, still another significant issue exists, what defines “team effectiveness?”

Defining Team Effectiveness

If organizations are to commit the financial, time and human resources to develop teams, they must have an idea of what constitutes team effectiveness. Many formal definitions of “team effectiveness” exist. Sundstrom (1999) uses the following “practical” definition of team effectiveness: “the extent to which a work team meets the performance expectations of key counterparts—managers, customers, and others—while continuing to meet members’ expectations of work with the team” (p.10). This definition

illustrates the importance of performance results the team delivers to key counterparts as well as the processes used within the team to achieve those results. The processes a team employs are important as they contribute to team member attitudes (Beyerlein & Harris, 1998), satisfaction (Ratzburg, n.d.) and commitment (Becker & Billings, 1993) which have a positive effect on productivity, turnover and employees' willingness to help co-workers (Becker & Billings, 1993; Mowday et al., 1982). After agreeing upon a team effectiveness definition, how can an organization make sure that the teams they implement are functioning effectively? Up to the present time, two major challenges in this area have been (a) knowledge of what factors compose team effectiveness and (b) adequately measuring those factors.

Dimensions of Team Effectiveness

For purposes of this study, the following distinction will be used for *dimensions, factors and scales*: *dimensions* denotes the team effectiveness topic areas gathered from literature and proposed for statistical evaluation in this study; *factors* denotes the categories resulting from factor analysis in this study, and; *scales* denotes the named categories assigned to the factors resulting from all statistical analyses in this study.

Research of team effectiveness suggests a variety of team effectiveness dimensions. Not surprisingly, two interrelated components of team effectiveness are that a team must work hard and that they must be committed to achieving results (Hick, 1998).

Additionally, the team should have the right mix of skills—including technical, problem-solving and interpersonal—to approach and accomplish the group tasks successfully.

Teams must also have the appropriate level of empowerment needed to carry out their

duties (Hyatt & Ruddy, 1997; Tesluk, Brass, & Mathieu, 1996) and proper leadership support (Hackman, 1987; Moran 1996), including meaningful rewards and recognition (Tesluk, Vance, & Mathieu, 1999; Kopelman, 1979; Rubin, Munz, & Bommer, 2005). The following list represents a compilation of the dimensions that emerged frequently in the team effectiveness literature, in my personal observation and experience working with teams, and on team effectiveness assessments developed and used by consulting firms and within organizations. Of the few team effectiveness assessments found in the literature, none provided information to indicate that a thorough statistical analysis was performed to demonstrate psychometric soundness of the instrument. Few empirical studies were found in my literature search on the topic of assessing team effectiveness. Empirical data has been cited where possible to support the team effectiveness dimensions included in this study. Some dimensions have little, if any, empirical data from the literature search to support their inclusion in this study. The purpose of including those dimensions in this study is to empirically evaluate if they are statistically significant factors that contribute to team effectiveness. A definition for each of the dimensions that will be evaluated in this study is provided in order to indicate the scope of the dimension name relevant to this study.

Cohesiveness/Team Relationships Cohesiveness is central to the study of groups and is largely influenced by the interpersonal relationships of group members (Pelled et al., 1999). Cohesiveness implies a feeling of solidarity with other group members. Healthy interpersonal relations help maintain effective and appropriate relationships with fellow workers which contributes to better information exchanges and decision-making in teams

(Pelled et al., 1999). Highly cohesive teams tend to have less absenteeism, high involvement in team activities and high levels of member coordination during team tasks (Morgan & Lassiter, 1992). Furthermore, Bettenhausen's (1991) review of group research linked team cohesion with team variables that included satisfaction, productivity and member interactions. Likewise, in their conceptual review, Swezey and Salas (1992) included cohesion as one of the seven primary categories that addressed teamwork process principles, and thus may discriminate between effective and ineffective teams. Team cohesion has also been noted as a critical motivational driver influencing team performance in prior empirical research (Weaver et al., 1997), and previous meta-analyses found significant cohesion-performance effects (Evans & Dion, 1991; Mullen & Copper, 1994; Sundstrum et al., 1990). The Team Effectiveness Profile (TEP) ("The Work Flow," n.d.) developed by ASI is a validated assessment that measures different aspects of individual/team relationships and Jones (1993) also includes a measure of team cohesiveness in his research on team effectiveness. For the purposes of this study, "the feeling of unity or oneness that exists among team members and the degree to which a group exists or operates as a unified entity" will be used as the definition for cohesiveness/team relationships.

Collaborative Problem-Solving/Decision-Making Problem-solving is an important skill for work teams (Guzzo & Shea, 1992; West et al, 1998). Work teams face what can sometimes be a challenge in problem-solving efforts—collaboration with others on their team. Additionally, most groups jump right into coming up with solutions before clearly defining the problem. Polk (2001) describes how two psychologists, Goldfreid and

Davidson, interviewed successful people to find out how they solved problems. They found successful problem-solvers: 1) have an attitude that problems are just part of life and are there to be solved; 2) take the time to define and describe a problem thoroughly before coming up with ideas to solve it; 3) brainstorm solutions only after defining the problem; 4) choose a solution by taking their brainstorm list and addressing the pros and cons of each idea, and; 5) try the selected solution and if it does not work to full satisfaction, they go back to step one and do the steps again. Effective problem-solving is an important skill for individual contributors as well as work teams. The Knowledge Team Effectiveness Profile (KTEP) addresses team problem-solving with several items under the heading of team process (“Knowledge Team Effectiveness Profile,” n.d.) and Kirkman and Rosen (1999) ask raters to provide feedback on problem-solving on their team assessment. After considering the key points presented in the literature and the items represented on these assessments, “the ability to recognize situations in which group members need to work together to solve problems, identify the appropriate people to be involved in the problem-solving, and determine an appropriate solution to the problem” will be used as the definition to represent the collaborative problem solving dimension.

Commitment The definition we are using for a work team stresses the importance of commitment to a shared, meaningful purpose and specific goals. The literature supports the notion that commitment to the team is related to a number of desired employee outcomes including productivity, turnover and employees’ willingness to help co-workers (Bishop & Scott, 1997; Becker & Billings, 1993), extrarole behavior (Becker & Billings,

1993) and team performance (Bishop & Scott, 1997; Bishop, Scott, & Casino, 1997; Scott & Townsend, 1994). Low levels of commitment to both the organization and the team have been linked to absenteeism, turnover and intention to quit (Becker & Billings, 1993; Mowday et al., 1982). A combination of individual items on the Group Process questionnaire (Hill et al., n.d.) and Kirkman & Rosen's (1999) Perception of Team Empowerment questionnaire are also designed to gauge team commitment level. Together, these sources influenced the definition of commitment as "the state of being bound emotionally or intellectually to the team's purpose and to the team members."

Communication Likely one of the most challenging aspects of personal and professional collaboration, the topic of communication is addressed frequently in literature and on published team effectiveness assessments (Swezey & Salas, 1992; Campion et al., 1996; Hill et al., n.d.; Jones, 1993; "Team Feedback System," n.d.; "Knowledge Team Effectiveness Profile," n.d.). Swezey and Salas (1992) included communication as one of the seven primary categories that address teamwork process principles, and thus may discriminate between effective and ineffective teams. Campion et al. (1996) found that process characteristics of the team, including communication, most strongly related to team effectiveness criteria in their study of various team design characteristics. The ongoing practice of open and honest communication seems essential for any team that aspires to quality and longevity. A team is only as good as each member's ability to communicate effectively including listening skills, sufficient sharing of information, proper interpretation and perception of others and properly attending to nonverbal cues (Varney, 1989). Whether it has its own dimension or is a combination of individual

items, the essence of communication can be summarized as “the methods and processes for gathering, distributing, attending to and exchanging information; the ability to share ideas openly, supportively, and objectively using appropriate verbal and non-verbal behaviors while actively listening.”

Conflict Management A major advantage of a work team structure is diversity of resources, knowledge, and ideas. However, diversity can also produce conflict. A conflict exists when two or more members of a group, or two or more groups, disagree. A conflict becomes harmful if tension within or between groups is such that it impedes members from thinking clearly or making sound decisions (Zander, 1994). However, not all conflicts are harmful. Conflict may be useful if it awakens members to alternative points of view and stimulates creativity in problem-solving and decision-making (Dyer, 1987; Dyer, 1995; Zander, 1994). The consequences of the conflict depend on how the members of a team manage, control and resolve the problem. It is important for teams to encourage useful conflict over substantive issues while taking time to resolve issues among members when negative conflict arises (“Surviving the Group,” n.d.). While it may not be possible to fully resolve all conflict, it must at minimum be managed (Rahim, 1992) as research has found evidence that effective conflict management improves team performance and functioning (Montoya-Weiss et al., 2001; Jehn & Chatman, 2000; Evans & Dion, 1991; Sundstrum et al., 1990). Varney (1989) reports that conflict remained the number-one problem for most of the teams operating within a large energy company, even after repeated training sessions on how to handle conflict and how to minimize the negative impact on team members. Whether conflict is linked to interpersonal relations,

group process, communication or any other source, the items present on various team assessments (“Team Feedback System,” n.d. and “Knowledge Team Effectiveness Profile,” n.d.) point toward the idea that conflict management is represented by the following definition: “the ability to recognize the presence of conflict, identify the source of conflict, and appropriately manage conflict.”

Continuous Improvement Continuous improvement is often associated with incremental changes in the day-to-day process of work with improvements being suggested by the workers themselves. Influential contributors in the area of continuous improvement including Taylor (1911), Deming (1986), Imai (1986), and Ohno (1988) have demonstrated such improvements that result from continuous improvement practices. The essence of continuous improvement involves producing a constant stream of improvements in all aspects of customer value, including quality, design, and timely delivery, while lowering cost at the same time. Although the concepts of continuous improvement were covered in some of the individual items on team assessments, the only assessment that measured it under its own heading was the Team Effectiveness Assessment (TEA) (“Team Effectiveness,” n.d.). An incorporation of the various items and concepts led to the following definition of continuous improvement: “the constant effort by the team to eliminate waste, reduce response time, simplify the design of both products and processes, and improve quality and customer service.”

Customer Focus As the definition of team effectiveness used for this research states, effective work teams seek to meet the expectations of key counterparts, including

customers (Sundstrom, 1999). If teams are empowered to decide how to best work with each of their customers, having direct access to information that allows them to plan, control and improve their operations and take corrective actions to resolve day-to-day problems, it seems that they should be able to better meet the expectations of their customers. Some team effectiveness assessments (Kirkman & Rosen, 1999; “Team Feedback System,” n.d.) include one or two statements about whether the team considers the customer perspective and others (“Team Effectiveness,” n.d.) focus more in depth with multiple questions around whether the team knows the customer expectations, seeks out the customer’s input, and uses the information to improve product delivery and customer relationships. Consideration of all of these various items contributes to the following definition of customer focus: “the degree to which the team mindset revolves around customers and their needs and to which team actions and deliverables support that mindset.”

Empowerment While many different forms of empowerment exist (e.g., personal, educational, etc.) this study examines it in relation to employees in work teams in an organizational setting. The concept of empowerment centers around the authority to make decisions about how to get the work done. In addition to the ability to make appropriate decisions, a key aspect of success for teams charged with a task or project is the authority to make the decisions that help them accomplish their goals. Empowerment entails an evolution from power-dependence relationships to those based on interdependence and influence (Carr, 1991). Essentially, management pushes down decision-making and approval authority to the lowest appropriate employee level in the

organization where, traditionally, such responsibility and authority was guarded closely by managers. Along with decision-making power, Lawler (1986) includes three additional components in his definition of empowerment: (a) information regarding processes, quality, customer feedback, events, and business results; (b) knowledge of the work, the business, and the total work system, and; (c) rewards tied to business results and growth in capability and contribution. In practice, employee empowerment is often introduced through establishing formally designated empowered work teams (Shipper & Manz, 1992). Empowerment has been associated with productivity at both the team (Hyatt & Ruddy, 1997; Tesluk, Brass, & Mathieu, 1996) and individual levels of analysis (Spreitzer, 1995; Spreitzer et al., 1997; Thomas & Tymon, 1994; Tymon, 1988). At Corning Inc., the Information Systems organization changed its business relationship with its internal customers through the creation of empowered self-managed teams. The resultant employee empowerment has been credited with increases in customer satisfaction, reduced costs, and reduced layers of management (Schrednick, Schutt & Weiss, 1992). Additionally, Kirkman and Rosen (1999) formally studied the antecedents and consequences of team performance and results indicated that more empowered teams were also more productive and proactive than less empowered teams and had higher levels of customer service, job satisfaction, and organizational and team commitment. Definitions of empowerment in the literature range from simple to complex. Other team effectiveness assessments (Kirkman & Rosen, 1999; "Knowledge Team Effectiveness Profile," n.d.; "Team Effectiveness," n.d.) cover the topic broadly or comprehensively. For purposes of this study, empowerment will be defined as "the degree to which the appropriate decision-making authority exists within the team."

Goal-Setting and Performance Management The definition of a work team being used in this study delineates that team members are responsible for themselves and are mutually accountable for the team's performance. The basic expectation for any work group or team is to perform. The positive relationship between specific, challenging goals and individual task performance is well documented (Locke et al., 1981; Mento, Steel & Karren, 1987). Gowen (1986) investigated the relationship between goal-setting and group task performance and results revealed that when group goals were set that were compatible with individual goals, a 31% increase in productivity was seen compared to a 19% increase with individual goals alone and a 12% increase with group goals alone. Furthermore, in a study by Matsui, Kakuyama, and Onglatco (1987), group and individual performance feedback provided half way through a task effectively improved performance for those subjects who were below either the group or individual target. Working to align team members' understanding of human performance, including effective goal-setting and performance management techniques, can contribute to the team effectively achieving their objectives. This concept is represented in just about every team effectiveness assessment encountered ("Team Feedback System," n.d.; Kirkman & Rosen, 1999; Jones, 1993; "Team Effectiveness," n.d.) in the literature review and with consideration of all of the items reviewed, goal-setting and performance management will be defined as "the ability to establish realistic, specific, and obtainable team goals and monitor, evaluate, and provide feedback to the team in accomplishing these goals."

Leadership Leadership support is vital to team success. Specifically, it is the support of the team's external leader, the leader with a supervisory role that is not a member of the teams they lead (Manz & Sims, 1993). It is likely the topic that appears most commonly in literature about team effectiveness. Given this frequency, it seems remiss that no publicly available assessment of team effectiveness was found to evaluate the role of the team's external leader. Internal team leadership is discussed in varying degrees (Jones, 1993; "Knowledge Team Effectiveness Profile," n.d.) but, in reality, the characteristics that are espoused to support team effectiveness reside with the external leader of the team. When team leaders delegate responsibility, ask for and use employee input and enhance team members' senses of personal control, the team members are more likely to experience meaning and impact in their work (Hackman, 1987). The external leader ensures appropriate resources are available to the team, provides training and coaching opportunities, bestows rewards and recognition and, ultimately, directly influences whether the team is allowed the empowerment it needs to accomplish its goals. Moran's (1996) research suggests that 77% of work team failure is due to lack of leadership support. Because of the emphasis on the importance of external leadership support in the literature, this dimension is being singled out and defined as, "the degree to which a leader serves as an effective guide to the team and provides necessary support and encouragement."

Meeting Management Skills Much of the work a team conducts occurs in a collaborative manner and/or setting such as a meeting. Unfortunately, meeting management skills go undeveloped or underdeveloped in many organizations (Weaver, 1997). As the purpose

of most meetings is to address items that relate to team process or project items, it stands that effectively conducting such meetings contributes to a team's ability to meet performance goals and expectations. Items that gauge meeting effectiveness topics such as using meeting time effectively and producing valuable outcomes from meetings have been found on other assessments ("Team Feedback System," n.d.; "Team Effectiveness," n.d.) and the importance of such skills is cited frequently by actual teams. The definition that will be used for meeting management skills is, "the ability to coordinate and conduct team meetings so that appropriate items are addressed, team processes are managed well, all team members have an equal opportunity to voice their opinions, and time is managed appropriately."

Recognition/Rewards The assumption that rewards and recognition is necessary from an employee perspective is most likely a true one. There is a definite link between the intention of people to stay at their place of employment and the recognition/rewards they receive for their performance. Some studies have shown a positive correlation between recognition given for work that is well done and performance and the length of time an employee intends to stay with their current employer (Tesluk, Vance, & Mathieu, 1999; Kopelman, 1979; Rubin, Munz, & Bommer, 2005). A logical link is that such individual needs and expectations carry over to expectations of a collective group of individuals in a work team. Surprisingly, this dimension was only explicitly represented in one of the assessments reviewed ("Team Effectiveness," n.d.). Its importance in the literature as well as in the personal testimony of countless team members I have worked with merits attention to this dimension. As such, the definition of recognition/rewards in this study

will be represented by, “the methods of appreciation and acknowledgement used within the team.”

Trust Trust is a complicated concept. It isn't a behavior per se; it occurs within a relationship and implies some amount of risk and individual vulnerability. The primary ‘glue’ that holds the group together is the trust as defined within the group beliefs, values, etc. Cummings and Bromiley (1996) maintain that a person trusts a group when that person believes that the group "(a) makes a good-faith effort to behave in accordance with any commitments both explicit or implicit, (b) is honest in whatever negotiations preceded such commitments, and (c) does not take excessive advantage of another even when the opportunity is available" (p. 303). Shared social norms, shared experiences and repeated interactions have all been suggested to facilitate the development of trust (Bradach & Eccles, 1988; Lewis & Weigert, 1985; Mayer et al, 1995). Anticipation of future association is also a key contributor that has been found to promote trust and cooperation in a group (Powell, 1990). Research on the relationship between trust and performance in groups has produced somewhat inconsistent findings across studies—some studies report a main effect between trust and performance while others do not. For instance, McAllister (1995) found a positive relation between the behavioral consequences of trust and the supervisor's assessment of performance. Smith and Barclay (1997) also found a positive relationship between trusting behaviors and perceived trustworthiness with task performance using different rationales. However, in Dirks’ (1999) study the relation between trust and team performance was not significant. In their 2001 study, Dirks and Ferrin postulate that rather than affecting performance directly, trust may moderate the relation between group processes and performance.

Given the importance of trust in any relationship, including the team relationship, trust will be evaluated as, “the degree to which team members believe they can depend on other team members’ abilities and intentions.”

Team behavior is complex because of the various dimensions that apply to team effectiveness. Not surprisingly, measurement of team effectiveness via such dimensions is complex, as well, and deserves special attention.

Measuring the Factors

Once an organization determines which team effectiveness factors to assess, the second of the two aforementioned challenges emerges—how to measure the factors. Just as effective work teams provide many positive outcomes for the organization, its members, and other stakeholders, it stands to reason that ineffective work teams can be detrimental in many ways. In my experience supporting work teams, I have encountered team members who were frustrated with lack of leadership support and appropriate direction and those teams that did not have good interpersonal relations, many times with one or two toxic team members that were difficult to work with. When a team must spend much of their time addressing such issues, oftentimes a decrease in productivity and an increase in discontent with leadership, the organization, and/or the team will result. When considering an average team size of seven employees and how much time they might spend dealing with such issues, the lost dollars and productivity really start to add up. If the team supports a product that goes to an external customer and the product is flawed or delayed because of team inefficiency, the detrimental impact takes on a new dimension. To that end, accurate assessment of effectiveness within teams is crucial.

A statistically valid and reliable means of measuring progress and effectiveness helps teams succeed by giving them and their managers a way to keep track of where they excel and where they can benefit from development. Creating a statistically valid and reliable assessment means paying special attention to development of the assessment items (i.e., researching literature, consulting subject matter experts, etc.) and involving the population which will use the assessment in a pilot study. Data from a pilot study should be used to statistically evaluate the psychometric properties of the assessment, including reliability and validity of the scales on the assessment. A concern with some of the assessments developed by consulting firms as well as by organizations which use teams is that their psychometric properties have not been evaluated and used as a guide for developing sound assessments.

Proper use of the information gained through an assessment is also critical. Fundamentally, teams should use assessment information to identify areas of excellent performance and areas where improvement is needed. Appropriate rewards and recognition help reinforce areas of excellent performance (Tesluk, Vance, & Mathieu, 1999; Kopelman, 1979; Rubin, Munz, & Bommer, 2005). In areas where improvement is needed, teams can benefit by participating in related learning modules or developmental opportunities. An added benefit of using assessment information exclusively for developmental purposes (as opposed to promotion, pay raises, etc.) is that individuals are likely to provide a higher level of candor in their ratings since they may be less concerned about being punished for low scores or missing out on rewards associated with high scores (“Self Report Methods,” n.d.).

Evaluating a Specific Measure

The purpose of this study is to examine principles of team effectiveness by evaluating a specific instrument, the Team Effectiveness Accomplishes More (TEAM) Assessment Tool¹. I developed the TEAM Assessment Tool as a basis for accurate development decisions for work teams in the study organization, a large aerospace organization headquartered in the United States. The organization has been using a different assessment, the Team Effectiveness Assessment (TEA), which was developed within that organization but was not evaluated statistically prior to its use in the company. My prior research included evaluation of the psychometric properties of the TEA and results indicated that the assessment was not accurately assessing effectiveness of the organization's teams.

The development process of the new assessment will include attention to development of the assessment scales and items considering research literature and consulting subject matter experts. After developing a draft assessment, a pilot administration of the assessment will be used to gather data from a sample of the population which will ultimately use the assessment. Data from the pilot study will be used to statistically evaluate the psychometric properties of the assessment, including factor analysis to guide appropriate factor development, reliability of scales to demonstrate adequate consistency among individual items in a scale, construct validity to ensure that the assessment is measuring its intended dimensions and criterion validity to demonstrate consistency of measurement of the TEAM Assessment Tool with other measures of a team's effectiveness.

CHAPTER 2

METHOD

Participants

Employees who are participating in work teams in both production and office settings of the U.S. division of a large aerospace organization completed the TEAM Assessment Tool. Additional demographic data were not collected as it was not relevant to the study and I did not want to potentially discourage employee participation by asking for demographic data that employees might have interpreted as invasive. All data were collected anonymously and at the team level so that no individual inputs could be identified. Prior to analysis, the data were cleaned to omit any records that had missing data for more than half of the 90 assessment items.

The target sample size for the study was 100 teams represented by at least 500 individuals. This target was determined based on my judgment of what best represents the population of interest (i.e., a judgment sample) as well as the following rules for sample size:

Rule of 150 - Hutcheson and Sofroniou (1999) recommend at least 150 - 300 cases, closer to 150 being acceptable when there are a few highly correlated variables, as would be the case when collapsing highly multicollinear variables, and;

Rule of 200 – Gorsuch (1983) recommends at least 200 cases, regardless of study specifics such as subjects to variable ratio.

The criteria of subjects-to-variable ratio no lower than five (Bryant & Yarnold, 1995) was also considered as was the suggested minimum sample size according to newer recommendations of MacCallum, Widaman, Zhang, and Hong (1999). These recommendations state that communalities greater than 0.6 require only 100 cases, communalities of approximately 0.5 require 100 to 200 cases, and communalities lower than 0.5 require 300 or more.

Procedure

Per requirements of the organization, each work team is required to self-assess their performance at least once annually. In addition to the team completing their required annual assessment using the TEA, teams were invited to volunteer to assess their performance using the new TEAM Assessment Tool. This was accomplished by sending an e-mail request for participation in the study to all of the team leaders throughout the company. Additionally, the opportunity to participate in the study was announced at several internal company team conferences. Teams were informed that their participation was voluntary, their information would be used anonymously, and that data from their pilot assessments would be used for the sole purpose of validating the psychometric properties of the assessment—they would receive no feedback from their participation as the instrument had not yet been psychometrically evaluated.

Teams had the choice of completing their assessments in electronic or paper format. The electronic version of the assessment was made available on a commercial electronic data collection website and the same assessment was available in paper version and was sent to the team leaders either via e-mail or company mail. All of the electronic

and paper assessments contained only information to identify the team and not any individual team members. Team leaders assigned random team names/numbers to participating teams but did not keep records of which name/number was assigned to the specific teams. The collection procedure was designed this way to maximize anonymity at the team level and insure anonymity at the individual level—there is no way to identify individual participant data, the level at which data are being analyzed.

Feedback was received from the team leaders that in some cases the instrument was completed by individual team members in private (e.g., alone at their computer or desk) or by individual team members in a team meeting setting (e.g., all team members seated at a meeting table individually completing a paper copy.) The completed paper copies were mailed to me and subsequently the data were translated into electronic format by professional data coding specialists at the University of North Texas. The data were entered by one specialist and verified for accuracy by another. The resulting database was merged with the database from the electronic version of the assessment to form the complete database.

Instrument

A thorough literature review of team effectiveness guided the initial thinking around the types of dimensions that were commonly associated with team effectiveness and the types of specific items that represented those dimensions. The initial set of items that the assessment contained were a combination of items represented in various other assessments as well as original items developed for this study. Once the initial draft of the new assessment was finished, it was reviewed and critiqued by the company internal

team subject matter experts (SMEs). Their feedback was incorporated and the revised assessment was distributed to seven SMEs external to the company. Two of the external SMEs are industrial/organizational psychologists who are professors and five of the SMEs are practitioners in the field of organizational development. All of the SMEs were asked to provide comments on the items, dimensions and response scale.

After consideration and compilation of the SME suggestions, the pilot TEAM Assessment Tool (see Appendix A) was comprised to include 12 dimensions of team effectiveness with 90 items total. Because of the proprietary nature of the instrument, items are presented in Appendix A in abbreviated form to communicate their essential meaning but not their full form. The dimension names are (a) Communication, (b) Decision-Making, (c) Performance, (d) Customer Focus, (e) Team Meetings, (f) Continuous Improvement, (g) Handling Conflict, (h) Leadership, (i) Empowerment, (j) Trust, (k) Cohesiveness/Team Relationships, and (l) Recognition and Rewards. These dimensions represent the previously described dimensions of team effectiveness that emerged frequently in the team effectiveness literature as well as on team effectiveness assessments developed and used by consulting firms and within organizations. Some of the dimension names are exactly as seen in the literature review and others were combined or deleted based on input from the internal and external SMEs. The pilot instrument did not list dimension names as a means to avoid leading those filling out the assessment to the basis of the question. Furthermore, the items on the assessment are randomized.

Response choices to each item on the TEAM Assessment Tool are *strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree*. The

agreement scale was chosen over a numerical scale as the teams in the study organization denote their team maturity level using a numerical scale. The possible influence of the team maturity level numerical rating on a participant's self assessment on the numerical scale of the organization's previous assessment (TEA) was thought to be a methods factor. Subsequently, the agreement scale was chosen.

A 5-point scale was chosen as proponents of scales with midpoint options contend that the midpoint increases measurement reliability (Madden & Klopfer, 1978; Rappaport, 1982; Ryan, 1980; Warland & Sample, 1973) and that the inclusion of the midpoint choice provides a viable option for respondents who genuinely do not have an opinion regarding a particular item. Without a midpoint, such respondents are forced to falsely report an opinion that corresponds to the choices offered. Validity maybe compromised if the respondent does not have the opportunity to convey their actual opinions and omitting the midpoint may deny respondents that opportunity (Madden & Klopfer, 1978). A 5-point scale was chosen as Biemer (1991) demonstrated that, statistically, respondents are unable to distinguish nuances on a scale with more than five choices.

All items on the assessment are written in the same direction so that answering *strongly disagree* for an item indicates disagreement in terms of effective team performance for that item. Conversely, answering *strongly agree* indicates agreement in terms of effective team performance for that item. None of the items on the assessment are reverse coded as research indicates that reverse coding does not provide consistent information (Wright & Masters, 1982), potentially confounds factor structure (Deemer &

Minke, 1999) and that reverse-coded items may reduce reliability (Weems & Onwuegbuzie, 2001).

CHAPTER 3

RESULTS

The purpose of this study is to evaluate the psychometric properties of the proposed TEAM Assessment Tool and validate the instrument for practical use.

Data Screening

The complete data set is comprised of 91 teams represented by 554 individuals. Prior to statistical analysis, the data were cleaned to omit any cases that lacked complete data. Seventy-eight cases had responses missing for more than half of the items. A pattern was detected in these cases showing that only the first few items of the assessment were completed and the remaining items were left blank. Feedback had been provided by the team leaders and team members that some of the participants did not have time to complete the entire assessment once they signed in and also that some of the team leaders signed into the survey for the purpose of perusing the assessment in advance of requesting participation from their teams. Those 78 cases were deleted with the belief that the data provided was likely not a full representation of a participant's team experience. For the remaining 476 cases, pairwise deletion method was used for any missing values in conducting the statistical analyses.

Sample Size Adequacy

The sample size used in the statistical analyses is adequate as the 476 cases exceeds both the Rule of 150 (Hutcheson & Sofroniou, 1999) and Rule of 200 (Gorsuch, 1983) for minimum sample size. The criteria of subjects-to-variable ratio no lower than five (Bryant & Yarnold, 1995) was met, as well. The suggested minimum sample size was also met according to newer recommendations of MacCallum, Widaman, Zhang, and Hong (1999). These recommendations state that communalities greater than 0.6 require only 100 cases, communalities of approximately 0.5 require 100 to 200 cases, and communalities lower than 0.5 require 300 or more.

Evaluating the Assumptions

The data were analyzed at the individual level using SPSS 15.0 software for all analyses. The first step in analysis was evaluating the assumptions (i.e., normality and linearity) to verify that the data were normal. As part of the analysis for evaluating assumptions, skewness, kurtosis, and histograms were evaluated. None of the items showed any indication of being skewed using ± 2.00 as the cutoff value for skewness. One item (“Team members treat each other with respect”) was slightly leptokurtotic with a value of 3.15 using ± 3.00 as the cutoff value. All other items were within the ± 3.00 range for the kurtosis statistic.

Confirmatory Factor Analysis

Next, a confirmatory factor analysis (CFA) was performed to determine if the 12 dimensions on the TEAM Assessment Tool were confirmed by the data. The 12

dimensions were not confirmed by CFA using principal component factor analysis with varimax rotation and Kaiser normalization. The rotation failed to converge in 25 iterations (and again in 50 iterations) when attempting to force a 12-factor solution, implying that a 12-factor solution does not fit the data. The decision was made to explore the factor structure further using an exploratory factor analysis.

Exploratory Factor Analysis

Exploratory factor analysis (EFA) using principal component factor analysis with varimax rotation and Kaiser normalization was conducted to validate the appropriate scales and demonstrate construct validation. The purpose of EFA is to identify factors, or dimensions, that underlie the relations among a set of observed variables (Pedhazur & Schmelkin, 1991). Varimax rotation focuses on cleaning up the factors by producing factors that have high correlations with one smaller set of variables and little or no correlation with another set of variables (Stevens, 1996). Kaiser normalization refers to the process in which the rotated matrix is rescaled to restore the original row sums of squares prior to rotating the matrix.

Thirteen factors explaining 68.17% of the variance emerged in 18 iterations when eigenvalue level was set at 1.0 (see Table 1). Although 44.30% of the variance was accounted for in Factor 1 and Factor 2 dropped to accounting for 4.35% of the variance, the factor cutoff was established at Factor 6 for the following reasons: the Scree plot (see Figure 1) begins to level out at Factor 6 indicating that contributions of additional factors is trivial; through Factor 6, a decent portion of the variance (58.64%) has been accounted for (see Table 1); the value between the rotation of sums of squared loadings is

Table 1

Total Variance Explained from Exploratory Factor Analysis for Full Set of TEAM Assessment Tool Data

Component	Total Variance Explained											
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings					
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %			
1	39.872	44.302	44.302	39.872	44.302	44.302	8.248	9.164	9.164			
2	3.919	4.354	48.656	3.919	4.354	48.656	7.942	8.825	17.989			
3	2.694	2.993	51.649	2.694	2.993	51.649	7.319	8.133	26.121			
4	2.350	2.611	54.260	2.350	2.611	54.260	6.735	7.483	33.604			
5	2.296	2.552	56.812	2.296	2.552	56.812	6.431	7.145	40.749			
6	1.643	1.825	58.637	1.643	1.825	58.637	5.533	6.148	46.897			
7	1.479	1.644	60.281	1.479	1.644	60.281	3.460	3.844	50.741			
8	1.462	1.624	61.905	1.462	1.624	61.905	3.361	3.734	54.475			
9	1.322	1.469	63.374	1.322	1.469	63.374	2.922	3.246	57.721			
10	1.211	1.346	64.720	1.211	1.346	64.720	2.786	3.096	60.817			
11	1.062	1.180	65.900	1.062	1.180	65.900	2.709	3.010	63.827			
12	1.024	1.138	67.038	1.024	1.138	67.038	2.418	2.686	66.514			
13	1.019	1.132	68.170	1.019	1.132	68.170	1.490	1.656	68.170			

Extraction Method: Principal Component Analysis.

greater between Factor 6 and Factor 7 than between any of the other 13 factors, indicating the spot where the greatest discrepancy of high factor loadings versus low factor loadings occurs for the 13 factors, and ; factor item groupings for Factors 7-13 do not seem to point to a valid construct that is not already accounted for in Factors 1-6. Additionally, since the TEAM Assessment Tool is a developmental tool for teams, an assessment that can provide feedback on as many factors that are supported statistically was desired.

Scree Plot

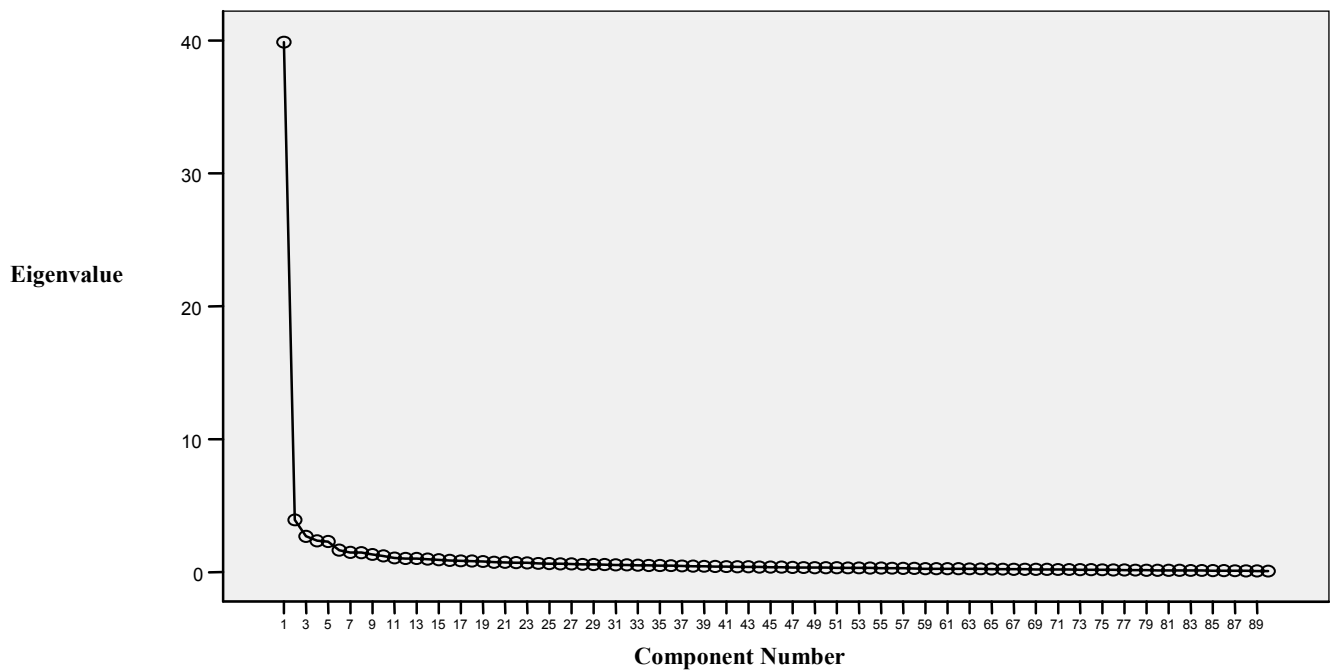


Figure 1. Scree plot for all original TEAM Assessment Tool items.

Examination of the rotated component matrix resulted in elimination of 47 items—22 items were eliminated because they loaded on a factor between 7 and 13 above 0.40, 16 items cross-loaded on more than one factor using 0.40 as a cutoff, and nine items did not load significantly on any factor using 0.40 as a cutoff. Forty-three items remained (see Table 2) on the assessment.

Communalities

Communalities (the proportion of the variance in the original items that is accounted for in the factor solution) (see Table 3) were also checked to see if any other items could be trimmed after EFA. Borrowing from the rationale set by MacCallum et al. (1999) for sample sizes, a cutoff value of 0.50 was set for evaluating communalities. All communalities were above 0.50 so no additional items were deleted in this step.

Item-Total Statistics

Item-total statistics were examined for each of the six factors (see Tables 4-9). Of particular interest was the *Cronbach's alpha score for each item if deleted* from the factor statistics. When the Cronbach's alpha values are close together for items within a factor, the implication is that the items might be measuring the same construct and further trimming of the factor might be appropriate. Additionally, Nunnally's (1978) guidance that alpha should be above 0.70 but not much higher than 0.90 was considered. Meeting the lower limit of that range (0.70) demonstrates adequate consistency among individual items in a scale and not exceeding the upper limit of the range (0.90) helps ensure that the

Table 2

TEAM Assessment Tool Rotated Factor Loadings for 43 Items Remaining After Exploratory Factor Analysis

Item	Factor					
	1	2	3	4	5	6
R1	.687					
RR1	.671					
R2	.658					
H1	.593					
C3	.533					
R4	.419					
C1	.444					
D5		.593				
D7		.571				
H5		.539				
D4		.537				
E3		.537				
E2		.517				
C7		.506				
C17		.500				
D6		.471				
C2		.424				
L6			.691			
L8			.669			
L5			.620			
L4			.596			
L3			.555			
L1			.554			
E1			.482			
T3				.745		
H3				.629		
H2				.618		
H4				.590		
T2				.560		
C8				.428		
T1				.427		
L9					.789	
RR5					.730	
RR3					.695	
RR4					.674	
RR6					.614	
CF7						.696
CF5						.634
CF4						.628
CF2						.615
CF1						.538
CF3						.494
CF6						.490
Total Items	7	10	7	7	5	7
Percent of						
Variance	44.30%	4.35%	2.99%	2.61%	2.55%	1.83%
Accounted for						

Note. Item codes are defined in Appendix A.

Extraction Method: Principal Component; Eigenvalues ≥ 1.0 .

Rotation Method: Varimax with Kaiser normalization; Rotation converged in 18 iterations.

Table 3

*Unrotated Communalities for
Initial Set of TEAM Assessment
Tool Items*

	Initial	Extraction
R1	1.000	.616
RR1	1.000	.639
P2	1.000	.591
TM1	1.000	.778
H1	1.000	.664
L1	1.000	.646
CF7	1.000	.660
P1	1.000	.689
D8	1.000	.725
CI1	1.000	.597
L2	1.000	.550
C1	1.000	.626
TM2	1.000	.646
CF6	1.000	.628
E1	1.000	.663
T1	1.000	.674
P3	1.000	.674
D1	1.000	.644
R2	1.000	.680
TM3	1.000	.673
CI2	1.000	.527
L3	1.000	.675
C8	1.000	.683
H2	1.000	.643
R3	1.000	.701
E2	1.000	.677
CF5	1.000	.737
C2	1.000	.602
P4	1.000	.605
TM4	1.000	.597
CI3	1.000	.661
L4	1.000	.707
D2	1.000	.651
H3	1.000	.639
T2	1.000	.677
CI4	1.000	.652
C4	1.000	.661
CF4	1.000	.706
L5	1.000	.707
E3	1.000	.715
D6	1.000	.668
P5	1.000	.582
TM5	1.000	.680

L6	1.000	.727
H4	1.000	.636
C3	1.000	.661
E4	1.000	.667
CI5	1.000	.666
RR2	1.000	.744
P6	1.000	.718
R4	1.000	.599
D3	1.000	.670
CF3	1.000	.622
L7	1.000	.719
TM6	1.000	.749
D9	1.000	.706
E5	1.000	.646
CI6	1.000	.612
P7	1.000	.705
L8	1.000	.791
C5	1.000	.592
T3	1.000	.767
CF2	1.000	.722
RR3	1.000	.751
H5	1.000	.718
L12	1.000	.630
D4	1.000	.754
E6	1.000	.663
P8	1.000	.702
R5	1.000	.788
D7	1.000	.707
L9	1.000	.792
RR4	1.000	.638
CF1	1.000	.658
R6	1.000	.778
C6	1.000	.655
CI7	1.000	.669
H6	1.000	.730
RR5	1.000	.733
D5	1.000	.753
L10	1.000	.698
E7	1.000	.704
R7	1.000	.765
T4	1.000	.720
L11	1.000	.771
C7	1.000	.744
RR6	1.000	.690
T5	1.000	.684
R8	1.000	.755
T3a	1.000	.766

Note: Extraction Method: Principal Component Analysis.

Table 4

Item Total Statistics for TEAM Assessment Tool Factor 1

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C1-... information within our team.	23.74	13.661	.671	.465	.875
C3-... share pertinent information.	23.75	14.129	.694	.505	.871
H1-... solve problems/conflicts ...	23.63	14.050	.697	.492	.871
R1-... respect.	23.32	14.252	.676	.509	.873
R2-... supportive of ...	23.42	14.206	.720	.540	.868
R4-... guiding values.	23.75	14.711	.641	.429	.877
RR1-... acknowledge each other ...	23.56	14.148	.684	.490	.872

scale items do not have a high level of item redundancy. In this case, item-total statistics were used to trim Factor 2 (see Table 5) as Factor 2 had the only alpha score of the six factors outside of the 0.70 to 0.90 range for alpha with a value of 0.94. Additionally, it had the most items of any of the six factors —ten items versus seven items on four of the other factors and five items on the remaining one factor. The interpretation of this information was that several items within Factor 2 were measuring the same thing. Considering the fact that as the number of items on a scale increases so does the alpha level, the objective was to eliminate items from Factor 2 to lower the 0.94 alpha level to the suggested value of approximately 0.90 (Nunnally, 1978). The *Cronbach's alpha if item deleted* statistics for Factor 2 were examined and the top three items that were adding the least value to the factor were eliminated. The items are: C2-... information across functional boundaries; CI7-... strives to learn ...; E3-... *what* things are done. The decision was made to eliminate the top three items using the following rationale: the three items were at or above the 0.93 alpha if deleted level whereas the other factor items

Table 5

Item Total Statistics for TEAM Assessment Tool Factor 2

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C2-... information across functional boundaries	34.00	35.242	.642	.427	.935
D4-... examine a number of possible solutions ...	33.50	35.877	.758	.633	.928
D5-...consider all team members' ideas ...	33.62	34.695	.800	.686	.926
D6-...examine the advantages and disadvantages ...	33.59	35.680	.744	.579	.929
D7-Consequences of our decisions ...	33.70	34.611	.796	.650	.926
C17-... strives to learn ...	33.57	35.967	.721	.542	.930
H5-... explore all points of view ...	33.58	35.352	.796	.656	.927
E2-... <i>how</i> things are done.	33.64	34.780	.752	.584	.929
E3-... <i>what</i> things are done	33.71	34.309	.721	.551	.931
C7-... seek to understand ...	33.55	36.209	.742	.579	.929

were at the 0.929 alpha if deleted level or below; the number of items for Factor 2 became more consistent with the number of items on the other five factors (seven items on five factors and five items on one factor) by eliminating three items, and; the items that remained after the three items were deleted left Factor 2 with seven items whose content appear to relate to each other better than did the factor with ten items. Deletion of the three items from Factor 2 lowered the alpha level for Factor 2 to .91, closer to Nunnally's (1978) suggested upper limit of approximately 0.90. Further rationale for not deleting items from the other five factors although the *Cronbach's alpha if item deleted* scores for items on each of those factors (see Tables 5, 6, 7, 8, and 9) were relatively

Table 6

Item Total Statistics for TEAM Assessment Tool Factor 3

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
L1-... resources needed ...	23.06	17.475	.673	.464	.892
L3-... provides effective feedback ...	23.24	17.199	.707	.524	.888
L4-... provides effective coaching ...	23.19	16.585	.776	.623	.881
L5-... seeks our input ...	23.22	16.595	.704	.518	.889
L6-... takes appropriate action.	23.17	17.092	.743	.564	.885
L8-... empowered ...	23.13	16.841	.763	.588	.882
E1-... authority we need ...	23.35	17.278	.626	.405	.898

Table 7

Item Total Statistics for TEAM Assessment Tool Factor 4

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C8-... ideas are listened to.	23.10	13.003	.698	.513	.862
H2-... respectfully disagree ...	23.21	13.649	.680	.481	.865
H3-... "agree to disagree" ...	23.28	13.817	.617	.402	.872
H4-... voice opposition to ideas.	23.34	13.225	.691	.481	.863
T1-... raising issues/concerns ...	23.08	13.354	.652	.472	.868
T2-... talked about freely.	23.31	13.344	.640	.418	.869
T3-... disagreeing with ideas ...	23.22	13.407	.716	.523	.860

Table 8

Item Total Statistics for TEAM Assessment Tool Factor 5

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
L9-... rewarded/recognized ...	14.73	8.811	.780	.632	.824
RR3-Our leader makes our good work known ...	14.65	9.631	.702	.542	.845
RR4-Non-monetary rewards	15.10	9.007	.699	.506	.846
RR5-We celebrate ...	14.75	9.680	.656	.441	.855
RR6-... leader understands what type of recognition/rewards ...	14.95	9.432	.662	.447	.854

Table 9

Item Total Statistics for TEAM Assessment Tool Factor 6

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
CF1-... needs of our customers	22.97	14.296	.705	.509	.867
CF2-... seek feedback ...	22.86	14.375	.673	.478	.871
CF3-... customer's expectations	22.69	14.715	.666	.456	.872
CF4-... strong business relationships ...	22.67	14.115	.728	.540	.864
CF5-... proactive in seeking customer feedback	23.00	14.115	.694	.501	.868
CF6-... know what customers expect ...	22.61	15.269	.591	.367	.880
CF7-... seek input ...	22.86	14.172	.686	.493	.869

close in value to other items within the factors is that the TEAM Assessment Tool is a developmental tool and teams should ideally be assessing their performance on a regular basis (e.g., the study organization sets a minimum of one assessment annually, although a

team can use it more often if desired.) With the anticipated frequency that teams will be using the assessment, the goal was to retain a total number of items on the assessment that was not high enough to cause participant fatigue but that also was not low enough to allow for the possibility of team members remembering the specific items from one administration of the assessment to the next. One important reason that a robust assessment that decreases the probability of users remembering items is that participant familiarity with items could potentially bias responses on administrations beyond the initial assessment as participants may believe they remember the item and may not pay proper attention to the specifics of a question on the subsequent assessment administrations. The consequence of such a scenario is that assessment results after the initial administration may not be accurate and, in turn, negatively alter the team development plan that is customized based on assessment results.

After Factor 2 was trimmed in this stage, six factors remained with five factors represented by seven items for each factor and one factor represented by five items. I deemed the number of items on each factor and the 40 final items on the assessment (see Appendix B) as meeting the aforementioned goal of retaining a total number of items on the assessment that did not cause participant fatigue but that also was robust enough to lower the probability of team members remembering specific items from one administration of the assessment to the next.

Scale Development

Evaluation of the six factors and the items contained within each factor guided development of scale names as follows:

Factor 1 was named Teamwork. It explains 44.30% of the variance and has seven items (see Appendix B) that stem from four of the originally proposed dimensions—three items from the Cohesiveness/Team Relationships dimension, two items from the Communication dimension, one item from the Recognition and Rewards dimension and one item from the Handling Conflict dimension. Teamwork was chosen as this scale name as the following four themes seen in the set of seven questions reflect the concept of teamwork: 1) sharing information among team members, 2) solving problems/conflicts effectively, 3) supporting other team members, and 4) embracing a common set of guiding values. The theme of sharing information is represented by two questions (C1 and C3). The theme of solving problems/conflicts is represented by one question (H1). The theme of supporting other team members is represented by three questions (R1, R2 and RR1). The theme of common values is represented by one question (R4). The belief that the questions and these four themes reflect the concept of Teamwork stems from my belief that the four themes represent the key points in the definition of work teams used in this research: A work team is a group of interdependent individuals who have complementary skills and are committed to a shared, meaningful purpose and specific goals. They have a common, collaborative work approach, clear roles and responsibilities, and hold themselves mutually accountable for the team's performance (Katzenbach 1993; Dyer, 1984; Guzzo & Dickinson, 1996) in the same way a traditional supervisor would—establishing methods for insuring work is completed as well as

offering support as needed and appropriate. Guzzo (1986) elaborates that the presence of interdependency is a key characteristic of work teams and is what distinguishes a work team from a work group. The four Teamwork themes of 1) sharing information among team members, 2) solving problems/conflicts effectively, 3) supporting other team members, and 4) embracing a common set of guiding values are fully represented in this definition of work teams and, as such, the Teamwork name was assigned to this scale.

Factor 2 was named Decision-Making. It explains 4.35% of the variance and has seven items (see Appendix B) from the four of the originally proposed dimensions—four items from the Decision-Making dimension, one item from the Communication dimension, one item from the Empowerment dimension and one item from the Handling Conflict dimension. Decision-Making was chosen as this scale name as all of the items on this scale relate to decision-making in one of two themes: 1) process of evaluating content of a particular decision, and 2) process of including perspectives of all members of the team. The decision content theme is represented by four items (D4, D6, D7 and E2). The theme of including perspectives of all team members is represented by three items (D5, H5 and C7).

Factor 3 was named Leadership Support. It explains 2.99% of the variance and has seven items (see Appendix B) from two of the originally proposed dimensions—six items from the Leadership dimension and one item from the Empowerment dimension. SME input indicated that the one item from the Empowerment dimension (E1-... authority we need ...) also related to the originally proposed Leadership dimension, presumably because a leader is in the position to grant empowerment to a team. Leadership Support was chosen as this scale name as the following themes of support

leaders provide to teams emerged in the scale items: 1) ensuring necessary resources for the team, 2) providing performance feedback to the team, 3) developing team skills through coaching, 4) collaborative efforts between the leader and the team, and 5) empowerment of the team by the leader. The theme of ensuring resources is represented by one item (L1). The theme of performance feedback is reflected by one item (L3). The theme of team skill development is reflected by one item (L4). The theme of collaborative efforts is represented by two items (L5 and L6). The theme of empowerment is represented by 2 items (L8 and E1).

Factor 4 was named Trust and Respect. It explains 2.61% of the variance and has seven items (see Appendix B) from three of the originally proposed dimensions—three items from the Trust dimension, three items from the Handling Conflict dimension and one item from the Communication dimension. Trust and Respect was chosen as this scale name as all of the items on the scale reflected either the theme of trust or respect. The theme of trust among team members is represented by three items (T1, T2 and T3). The theme of respect among team members is represented by four items (C8, H2, H3 and H4).

Factor 5 was named Recognition and Rewards. It explains 2.55% of the variance and has five items (see Appendix B) from two of the originally proposed dimensions—four items from the Rewards and Recognition dimension and one item from the Leadership dimension. SME input indicated that the one item from the Leadership dimension (L9-... rewarded/recognized ...) also related to the originally proposed Recognition and Rewards dimension as the item is about rewards and recognition provided by the leader. The two themes derived from the five items on this scale are: 1) the existence of rewards and recognition, and 2) the effectiveness of rewards and

recognition. The theme of the existence of team recognition and rewards is represented by three items (L9, RR3 and RR5). The theme of the effectiveness of team recognition and rewards is represented by two items (RR4 and RR6).

Factor 6 was named Customer Focus. It explains 1.83% of the variance and has seven items (see Appendix B) from the originally proposed Customer Focus dimension. Themes derived from the seven items include: 1) determination of customer needs and expectations, 2) customer feedback on team performance, and 3) strength of customer relationships. The theme of determining customer needs and expectations is represented by three items (CF1, CF3 and CF6). The theme of customer feedback on team performance is also represented by three items (CF2, CF5 and CF7). The theme of customer relationships is represented by one item (CF4).

Reliability of Scales

Scale reliability was assessed using Cronbach's coefficient alpha using the widely accepted social science cutoff of 0.70 (Cronbach, 1951). Additionally, Nunnally's (1978) guidance that alpha should be above .70 but not much higher than .90 was also considered. Meeting the lower limit of that range (0.70) demonstrates adequate consistency among individual items in a scale. Not exceeding the upper limit of the range (0.90) helps ensure that the scale items do not have a high level of item redundancy. Alphas for all scales fell between 0.87 and 0.91 (see Table 10) demonstrating adequate consistency among the individual items in each scale.

Table 10

Means, Standard Deviations, Reliabilities, and Correlation Matrix for Six Scales, Overall Scale and Two Performance Items of Final TEAM Assessment Tool

	Mean	SD	Teamwork	Decision-Making	Leadership Support	Trust & Respect	Recognition & Rewards	Customer Focus	Overall Scale	Item Collaborate
Teamwork	3.93	.620	(.889)							
Decision-Making	3.73	.656	.778	(.909)						
Leadership Support	3.86	.696	.721	.749	(.902)					
Trust & Respect	3.87	.604	.782	.763	.663	(.882)				
Recognition & Rewards	3.70	.758	.534	.634	.676	.515	(.872)			
Customer Focus	3.80	.626	.690	.733	.696	.634	.588	(.887)		
Overall Scale	3.82	.567	.879	.916	.881	.845	.752	.848	.733	
Item Collaborate	3.96	.762	.715	.715	.614	.699	.419	.568		
Item Perform	3.96	.821	.581	.577	.498	.576	.397	.565	.622	.485

Note. $N = 476$; all correlations significant at $p < .01$. Cronbach's alpha scores are enclosed in parentheses.

Construct Validity

Construct validity demonstrates that scores generated by assessment procedures are statistically correlated with independent measures of similar content and skill, and uncorrelated with material that is dissimilar in content and extraneous to the purposes and goals of assessment (Cattell, 1978; Cronbach, 1989; Gorsuch, 1983; Nunnally, 1978). Since the TEAM Assessment Tool is designed to be a developmental tool rather than a predictive tool, establishing construct validity is appropriate over predictive validity which demonstrates the ability of an assessment tools to predict future performance (Cattell, 1978; Kerlinger, 1979; Nunnally, 1978.) Evidence of construct validity has been demonstrated in part thus far by EFA and reliability analysis. In addition, use of SME input added to content validity (extent to which a measure represents all facets of a given concept) which supports construct validity.

Criterion Validity

Criterion validity is a measure of how well one variable or set of variables predicts an outcome based on information from other variables. In this section, I endeavored to provide evidence for criterion validity for the TEAM Assessment Tool by demonstrating correlation between team member perception of team performance and level of performance as indicated by TEAM Assessment Tool scores. I attempted to gather comprehensive performance data (e.g., cost savings, cycle time improvements, process improvements) for the teams so criterion validity could be maximized by evaluating objective performance measures with the assessment results. The organization, however, did not have a robust enough metric system on team performance

to support that attempt. Criterion validity was, therefore, evaluated using two items on the assessment that measured team member opinion of team performance. “Item Perform” focuses on team output (i.e., “Our team performs at a high level.”) and “Item Collaborate” focuses on the process used to achieve those outputs (i.e., “Team members collaborate effectively with each other.”) The reason these two items were used ties back to the definition of team effectiveness used for this study: “the extent to which a work team meets the performance expectations of key counterparts—managers, customers, and others—while continuing to meet members’ expectations of work with the team” (Sundstrom, 1999, p. 10). This definition illustrates the importance of performance results the team delivers to key counterparts as well as the processes used within the team to achieve those results. In lieu of objective performance data, the two self-report items, Item Perform and Item Collaborate were used to analyze criterion validity. Significant limitations exist for this type of self-report data, including that people may not be truthful deliberately for reasons of social desirability or they may not have the ability to see the situation clearly and report accurately. The procedures used in this study to ensure anonymity of participant responses may have decreased the social desirability aspect for participants.

The correlation matrix in Table 5 shows that correlations for all pairings evaluated were significant at the $p < .01$ level. Each of the six scales was significantly correlated with each other and with the overall scale. Additionally, each of the two performance items was significantly correlated with each of the scales and the overall scale. The significant results in correlation between team member perception of team performance and level of performance as indicated by TEAM Assessment Tool scores indicate some

degree of criterion validity for the TEAM Assessment Tool. In practical terms, these results mean that when the TEAM Assessment Tool scores indicate a team's effectiveness is high, team member opinion also is that the team's effectiveness is high as evaluated by self-ratings of team performance level and team collaboration level. Conversely, when the TEAM Assessment Tool scores indicate a team's effectiveness is low, team member opinion also is that the team's effectiveness is low as evaluated by self-ratings of team performance level and team collaboration level.

CHAPTER 4

DISCUSSION

The present study investigated dimensions of work team performance that contribute to team effectiveness. Specifically, the psychometric properties of an assessment I developed that measures dimensions of team effectiveness (TEAM Assessment Tool) were examined. Considering the fact that assessment items are often eliminated during statistical analyses of this type, the assessment was deliberately designed with a robust set of 90 items in anticipation of the total being reduced after analyses were performed. As anticipated, the number of items was reduced after analyzing the data and 40 items remained on the final scale (see Appendix B). The twelve dimensions originally proposed were reduced to six factors. Items from nine of the twelve originally proposed dimensions are represented in the six new factors indicating that a majority of the dimension concepts were validated as meaningful contributors to the construct of team effectiveness. An explanation of how the twelve originally proposed dimensions are represented in the final assessment is as follows:

Four of the original dimension names remained the same after analysis as follows:

Customer Focus All seven items from the original Customer Focus dimension significantly loaded on the same factor so the name Customer Focus remained for that scale.

Leadership Of the twelve items from the original Leadership dimension, six items significantly loaded on the same factor so it remained a Leadership scale, although with the additional distinction of *Support* to reinforce that this scale is a measure of the support given by the team's external leader. The new scale name is Leadership Support.

Recognition and Rewards Of the six items from the Recognition and Rewards dimension, four items significantly loaded on the same factor so the name Recognition and Rewards remained for the scale.

Decision-Making Of the nine items from the original Decision-Making dimension, four items significantly loaded on the same factor so the scale name Decision-Making remained for the scale. Noteworthy is the fact that three additional items from other dimensions that represent the concept of decision-making also significantly loaded on this factor.

Six of the originally proposed dimensions were dispersed among several of the new scales as follows:

Communication Four of the original eight items from the original Communication dimension emerged in the new scales Teamwork (two items), Decision-Making (one item), and Trust and Respect (one item).

Handling Conflict Five of the six items from the original Handling Conflict dimension emerged in the new Teamwork scale (one item), Decision-Making scale (one item) and

Trust and Respect scale (one item).

Empowerment Two of the seven original items from the Empowerment dimension emerged in the new Leadership Support scale (one item) and Decision-Making scale (one item).

Trust Three of the five items from the original Trust dimension emerged on the new Trust and Respect scale.

Cohesiveness/Team Relationships Three of the original eight items from the original Cohesiveness/Team Relationships dimension all emerged in the Teamwork scale.

Items from the following three original dimensions did not emerge on the final assessment:

Performance Although the two items that assessed team member opinion of team performance were good items in that they met statistical assumptions, neither of the items emerged on the final assessment. The indication might be that performance is not a factor that contributes to effectiveness rather it is an outcome of team effectiveness factors.

Team Meetings While items from the Team Meetings dimension are not represented in the final assessment, similar concepts are represented throughout the assessment with

items from other original dimensions. Tasks that occur in Team Meetings are similar to concepts represented by the Communication, Decision-Making and Handling Conflict scales. The indication might be that the venue (i.e., a team meeting setting) may not be as important as the concepts represented in the Team Meeting dimension.

Continuous Improvement Items from the Continuous Improvement dimension are not represented in the final assessment but similar concepts are represented throughout the assessment with items from other original dimensions. The Leadership Support scale covers feedback and coaching, the Customer Focus scale includes an item that deals with looking for new ideas to exceed customer expectations, and the Trust and Respect scale has an item that deals with learning from mistakes/failures. While none of the items from the original Continuous Improvement dimension appeared on the final assessment, similar concepts seem to be represented elsewhere on the final assessment.

Implications of Results

The difference in the twelve dimensions originally derived from the literature review versus the six factors confirmed by this research might be explained in the following way. The original twelve dimensions were all derived from various parts of literature relating to team effectiveness. A team effectiveness assessment or study that examined all of the twelve dimensions together was not found in the literature search so this comprehensive combination of dimensions has likely never been examined together in a statistically sound research study. Bringing these twelve dimensions together in one study provides the unique opportunity to evaluate the overall concept of team

effectiveness in a comprehensive fashion and evaluate how evaluating these dimensions together affect the factor structure. As seen in the six-factor solution resulting from the present research and as the SME input reflects, a single item can relate to more than one scale (e.g., L9-... rewarded/recognized ... relates to both the Rewards and Recognition scale and the Leadership scale.) This pattern of one item relating to multiple factors could explain the reduction in number of the original twelve dimensions derived from the literature search to the final six scales as determined by this research. Several of the final scales (e.g., Teamwork, Decision-Making, Trust and Respect) support this belief as they contain a mixture of items from the original dimensions.

Examination of the six final scales points to an underlying structural hierarchy of the scales. Three of the scales (i.e., Teamwork, Decision-Making, and Trust and Respect) are all processes that occur in the internal workings of the team. The remaining three dimensions (i.e., Leadership Support, Rewards and Recognition, and Customer Focus) all occur outside of the team's internal workings. The Teamwork scale accounts for a substantial 44% of variance. Of the three internal scales, there appears to be a structure of two scales supporting the third scale. Decision-Making and Trust and Respect both appear to be subsets of the Teamwork scale. Concepts represented in the Teamwork scale are represented in more detail by both the Decision-Making scale and the Trust and Respect scale. Of the processes external to the team, there appears to be a separation of team effectiveness drivers and team effectiveness supporters. For purposes of this study, a team effectiveness supporter can be viewed as something external to the team that supports the effectiveness of team performance and a team effectiveness driver can be viewed as something external to the team that drives the team to achieve

effectiveness. Two scales, Leadership Support and Rewards and Recognition, fit into the team effectiveness supporter category and one scale, Customer Focus, fits into the team effectiveness driver category.

High intercorrelation of the six scales suggests that the different scales are measuring the same concept and a higher-order structure may exist. My speculation on a hierarchical structure is as follows: the overarching theme is team effectiveness and the sub-themes are: 1) internal supporters of team effectiveness; 2) external supporters of team effectiveness, and; 3) external drivers of team effectiveness. All contribute to team effectiveness from a unique perspective. This structure reveals another benefit to the previously-stated benefits of including factors beyond the first factor that accounted for such a large percentage of the variance. The six-factor solution provides a more comprehensive look at team effectiveness than the one-factor solution as it combines internal and external contributors to team effectiveness whereas the one-factor solution only provides general information about internal team processes. Because the TEAM Assessment Tool is a developmental tool, the comprehensive nature of the six-factor solution is preferred as it gives a team widespread feedback on items that contribute to their effectiveness.

The final six-scale, 40-item assessment demonstrated appropriate reliability among the scales and with the overall scale. Additionally, construct validity and criterion validity were demonstrated in multiple ways. The indication is that the new structure is solid and comprehensive, representing a majority of the originally proposed dimensions which were derived from an exhaustive literature review. Therefore, organizations and teams that use this assessment should feel confident that 1) they are effectively measuring

the critical components of team effectiveness when using the TEAM Assessment Tool, and 2) that the assessment is truly measuring what it purports to measure—team effectiveness.

Study Limitations

Data for this study were collected from multiple sites of a large aerospace organization headquartered in the U.S. The organization has been using the work team structure for approximately 10 years and agreed to participate in this research as they desired a psychometrically sound team effectiveness assessment. The possible limitation of this scenario is that results may not generalize to work teams in other industries or in countries whose corporate culture varies significantly from that of Corporate America.

Additionally, even though the study organization originally adopted a work team structure approximately 10 years ago, teams have different levels of maturity and tenure as a team for at least three reasons: it is not uncommon for employees to join or leave existing teams for a variety of reasons; new teams are formed as are deemed necessary by new projects, and; it takes time for an organization with many employees and sites to fully implement teams. The possible limitation in this fact is that the variety of team experience and maturity level was not attended to in selecting the study sample. Participants volunteered to participate in the study in response to e-mail requests and announcements at the organization's internal team conferences. A self-selection bias may also exist in that teams who volunteered for participation may be ones who have had positive experiences with their work team and that could adversely affect the data. Data items were evaluated for skewness and kurtosis in an attempt to note any significant

violations of these assumptions that might suggest such a self selection bias. Only one of the original 90 assessment items was slightly kurtotic with a value of 3.15 where 3.00 was used as the cutoff value for kurtosis.

Objective data on performance was not available for the attempt to further demonstrate construct validity through use of correlations of team performance with the assessment results. Instead, correlations of self-report data from team member opinion of team performance with the assessment results were evaluated. While the correlations were significant using this method, the possibility of response bias exists with self-report data. Because this study evaluates effectiveness of work practices, social desirability could influence participant responses. The measures used in this study to ensure anonymity of participant responses may have decreased the social desirability aspect for participants. Additionally, evaluation of skewness and kurtosis for the two performance items did not suggest anything suspect about their quality. Both items had a mean of 3.96 on a scale of 1 to 5 and neither were out of range for skewness or kurtosis. Although 3.96 is a bit higher than the 3.0 midpoint, the presumption is that many of the team members that participated in the study have been in existence for some time and have benefited from the required team training within the organization. The possibility of a mono-method bias also exists because a single measure was used to assess performance data and the results will correlate to a degree solely due to the fact that the same response format was presented to the respondents.

Despite the limitations of this study, its findings can be a useful developmental tool for work teams and for researchers planning to conduct research in this area.

Recommendations for Use

The TEAM Assessment Tool is designed for use by teams that have some experience working together as the questions require team member opinion of prior team experiences. There is not a delineated minimum amount of team existence identified however the overarching recommendation is that teams should have adequate time and experience together to be able to provide ratings of team performance in relation to the six scales on the assessment, (1) Teamwork, (2) Decision-Making, (3) Leadership Support, (4) Trust and Respect, (5) Recognition and Rewards, and (6) Customer Focus.

As the TEAM Assessment Tool is a developmental assessment, perhaps the most important recommendation is that results from the assessment should be linked to a developmental plan for the team. Special attention should be given to team ratings on Scale 1, Teamwork, since it accounts for 44% of the variance in the unrotated solution on this assessment of team effectiveness. If scores are low on this scale, the likelihood exists that the team is struggling with effectiveness and appropriate developmental opportunities should be prescribed to the team and vigorously pursued by the team. A variety of possibilities exist for the type of developmental feedback that teams can pursue and organizational aspects such as budget and time resources must be considered when designing developmental opportunities.

Scale 3, Leadership Support, is a measure of the effectiveness of the team's leader. So, while the Leadership Support scale contributes to the effectiveness of the team, the developmental feedback should be conveyed to the team leader. Ideally the team leader should receive an overall picture of team results along with the feedback from the Leadership Support scale. Collaborative planning on development opportunities

for the team is suggested.

A team can achieve a comprehensive picture of their effectiveness ratings by supplementing the TEAM Assessment Tool self-report data with objective performance data such as cost savings, cycle time improvements, and process improvements and by gathering multi-source feedback from other individuals or groups that interact with the team (e.g., peers, managers, customers, etc.) These data are especially helpful in tempering the limitations of self-report data and providing valuable information from the perspective of all key stakeholders that interact with the team.

Although the TEAM Assessment Tool shows evidence of psychometric soundness in many regards using data from the study organization, the assessment should be used with caution outside of the study organization until broader research is conducted. This caution is based on the fact that the data were collected from one organization that has been utilizing a work team structure for just over one decade and findings may not generalize to other populations.

Suggestions for Future Research

Future research that expands this study should attend to collecting data from a variety of sources. Specifically, several organizations that represent a variety of industries and nationalities could uncover constructs of team effectiveness that may be present in corporate cultures that differ from those of the study organization. Additionally, attention to sampling procedures that provide adequate and even representation of the entire range of team maturity levels could provide results that generalize to a wider population. Inviting specific teams to participate in data collection

rather than soliciting volunteers could decrease potential bias associated with self-selection methods used in this study. Furthermore, recording team stage level as demographic data for teams that provide data would allow for additional approaches in statistical examination of the data that may provide additional insight such as significance of particular team effectiveness constructs at certain stage levels. The evidence for criterion validity provided in this study could be strengthened by using a research design that includes objective performance data such as cost savings, cycle time improvements, process improvements, etc. rather than self-report performance data. Lastly, using a variety of response scales (e.g., frequency scales, agreement scales, etc.) throughout the assessment could minimize methods errors associated with using the same response scale throughout the entire assessment.

ENDNOTES

¹The University of North Texas Committee for the Protection of Human Subjects (See Appendix C) approved use of the data associated with this instrument for this research.

APPENDIX A

TEAM ASSESSMENT TOOL ITEMS WITH PROPOSED SCALE NAMES
PRIOR TO STATISTICAL ANALYSIS

TEAM Assessment Tool Items* with Proposed Scale Names
Prior to Statistical Analysis

Communication (C)

- C1-... information within our team
- C2-... information across functional boundaries
- C3-... share pertinent information
- C4-... listening skills
- C5-... use the medium most appropriate ...
- C6-Roles and responsibilities...
- C7-... seek to understand ...
- C8-... ideas are listened to

Decision Making (D)

- D1-... understands which decisions ...
- D2-... define problems ...
- D3-... make the decisions needed ...
- D4-... examine a number of possible solutions ...
- D5-... consider all team members' ideas ...
- D6-... examine the advantages and disadvantages ...
- D7-Consequences of our decisions ...
- D8-... feel free to point out problems ...
- D9-Differences of opinion ...

Performance (P)

- P1-... monitor team performance ...
- P2-... what we are accountable for ...
- P3-... how our performance ... is measured
- P4-... address performance problems
- P5-... held accountable for ...
- P6-... inadequate team member performance
- P7-... continuously improving ...
- P8-... performs at a high level

Customer Focus (CF)

- CF1-... needs of our customers
- CF2-... seek feedback ...
- CF3-... customer's expectations
- CF4-... strong business relationships ...
- CF5-... proactive in seeking customer feedback
- CF6-... know what customers expect ...
- CF7-... seek input ...

Team Meetings (TM)

- TM1-... conducts weekly meetings.
- TM2-... valuable outcomes
- TM3-... most important issues ...
- TM4-... follow a standard format
- TM5-... valuable use of time
- TM6-... supports weekly team meetings

Continuous Improvement (CI)

- CI1-... improve personal capabilities.
- CI2-... individual/personal development plans
- CI3-... improve work processes
- CI4-Successes are debriefed ...
- CI5-Mistakes are debriefed ...
- CI6-... link its improvements to ...
- CI7-... strives to learn ...

Handling Conflict (H)

- H1-... solve problems/conflicts ...
- H2-... respectfully disagree ...
- H3-... "agree to disagree" ...
- H4-... voice opposition to ideas
- H5-... explore all points of view ...
- H6-... opposing points of view ...

Leadership (L)

- L1-... resources needed ...
- L2-... access to training ...
- L3-... provides effective feedback ...
- L4-... provides effective coaching ...
- L5-... seeks our input ...
- L6-... takes appropriate action
- L7-... supports our efforts
- L8-... empowered ...
- L9-... rewarded/recognized ...
- L10-... raising issues/concerns with our leader
- L11-... actively supports ...
- L12-... supports team members ...

Empowerment (E)

- E1-... authority we need ...
- E2-... *how* things are done
- E3-... *what* things are done
- E4-... actively involved in solving them
- E5-... appropriate for our level ...
- E6-... knows the level ...
- E7-... share in leadership ...

Trust (T)

- T1-... raising issues/concerns ...
- T2-... talked about freely.
- T3-... disagreeing with ideas ...
- T3a-... disagreeing with ideas ...
- T4-... able to tell each other ...
- T5-... confident in the abilities ...

Cohesiveness/Team Relationships (R)

- R1-... respect.
- R2-... supportive of ...
- R3-... collaborate effectively ...
- R4-... guiding values.
- R5-... good of the team
- R6-... depend on each other
- R7-... each others' success
- R8-... roles/responsibilities.

Recognition/Rewards (RR)

- RR1-... acknowledge each other ...
- RR2-Our leader shows appreciation ...
- RR3-Our leader makes our good work known ...
- RR4-Non-monetary rewards ...
- RR5-We celebrate ...
- RR6-... leader understands what type of recognition/rewards ...

* Because of the proprietary nature of the instrument, items are presented here in abbreviated form to communicate their essential meaning but not their full form.

APPENDIX B

TEAM ASSESSMENT TOOL ITEMS WITH FINAL SCALE NAMES
AFTER STATISTICAL ANALYSIS

TEAM Assessment Tool Items* with Final Scale Names
After Statistical Analysis

Scale 1 - Teamwork

- C1-... information within our team.
- C3-... share pertinent information.
- H1-... solve problems/conflicts ...
- R1-... respect.
- R2-... supportive of ...
- R4-... guiding values.
- RR1-... acknowledge each other ...

Scale 2 – Decision-Making

- D4-... examine a number of possible solutions ...
- D5-... consider all team members' ideas ...
- D6-... examine the advantages and disadvantages ...
- D7-Consequences of our decisions ...
- H5-... explore all points of view ...
- E2-... *how* things are done.
- C7-... seek to understand ...

Scale 3 – Leadership Support

- L1-... resources needed ...
- L3-... provides effective feedback ...
- L4-... provides effective coaching ...
- L5-... seeks our input ...
- L6-... takes appropriate action.
- L8-... empowered ...
- E1-... authority we need ...

Scale 4 – Trust and Respect

- C8-... ideas are listened to.
- H2-... respectfully disagree ...
- H3-... "agree to disagree" ...
- H4-... voice opposition to ideas.
- T1-... raising issues/concerns ...
- T2-... talked about freely.
- T3-... disagreeing with ideas ...

Scale 5 - Recognition and Rewards

- L9-... rewarded/recognized ...
- RR3-Our leader makes our good work known ...
- RR4-Non-monetary rewards ...
- RR5-We celebrate ...
- RR6-... leader understands what type of recognition/rewards ...

Scale 6 - Customer Focus

CF1-... needs of our customers

CF2-... seek feedback ...

CF3-... customer's expectations

CF4-... strong business relationships ...

CF5-... proactive in seeking customer feedback

CF6-... know what customers expect ...

CF7-... seek input ...

* Because of the proprietary nature of the instrument, items are presented here in abbreviated form to communicate their essential meaning but not their full form.

APPENDIX C
RESEARCH CONSENT FORM

University of North Texas

Institutional Review Board Research Consent Form

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the proposed procedures. It describes the procedures, benefits, risks, and discomforts of the study. It also describes the alternative treatments that are available to you and your right to withdraw from the study at any time. It is important for you to understand that no guarantees or assurances can be made as to the results of the study.

Subject Name

Date

Title of Study

Investigating the Psychometric Properties of Team Effectiveness Assessment

Principal Investigator Cynthia Cantu

Co-Investigator(s) Dr. Mike Beyerlein

Start Date of Study

03/01/2004

End Date of Study

08/31/2004

Purpose of the Study

To assess the psychometric properties of the Team Effectiveness Assessment (TEA) Survey and provide a valid team assessment survey for XXXXXXXXXX Company.

Description of the Study

Data will be collected by administration of the TEA Survey in order to assess the psychometric properties of the survey. Approximately 150-200 teams from the XXXXXXXXXX will participate.

Procedures to be used

Data will be gathered via computer survey and paper and pencil surveys. Appropriate statistical tests will be conducted with the data in order to determine its statistical properties.

Description of the foreseeable risks

Risks should be minimal as precautions have been taken to guard confidentiality and teams (and individuals) are participating on a voluntary, informed basis.

Benefits to the subjects or others

Use of a valid instrument for assessing Team Effectiveness.

Procedures for Maintaining Confidentiality of Research Records

Data will be submitted anonymously by team members via computer survey or written assessment. No names or information will be gathered that will allow for individual identification.

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