Initial Development of a Team Viability Measure

Jessica Nicole Cooperstein
DePaul University, jcoopers@depaul.edu

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Initial Development of a Team Viability Measure

A Thesis
Presented in
Partial Fulfillment of the
Requirements for the Degree of
Masters of Arts

By
Jessica Nicole Cooperstein
June 2017

Department of Psychology
College of Liberal Arts and Sciences
DePaul University
Chicago, Illinois
The Thesis Committee

Suzanne T. Bell, Ph.D.
Chairperson

Goran Kuljanin, Ph.D.
Committee Member
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Biography

Jessica Cooperstein was born in Malvern, Pennsylvania, on February 3, 1992. She graduated from Great Valley High School in 2010. She received her Bachelor of Science degrees in Psychology and Labor Employment Relations from The Pennsylvania State University in 2014.
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Abstract

Team effectiveness has been studied greatly in organizational research, and many factors have been identified that contribute to team success. However, given that numerous work teams today are long-term, ongoing entities, performance alone may not be the most appropriate measure. Many teams need to be highly adaptive to meet environmental demands (Tannenbaum, Mathieu, Salas, & Cohen, 2012). These teams go through several performance episodes, often managing several tasks simultaneously (Marks, Mathieu, & Zaccaro, 2001). Team viability as a construct may be useful in determining how well a team will perform on subsequent tasks. Viability assesses the team’s potential for future success based on its current health and sustainability (Bell & Marentette, 2011). This thesis describes the development and initial validation of a measure of team viability that can be used for ongoing teams. There has been much construct confusion in the literature on team viability. The importance of team viability is discussed as well as how it is distinct from similar constructs such as satisfaction. An initial content validation of the measure was conducted using subject matter experts who provided feedback on scale items. Results indicated that several initial items used in the item pool are clearly representative of viability. The experts also recommended that the ideas of sustainability, development, and willingness to work with team members again are important aspects of viability that should be captured in both the definition and items used. Future research can further refine
the items and definition based on the SME feedback and collect convergent and divergent validity evidence.
Introduction

Teams are a vital part of most organizations (e.g., Mathieu, Maynard, Rapp, & Gilson, 2008); as such, researchers have devoted their attention to studying team dynamics in an effort to understand what makes teams successful (e.g., Hackman, 1987; Kozlowski & Ilgen, 2006). Researchers previously have presumed factors such as team membership, roles, and structures are stable variables in a team’s lifetime (Tannenbaum, Mathieu, Salas, & Cohen, 2012). However, teams today are typically dynamic, ongoing, and have fluid membership (Tannenbaum et al., 2012). Teams that work together over time go through several recurring input-process-outcome episodes linked together (Marks et al., 2001). Thus, because these ongoing teams are unique in nature, it is necessary to understand how to manage these specific dynamic teams.

Performance and effectiveness are two of the most widely studied criterion in organizational research (e.g., Bommer, Johnson, Rich, Podsakoff, & MacKenzie, 1995; LePine et al., 2008). Scholars have noted specifically the importance of investigating predictors of performance and effectiveness at the group level (Mathieu, Maynard, Rapp, & Gilson, 2008). Due to their increased reliance on teams to accomplish tasks, organizations naturally have a vested interest in understanding what makes teams successful.

However, performance and effectiveness alone may not be adequate when studying ongoing project teams. Considering a team’s viability helps address the concern of studying groups that complete multiple tasks over time. Due to the ebb
and flow of team members and the execution of several performance episodes, one must look past performance on a single task with a specific set of team members. Unlike performance and effectiveness, team viability is forward-thinking in nature as it emphasizes the capability of a team’s success for future endeavors beyond the current situation (Bell & Marentette, 2011). With an understanding of a given team’s viability, managers can take a proactive approach to guide ongoing teams to successful performance. Team viability can provide information as to whether or not a team needs to improve upon their current behaviors as well as if they will work well together in the future.

Despite its theoretical importance, team viability is understudied and suffers from much construct confusion. While scholars have acknowledged the importance of viability in previous literature (e.g., Bell & Marentette, 2011; Hackman, 1987), little has been done thus far to formally develop and validate a measure. Due to the lack of progress in developing a construct, team viability has been defined and measured inconsistently. Furthermore, viability has not been clearly distinguished from other related constructs (e.g., satisfaction). Establishing team viability as a unique construct through scale development and validation is necessary as it is a vital component to understanding team effectiveness in modern work environments.

Development of a team viability measure will be extremely useful to team-based organizations. Perceptions of a team’s future effectiveness are important to consider, as managers can use such information to implement team interventions between task episodes. Future research can empirically identify the
antecedents of viability once a measure is established. Then, practitioners can focus their interventions on a particular area that needs improvement.

This thesis is organized as follows. In the next section, I provide more detail about the importance of team viability as a construct and addresses the lack of consistency in the literature over how it is measured. I then review how other researchers have defined and measured viability previously. Next, I build the nomological net of team viability, which lays the theoretical foundation for establishing construct validity. The nomological net section has subsections that explain how team viability is distinct from other related constructs: performance, cohesion, satisfaction, resilience, adaptability, and potency. Following the literature review, I report methodology and results for an initial step in scale development, content validation. Throughout, I point to research gaps and identify common themes in the measurement of team viability. In addition to providing further clarification of team viability as a construct, this research seeks to provide scholars with an understanding of how they can use a measure of team viability to help ongoing project teams be successful.

Understanding Team Viability as a Construct

Team viability is the capacity of a team to be sustainable and continue to succeed in future performance episodes (Bell & Marentette, 2011). Viability is unique in that it is a higher-order construct describing the current team state as well as the capability for future team success (Hackman, 1987; Bell & Marentette, 2011). The construct of viability captures the team’s health as a whole unit, but also emerges from the characteristics and shared perceptions of individual
members. Understanding a team’s viability can inform persons of interest of the potential the team has for sustaining itself and adapting to future performance demands.

At the individual level, member characteristics and shared perceptions are important component for the overall health of the team. For example, individual member characteristics such as cognitive ability can influence the formation of a shared mental model (Mohammed, Ferzandi, & Hamilton, 2010). Having a shared mental model in a team can facilitate more efficient processes (e.g., coordination, backup behaviors, learning behaviors) (Fiore & Salas, 2004). These processes can positively contribute to group performance (Mohammed, Ferzandi, & Hamilton, 2010). Maintaining performance over time is a function of such processes and behaviors, and therefore consideration of viability without examining the team composition and shared properties does not provide a complete picture.

Whether a team is viable as a unit also includes an affective component. To be sustainable and grow over time, individual members must be willing to work with their team in the future. According to affective events theory, team member exchanges are seen as affective events for team members that evoke positive or negative emotions (Weiss & Cropanzano, 1996). The positive or negative emotions experienced by team members subsequently influence one’s commitment to the team, satisfaction, and effort (Tse & Dasborough, 2008). Since viability is a construct that is time-oriented, it is necessary to consider the emotion of members because it can drive important team processes and outcomes.
At the team level, a team needs the resources, norms, and organizational support to facilitate sustainability and growth over time. Consideration of viability as just a characteristic of individual members does not consider the group’s functioning as a unit, and consideration of viability as just a team property excludes commonly held perceptions and attitudes of the members (e.g., potency) that contribute to the team’s sustainability. Viability must include more than perceptions of the current team membership, suggesting that viability is a unique construct with multi-level antecedents and outcomes. Figure 1 depicts antecedents and outcomes of team viability that will be discussed next. It should be noted that the figure and discussion are not an exhaustive list, but instead represent key variables related to team viability.

The Dynamics of Team Viability

Antecedents of team viability. As mentioned previously, viability is a function of various team inputs and processes. These dynamic team properties are often referred to as emergent states (Marks et al., 2001). Emergent states include the dynamic cognitive, motivational, and affective properties of teams that are dependent upon team inputs and processes (Marks et al., 2001). Team viability, therefore, is a dynamic construct: it is a function of the most recent performance as well as other group characteristics (e.g., collective efficacy, cohesion) that may vary over time (Bell & Marentette, 2011; Marks et al., 2001). Therefore, it is important to separate viability from its antecedents and outcomes. What distinguishes emergent phenomena from team processes is that emergent states describe the current state of a team rather than the activities the team engages in
(Marks et al., 2001). Emergent phenomena manifest from the bottom up in teams from the psychological characteristics, processes, and interactions among individuals (Kozlowski, Chao, Grand, Braun, & Kuljanin, 2013). Some emergent states that have received attention in the literature include team confidence, empowerment, team climate, cohesion, and trust.

As mentioned previously, emergent states are partly a function of team inputs. Viability itself is partly a function upon the team composition and individual affect. The individual members of viable teams have unique qualities that contribute to the team’s potential. Members of sustainable teams have the necessary skills and abilities to meet future demands (Bell & Marentette, 2011).

Individual member beliefs about team composition influence subsequent task motivation and effort, which has implications for a team’s viability (Bell & Marentette, 2011). Motivation and effort not only have implications for a given task, but also for long-term viability as increased motivation will help members persist toward accomplishing group objectives in the face of obstacles (Locke & Latham, 2002). Even when there are conflicting priorities, members of viable teams are motivated to continue making an effort toward completing the team’s tasks.

Team viability is also a function of the team’s processes and dynamics. It is likely that the same factors that contribute to high team performance also contribute to the team’s overall sustainability. A multitude of dynamics and other team phenomena can be considered, such as cohesion, shared mental models, and coordination. Overall, the social processes in a group should be helpful in
enabling team members to work together on subsequent tasks (Hackman, 1987). Cohesion, for example, is especially important in interdependent groups (Beal, Cohen, Burke, & McLendon, 2003). Many studies have demonstrated a strong correlation between cohesion and performance behaviors (Beal et al., 2003).

The use of resources can influence a team’s viability as well. Resources have a motivating potential and research has indicated that job resources such as supervisor support and performance feedback predicted employee engagement (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Hackman & Oldham, 1980). It is possible that teams that are able to access organizational resources (i.e., task advice, strategic information, money, upper management support) have better performance than teams that do not have such access. Having connections with formal leaders outside one’s own team has been shown to help increase team effectiveness (Oh, Chung, & Labianca, 2004). The reciprocal relationship could be true as well; it could be that teams that are perceived as viable by the organization are given more resources and attention. Future investigations beyond the scope of this study should explore the potentially reciprocal relationship between viability of a team and resources.

Viability can be considered an input for the next performance task or an output from a current episode. The viability of a team can contribute to the next task episode by influencing upcoming performance. Viable teams know how to develop successful performance strategies, effectively work with one another, and maintain task motivation. These characteristics will increase future performance. Team viability can also be a proximal outcome because it can result from
effective team processes (e.g., coordination), member satisfaction, and successful task performance. A team that enjoys working together and is successful can be viable.

Figure 1. Key Variables that Influence Team Viability

<table>
<thead>
<tr>
<th>Antecedents:</th>
<th>Outcomes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual member characteristics</td>
<td>• Effectiveness</td>
</tr>
<tr>
<td>(e.g., cognitive ability, motivation)</td>
<td>• Performance</td>
</tr>
<tr>
<td>Individual and team affect (e.g.,</td>
<td>• Resources</td>
</tr>
<tr>
<td>satisfaction)</td>
<td>• Less managerial intervention</td>
</tr>
<tr>
<td>Shared perceptions (e.g., potency)</td>
<td>• Organizational support</td>
</tr>
<tr>
<td>Team processes and behaviors</td>
<td>• Satisfaction</td>
</tr>
<tr>
<td>(e.g., communication,</td>
<td>• Commitment</td>
</tr>
<tr>
<td>coordination, backup behaviors,</td>
<td></td>
</tr>
<tr>
<td>adaptation)</td>
<td></td>
</tr>
<tr>
<td>Emergent states (e.g., cohesion)</td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td></td>
</tr>
</tbody>
</table>

Processes and behaviors of viable teams. Viable teams engage in several sets of behaviors that allow them to maintain success beyond the current task.

Marks and colleagues (2001) developed a taxonomy of important team processes for both action and transition phases of teamwork. One way teams become sustainable over time is through detailed preparation before beginning the next task episode. Goal specification, strategy formulation, and deliberate planning can help teams direct their attention and effort when working together (Marks et al., 2001). Setting a specific and challenging goal increases task motivation and commitment, which is especially necessary for ongoing teams (Locke & Latham, 2002). Outlining expectations, role assignments, and steps to effectively achieve
the mission will help increase task clarity and allow members to feel more confident in working together on a project (Hu & Liden, 2011).

Adaptive behaviors are one of the key drivers of team resilience and sustainability (Alliger, Cerasoli, Tannenbaum, & Vessey, 2015). A team that is viable can improve upon itself over time and maintain task performance without burning out (Behfar, Peterson, Mannix, & Trochim, 2008; Bell & Marentette, 2011; Kozlowski & Bell, 2003; Rousseau & Aubé, 2010). Adaptability allows the team to adjust their performance strategy for each task, thus leading to successful outcomes. Adaptive behaviors such as information gathering, information transfer, task prioritization and task distribution have been associated with increased group performance (Waller, 1999). Especially in teams that are ongoing and must deal with changing task demands and membership, adaptive behaviors often necessary for team survival. Particularly when facing membership change, viable teams are better able to integrate new members without compromising efficiency and performance by “updating” their transactive memory system and being open to new ways of working (Lewis, Belleveau, Herndon, & Keller, 2007). Teams must make adjustments to strategies, behaviors, role structures, and resource allocations in response to any change that comes their way (Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995). Reactive strategy adjustment is vital for persisting in the face of obstacles (Marks et al., 2001). Viable teams are better at recognizing these changes, adjusting their priorities, and implementing the new strategies (Kozlowski, Gully, Nason, & Smith, 1999).
Healthy teams also engage in interpersonal processes and behaviors such as conflict and affect management. Members understand how to prevent or control conflict before it occurs through planning (such as creating a team charter; Smolek, Hoffman, & Moran, 1999), development of norms for cooperation (Tjosvold, 1985), and creation of rules for handling problems (Marks et al., 2001). When task and relational conflicts arise, members work together to solve the problem and reach a compromise. Interpersonal adaptability—such as adjusting interpersonal style to achieve a goal, changing one’s behavior to work effectively with a new team member—is also necessary when people must interact closely with one another to accomplish the task (Pulakos, Arad, Donovan, & Plamondon, 2000).

Viable teams have better communication processes in place. Information sharing has been associated with team performance, and is believed to help teams function due to increasing awareness of team member knowledge, clarifying issues, and raising alternative solutions to problems (Mesmer-Magnus & DeChurch, 2009; Van de Ven, 1986). The exchange of information helps develop a team’s transactive memory system and creates a greater pool of available information to use when performing a task (Mesmer-Magnus & DeChurch, 2009). Teams that have the capacity to achieve growth and performance over time understand the importance of open communication and knowledge sharing.

**Consequences of team viability.** Because viable teams are more adaptable, motivated, and use better task strategies, such teams will be more effective and have better performance over time than teams that are not
considered viable. Sustainable teams require less managerial intervention and have less failure in both the short- and long-term due to effectively managing their teams’ composition and the use of efficient processes. Viability may lead to the organization giving the members more resources and attention. Teams that are successful over time may also increase member satisfaction and commitment, and perhaps attract outside members or groups.

**Boundary Conditions**

This paper advocates for the importance of team viability as a construct. However, certain organizational contexts and team types will be better suited for the inclusion of viability than others. Consideration of long-term sustainability is not needed for all types of teams. Therefore, it is necessary to outline the boundary conditions for when viability, as defined here, is relevant.

Team viability is most applicable to ongoing organizational teams. Ongoing teams are one of the most prevalent types of team used in contemporary organizations (Devine, Clayton, Philips, Dunford, & Melner, 1999). Teams that are ongoing differ from short-term teams in terms of team and task duration (Bradley, White, & Mennecke, 2003). Project and design teams are often ongoing in nature. Whereas short-term teams are expected to disband after having worked together for a brief period, ongoing teams execute tasks that involve longer work cycles and are composed of members who expect to be working together on future tasks. Long-term teams that perform repetitive, predictable tasks (e.g., manufacturing) might not undergo the same type of dynamic change that most ongoing teams face; however, viability can still be a concept relevant for these
teams if they mismanage or burn up resources during high production periods or are ineffective at integrating new members. The longevity of ongoing teams brings about the need to understand a team’s performance capacity for upcoming endeavors.

Team viability is relevant to any team that goes through multiple performance episodes. Even if the life cycle of the team is relatively short, viability can help provide information as to whether or not the team will be successful in the subsequent task episode. Viability may be less of a concern for ad hoc teams or teams that are terminated once the task is complete (Sundstrom, 1990).

In addition to engaging in multiple performance episodes, one must consider viability with teams that encounter task and environmental changes. Any kind of change—whether it be membership change, new customer demands, or loss of resources—can have implications for team effectiveness. When changes require the team to adapt their performance strategy, decision-making processes, or socialization tactics, there is a chance that the performance potential may suffer.

Lastly, viability is an important construct to consider for organizations that are interested in strategic resource allocation. At multiple levels of the organization, strategy is a “pattern in a stream of decisions and actions” (Mintzberg & McHugh, 1985, p. 161). Top management’s goal, in particular, is to maneuver the overall company to a preferable and profitable course of direction (Noda & Bower, 1996). Teams lower in the organization, therefore, must
demonstrate their value to top managers in terms of usefulness and performance.

Managers in charge of multiple teams can assess viability in order to decide how to allocate resources (Noda & Bower, 1996). In other words, viability, in combination with how a team contributes to the organization's objectives, can guide managers in resource allocation. For example, managers may wish to devote more resources to teams that contribute to an organization's strategy and are viable. Alternatively, there could be occasions where a team is critical to an organization's strategy and there is not another viable team that could execute that role. The resource-based view of the firm (Grant, 1991; Penrose, 1959; Wernerfelt, 1984), which argues that the firm’s resources can be a source of competitive advantage (Barney, 1991). Teams represent a human capital resource; therefore, if an organization deems a certain team as more viable, they will probably devote more time and attention to that team in order to develop its human capital (Ployhart & Moliterno, 2011). Human capital is a particular resource that can help drive unit-level performance (Ployhart & Moliterno, 2011). With teams that have lower performance, a measure of viability (and its correlates) could be used to identify what resources or coaching are needed.

**How Viability Has Been Defined and Measured in the Past**

Identifying the problems of research on team viability must start with explicating some issues in operational definitions of viability. Team viability has been defined in several ways over the past few decades (Bell & Marentette, 2011). This next section will review the different conceptualizations of the construct and reiterate the construct confusion that has existed in the past.
Currently there does not seem to be one consistently used and conceptually sound definition of team viability. Illustration of the construct proliferation issue will reiterate the need for officially developing and validating a team viability measure.

**Early definitions.** Hackman (1987) was one of the first to discuss the notion of team viability. He presented three criteria for team effectiveness, one of which captures the essence of viability: “the social processes used in carrying out the work should maintain or enhance the capability of members to work together on subsequent team tasks” (p. 323). While not explicitly using the term “team viability”, this requirement speaks to a team’s potential for future performance on later tasks. Hackman’s (1987) definition of team viability places an emphasis on social processes and how that will impact the “group experience.”

Sundstrom, De Meuse, and Futrell (1990) presented an ecological approach to analyzing team effectiveness and included a definition of viability in their model. Acknowledging Hackman and Oldham’s (1980) proposition that teams can get burnt out from unresolved conflict, their definition of viability expanded upon Hackman’s (1987) and focused on member satisfaction and willingness to continue working together. Sundstrom and colleagues (1990) asserted that a more comprehensive definition would also include constructs such as cohesion, coordination, communication, and problem-solving. While their definition also emphasizes working together in the future, Sundstrom, De Meuse, and Futrell (1990) include a wider range of constructs that adds more facets to the definition of team viability.
Bell and Marentette (2011) conceptually analyzed team viability and called for future researchers to formally develop and validate a measure. Their definition—a team’s capacity for the sustainability and growth required for success in future performance—stems from thoroughly investigating the construct and more accurately captures the spirit of viability. Emphasizing the team as a whole beyond current team membership takes into account the nature of teams in today’s dynamic organizations. Due to Bell and Marentette’s (2011) analysis of the construct confusion issue and consideration of carefully defining viability as well as an overall review of the literature, my definition of viability is most closely related to Bell and Marentette (2011). Here, I provide a working definition of viability as the capacity of a team to be sustainable and continue to succeed in future performance episodes.

Essentially, my definition is a paraphrasing of Bell and Marentette’s (2011) viability definition, however a few elements were changed. Because viability is regarding the group as a whole, I added the word “team” to emphasize the importance of viability as a team construct. Additionally, it may not be necessary for a team to demonstrate growth over time, but rather maintain itself as a functioning and successful entity; therefore, the words “growth required” were removed. Ultimately, though, the Bell and Marentette (2011) definition most closely captures the essence of viability by mentioning the idea of sustainability and success in future performance episodes. My definition of team viability was used in the current content validation study. As this study represents the early stages of scale development, appropriate revisions will be made to the definition
using the input of subject matter expert (SME) collected during the validation process. Feedback on the definition of viability used here is later mentioned in the results and discussion.

**Operationalizations of viability.** The construct confusion issue has often been due to the fact that the definitions and operationalizations of viability have not been aligned. Various trends have occurred, such as measuring a completely different construct from the definition altogether or including a multitude of variables in the measurement of viability. Appendix A provides a table of previous studies that have measured team viability. Studies that mentioned viability as a construct but did not define or measure it were not included in the table. Additionally, the table in Appendix A is not an exhaustive list of all empirical studies that have measured team viability, but rather a selection of studies in the literature to represent the construct confusion that currently exists.

A few studies have included numerous variables when operationalizing viability. Balkundi and Harrison (2006) explain viability as a “broad construct that captures both the satisfaction of teammates with their membership and their behavioral intent to remain in their team.” Interestingly, this meta-analysis considered team member satisfaction, team climate, team commitment, and indicators of group cohesion all as measures of team viability. Aubé and Rousseau (2005) include willingness to work together again, adaptability, problem-solving, and social integration as aspects of team viability. The team viability scale used in their study included four items designed to measure team’s capacity to adapt to changes, solve problems, integrate new members, and
continue to work together in the future. While all of these factors may contribute to the sustainability of the team, the variables in and of themselves do not describe the overall health of a group.

Another trend in the research literature is that many studies use measures of satisfaction to measure viability (e.g., Balkundi et al., 2009; Bushe & Coetzer, 2007; Mello & Delise, 2015; Resick et al., 2010; Tekleab, Quigley, & Tesluk, 2009) and others include willingness to work together again (e.g., Aubé and Rousseau, 2005; Costa et al., 2015; Resick et al., 2010; Tekleab et al., 2009). The issue with using satisfaction items to measure viability is that member satisfaction may not be a necessary condition for team sustainability. Members of teams may not have a choice in who they work with on a task and must continue to perform despite their opinions about their fellow group members. This may happen frequently if employees experience normative or continuance commitment to an organization. Normative commitment in a team means that one remains because they feel compelled to, whereas continuance commitment means that one remains because they feel they have to stay (Meyer & Allen, 1991). Such teams may still be successful over long periods of time even if the individual members do not necessarily like one another on a personal level. Therefore, definitions and items of viability that solely speak to member satisfaction do not adequately capture the team’s overall health and sustainability.

Barrick and colleagues (1998) measurement of viability seems to best assess the overall health and sustainability of a team. They refer to viability as the team’s capability to continue function as a unit, and used single supervisor ratings
to assess the team as a whole. Specifically, supervisors rated each team’s capability to maintain itself over time. The authors then calculated a composite score to represent each team’s viability (Barrick et al., 1998).

Inspection of items from previous research shown in Appendix A suggest that team viability has been measured inconsistently. The development and validation of a team viability scale is needed to formally establish a measure as well as reduce the construct confusion problem that has existed in the past.

**Building a Nomological Net of Related Constructs**

An important part of demonstrating construct validity is to create a nomological network (Cronbach & Meehl, 1955; Messick, 1995). Researchers must show how the construct is both conceptually distinct and empirically distinct from other related constructs (Cronbach & Meehl, 1955; Messick, 1995; Shaffer, DeGeest, & Li, 2016). This section will describe how team viability is related to and distinct from performance, cohesion, satisfaction, resilience, adaptability, and potency.

**Performance.** Current performance, while related, is distinct from the notion of viability. Team viability is forward-thinking in that it reveals the team’s capability for future success (Bell & Marentette, 2011). Whereas viability describes the “state” of the team, performance can be considered either a behavior or an outcome (Campbell, 1990). The view of performance as an outcome is pretty common in organizational research (Beal et al., 2003). Performance is measured in the literature in a variety of ways, however many studies focus on objective performance and use supervisor ratings of the team.
Performance in a given time period can be marked in different ways, for example the accomplishment of a given goal (e.g., reaching a sales quota) or members’ perceptions that the team was successful (Marks et al., 2001). Marks and colleagues (2001) posited that teams go through several performance episodes (action periods) that are characteristic of certain team behaviors, and each action phase is connected by a transition phase. Performance behaviors are more closely linked to processes than are performance outcomes, which are often determined by factors unrelated to the group effort (Beal, Cohen, Burke, & McLendon, 2003).

When conceptualized as behaviors, performance can be seen as a series of processes (Beal et al., 2003). Team members engage in several processes to achieve collective goals, such as strategic formulation, coordination, and conflict management (Marks et al., 2001). Teams that can successfully navigate these processes and reach their objectives are considered high performing (Marks et al., 2001). Through the behavior lens, performance can be considered as part of a multilevel process that emerges from individual- and team-level task work and teamwork (Klein & Kozlowski, 2000).

Team viability is expected to be related to performance, however it should have a stronger relation with performance outcomes than with performance behaviors because it describes the overall health of the team. While performance overall is expected to be moderately related to viability, other factors contribute to viability beyond performance behaviors and outcomes such as a team’s adaptability.
Factors affecting the future performance cannot be attributed solely to the current performance of the team (Gonzalez-Roma, Fortes-Ferreira, & Peiro, 2009). This is due to the fact that teams may have success on a particular task but may not achieve the same performance in the future due to becoming “burnt out” or using up all of their resources (Hackman, 1987). There are many potential impediments to performance that are out of control of the team members (Campbell, 1990; Campbell, McCloy, Oppler, & Sager, 1993). For example, a sales team may have poor performance due to the state of the economy or the time of year. Also, if the experience of working together on a task was distressing, members may not be willing to work together again in the future (Costa, Passos, & Barrata, 2015).

According to Hackman (1987), the social processes that occur within a group should enhance team capabilities. But, unresolved conflict or divisive interaction can be particularly damaging to a team’s potential of being successful again (Costa et al., 2015). As mentioned previously, teams today are typically ongoing but are highly adaptive and characterized by continuous change (Tannenbaum et al., 2012; Campbell & Campbell, 2001). Personnel turnover that occurs within these teams can make it more difficult to develop positive group characteristics such as team cohesion (Kozlowski & Chao, 2012) or shared mental models (Santos & Passos, 2013). Thus, viability is related to performance, but several other factors in addition to performance contribute to a team’s sustainability.
**Satisfaction.** Satisfaction is an attitude that occurs at the individual level (Harrison, Newman, & Roth, 2006). Satisfaction is a measure of affective response to other team members that may not be adequate for providing a complete picture of how the team will perform in the future. As a shared team property, satisfaction is typically measured by aggregating individual-level perceptions to the team level (Klein & Kozlowski, 2000). Previously, many viability measures have been treated in a manner similar to satisfaction in which individual-level responses are aggregated (e.g., Jehn, Greer, Levine, & Szulanski, 2008; Resick et al., 2010).

While two distinct constructs, there is likely a relationship between member satisfaction and team viability. A meta-analysis conducted by De Dreu and Weingart (2003) revealed that there is a negative association between relationship conflict and satisfaction. Conflict that results from interpersonal issues can hinder task performance and cause members to view the experience in a negative manner (De Dreu & Weingart, 2003). Team members who are unhappy with working with their fellow group members may not be willing to work with them again in the future, thus impacting the team’s sustainability (Costa et al., 2015). However, teams can still be considered viable with members who do not necessarily like one another. If members have the requisite motivation and ability to complete the task, the team can still be successful over time.

**Cohesion.** Cohesion can be thought of as the social and motivational forces that bind members to each other and to their group (Beal, Cohen, Burke, & McLendon, 2003; Guzzo & Shea, 1992). Individuals can be cohesive in relation
to their task as well as interpersonally (Mullen & Copper, 1994). Multiple studies have shown a positive relationship between team cohesion and performance (Beal et al., 2003; Evans & Dion, 1989; Mullen & Copper, 1994) and team effectiveness (Barrick et al., 1998). Cohesion impacts performance by creating a strong bond between members, motivating them to perform well, and increasing coordination abilities (Beal et al., 2003). It has also been suggested that cohesion and performance have a reciprocal relationship, such that both reinforce one another over time (Mathieu, Kukenberger, D’Innocenzo, & Reilly, 2015). Cohesion plays an important role especially for teams that require coordination and are highly interdependent (Beal et al., 2003; Hogel & Gemuenden, 2001).

Cohesion forms in a group when the members are attracted to one another and develop a shared identity. Thus, cohesion can be seen as interaction-dependent and can evolve over time. Cohesion enables the group members to become more committed to the task and better achieve their set goals (Klein & Mulvey, 1995). Theories have stated that cohesion forms relatively quickly and allows teams to focus on developing other capabilities such as coordination (Kozlowski, Gully, Nason, & Smith, 1999). Team cohesion is extremely important for a group’s performance, but if ongoing teams face frequent membership change, development of cohesion may be hindered.

Cohesion is an affective, psychological emergent state that reflects shared commitment and attraction among team members as a result of experience and interaction (Barrick, Bradley, Kristof-Brown, & Colbert, 2007). It has been conceptualized as a dynamic process that is reflected in the “tendency of a team to
stick together and remain united in the pursuit of its objectives” (Carron, Brawley, & Widmeyer, 1998). Based on this definition, then team cohesion should most certainly impact a group’s viability. Both cohesion and viability are important indicators of subsequent teamwork processes and outcomes (Beal et al., 2003; Gully, Devine, & Whitney, 1995).

**Resilience.** Teams research scholars have also discussed the concept of team resilience (e.g., Furniss, Back, Blandford, Hildebrandt, & Broberg, 2011; Alliger, Cerasoli, Tannenbaum, & Vessey, 2015; Stephens, Heaphy, Carmeli, Spreitzer, & Dutton, 2013). While similar to team viability in that it contributes to overall team effectiveness and well-being, resilience is the ability and capacity to withstand and recover from challenges and unexpected events (Alliger et al., 2015; Furniss et al., 2011). Resilience enables the ability to “bounce back” from a setback or failure and return to a prior baseline of normal functioning (Coutu, 2002; Stephens et al., 2013).

Viability describes the team as a whole, however resilience operates at all levels of analysis (Alliger et al., 2015; Stephens et al., 2013). At the individual level, people face adversity and challenges in organizations, such as working with a difficult colleague (Cortina, Magley, Williams, & Langhout, 2001). Resilient individuals have a firm acceptance of reality, the ability to search and find meaning in terrible times, and an aptitude for improvising and adapting to change (Coutu, 2002).

Conceptualized at the team level, team resilience serves to provide teams with the capacity to bounce back from failure, setbacks, conflicts, or any other
threat to well-being that a team may experience. Resilience in groups enables teams to rebound and meet numerous demands with minimum process loss (Van der Kleij, Molenaar, & Schraagen, 2011). Some factors that support resilience in teams are coordination, information exchange, error management, and workload distribution management (Malakis & Kontogiannis, 2008).

Organizations can be considered resilient if they are able to deal successfully with unexpected events or can persist despite poor circumstances (Furniss et al., 2011; Riolli & Savicki, 2003). Organizational structure, resources, and processes can either help or hinder the ability to build resiliency and “bounce back” (Furniss et al., 2011; Riolli & Savicki, 2003). The concept of organizational resilience has been studied in a number of applied settings such as hospitals (e.g., Mallak, 1998), firefighting teams (e.g., Weick, 1993), and business (e.g., Coutu, 2002; Hamel & Valikangas, 2003).

Some of the same antecedents of resilience may also impact a team’s viability. Research has suggested that resilience depends a lot of the quality of interpersonal relationships in group (Stephens et al., 2013). The ability to connect and interact effectively has proven to be important for resilience; high-quality interaction can facilitate the sharing of information and development of adaptive solutions to problems (Flach, 1997; Paulus & Nijstad, 2003). Teams that resolve challenges effectively and in a manner that maintains its health and resources will be more viable (Alliger et al., 2013). Teams comprised of high-quality relationships and exchanges are valuable for resilience because the members can better collectively deal with difficult situations (Carmeli, Friedman, & Tishler,
Resilient teams maintain viability by preserving their resources and knowing how to effectively recover from challenges (Alliger et al., 2013).

**Adaptability.** Adaptability involves versatility, flexibility, and tolerance of uncertainty and focuses on response to change (Burke, Stagl, Salas, Pierce, & Kendall, 2006; Pulakos, Arad, Donovan, & Plamandon, 2000). Similar to resilience, adaptability has been studied at the individual level, which is one way it is distinct from viability. Pulakos and colleagues (2000) developed a taxonomy of individual adaptive performance that identified eight dimensions: solving problems creatively; dealing with uncertain and unpredictable work situations; learning work tasks, technologies, and procedures; demonstrating interpersonal adaptability; demonstrating cultural adaptability; demonstrating physically oriented adaptability; handling work stress; and handling emergencies or crisis situations. This taxonomy implies that adaptability is related to other constructs such as learning (see Edmondson, 1999), innovation (see De Dreu & West, 2001), and problem management (see Tesluk & Mathieu, 1999).

The lines between viability and adaptability have been blurred in the literature. Aubé and Rousseau (2005) viewed viability as the team’s ability to not only adapt to changes that occur but also how willing members of the team were to work with one another again. Their measure used for team viability includes items such as “Team members adjust to changes that happen in their work environment” (which appears to be tapping into adaptability) and “The new members are easily
integrated into this team” (which appears to be more about social integration). Furthermore, there is not validation evidence presented for the scale.

In summary, adaptive team performance appears to be a general process underlying team functions and effectiveness (Burke et al., 2006). Similar to viability, it can be conceptualized as a global property of the team, however adaptability can be considered as an individual trait as well (Burke et al., 2006; Kozlowski et al., 1999). Adaptive team performance is “multilevel, multiphasic, and cyclical in nature” that encompasses several processes and emergent states. It could be said that the capabilities, processes, and behaviors (e.g., leadership, psychological safety, high-quality relationships, and communication) that create resilient and adaptable teams could also contribute to their overall health and sustainability (Alliger et al., 2015). Ultimately, tough, resilience and adaptability seem to require an adjustment or response to some type of stressor or change; viability does not necessarily need a stressor.

**Team efficacy and potency.** Team (or collective) efficacy is the team’s shared perception of its capability to successful perform a given task whereas potency refers to a team’s perceptions of its general capabilities across all tasks and situations (Bandura, 1997; Gibson, 1996). High levels of collective efficacy and potency provide a sense of confidence to teams which helps them persevere in the face of adversity (Gully, Incalcaterra, Joshi, & Beaubien, 2002). In research, team efficacy and potency have been linked to team effectiveness (Campion, Medsker, & Higgs, 1993; Campion, Papper & Medsker, 1996; Gibson, 1999; Gibson, Randel, & Earley, 2000; Mitchell, 1997; Shea & Guzzo, 1987).
Efficacy and potency can be considered affective emergent states and shared properties of the team. They are affective emergent states because collective efficacy and potency involve beliefs and perceptions about the team’s capabilities. They are also shared properties of the team because they are aggregated individual responses. Alternatively, viability is a global team property that considers the future and the potential for a team to maintain their performance (Bell & Marentette, 2011; Gully et al., 2002).

Collective efficacy and potency could perhaps be considered antecedents of a team’s viability. It is also possible that each of the constructs exhibit differential relationships with performance. For example, members of the team can have the belief that the team will be successful no matter what the task (high potency), but the team might not be viable if they no longer have access to important resources or do not wish to work with the same group again. Similarly, a team high on potency can be confident that they will carry out a given task, but frequent membership change can impair their adaptability and performance strategies.

Towards a Construct Valid Measure

To establish and validate a construct, it is important to demonstrate how it is both conceptually and empirically distinct from related constructs (Shaffer, DeGeest, & Li, 2016). I have previously discussed the conceptual underpinnings of team viability, how it is different from other constructs, and the need for formally validating a viability scale. Following this introductory section, I present
the methodology and results from an initial content validation study that is a crucial first step toward psychometric validation of a measure of team viability.

**Rationale**

The purpose of the present study was to develop and conduct initial validation steps of a team viability measure. Carrying out these steps will make several contributions to understanding successful performance in ongoing teams. First, a thoroughly validated measure will hopefully reduce the construct confusion issues that have existed in previous studies. To date, there is not a well-validated measure of viability reported in the literature. The items developed here for the current research fill this need because they focus specifically on the sustainability of the team as a whole in an effort to not contribute to the construct proliferation problem. The goal is to create an instrument that reliably and efficiently assesses viability for ongoing and dynamic project teams. To validate a construct, it is important to both theoretically and empirically demonstrate how it is related to as well as distinct from similar constructs (thus demonstrating its convergent and discriminant validity; Campbell & Fiske, 1959; Shaffer, DeGeest, & Li, 2016). Second, a validated measure can be used in future research that can enhance our knowledge of team viability, as well as help us identify its antecedents and implications. Once established, this measure will have great practical utility for organizations. Managers can assess the overall health of a team and use that information to making staffing decisions or to implement interventions if needed.
Method

Overview

Two elements are key for a successful team viability measure. First, the measure must accurately represent the team viability construct. In other words, the measure must be valid. There are various types of validity, however for scale development the main concern is construct validity (Cronbach & Meehl, 1955). Construct validity refers to the extent to which a measure captures a specific theoretical construct or trait (Cronbach & Meehl, 1955). Evidence of construct validity is provided by convergent validity (the extent to which similar constructs are related), discriminant validity (the extent to which the measure differs from measures of dissimilar constructs), and criterion-related validity (the extent to which the scale is related to its theoretical causes and correlates) (DeVellis, 1991). Second, the measure must be appropriate for field settings and easy to administer so that ongoing teams in organizational settings can benefit from the scale. Demonstrating multiple forms of validities is beyond the scope of this thesis project, however, additional studies should show evidence for convergent, discriminant, and predictive validities.

The main purpose of the current study was the development of a pool of content-valid items that could serve as the basis for a team viability scale. Specifically, I created items and used both Industrial-Organizational psychology graduate students and subject matter experts (SMEs) to evaluate the developed items. Feedback from SMEs who are knowledgeable in team research is necessary
in order to inform the revision of both the conceptualization of team viability and how it will be measured in additional validation studies.

In developing the measure, I followed the general steps advocated in the psychometric literature. In particular, I referred to both Hinkin (1998) as well as DeVellis (1991) for recommendations on scale development. Hinkin (1998) and DeVellis (1991) both provide a framework to guide the development of a psychometrically sound measure. Hinkin (1998) outlined five important steps: item generation, questionnaire administration, initial item reduction, scale evaluation, and replication with an independent sample (see Appendix B for descriptions of each step). The viability instrument should capture the full domain of the definition, be composed of items that are readable and understandable, and be applicable to any type of long-term, dynamic team. This research is focused on the first step (item generation).

**Item Generation**

One of the most vital steps of scale development is item generation (Hinkin, 1995). An initial pool of items was created based on the viability definition developed for this study ("the capacity of a team to be sustainable and continue to succeed in future performance episodes."). The primary concern was content validity—the measure must adequately capture the specific domain of interest while not containing any extraneous content (Hinkin, 1995).

The items were written with the intention of gearing them towards a long-term, dynamic team (rather than an ad hoc team). The purpose of those who use the team viability measure will be to act as a quick indicator of the sustainability
of a given team. Survey items in this case were designed to capture all elements of team viability that apply to ongoing teams.

Generally, it is recommended to generate two to three times the number of items that are intended for the measure. This is due to the fact that approximately only one half of the items will be retained in the final scale (Hinkin, 1998). For this study, the goal for the initial item generation was to have a pool of 20-25 items, as the intention is to ultimately end up with a relatively short measure. Many items will be dropped as a result of the content validation study and the additional psychometric analyses. In addition to items written by the author, items were culled from previously published sources that reflect the domain of the construct (Aubé & Rousseau, 2005; Barrick et al., 1998; Foo et al., 2006; Lewis, 2004; Marrone, Tesluk, & Carson, 2007). Thus, the initial pool of items included a combination of items from previous studies looking at viability as well as items generated by the author (see Appendix C).

When constructing and validating a new scale, one must make sure the scale uses clear and appropriate language in order to accurately assess the construct of interest. All items should be clear, concise, and readable (Worthington & Whittaker, 2006) as well as reflect team viability (DeVellis, 1991). Scale length and how items are written can affect participant responses (Roznowski, 1989). Any items that are poorly worded or are not relevant can negatively impact the results of the factor analysis.

Multiple items help create a more reliable test, but the intention is to create a parsimonious team viability measure with each item still sensitive to the
construct (Cronbach & Meehl, 1955). The goal was to end up with a single-factor model and have a parsimonious scale that can be easily administered in field settings.

The Use of Subject Matter Experts

First, feedback was obtained from doctoral students in industrial-organizational psychology (N = 3) who served as content raters and provided feedback on the readability, clarity, and phrasing of the items. These individuals were provided with the definition of team viability as well as written instructions for the content assessment. This step helped to gain more feedback about how the initial pool of items were worded.

As with any scale development process, it is necessary to use SMEs to make an assessment of content validity. This process helps act as a pretest, eliminating any items that are viewed as conceptually inconsistent (Hinkin, 1998). Subject matter experts (SMEs) used in the current study of content development were individuals with knowledge and expertise in team research.

In selecting these individuals, the Standards for Educational and Psychological Testing (American Educational Research Association, American Psychological Association, & National Council on Measurement Education, 2014) emphasizes the necessity of relevant training, experience, and qualifications of content experts. The SMEs used for this study were researchers and practitioners who have published research related to team effectiveness in top-tier journals. There is no specific recommended number of how many SMEs are
needed; studies have varied from only using three SMEs (e.g., Schmit, Kihm, & Robie, 2000) to as many as thirty (e.g., Sireci & Geisinger, 1995).

**Procedure**

I generated an initial list of 22 SMEs and solicited their participation, with the goal of obtaining feedback from at least ten SMEs with expertise in team research. All 22 experts identified were asked to act as SMEs for this study. Of the 22 SMEs contacted, a total of 10 individuals responded, for a response rate of 45%. Participants were asked to provide the number of years involved in research or practice related to team science, and the years of expertise ranged from five years to over 30 years.

An invitation to take the content development survey was sent via email. In the contact letter, a brief description of the study was given, and the study purpose was described as “carrying out the initial stages of scale development for creating a team viability measure.” To encourage participation, I explained why the individual was chosen as a content expert as well as the value of measuring team viability. Instructions for accessing the online survey were provided as well as a Qualtrics link. Individuals were told in the email that an optional $30 Amazon gift card would be given as a token of appreciation.

The purpose of the content development was to have SMEs evaluate each individual item, the items as a set, and the definition of team viability (Grant & Davis, 1997). The complete SME content validation survey is provided in Appendix D. When an SME began the survey on Qualtrics, they were provided instructions and then proceeded to rate each individual item as either **Clearly**
Representative, Somewhat Representative, or Not Representative (Zaichkowsky 1985). Zaichkowsky's (1985) anchors for the rating scale were employed as variants of the method have been used frequently in scale development research (Bearden, Netemeyer, & Teel, 1989; Netemeyer et al., 1995, 1996). In addition to judging representativeness, a text box was provided below each item if SMEs deemed it appropriate to make revisions to the wording of a particular item.

Following individual item assessment, there were a series of open-ended questions to capture more in-depth feedback. These questions were included in order to provide the SMEs an opportunity to recommend any additional items they deem appropriate to include in the measure of team viability as well as provide feedback on the definition. Because content validity is such a crucial first step of scale development, it was important to have subject matter experts give feedback on the definition currently being used and the item wording. If there were major issues with the definition, then it could be revised for the future steps of developing the scale.

**Item Content Validity Ratios**

Development of a scale involves construct validation, and content validity is an important component of construct validation (Cronbach & Meehl, 1955; Haynes, Richard, & Kubany, 1995; Hinkin, 1998; Lawsche, 1975). Content validity offers evidence about the degree to which the elements of the measure are relevant to and representative of the targeted construct. Content validation inevitably provides validation, and sometimes refinement, of the targeted construct (Hinkin, 1998; Smith & McCarthy, 1995). DeVellis (1991) details
several key steps in a content validation, one of which having experts review the construct and instrument. Both qualitative evaluation (i.e., suggested additions, deletions, and modifications) and quantitative evaluation (of relevance and representativeness of items) are a crucial part of content validation (DeVellis, 1991; Haynes, Richard, & Kubany, 1995).

Lawshe’s content validity ratio (CVR) is one of the most common means of quantitatively assessing the content validity of a measure (Lawshe, 1975). It is a useful index for the retention of rejection of specific test items. The qualitative feedback SMEs provide on test items is invaluable, however the CVR can further identify important items to keep as well as assess the overall agreement between the experts (Lawshe, 1975). Content validity in the operational sense is the extent to which SMEs perceive overlap between the measure and the construct domain. According to Lawshe (1975), any item that is deemed “essential” by more than half of the SMEs used has some degree of content validity. Additionally, the more experts (more than 50%) that view the item as essential, the greater the extent that that particular item has content validity.

Below is Lawshe’s content validity ratio that was used for assessing content validity of the team viability items, where $n_e$ represents the number of experts who indicated the item was essential and $N$ represents the total number of SMEs.

$$CVR = \frac{n_e - \frac{N}{2}}{\frac{N}{2}}$$
If less than half of the SMEs say that the item is essential, the CVR will be negative. If exactly half of the SMEs say it is essential and the other half do not, the CVR will be zero. If all of the SMEs say that the item is essential, the CVR will be equal to 1. Lastly, if the majority of the SMEs (but not all) say that the item is essential, the value of the CVR will be between 0 and 0.99. Thus, it is ideal to get a CVR value as close to 1 as possible.

To provide validation evidence for a measure, the CVR first must be computed for each individual item. Only items that meet a minimum CVR threshold value are retained. This threshold value is relative to the number of SMEs used. According to Lawshe (1975), when there are 10 SMEs, each item should have a minimum CVR value of 0.62 in order to be kept. It should be noted, however, that item retention should not solely be based on the CVR, but rather in conjunction with the researcher’s expertise and other aspects of traditional item analysis and scale development.
Results

Content Validity Ratio Analysis

For the purposes of discerning the items that are most essential to measuring team viability, I only used the SMEs who said “Clearly Representative” for the \( n_e \) part of the CVR equation. Based on the results of the CVR analysis, a few items emerge as especially important in measuring team viability. See Table 1 for the results from the CVR item calculations.

All ten SMEs indicated that item 9 (“The members of this team could work for a long time together”) was clearly representative (i.e., essential) of team viability. The majority of SMEs (nine out of ten) also agreed that items 5 (“Most of the members of this team would welcome the opportunity to work as a group again in the future”) and 11 (“This team has the capacity for long-term success”) are essential for measuring team viability. This result is interesting as item 5 introduces the element of willingness to work with team members in the future. According to the SMEs, it is important to take into account the extent to which individual members want to be a part of the same team in future performance episodes.

Items that have previously been used to measure team viability were included in the initial pool. Aubé and Rousseau (2005) measured viability with items that appeared to capture other constructs such as adaptability (“Team members adjust to the changes that happen in their work environment”), social integration (“The new members are easily integrated into the team.”), and problem solving (“When a problem occurs, the members of this team manage to...
solve it.”). It was important to include these items in the content validation to assess how SMEs viewed them. As was expected, there was no consensus regarding the appropriateness of these items in operationalizing team viability as defined in this study. For the item, “This team was able to adjust to changes in their work environment”, five out of the ten SMEs indicated that it was clearly not representative of team viability, however two SMEs agreed it was clearly representative. For the other two Aubé and Rousseau (2005) items used in the content validation survey, seven out of the ten SMEs viewed the items as clearly not representative of the construct. While not unanimous, results are consistent with the ideas of construct confusion regarding previous measures of team viability in the literature. For the next stage of the scale validation, it is recommendation that those items be dropped from a measure of team viability.

While the intention was to have a short measure of viability (i.e., about three items) that could be used by managers to quickly gauge the overall health of a given team, it appears from the results of the SME survey that there are multiple items that represent the construct. Eight SMEs indicated that item 10 (“This team has what it takes to be effective in the future”) was essential and seven SMEs indicated that items 3 (“This team would work well together in the future”), 12 (“This team has positioned itself well for continued success”), 13 (“This team has the ability to perform well in the future”), and 15 (“This team has the ability to function as an ongoing unit”) were representative of viability. For these items, either one or no SMEs indicated that the item was not representative.
However, based on the initial CVR calculations (the second to last column from the right in Table 1) and using Lawshe’s recommended threshold of 0.62 when using 10 SMEs, only 3 items would be retained for the next steps of scale development (items 9, 5, and 11). Because this study represents an early phase of scale development, it would not be appropriate to only use three items for future steps. The benefit of Lawshe’s content validity ratio is to help refine the item set and gain information about the extent to which SMEs agreed on the representativeness of the items; however, the researcher must also use their own judgement and theoretical reasoning to dictate which items will be retained. Psychometric analyses have not yet been conducted, therefore more items are needed for testing. Also, many items SMEs indicated as “Somewhat Representative”, suggesting that they are not entirely poor representations of team viability. Perhaps those items need to be reworded. Future psychometric analyses can reveal the performance of those items. CVR values were computed a second time using both the “Clearly Representative” and “Somewhat Representative” options to deem which experts agreed that item was essential. When the CVR was done in this manner, many more items had a CVR that met the suggested threshold value of 0.62. Therefore, for future research, these 10 items will be included in the item pool for the next steps in scale development.

Appendix D contains which items will be retained for future scale development phases, as well as additional items that were written to be tested. Items in which more than half of the experts agreed were essential will be retained. Decision rules using Zaichowsky’s (1985) rating method vary and it is
up to the researcher to determine what decision rule is best for item retention
during the content validation phase. Psychometric analysis will be used in
subsequent scale development phases of this research to provide additional
information for which of the items with acceptable SME ratings items should be
kept or discarded.

**Subject Matter Expert Feedback**

**Item Feedback.** In addition to rating the individual items, SMEs were
given the option to provide open-ended feedback responses to a few questions. In
response to the first question (“Please write any items that you feel are not
currently being captured.”), only two experts provided suggestions, however both
suggested items were similar. One SME indicated that an additional item should
tap into the “willingness of members to remain in the team”, whereas the other
SME suggested that an important item should be “The members of this team wish
to continue working together in the future”.

More feedback was garnered related to the items in the pool as a whole.
Many experts noticed that some of the items seemed representative of other
concepts such as group potency, efficacy, and adaptability (e.g., “The team is able
to adjust to changes in their work environment”). Because there was strong
consensus that those items were capturing other constructs, they should be
removed from the item pool for the next steps of the scale development process.
One SME indicated, “The items appear to disproportionately capture the second
part of the definition of viability (future success) with less emphasis on the first
(sustainability). I noticed very few negatively-worded items. If this was not
intentional, I would suggest revising a few more to be negatively framed.”

Another expert suggested revisiting the early team cohesion literature for ideas on developing the items.

**Construct Definition Feedback.** Lastly, SMEs were provided the option of giving feedback on the definition of team viability used. Five out of the ten experts did not provide suggestions for the current definition, and one SME said that it was a “good definition”.

Other SMEs were confused by either the wording in the definition of the construct in general. In particular, “to be sustainable” was a phrase that was not clear to a few experts. Another expert indicated that if individual team members complete the measure, many of the items can be interpreted as team efficacy (e.g., “This team has the capacity for long-term success”). Team efficacy should be included in later phases of the validation process that are designed to demonstrate discriminant validity. The item in question should only be retained if it more clearly measures team viability.

While the use of the term sustainability led to confusion, the experts still mainly agreed that the emphasis should be placed on team sustainability, not performance. As one SME noted, “I see viability primarily about sustainability, a team-level construct of turnover or turnover intentions.” They recommended that the definition should be edited to read *the capacity of a team to be sustainable and continue to perform together on future tasks and/or projects*. Another expert emphasized that the focus should be on the “desire and capability of sustained effort for future activities.” Once again, the common element of introducing
member willingness to work again with the team has emerged in the SME feedback.

Finally, one SME discussed the importance of including a component of development (or enhancement) in the conceptual definition of team viability. They suggested that “it is really important that this is included in the definition (and therefore the scale being developed) as current and future teams need to develop their capabilities to adapt to new challenges in order to be sustainable and succeed on future performance episodes…a viable definition of team viability should consider the dynamism associated with teams.” This is consistent with Bell and Marentette’s (2011) definition of viability that included the growth component of team development over time. In summary, it appears that SMEs would indicate that it is essential to capture the ideas of sustainability and team growth, with less emphasis on team performance. Implications of their feedback and how it will inform the revision of the team viability definition are discussed next.
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<tr>
<th>Item</th>
<th>SME 1</th>
<th>SME 2</th>
<th>SME 3</th>
<th>SME 4</th>
<th>SME 5</th>
<th>SME 6</th>
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<th>SME 8</th>
<th>SME 9</th>
<th>SME 10</th>
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<tr>
<td>1. This team should continue to function as a unit.</td>
<td>CR*</td>
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<td>CR</td>
<td>SR</td>
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<tr>
<td>2. This team is capable of working together as a unit.</td>
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</tr>
<tr>
<td>3. This team would work well together in the future.</td>
<td>SR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>4. As a team, this work group shows signs of falling apart.</td>
<td>NR</td>
<td>SR</td>
<td>CR</td>
<td>SR</td>
<td>SR</td>
<td>CR</td>
<td>NR</td>
<td>CR</td>
<td>NR</td>
<td>CR</td>
</tr>
<tr>
<td>5. Most of the members of this team would welcome the opportunity to work as a group again in the future.</td>
<td>CR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>6. The team is able to adjust to changes in their work environment.</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>CR</td>
<td>NR</td>
<td>SR</td>
<td>NR</td>
<td>CR</td>
<td>SR</td>
<td>SR</td>
</tr>
<tr>
<td>7. New team members are easily integrated into the team.</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>CR</td>
<td>NR</td>
<td>SR</td>
<td>NR</td>
<td>CR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>8. When a problem occurs, the members of this team manage to solve it.</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>SR</td>
<td>NR</td>
<td>CR</td>
<td>SR</td>
<td>NR</td>
</tr>
<tr>
<td>9. The members of this team could work for a long time together.</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
</tbody>
</table>

*CR = Clearly Representative; SR = Somewhat Representative; NR = Not Representative
<table>
<thead>
<tr>
<th>Item</th>
<th>SME 1</th>
<th>SME 2</th>
<th>SME 3</th>
<th>SME 4</th>
<th>SME 5</th>
<th>SME 6</th>
<th>SME 7</th>
<th>SME 8</th>
<th>SME 9</th>
<th>SME 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. This team has what it takes to be effective in the future.</td>
<td>NR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>11. This team has the capacity for long-term success.</td>
<td>CR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>12. This team has positioned itself well for continued success.</td>
<td>CR</td>
<td>SR</td>
<td>SR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>13. This team has the ability to perform well in the future.</td>
<td>CR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>14. This team has the resources to perform well in the future.</td>
<td>CR</td>
<td>NR</td>
<td>SR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>SR</td>
</tr>
<tr>
<td>15. This team has the ability to function as an ongoing unit.</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>NR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
</tr>
<tr>
<td>16. This team could succeed together on a different task.</td>
<td>NR</td>
<td>SR</td>
<td>NR</td>
<td>SR</td>
<td>SR</td>
<td>SR</td>
<td>CR</td>
<td>SR</td>
<td>SR</td>
<td>SR</td>
</tr>
<tr>
<td>17. This team would have success on a different task.</td>
<td>NR</td>
<td>SR</td>
<td>NR</td>
<td>SR</td>
<td>SR</td>
<td>SR</td>
<td>CR</td>
<td>SR</td>
<td>SR</td>
<td>SR</td>
</tr>
<tr>
<td>18. This team has the motivational energy to keep working together as a unit.</td>
<td>CR</td>
<td>SR</td>
<td>NR</td>
<td>SR</td>
<td>NR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>CR</td>
<td>SR</td>
</tr>
<tr>
<td>19. This team has what it takes to persist in the face of obstacles.</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>SR</td>
<td>SR</td>
<td>SR</td>
<td>NR</td>
<td>CR</td>
<td>SR</td>
<td>SR</td>
</tr>
<tr>
<td>20. This team will still be successful even if the members do not like one another.</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>SR</td>
<td>SR</td>
<td>SR</td>
<td>CR</td>
<td>CR</td>
<td>NR</td>
<td>NR</td>
</tr>
</tbody>
</table>
### Table 2. Item Content Validity Ratios

<table>
<thead>
<tr>
<th>Item</th>
<th>No. of Experts Who Indicated Item was Clearly Representative</th>
<th>No. of Experts Who Indicated Item was Somewhat Representative</th>
<th>No. of Experts Who Indicated Item was Not Representative</th>
<th>CVR (Just CR)</th>
<th>CVR (CR and SR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. The members of this team could work for a long time together.</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5. Most of the members of this team would welcome the opportunity to work as a group again in the future.</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>11. This team has the capacity for long-term success.</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>10. This team has what it takes to be effective in the future.</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td>3. This team would work well together in the future.</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>12. This team has positioned itself well for continued success.</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>13. This team has the ability to perform well in the future.</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>15. This team has the ability to function as an ongoing unit.</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>1. This team should continue to function as a unit.</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>0.2</td>
<td>1</td>
</tr>
<tr>
<td>14. This team has the resources to perform well in the future.</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>0.2</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 1. Item Content Validity Ratios (continued)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>18. This team has the motivational energy to keep working together as a unit.</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4. As a team, this work group shows signs of falling apart.</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>2. This team is capable of working together as a unit.</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. The team is able to adjust to changes in their work environment.</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7. New team members are easily integrated into the team.</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>20. This team will still be successful even if the members do not like one another.</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>8. When a problem occurs, the members of this team manage to solve it.</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. This team could succeed together on a different task.</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. This team would have success on a different task.</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>19. This team has what it takes to persist in the face of obstacles.</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Content Validity Index (Mean CVR) = 

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Mean CVR</td>
<td>-0.02</td>
<td>0.57</td>
</tr>
</tbody>
</table>
Table 3. SME Open-Ended Feedback

<table>
<thead>
<tr>
<th>SME</th>
<th>Yrs. Experience</th>
<th>Please write any items that you feel are not currently being captured.</th>
<th>Please provide any comments/suggestions about the definition of team viability that is being used.</th>
<th>If you have any additional comments, thoughts, or suggestions for developing the team viability measure, please provide them below.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME 1</td>
<td>18</td>
<td>Willingness of team members to remain in the team</td>
<td>The construct should not include performance -- team viability focuses on team membership and not its effects.</td>
<td>None</td>
</tr>
<tr>
<td>SME 2</td>
<td>17</td>
<td>None</td>
<td>To be sustainable is a bit awkward - I'm not 100% sure what it means.</td>
<td>None</td>
</tr>
<tr>
<td>SME 3</td>
<td>12</td>
<td>None</td>
<td>The use of &quot;success&quot; or &quot;perform well&quot; in the definition and items confuses the construct to me. If you're asking team members to complete the questionnaire, then this sounds much like team efficacy items (&quot;this team will succeed.&quot;). Team efficacy, resources, cohesion, etc. may all predict viability, but I see viability as primarily about sustainability, a team-level construct of turnover or turnover intentions. I would edit the definition to read: &quot;The capacity of a team to be sustainable and continue to perform together on future tasks/projects.&quot;</td>
<td>There are old definitions of team cohesion (Festinger, etc.) that define cohesion similar to viability (field of forces acting on members to stay in a group). I think these authors originally meant for cohesion to be viability, but the cohesion construct got warped into social relations and task commitment for some reason. Anyway, I would suggest revisiting some of the old team cohesion literature for some ideas on items and revising the definition.</td>
</tr>
<tr>
<td>SME 4</td>
<td>20</td>
<td>The members of this team wish to continue working together as a team in the future.</td>
<td>Good definition.</td>
<td>General comment: Some of the items seemed more representative of the concept of group potency than of the concept of team viability.</td>
</tr>
</tbody>
</table>
The concept of viability includes an element of development (or enhancement) which seems to be missing from this definition. I believe it is really important that this is included in the definition (and therefore the scale being developed) as current and future teams need to develop their capabilities to adapt to new challenges in order to be sustainable and succeed on future performance episodes. I'm not suggesting an adaptability component to the definition, as that is a separate construct. But I think a viable definition of team viability should consider the dynamism associated with teams.

The items appear to disproportionately capture the second part of the definition of viability (future success) with less emphasis on the first (sustainability). I noticed very few negatively-worded items. If this was not intentional, I would suggest revising a few more to be negatively framed.

I recommend that Suzanne and you focus on desire and capability of sustained effort for future activities. Some items slipped into measures of current processes or states (e.g., efficacy), and others slipped into adaptability (can work in different contexts). Related, but different constructs.
Discussion

Teams are a vital part of most organizations (e.g., Mathieu, Maynard, Rapp, & Gilson, 2008), and most teams today are dynamic, ongoing, and have fluid membership (Tannenbaum et al., 2012). Team viability is an important construct for studying modern teams. Despite its importance, team viability has suffered from much construct confusion (Bell & Marentette, 2011). The purpose of the current investigation was to clarify team viability as a construct as well as carry out the initial steps in developing a valid measure.

A first crucial step in scale development is content validation. One must first begin by thoroughly review existing literature and identify gaps and inconsistencies (Hinkin, 1995, 1998). There remained a strong need for developing a valid and sound measure of team viability, as it has been defined and measured inconsistently in previous research (Bell & Marentette, 2011). The main purpose of the current study was to clearly conceptualize team viability, and carry out the initial content validation of the measure. The content validity serves as a pretest, to eliminate any conceptual inconsistencies. Retained items should represent a reasonable measure of the construct (Hinkin, 1998).

Specifically, in this study, I created items and used SMEs to gain valuable and informative feedback. Findings from this study indicate that certain key elements are important in measuring viability. A clear emphasis should be made on the sustainability of the team, and not necessarily performance. Use of the phrase “continue to succeed” in my definition of viability led SMEs to believe
that performance was also being considered as part of the construct. While current performance can impact the viability of a team, viability itself is whether or not the team can sustain itself over time.

The dictionary defines viability as “the capacity to operate or be sustained.” The SMEs also mentioned that it was important to capture the notion of sustainability when defining and measuring viability. Numerous studies have examined the factors that contribute to work team effectiveness as well as to sustainability at the organizational level (e.g., Black & Boal, 1995; Oliver, 1997; Pfeffer, 1995; Starik & Ranks, 1995). However, similarly to viability, limited research is available on the factors that contribute to long-term work team sustainability (Houghton, Neck, and Manz, 2003). Houghton and colleagues (2003) acknowledged this gap in the literature, and presented a cognitive model of work team sustainability, arguing that team self-efficacy perceptions and constructive self-talk lead to team “opportunity thinking” which ultimately results in sustained team performance. However, since the concept of sustainability in teams itself is not well-researched, it was not clear how Houghton, Neck, and Manz (2003) were operationalizing sustainability; some areas appeared to be referring to team performance, others to team endurance and resilience. Before factors contributing to team sustainability can be researched, the construct needs to be well-established.

It also seems necessary to include measurement of team member willingness to work with one another again in the viability scale. Willingness to work with the team over time can influence the formation of work team trust.
(Costa, 2003) that in turn can impact the development of team-oriented commitment and work team effectiveness (Ellemers, de Gilder, & van den Heuvel, 1998).

Lastly, the element of development (or enhancement) emerged as an important aspect of viability that should be included in its measurement according to the SME feedback. Current and future teams need to adapt to new challenges in order to be sustainable and succeed on future performance episodes (Bunderson & Sutcliffe, 2003; LePine, 2005; Porter, 2005; Porter, Web, & Gogus, 2010). It is important to be careful, though, not to measure adaptability itself. There are numerous factors that contribute to team development beyond adaptability such as team learning (Ellis, Hollenbeck, Ilgen, Porter, West, & Moon, 2003; Hirst, Van Knippenberg, & Zhou, 2009; Van den Bossche, et al., 2006; Van der Vegt & Bunderson, 2005). When convergent, discriminant, and predictive validity of the viability measure are evaluated, it can be determined how adaptability is related to the viability construct.

Based on the SME feedback, it is appropriate to revise the definition of viability for the next phases of scale development. Less emphasis on performance and more emphasis on the team’s sustainability, growth, and development is needed. Because Bell and Marentette’s (2011) definition captures these elements, it is suggested that the new definition of viability revise their definition to include the word “team”, emphasizing that it is a team construct. Therefore, it is recommended that the new viability definition be the capacity of a team for the sustainability and growth required for success in future performance episodes.
Future Research

Future research is needed to complete the development and validation of the team viability measure. As mentioned previously, Hinkin (1998) proposed a six step scale development process: item generation, questionnaire administration, initial item reduction, confirmatory factor analysis, convergent/discriminant validity, and replication. The efforts of the current study have carried out the first three phases of Hinkin’s (1998) scale development process (item generation, questionnaire administration, and initial item reduction). Studies beyond the scope of this thesis can continue the development and validation process of the team viability scale.

Future research can further refine the items and definition based on the SME feedback and collect convergent and divergent validity evidence. Considering the SME input, a few additional items will be added to make sure the measure appropriately captures the ideas of sustainability and growth. Appendix D contains items that will be retained for the next phases of scale development as well as suggested additional items that can be added. Items were retained based on the results of the CVR analysis, however because this study represents an initial phase of scale development, additional items were kept that were deemed somewhat representative of team viability (even if the CVR value was below the suggested threshold). Future research can see how those items perform psychometrically. Also, a few new items were written based on the SME feedback recommending that the concepts of sustainability, growth, and development be captured in the measurement of viability.
The new items should be piloted and then the total list of items should be given to a diverse sample of ongoing teams to see how well those items confirm expectations regarding the psychometric properties of the scale (Hinkin, 1998). In addition to administering the items of interest, it will also be necessary for researchers to administer other established measures to psychometrically examine the nomological network. The nomological net of constructs explained in this paper can be the basis for the measures to be collected in these future studies.

To reduce common source-common method bias, the researcher should also collect information from other sources (e.g., objective performance data). Together, the data from these other measures can provide preliminary evidence of criterion-related, convergent, and discriminant validity (a necessary part of scale development) (Hinkin, 1998). Once this evidence is garnered, the same set of measures should be administered to a separate, independent sample (the replication phase). These steps are needed for appropriate validation of the new team viability measure.

**Theoretical and Practical Implications**

The findings from this initial study have both theoretical and practical implications. From a theoretical perspective, it is evident that team viability is a complex construct that is nuanced in many ways. Because viability is a function of individual member characteristics and emergent team states, it is not merely a global team property. Additionally, viability is not simply related to team performance, but also involves a team's ability to function over a long period of time and have members who are willing to work with one another.
From the SME feedback, the concept of sustainability needs to be explored further in future investigations. Consistent with the notion of construct confusion, many of the items that have been previously used in team viability research were deemed by SME to not appropriate capture the team viability construct. As expected they were suggested to measure other (related) constructs such as team potency, adaptability, and problem-solving. While many expert’s ratings converged on several of the items, three items in particular had the strongest convergence in terms of SME ratings the item as relevant to team viability (see Table 1). As this is the initial stage of scale development, more than three items will be used in subsequent steps (see Appendix E). Additional psychometric research can be used to determine a final set of items.

From a practical perspective, there are also several implications of the current findings. Given that numerous work teams today are long-term, ongoing entities, performance alone may not be the most appropriate measure. Many teams need to be highly adaptive to meet environmental demands (Tannenbaum, Mathieu, Salas, & Cohen, 2012). These teams go through several performance episodes, often managing several tasks simultaneously (Marks, Mathieu, & Zaccaro, 2001). Team viability as a construct may be useful in determining how well a team will perform on subsequent tasks. The SME feedback stressed the importance of measuring the sustainability and development aspect of the construct, suggesting that that is the core part of viability. Once this measure is validated, it can be extremely useful to organizations who want to consider how to best allocate their resources. A brief measure of viability can help organizations
determine the teams that are successful, and which teams are in need of intervention. Additionally, once this measure is validated, future research can assess the efficacy of various interventions to optimize team viability.

In conclusion, team viability is an important construct for team effectiveness and performance in modern organizations. This research conducted valuable first steps in the development and validation of a measure of team viability. An extensive review of viability in the current literature, initial item development, and subject matter expert feedback are all critical steps towards creating a sound and valid team viability measure. Results from the current study can greatly inform the next steps of scale development. Once a measure is established, research can be conducted to further explore the dynamics of viability. The team viability domain is a rich area for future research that can be useful for managers, teams, and organizations.
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Resick, C.J., Dickson, M.W., Mitchelson, J.K., Allison, L.K., & Clark, M.A.


## Appendices

### Appendix A. Previous Studies Examining Team Viability

<table>
<thead>
<tr>
<th>Article</th>
<th>Definition of Viability</th>
<th>Description of Viability Scale</th>
<th>Sample Items</th>
<th>Cronbach’s Alpha of Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sundstrom, De Meuse, &amp; Futrell (1990)</td>
<td>Members’ satisfaction, participation, and willingness to continue working together.</td>
<td>N/A (meta-analysis)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Harris &amp; Barnes-Farrell (1997)</td>
<td>No stated definition</td>
<td>Specific scale not reported;</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Items using a 7-point scale (1 = no contribution whatsoever, 7 = a very large contribution)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Barrick, Stewart, Neubert, & Mount (1998) | The capability of team members to continue working together cooperatively.              | Items adapted from DeStephen & Hirokawa (1988) and Evans & Jarvis (1986); 12 items using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) | 1. This team should not continue to function as a team.  
2. This team is not capable of working together as a unit. | $\alpha = 0.82$               |
### Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Definition of Team Effectiveness</th>
<th>Items Developed</th>
<th>Measurement 1</th>
<th>Measurement 2</th>
<th>Measurement 3</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rentsch &amp; Klimoski (2001)</td>
<td>Hackman’s (1990) definition of team effectiveness</td>
<td>Items developed by authors; based items on Hackman’s (1990) definition</td>
<td>Members look forward to team meetings.</td>
<td>Team members “carry their weight”.</td>
<td>Members are highly committed to the team.</td>
<td>α = 0.80</td>
</tr>
<tr>
<td>Pirola-Merlo, Härtel, Mann, &amp; Hirst (2002)</td>
<td>The extent to which team members are willing and able to continue working productively together (West, Borril, &amp; Unsworth, 1998).</td>
<td>Six items using a 5-point Likert scale</td>
<td>I hope to stay with this team for a long time.</td>
<td></td>
<td></td>
<td>α = 0.92</td>
</tr>
</tbody>
</table>
## Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Description</th>
<th>Items</th>
<th>Items Adapted From</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinclair (2003)</td>
<td>Not stated</td>
<td>Items adapted from Watson, Michaelson, and Sharp (1991)</td>
<td></td>
<td>$\alpha = 0.84$</td>
</tr>
<tr>
<td>Lewis (2004)</td>
<td>The capability of groups to continue to perform effectively in the future.</td>
<td>Specific scale structure not reported; Three items based on Hackman (1987)</td>
<td></td>
<td>$\alpha = 0.97$</td>
</tr>
<tr>
<td>Afolabi &amp; Ehigie (2005)</td>
<td>The capability of the members of a team to continue working together.</td>
<td>Four-item team viability scale using a 5-point Likert scale developed by Leanna (1985)</td>
<td>Not stated</td>
<td>$\alpha = 0.69$</td>
</tr>
</tbody>
</table>
## Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Description</th>
<th>Items</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aubé &amp; Rousseau (2005)</td>
<td>The team’s capacity to adapt to internal and external changes as well as the probability that team members will continue to work together in the future (Hackman, 1987; Sundstrom et al., 1990; West et al., 1998).</td>
<td>Four items designed to measure the team’s capacity to adapt to changes, to solve problems, to integrate new members, and to continue to work together in the future.</td>
<td>$\alpha = 0.84$</td>
</tr>
<tr>
<td>Balkundi &amp; Harrison (2006)</td>
<td>A group’s potential to retain its members.</td>
<td>N/A (meta-analysis)</td>
<td>N/A</td>
</tr>
<tr>
<td>Coetzer &amp; Bushe (2006)</td>
<td>Operationalized as satisfaction with membership and satisfaction with output</td>
<td>Six items developed by authors</td>
<td>$Satisfaction with membership: \alpha = 0.93$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$Satisfaction with output: \alpha = 0.88$</td>
</tr>
</tbody>
</table>
## Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Definition of Team Viability</th>
<th>Items/Scale Structure</th>
<th>Items/Scale Notes</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Druskat &amp; Pescosolido (2006)</td>
<td>The degree to which members of the team are able to continue working together in the future (Hackman, 1986).</td>
<td>Items from Hackman’s (1990) Flight Crew Survey</td>
<td>1. There is a lot of unpleasantness among people in this team. (reverse coded)</td>
<td>$\alpha = 0.79$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Sometimes one of us refuses to help another team member out.</td>
<td></td>
</tr>
<tr>
<td>Foo, Sin, &amp; Yong (2006)</td>
<td>No stated definition.</td>
<td>Items adapted from Hackman (1988) Flight Crew Questionnaire; Seven items using a 7-point Likert scale</td>
<td>1. Members of the team care a lot about it, and work together to make it one of the best.</td>
<td>$\alpha = 0.84$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Working with members of the team is an energizing and uplifting experience.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. As a team, this work group shows signs of falling apart. (reverse coded)</td>
<td></td>
</tr>
<tr>
<td>Van den Bossche, Gijselaers, Segers, &amp; Kirschner (2006)</td>
<td>The capability of members to work together in the future</td>
<td>Two items based on Hackman (1989)</td>
<td>1. I would want to work with this team in the future.</td>
<td>$\alpha = 0.88$</td>
</tr>
<tr>
<td>Bushe &amp; Coetzer (2007)</td>
<td>Satisfaction with team membership and satisfaction with team output.</td>
<td>Items developed by authors; specific scale structure not reported</td>
<td>1. Being a member of this team has been personally satisfying.</td>
<td>$Satisfaction with membership: \alpha = 0.93$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. I would choose this team to work with on similar tasks in the future.</td>
<td>$Satisfaction with output: \alpha = 0.88$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. I am satisfied with the final project of this team.</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Description</th>
<th>Items used</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marrone, Tesluk &amp; Carson (2007)</td>
<td>The extent to which a team was able to increase its ability to perform as an intact unit over time, was assessed via three items developed for this study (based on Hackman [1987] and Sundstrom et al. [1990]).</td>
<td>Items used a 5-point Likert scale</td>
<td>$\alpha = 0.81$</td>
</tr>
<tr>
<td>Jehn, Greer, Levine, &amp; Szulanski (2008)</td>
<td>A team’s ability to retain its members through attachment to the team and members’ willingness to remain part of the team (Balkundi &amp; Harrison, 2006).</td>
<td>Four items based on Balkundi and Harrison (2006)</td>
<td>$\alpha = 0.82$</td>
</tr>
<tr>
<td>Balkundi, Barsness, &amp; Michael (2009)</td>
<td>Intention to quit the team</td>
<td>First measured intention to quit team using two items from Colarelli (1981); Items used a 5-point Likert scale; Then calculated team viability score based on item responses</td>
<td>$\alpha = 0.71$</td>
</tr>
</tbody>
</table>
### Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Measure</th>
<th>Methodology</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boies &amp; Howell (2009)</td>
<td>The desire or perceived capacity of team members to work together in the future.</td>
<td>Twelve items using a 7-point Likert scale based on Barrick, Stewart, Neubert, and Mount (1998)</td>
<td>Not stated</td>
</tr>
<tr>
<td>Tekleab &amp; Quigley (2009)</td>
<td>The degree to which group members wish to work together as a team in the future.</td>
<td>Four items adapted from DeStephen and Hirokawa (1988) using a 7-point Likert scale</td>
<td>1. This team should not have continued to function as a team. (reverse coded)</td>
</tr>
<tr>
<td>Quoidbach &amp; Hansenne (2009)</td>
<td>The capability of the team to continue to function as a unit.</td>
<td>Measured by team turnover rate over the course of the length of the study (4 months)</td>
<td>N/A</td>
</tr>
<tr>
<td>Ortega, Sanchez-Manzanares, Gil, &amp; Rico (2010)</td>
<td>Not stated</td>
<td>Measured with one item designed by Lewis (2004) based on Hackman (1990)</td>
<td>1. If I had to participate in another project like this one, I would like to work with the same team again.</td>
</tr>
</tbody>
</table>
## Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Study Description</th>
<th>Measurement Details</th>
<th>Items</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resick, Dickson, et al. (2010)</td>
<td>Members’ satisfaction, participation, and willingness to continue working together.</td>
<td>Items adapted from Tesluk and Mathieu (1999) team satisfaction scale and Bayazit and Mannix (2003) willingness to work with teammates scale; Seven items using a 5-point scale (1 = strongly disagree, 5 = strongly agree)</td>
<td>1. I really enjoyed being part of this team. 2. I get along with the people on this team. 3. I felt like I get a lot out of being a member of this team. 4. I’m very happy that I was a member of this team. 5. I wouldn’t hesitate to participate on another task with the same team members. 6. If I could have left this team and worked with another team, I would have. (reverse-worded) 7. If given the choice, I would prefer to work with another team rather than this one. (reverse-worded)</td>
<td>α = 0.90</td>
</tr>
<tr>
<td>Rousseau &amp; Aubé (2010)</td>
<td>The extent to which team members are able to continue to work together in the future (Hackman, 1987; Marrone, Tesluk, &amp; Carson, 2007; Pescosolido, 2003)</td>
<td>Assessed using the 4-item scale developed by Aubé and Rousseau (2005); items used a 5-point Likert scale</td>
<td>1. Team members adjust to the changes that happen in their work environment. 2. When a problem occurs, the members of this team manage to solve it. 3. New members are easily integrated into this team. 4. The members of this team could work together for a long time.</td>
<td>α = 0.80</td>
</tr>
</tbody>
</table>
### Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Description</th>
<th>Methodology</th>
<th>Items</th>
<th>Reliability</th>
</tr>
</thead>
</table>
| Aubé & Rousseau     | The team’s ability to adapt to the internal and external changes and difficulties that impinge on collective work (Aubé & Rousseau, 2005; Hackman, 1987; Sundstrom et al., 1990). | Assessed using the 4-item scale developed by Aubé and Rousseau (2005); items used a 5-point Likert scale | 1. Team members adjust to the changes that happen in their work environment.  
2. When a problem occurs, the members of this team manage to solve it.  
3. New members are easily integrated into this team.  
4. The members of this team could work together for a long time. | $\alpha = 0.80$ |
| Santos & Passos     | Based on Hackman’s (1987) criteria of effectiveness                        | Items adapted from Bayazit and Mannix (2003); Three items using a 7-point scale (1 = totally disagree, 7 = totally agree) | 1. If I could have left this team and worked with another team, I would have. (reverse-worded)  
2. I wouldn’t hesitate to participate on another task with the same team members.  
3. If given the choice, I would prefer to work with another team rather than this one. (reverse-worded) | $\alpha = 0.90$ |
## Appendix A. Previous Studies Examining Team Viability (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Description</th>
<th>Items</th>
<th>Item Examples</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa, Passos, &amp;</td>
<td>The team’s capacity for the sustainability and growth required for success</td>
<td>Items adapted from Standifer et al. (2009, unpublished data); Four</td>
<td>1. I would not hesitate in participating with this team in future competitions.</td>
<td>$\alpha = 0.89$</td>
</tr>
<tr>
<td>Barrata (2015)</td>
<td>in future performance episodes (Bell &amp; Marentette, 2011)</td>
<td>items using a 7-point Likert scale ($1 = I$ totally disagree, $7 = I$</td>
<td>totally agree)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hu &amp; Liden (2015)</td>
<td>Team members’ satisfaction with team experiences and their intention to</td>
<td>Twelve items from Barrick et al.’s (1998) scale</td>
<td>1. I believe that my personal well-being has been improved as a result of</td>
<td>$\alpha = 0.91$</td>
</tr>
<tr>
<td></td>
<td>continue membership on the team.</td>
<td></td>
<td>participating in this team.</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mello &amp; Delise</td>
<td>The degree to which team members are willing to remain on the team.</td>
<td>Items developed by Tekleab, Quigley, &amp; Tesluk (2009); Five items</td>
<td>1. If I had the chance, I would have switched teams. (reverse coded)</td>
<td>$\alpha = 0.89$</td>
</tr>
<tr>
<td>(2015)</td>
<td></td>
<td>using a 5-point scale ($1 = strongly disagree, 5 = strongly agree)</td>
<td></td>
<td></td>
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</tbody>
</table>
### Appendix B. Steps in Scale Development

<table>
<thead>
<tr>
<th>Step in Scale Development (Hinkin, 1998)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1: Item Generation (Current Study)</strong></td>
<td>The first step is to generate items assessing the focal construct based on a review of the literature. After items are generated, they should be subjected to an assessment of content validity using subject matter experts. This process helps remove items that are conceptually inconsistent and minimizes issues with subsequent psychometric analyses.</td>
</tr>
<tr>
<td><strong>Step 2: Questionnaire Administration (Future Research)</strong></td>
<td>Items should be presented to a representative sample, with the objective of testing how well the items perform psychometrically. Additional measures should be given of constructs from the nomological network.</td>
</tr>
<tr>
<td><strong>Step 3: Initial Item Reduction (Future Research)</strong></td>
<td>Factor analysis should be used to further refine the measure. After dimensionality is established, the reliability (internal consistency) of the measure should be assessed.</td>
</tr>
<tr>
<td><strong>Step 4: Confirmatory Factor Analysis (Future Research)</strong></td>
<td>Confirmatory factor analysis helps the researcher quantitatively assess the quality of the factor structure. This step is a confirmation that the prior analyses have been conducted correctly.</td>
</tr>
<tr>
<td><strong>Step 5: Convergent/Discriminant Validity (Future Research)</strong></td>
<td>To provide evidence of construct validity, it is also important to examine the extent to which the measure correlates with other similar constructs (convergent validity) and to which it does not correlate with dissimilar constructs (discriminant validity). The researcher should also examine criterion-related validity (the relationship between the measure and variables it is expected to be related to).</td>
</tr>
<tr>
<td><strong>Step 6: Replication (Future Research)</strong></td>
<td>The same sample should not be used for both scale development and for assessing the psychometric properties of the measure due to potential common source/common method variance. Additional independent samples should be used to enhance the generalizability of the measure. The scale testing process should be repeated with these samples.</td>
</tr>
</tbody>
</table>
Appendix C. Initial Items for Scale Development

Barrick, Stewart, Neubert, & Mount (1998)
This team should continue to function as a unit.
This team is capable of working together as a unit.

Lewis (2004)
This team would work well together in the future.

Foo, Sin, & Yiong (2006)
As a team, this work group shows signs of falling apart. (R)

Marrone, Tesluk, & Carson (2007)
Most of the members of this team would welcome the opportunity to work as a group again in the future.

Aubé & Rousseau (2005)
Team members adjust to the changes that happen in their work environment.
The new members are easily integrated into the team.
When a problem occurs, the members of this team manage to solve it.
The members of this team could work a long time together.

Other items:
This team has what it takes to be effective in the future.
This team has the capacity for long-term success.
This team has positioned itself well for continued success.
This team has the ability to perform well in the future.
This team has the resources to perform well in the future.
This team has the ability to function as an ongoing unit.
This team should work together again on a different task.
This team would have success on a different task.
This team has the motivational energy to keep working together as a unit.
This team has what it takes to persist in the face of obstacles.
This team will still be successful even if the members do not like one another.
Appendix D. Subject Matter Expert Survey

Thank you for serving as a subject matter expert. Your expertise will help further develop and validate a measure of team viability.

Below is the definition of team viability. Beginning on the next page, you will be shown current items in consideration and be asked a few questions regarding content validity and quality. At the end of the survey, you will be provided the chance to offer additional suggestions regarding the conceptualization of team viability, adding new items, and the length of the measure.

**Team Viability:** The capacity of a team to be sustainable and continue to succeed in future performance episodes.

Assess each individual item on how well it represents the focal construct of team viability. Mark either **Clearly Representative**, **Somewhat Representative**, or **Not Representative** based on your evaluation. If you would like to suggest revisions to an item, please include them in the text box below each item.

<table>
<thead>
<tr>
<th>Clearly Representative</th>
<th>Somewhat Representative</th>
<th>Not Representative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This team should continue to function as a unit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. This team is capable of working together as a unit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. This team would work well together in the future.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. As a team, this work group shows signs of falling apart.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Most of the members of this team would welcome the opportunity to work as a group again in the future.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The team is able to adjust to changes in their work environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. New team members are easily integrated into the team.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. When a problem occurs, the members of this team manage to solve it.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. The members of this team could work for a long time together.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. This team has what it takes to be effective in the future.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. This team has the capacity for long-term success.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. This team has positioned itself well for continued success.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. This team has the ability to perform well in the future.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. This team has the resources to perform well in the future.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. This team has the ability to function as an ongoing unit.</td>
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<tr>
<td>16. This team could succeed together on a different task.</td>
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<tr>
<td>17. This team would have success on a different task.</td>
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<tr>
<td>18. This team has the motivational energy to keep working together as a unit.</td>
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<tr>
<td>19. This team has what it takes to persist in the face of obstacles.</td>
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<tr>
<td>20. This team will still be successful even if the members do not like one another.</td>
<td></td>
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</tbody>
</table>
Open-Ended Questions:

1. Please write any items that you think are not currently being captured.

2. Please provide any comments/suggestions about the definition of team viability that is being used:
   "The capacity of a team to be sustainable and continue to succeed in future performance episodes."

3. If you have any additional comments, thoughts, or suggestions for developing the team viability measure, please provide them below.

4. What is your experience with research or practice related to team science? (Asked to report number of years involved in research or practice related to team science)
Appendix E. Items for Future Steps in Scale Development

Items from Current Study:

1. The members of this team could work for a long time together.
2. Most of the members of this team would welcome the opportunity to work as a group again in the future.
3. This team has the capacity for long-term success.
4. This team has what it takes to be effective in the future.
5. This team would work well together in the future.
6. This team has positioned itself well for continued success.
7. This team has the ability to perform well in the future.
8. This team has the ability to function as an ongoing unit.
9. This team should continue to function as a unit.
10. This team has the resources to perform well in the future.

Additional Items to Be Used in Next Steps of Scale Development:

1. This team is well positioned for growth over time.
2. This team can develop to meet future challenges.
3. This team has the capacity to sustain itself.
4. This team has what it takes to endure in future performance episodes.