

Technical Report 1429

Developing and Validating Measures of Army Unit Resilience

Scott Tannenbaum

The Group for Organizational Effectiveness

John Mathieu

University of Connecticut

Jamie Levy

The Group for Organizational Effectiveness

Dale Watson

Penn State University

Travis Maynard

Colorado State University

Rebecca Beard

The Group for Organizational Effectiveness

Eduardo Salas

Rice University

Bridget Boyle, Colanda Cato,

Shala Blue, Cassie Berry

U.S. Army Research Institute



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for the Behavioral and Social Sciences**

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**Department of the Army
Deputy Chief of Staff, G1**

Authorized and approved:

**MICHELLE L. ZBYLUT, Ph.D.
Director**

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Technical review by

Kathleen Darbor, U.S. Army Research Institute
Nathanael Keiser, U.S. Army Research Institute

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Alok Bhupatkar, Chief

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DEVELOPING AND VALIDATING MEASURES OF ARMY UNIT RESILIENCE

EXECUTIVE SUMMARY

Research Requirement:

This technical report summarizes the work under contract W911NF-18-C-0024, “*Developing and Validating Measures of Unit Resilience*.” Given the demanding nature of its mission, the Army must take actions to ensure that their collective units, not just individual Soldiers, are highly resilient and able to withstand and adapt to a wide range of stressors and challenges. Therefore, it is important to be able to effectively assess resilience at the unit-level and to understand and examine the factors that can enable or diminish it. Our focus is on developing construct valid and psychometrically sound measures of the resilience of small Army units, such as a team, squad, or platoon. Throughout the report, we use the term “team” to refer to such units.

Procedure:

In this report we introduce and describe a theoretical framework of team resilience, which depicts the construct space, or nomological network of relations, surrounding team resilience. This discussion offers conceptual clarity to a body of literature filled with different definitions, operationalizations, and construct confusion with related concepts. It also sets the stage for building valid, useful measures of team resilience. We describe the results of a literature review conducted to advance our understanding of how the team resilience construct had been conceptualized by prior researchers and to take note of any prior attempts to measure team resilience. We then share the results of our interviews with members of Army teams, which ground our measures and related products in practical needs and considerations. Next, we summarize our procedures for developing the draft measures of team resilience and supporting constructs, including the methods and results of activities that evidenced the content validity of the Core Unit Resilience measure. In the following section, we report the methods and results of successful efforts with two different Army team samples that demonstrate the psychometric soundness and construct validity of the measures. We then introduce the primary product of the prior activities, The Unit Resilience Measurement Battery (The Battery). The Battery is the collection of final, valid measures of team resilience and related constructs. It includes three alternative options for measuring team resilience (Core Unit Resilience, the 2-Item Unit Resilience Short Form, and the 5-Item Unit Resilience Short Form) and measures of Stressors, Environmental Challenges, Minimizing Factors, Mending Efforts, and Resilience Manifestations.

Findings:

The findings from the two samples provide ample evidence for the psychometric soundness, content validity, and construct validity of each of the 12-item scales (current capacity and future confidence) within the measure of Core Unit Resilience. Our empirical analyses supported the convergent validity of items intended to measure each of the three first-order dimensions of team resilience (i.e., physical, affective, and cognitive). For example, the scale internal consistencies were acceptable at both the subscale and overall composite levels. Team members exhibited high levels of agreement among their ratings of their team resilience, and, with a few exceptions,

significant between team variance (i.e., intraclass correlations [ICCs]) was evident among their responses. The confirmatory factor analyses (CFAs) results were also very consistent across the two samples and analyses of the ratings of *current resilience levels* paralleled those using *future confidence levels*. These data support the use of the 12-item measure for measuring team resilience in terms of three highly correlated first order dimensions (i.e., physical, affective, and cognitive) or in terms of an overall composite measure of resilience. For the Core Unit Resilience measure, a sample of subject matter experts consistently sorted most items according to their intended latent constructs. The empirical results from both samples also suggest that the psychometric characteristics of the other measures within The Battery are also acceptable.

As for relationships with other constructs in the nomological network, the results from the two samples were encouraging. First, the team sample at Army installations yielded findings consistent with our expectations in that team resilience correlated negatively with environmental stressors and challenges, and positively with minimizing, mending, and manifestations. Moreover, current team resilience levels partially mediated the influence of environmental factors and mending on team performance. However, for the recruiting team sample, the station commanders' ratings of environmental stressors and challenges, as well as team resilience related actions, showed limited correlations with recruiters' reports of team resilience. We suspect that these findings are attributable, in part, to the fact that we had separate sources of information for the correlates and resilience levels, and that we only had slightly over 100 instances when both scores were available. The prediction of recruiting station team performance was more in keeping with our expectations. For example, team resilience exhibited significant predictive validity of team performance. Moreover, environmental stressors and team minimizing, as reported by the station commanders, exhibited negative and positive relationships, respectively, with subsequent performance. Finally, we reported the convergent and predictive validity of our three different team resilience measures, which correlated highly with one another and exhibited comparable correlations with team performance.

Utilization and Dissemination of Findings:

The development of these instruments fills important research gaps and applied needs. The validated measures within The Battery can be used by Army researchers to further explore team resilience questions. The measures can also be used by team leaders, trainers, observers, or others in training and operational contexts. The measures have numerous practical applications including use during team training, as a means of accelerating team or leadership development, and as a diagnostic tool in field settings. The Battery offers users multiple measurement options that can be chosen to meet the purpose and needs of the data collection.

DEVELOPING AND VALIDATING MEASURES OF UNIT RESILIENCE

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Chapter 1. General Introduction

This final technical report summarizes the work under contract W911NF-18-C-0024, *“Developing and Validating Measures of Unit Resilience.”* In this report we describe the underlying need and theoretical foundation for this effort and define unit resilience. We describe the importance of assessing resilience at the unit-level and understanding the factors that can enable or diminish it. We introduce and describe a theoretical framework of unit resilience, which depicts the construct space, or nomological network of relations, surrounding team resilience. We detail our objectives and overall approach to advancing our theoretical framework of unit resilience; grounding this framework in Army team needs and developing and validating a set of measures of unit resilience and the factors that influence it. We describe the results of a literature review conducted to gain a better understanding of how the unit resilience construct had been conceptualized by prior researchers and to take note of any prior attempts to measure unit resilience. We share the results of interviews with members of Army teams, which grounded our subsequently developed measures and related products in practical considerations. Next, we summarize our procedures for developing the content for the draft measures of unit resilience and supporting constructs, including the methods and results of activities that evidenced the content validity of the measures. In the following section, we report the methods and results of successful efforts with two different Army team samples that demonstrate the psychometric soundness and construct validity of the measures. We then introduce the primary product of the prior activities, The Unit Resilience Measurement Battery (The Battery). The Battery is the collection of final, valid measures of unit resilience and related constructs. It includes three alternative options for measuring Unit Resilience (the versions differ in the number of items and diagnostic detail they provide), and measures of Stressors, Environmental Challenges, Minimizing, Mending, and Manifestations. We conclude with a set of applied recommendations based on our research and suggest where future research is needed.

The Need

*“In this environment, there can be no complacency—we must make difficult choices and prioritize what is most important to field a lethal, **resilient**, and rapidly adapting Joint Force.”*
– 2018 National Defense Strategy Summary

Organizational leaders world- and industrywide recognize that teams are essential building blocks of organizations. This is particularly true in the United States Army. Given the demanding nature of its mission, the Army must take actions to ensure that their collective units, not just individual Soldiers, are highly resilient and able to withstand and adapt to a wide range of challenges while also being better prepared for future challenges. Unit resilience is important to maximizing the human potential of Army units in multi-domain operations (Department of the Army, 2018). Therefore, it is important to be able to effectively assess resilience at the unit-level and to understand and examine the factors that can enable or diminish it. In the context of Army operations, terms such as “small unit” are generally understood to refer to groups of Soldiers assigned together as a team, squad, or platoon. While we believe the theory and implications of the current effort are scalable to larger collectives, our focus is on developing construct valid and psychometrically sound measures of the resilience of small Army units. We will use the term “team” to refer to such units. Teams are “a distinguishable set of two or more people who

interact, dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission” (Salas et al., 1992, p. 4).

Results of career surveys often find that careers in the military are considered among the most stressful occupations (e.g., Careercast.com, 2019). This is not surprising given that the literature and our own research with military personnel and teams suggests that modern-day military contexts are wrought with challenges and stressors that stem from a variety of causes. Bartone and colleagues (Bartone, 2006; Bartone et al., 1998) have outlined several sources of stressors faced by military teams including: 1) isolation; 2) role ambiguity; 3) powerlessness; 4) boredom – alienation; 5) danger and threatening environments; and 6) workload. Tucker and colleagues (2009) also identified workload as a source of stress. Other stressors include deployment rates (MacGregor et al., 2012), assignments (Adler et al., 2003), and global deployments (Keats, 2010). Moreover, our discussions with members of Army recruiting teams as part of this effort suggest that some stressors are predictable while others are unexpected.

Research has primarily focused on the impact these triggers of stress have on individual Soldier’s resilience levels (e.g., Harms et al., 2013; Schaubroeck et al., 2011). Schaubroeck et al. (2011) studied Army Soldiers who served in combat units active in Iraq and advanced a model whereby a higher-order psychological trait, Psychological Capital, was believed to somewhat insulate them from negative reactions to traumatic circumstances.

Schaubroeck et al. (2011) found general support for their hypothesized relations, but also found that the number and severity of unit-level traumatic events moderated individual level relationships. Specifically, unit resilience was not a simple aggregation of individual Soldiers’ resilience. Rather, it is truly a team-level phenomenon. Accordingly, a team comprised of highly resilient individuals may still suffer communication breakdowns, inconsistent situational awareness, coordination breakdowns, and low morale in part because of an insufficient amount of *team resilience*. Nonetheless, in comparison to work examining individual resilience, there is still a dearth of research focusing on team resilience. In response, the current effort aimed to develop a better understanding of the nature of team resilience, including the factors that enhance or diminish it. Specifically, our primary objective was to produce theoretically grounded, practical, Army-relevant, validated measures of team resilience that can be used in research and field (i.e., non-research) settings, and that can be completed by either team members, leaders, or informed observers (e.g., trainers).

A solid theoretical foundation and construct clarity is essential for building valid, useful measures of team resilience. Therefore, the current program of research began by clarifying and building upon our existing theoretical framework for team resilience. Prior to our discussion of activities that sought to clarify our framework, we provide a discussion of the theory that provides the foundation of our framework and the nomological network within which the construct of team resilience resides. Additionally, we detail a multi-dimensional conception of team resilience as a dynamic emergent state that gives rise to behavioral manifestations when teams are under pressure. We also highlight factors that may minimize drains on team resilience and help mend resilience levels over time.

Background and Theoretical Foundation

A compelling theory for understanding team resilience is Conservation of Resources (COR; Halbesleben et al., 2014; Hobfoll, 1989). According to COR theory, entities are motivated to protect their current resources (conservation) and to acquire new resources (acquisition). COR theory generally defines resources as objects, states, conditions, and other factors that people value (Halbesleben et al., 2014). The value of resources varies as a function of the entities (e.g., individuals, units) and situations in question. COR theory is grounded on the concept of resources – and for our purposes, we envision team resilience metaphorically as a reservoir of such resources. Some resilience reservoirs may be larger than others, some may drain more quickly than others, and some may replenish faster than others. The volume of the reservoir represents the amount of resources that a team can direct toward handling stressors to maintain performance levels.

The COR theory aligns well with a definition of team resilience introduced by members of our research team: “the capacity of a team to withstand and overcome stressors in a manner that enables sustained performance; it helps teams handle and bounce back from challenges that can endanger their cohesiveness and performance” (Alliger et al., 2015, p. 177). As shown in Table 1, the current *capacity* of team resilience is a key component of several definitions of team resilience within the extant literature (see Altman-Dautoff, 2001; Sutcliffe & Vogus, 2003; West et al., 2009).

Table 1*Exemplar Definitions of Team Resilience*

Citation	Team Resilience Definition
Meneghel, Martinez, & Salanova, 2016	“Team resilience is the <i>capacity</i> to bounce back from failure, setbacks, conflicts, or any other threat to well-being that they may experience” (West et al., 2009, p. 253)
Alliger et al., 2015	“the <i>capacity</i> of a team to withstand and overcome stressors in a manner that enables sustained performance; it helps teams handle and bounce back from challenges that can endanger their cohesiveness and performance” (p. 177).
Carmeli et al., 2013	“a team’s <i>belief</i> that it can absorb and cope with strain, as well as a team’s capacity to cope, recover and adjust positively to difficulties” (p. 149).
Morgan et al., 2013	“a dynamic, psychosocial process which protects a group of individuals from the potential negative effect of stressors they collectively encounter. It comprises of processes whereby team members use their individual and <i>collective resources</i> to positively adapt when experiencing adversity’ (p.552).
West et al., 2009	“the <i>ability</i> to either thrive under high liability situations, improvise and adapt to significant change or stress, or simply recover from a negative experience are less likely to experience the potentially damaging effects of threatening situations” (p. 254).
Sutcliffe & Vogus, 2003	“the <i>capacity</i> to rebound from adversity strengthened and more resourceful” (p. 97).
Altman-Dautoff, 2001	Resilient individuals, groups, or organizations “typically regain their equilibrium faster, maintain higher levels of productivity and quality in their work, preserve their physical and emotional health, and achieve more of their objectives” (p. 16).

A second key component of team resilience found in many definitions refers to the team’s *collective confidence* or efficacy style belief for the future (see Table 1). For example, Carmeli et al., (2013) defined resilience in terms of “a team’s belief that it can absorb and cope with strain, as well as a team’s capacity to cope, recover and adjust positively to difficulties” (p. 149). Others have advanced similar definitions of resilience as including competency beliefs (e.g., Meneghel, Martinez, & Salanova, 2016; Morgan et al., 2013).

We believe that team resilience incorporates both the current capacity and collective (future) confidence dimensions of resilience and in doing so we consider team resilience as an

emergent state. Marks et al. (2001) defined emergent states as “constructs that characterize properties of the team that are typically dynamic in nature and vary as a function of team context, inputs, processes, and outcomes. Importantly, emergent states describe cognitive, motivational, and affective states of teams, as opposed to the nature of their member interaction” (p. 357). Both the confidence and capacity aspects of team resilience reflect cognitive and affective states, with confidence subsuming the motivational aspects. However, unlike other states (e.g., cohesion), team resilience also has a somatic nature to it in terms of members’ current physical resources (e.g., how tired, stressed, physically worn out, etc. that they may be). In sum, team resilience levels are a collective function of members’ current capacities of, and confidence in, their cognitive, affective, and somatic states.

Accordingly, drawing from COR and Alliger et al. (2015) we define team resilience as *team members’ collective **confidence** and **capacity** (cognitive, affective, somatic) to withstand and overcome stressors in a manner that enables sustained performance. Resilience helps them handle and bounce back from challenges that can endanger their cohesiveness and performance.*

In addition to being multi-dimensional, team resilience is also a latent construct. Latent constructs give rise to behaviors – or indicators – but latent constructs are not themselves directly observable. In other words, *team resilience levels give rise to behavioral manifestations when the team is under stress*. These manifestations, in response to stressors of varying types with differing characteristics (i.e. duration, novelty, frequency, etc.), reveal levels of latent resilience.

We conceptualize team resilience as including both current capacity and confidence (for the future) dimensions, which describes the latest thinking with regards to the construct. As such, we set out to develop measures that can capture both the latent construct of resilience as well as related behavioral indicators. This approach set the stage to create measurement tools that can measure team resilience from the perspective of the team members directly as well as from others who are observing the team (e.g., trainers).

Conceptual Clarity

Previously, a lack of conceptual clarity about team resilience lead to a proliferation of different definitions, operationalizations, and construct confusion with related concepts. It is critical to articulate clearly the nature of concepts when outlining a nomological network and building measures of focal constructs (Podsakoff et al., 2016; Schwab, 1980). Such clarity helps to: (a) make it easier to distinguish a focal concept from similar concepts in the field; (b) diminish concept proliferation (aka, multiple inconsistent versions of a construct); (c) increase the alignment between a concept and its measures or manipulations; (d) specify and test a nomological network associated with one’s focal concept; (e) decrease the likelihood that measures of one’s focal concept will be deficient or contaminated (Podsakoff et al., 2016). The required level of precision guided us to detail the nature of team resilience as a latent variable as well as its manifestations while under duress, and to distinguish it from related – but different – constructs.

Resilience levels may enable a team to adapt to challenging circumstances and maintain performance under pressure. However, adaptation and performance changes are not themselves resilience – they are manifestations or outcomes of resilience. The construct of team resilience

has often been conflated with factors that build resilience and outcomes that stem from it. For example, Sharma and Sharma (2016) recently offered a measure of team resilience encompassing four sub-dimensions: (a) group structure; (b) mastery approaches; (c) social capital; and (d) collective efficacy. Notably, social capital may be considered as a part of the “capacity” facet of resilience, whereas collective efficacy represents the collective “confidence” facet. However, group structure is a potential antecedent of team resilience, as are members’ mastery approaches. Elsewhere, West et al. (2009) included adaptability as an aspect of resilience. Although latent resilience levels may generate manifestations in the form of adaptability under stress, and adaptability may serve to build future resilience capacities – they are separate and distinct constructs.

Our research has developed and applied a measurement approach that differentiates levels of core resilience as a multi-dimensional emergent state (with capacity and confidence sub-dimensions) for cognitive, affective, and somatic (i.e., physical) conditions that may be indexed at any point in time. In other words, it captures how mentally, emotionally, and physically spent a team is at any given time. Notably, these are inferred *unobservable* variables that may be estimated by the members themselves.

When teams are subjected to stressors, resilience levels may also be observed or inferred from the patterns of team behaviors that occur – i.e., *resilience manifestations*. These resilience manifestations represent behaviors and processes that a team evokes under stress in order to maintain health and performance. Such behaviors may include maintaining situational awareness, emotional control, and monitoring members’ physical health. They may also include actions such as monitoring resource levels, teammates, and progress toward goals, as well as processes such as coordination actions, back-up behaviors, and adapting to challenges. Resilience manifestations are only apparent when teams are exposed to stressful conditions. This is in contrast to core resilience levels (current capacity and collective confidence) that can be assessed at any particular time - or in general, in terms of a team’s overall resilience across situations.

Figure 1 depicts our Unit Resilience Model, which depicts the construct space, or nomological network of relations, surrounding team resilience. As noted above, team resilience is a multi-dimensional latent construct comprised of members’ *future confidence* and *current capacity* levels (i.e., cognitive, affective, and somatic) which give rise to behavioral resilience manifestations (e.g., situational awareness and emotional control, diagnosing challenges, coordination, and backup behaviors) when teams are stressed.

Also shown in Figure 1 are example enablers that can help to build and protect resilience levels (i.e., “*minimizing factors*”) as well as other enablers which promote recovery (i.e., “*mending efforts*”). Each of these categories tie in nicely with COR theory, as this theory focuses on two related phenomena: 1) primacy of resource loss—the notion that there is more of a premium on avoiding losses in any circumstance than there is on promoting gain; and 2) resource investment – individuals will invest resources in order to protect against and recover from losses, and to stockpile resources (Halbesleben et al., 2014; Hobfoll, 1989).

Minimizing factors such as proper staffing levels, training activities, planning and anticipating activities, and the availability of vital resources, as well as other interventions can be

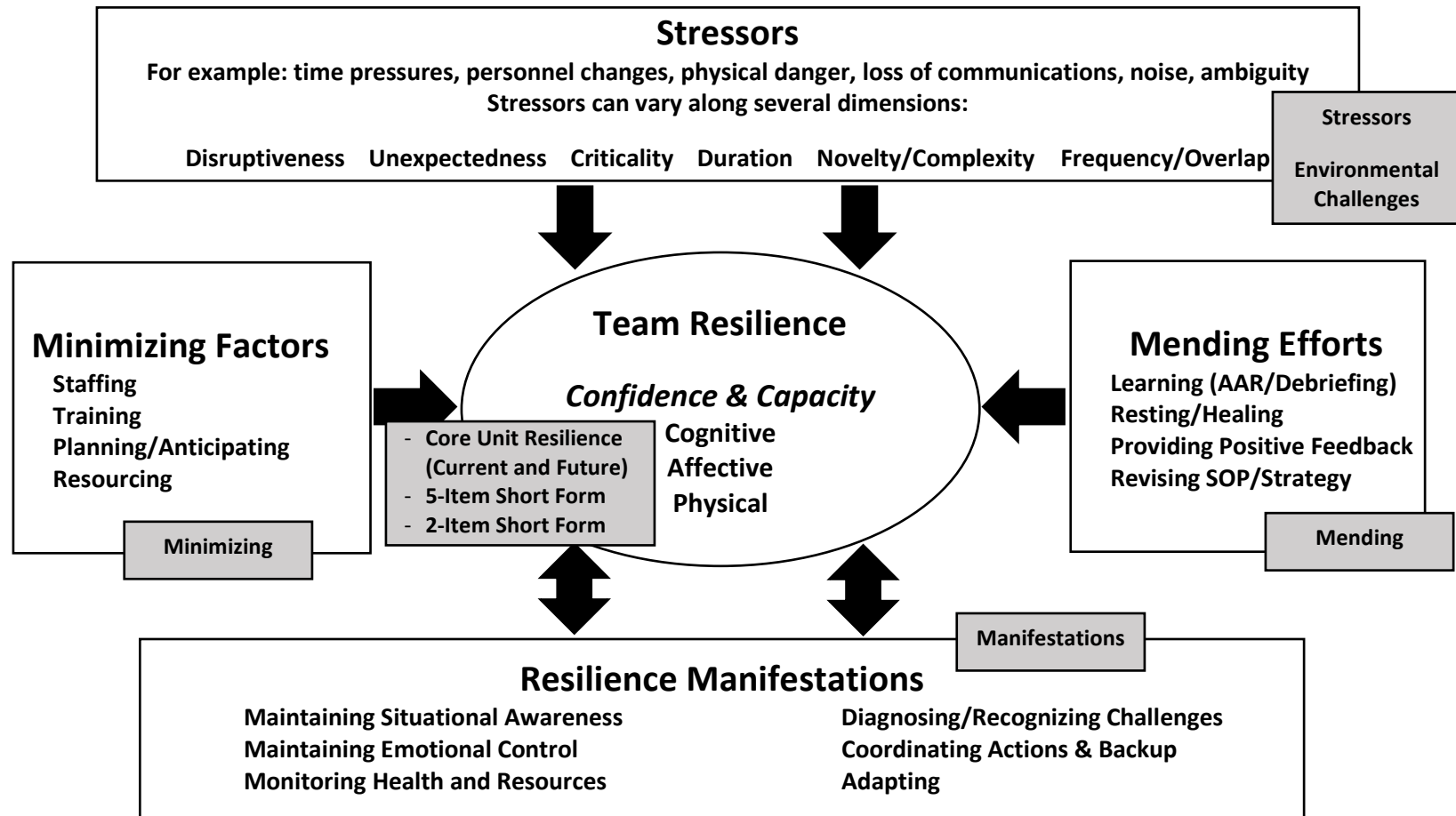
introduced prior to task engagements, and are designed to help build or replenish resilience levels and to minimize the loss of resilience when the team faces future stressors. Accordingly, the “minimizing” actions taken by the team prior to facing a stressor represent different forms of *resource investments* designed to build and protect future resource (resilience states) levels. Importantly, these factors are antecedents to resilience – they are not indicators of resilience themselves. The extant literature often conflates the two types of constructs. For theoretical, diagnostic, and practical concerns it is important to differentiate antecedents from the resulting levels of unit resilience (Podsakoff et al., 2016). Similarly, other enablers, “*mending efforts*”, can be evoked after team task engagements. Again, from the COR theory lens, these represent efforts to replenish resilience levels as quickly as possible and reduce the loss of resilience resources during subsequent action. Accordingly, mending efforts tie into the “recover from losses” aspect of *resource investment* from the COR theory. Examples of mending efforts include conducting well-designed learning activities (e.g., after action reviews [AARs]/debriefing sessions), ensuring ample rest and healing, providing positive feedback and encouragement, and revising standard operating procedures (SOPs) and strategies as warranted. As with *minimizing*, it is also important to acknowledge that these *mending efforts* are distinct from team resilience levels.

As stated previously, the manifestations of team resilience are most apparent when the team is subjected to stressors. In the Army, stressors can include time pressures, staffing or skill shortages, loud noises, physical demands, or even hazardous conditions, etc. Prior work has theorized about the importance of different types of stressors (e.g., Maynard et al., 2015), and we recognize that stressors and challenges within the team environment can vary along several critical dimensions. Within Figure 1, we highlight several dimensions along which stressors may vary such as the level of disruptiveness of the stressor (mild to severe), whether it was expected, and the criticality of the stressor for the team (e.g., Morgeson & DeRue, 2006). Given the fact that we conceptualize team resilience as being highly dynamic, we also include several temporal dimensions. We consider the duration of a given stressor, how frequently such stressors emerge, and whether they overlap with one another, as repeated sustained exposure to stressors may compound their impact and drain subsequent team resilience levels.

Finally, while not depicted in Figure 1, team effectiveness plays an important role in the team resilience nomological network. Successfully navigating challenging circumstances directly influences team effectiveness. Effectiveness can be gauged in a variety of ways including team productivity, efficiency, and quality, as well as social psychological outcomes such as members’ collective and individual reactions, unit cohesion, command climate, and burnout (Mathieu & Gilson, 2012). In turn, team effectiveness levels will have implications in terms of future team resilience levels. Highly effective teams may be able to protect or even build their resilience resources, whereas ineffective teams may tax team resilience and lower their capacities going forward. Thus, resilience enables teams to be effective in challenging situations and being effective in turn can boost resilience levels for the future.

Figure 1

The Unit Resilience Model



Note. The unshaded shapes (rectangles and oval) represent the constructs, or factors, within the Unit Resilience Model. The grey text boxes list the names of the measures that assess the factors.

Chapter 2. Theory Development and Grounding

Unit Resilience Theoretical Framework and Previous Measures

Introduction

Our effort began by engaging in activities to more fully develop our theoretical understanding and framework. To ensure we had a clear and updated understanding of how the team resilience construct had been defined and conceptualized by prior researchers and take note of any prior attempts to actually measure this construct, we conducted a review of the literature in the areas of unit and team resilience. This built upon prior reviews conducted by members of our team (e.g., Alliger et al., 2015; Maynard et al., 2016).

Method

Our review started by doing a search of Web of Science, PsychInfo, and Business Source Premier databases for work that included resilience and team, group, or unit in their title or abstract. We complimented this broad search with a ‘backward search’ of reference lists in the articles obtained from our search of the databases indicated above. Likewise, to make sure we were not missing any pertinent articles, we also ran a search within Google Scholar with the same keywords as well as a search to identify unpublished studies by searching the online programs of multiple scholarly conferences (e.g., Academy of Management, Society for Industrial and Organizational Psychology). From the articles that surfaced through this multi-faceted approach, we made note of the various ways in which unit/team resilience had been defined and conceptualized to make sure we understood the theoretical heritage of this construct. Additionally, we pulled out any articles that had actually measured unit/team resilience previously.

Results and Discussion

The theoretical grounding that emerged based on our review of the literature shaped our thinking around the team resilience nomological network that we introduced as part of this project. Namely, we confirmed our view of team resilience as a latent construct that is positioned between minimizing and mending factors suggested by Alliger et al. (2015). As such, while team resilience can exist, it is only visible through various resilience manifestations in the face of various stressors. Each of these categories are detailed within our suggested team resilience nomological network.

In terms of prior studies that actually measured unit/team resilience, we found 18 salient articles (see Table 2). Of note here is that some of these prior measurements tapped items that we would view as minimizing, manifestations, or mending (e.g., Lopes, 2010; van der Beek & Schraagen, 2015). That said, there were a few measures that attempted to measure unit/team resilience in line with the manner in which we conceptualized team resilience as including both capacity and confidence (e.g., Carmeli et al., 2013; Rahimnia et al., 2014). A limitation of the existing measures is the variation of the given referents, which range from the individual, to the team, to leaders, and up to the organizational level, as shown in Table 2. Level of analysis is an

important consideration, given that the team level is the focus of our conceptualization, this provides motivation for developing a measure appropriately aligned to the team level.

Conducting this review enabled us to see sample items, scales and scale anchor points, and psychometric characteristics (e.g., Cronbach's alpha) of prior measures of unit/team resilience and other constructs within our model. We considered these features from prior measures as we developed our measures for this effort.

Table 2*Team Resilience Measurement Literature Review Summary*

Citation	Context	Dimensions in our Model	Sample Items	Measurement Considerations
Alliger et al., 2015	Team-level of analysis	Minimizing; Mending	Establish a process for assessing and communicating the nature and potential impact of a developing situation/challenge	Does not use a scale but provides behaviors of resilient teams
Amaral et al., 2015	Team-level of analysis (115 individuals of information technology/information systems projects developed in an academic setting)	A little of all - including physical	- Promote the ability of project team members to learn from mistakes - Minimize disturbances during the project lifecycle (e.g., lack of information, rumors, etc.)	Not really the creation of a scale. Merely solicited input from respondents on the things that are most likely to lead to the development of team resilience
Blatt, 2009	Team-level of analysis (122 entrepreneurial teams)	Mending	When unexpected challenges occur, we discuss how we could have prevented them.	Cronbach's alpha not reported but stated as "high"
Carmeli et al., 2013	Top Management Team (TMT) Level of Analysis (74 TMTs studied)	Unit Resilience - confidence & capacity	- When encountering a new and difficult task, we are certain we can do it successfully - We do not make the necessary changes and adaptations to respond effectively to changes in the industry (reversed)	5-point Likert scale (ranging from 1 = not at all to 5 = to a large extent) - Cronbach's alpha for the two scales were .82 and .88 respectively

Citation	Context	Dimensions in our Model	Sample Items	Measurement Considerations
<i>(continued)</i>				
Carmeli et al., 2010	Organizational-level of analysis (117 organizations)	Unit Resilience - capacity	This organization encounters difficulties to respond to environmental changes (reversed)	5-point Likert scale (ranging from 1 = to a large extent to 5 = not at all) - Cronbach's alpha = .82
Carmeli & Sheaffer, 2008	Organizational-level of analysis – perceived organizational capacity to adapt (121 organizations)	Unit Resilience - capacity	This organization is having difficulties in responding and adapting to environmental turbulence (reversed)	5-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree) - Cronbach's alpha = .70
Lopes, 2010	Small unit level of analysis – a development of a tool but not tested	Minimizing; Manifestation; Mending	- Unit leaders promote organizational values, learning, growth, and efficacy - The unit has sufficient strategic, logistic, or material resources to accomplish their mission - The unit is able to improvise and provide flexible and adaptive responsiveness to adverse situations	5-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree)

(continued)

Citation	Context	Dimensions in our Model	Sample Items	Measurement Considerations
Mallak, 1998	Mixture of individual- and team-level of analysis (128 nurse executives from Michigan)	Minimizing; Manifestation	• Enjoy improvising solutions to problems • Have access to resources	N/A
Meneghel, Martinez, & Salanova, 2016	Team-level of analysis (1,633 employees in 275 teams from 52 Spanish companies)	Minimizing; Manifestation; Unit Resilience	In difficult times, my team... • tries to look on the positive side • adapts to changes in a positive way, and become stronger when overcome them	N/A
Meneghel, Salanova, & Martinez, 2016	Team level of analysis (1,076 employees who are part of 216 teams in 40 different companies)	Minimizing; Manifestation; Unit Resilience	In difficult times, my team... • tries to look on the positive side • adapts to changes in a positive way, and become stronger when overcome them	• 7-point Likert scale (ranging from 0 = never to 6 = always) • Cronbach's alpha = .87
Morgan et al., 2013	Team-level of analysis (Case study across a range of sports)	Not a scale - just dimensions	• Gaining experience of challenging situations • Sustaining high effort levels in difficult moments	• Did not develop a scale but introduced dimensions

(continued)

Citation	Context	Dimensions in our Model	Sample Items	Measurement Considerations
Powley & Lopes, 2011	Small unit level of analysis – a development of a tool but not tested	Minimizing; Manifestation; Mending	Similar items to those in Lopes, 2010: • The unit is able to adapt to changes in their operational environment, and accomplish its goals with minimal dysfunction and without wasting the units' finite resources	• 5-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree)
Rahimnia et al., 2014	TMT-level of analysis (139 TMTs from industrial units in Northeast Iran)	Unit Resilience - confidence & capacity	• When the top management team encountering a new and difficult task, it is certain it can do it successfully • To which extent, the top management team makes the necessary changes and adoptions to respond effectively to changes in the industry	• Cronbach's alpha = .83 for efficacious beliefs and .81 for adaptive capacity
Sharma & Sharma, 2016	Scale development of resilience at team-level of analysis –responses from 160 individuals from 12 IT companies in India	Minimizing; Manifestation; Mending; Unit Resilience	• My team can handle the most difficult situations • The team is highly imaginative in thinking about new or better ways to complete our task(s) • Team members adjust their approach(es) to overcome obstacles	• Responses of individuals who are not necessarily grouped within teams – just individual responses

(continued)

Citation	Context	Dimensions in our Model	Sample Items	Measurement Considerations
Sinclair & Wallston, 2004	Individual-level of analysis (individuals with rheumatoid arthritis)	Unit Resilience; Mending; Manifestations	• I believe I can grow in positive ways by dealing with difficult situations • I look for creative ways to alter difficult situations	• Cronbach's alpha values ranged from .64 to .76 across the four data collection episodes
Stephens et al., 2013	TMT-level of analysis (82 TMTs from Israeli firms)	Unit Resilience	• We (TMT members) know how to handle difficult situations when we face them	• 7-point Likert scale (ranging from 1 = not at all to 7 = to a very large extent). • Cronbach's alpha = .92
van der Beek & Schraagen, 2015 (includes some copyrighted items)	Scale development of resilience at team-level of analysis – responses from 91 participants from 2 companies	Minimizing; Manifestation; Mending	If an irregularity/unexpected situation arises when solving a disturbance, then... • The people in my team ask each other critical questions to get a clear idea of the situation and our task	• Responses of individuals who are not necessarily grouped within teams – just individual responses
West et al., 2009	Team-level of analysis (101 teams; 3- or 4-person teams) comprised of 343 students from a Midwestern university	Unit Resilience	• Our team can get through difficult times at work because we've experienced difficulty before • When we have a setback at work, our team has trouble recovering from it, moving on (reverse)	N/A

Unit Resilience Content Grounding Interviews

Introduction

Following our review of the literature we conducted group interviews (i.e., focus groups) with members of Army recruiting teams. The objective of these interviews was twofold. First, we sought to ensure that our measures, based on theory, would also be grounded in Army team needs and realities. Second, as we planned and prepared for our construct validation efforts, we realized that we needed to ensure that the teams that would participate in our validation activities were ideal candidates for our research. Specifically, the teams needed to be composed of members who worked interdependently (i.e., not simply groups of individuals who do not interact) and needed to be exposed to challenges and stressors that could trigger manifestations of unit resilience.

Method

Participants. During planning stages of our project, Army recruiting teams had been identified as potential participants for subsequent validation work given their stressful mission and that they worked in teams. Therefore, researchers from the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) and the Group for Organizational Effectiveness (gOE) conducted interviews with members of two Army recruiting teams in Harrisburg, PA. Participants from one team included 11 recruiters/team members and a team commander and participants from the second team were seven recruiters/team members and a commander.

Procedures and Materials. Researchers interviewed recruiters together as a team and interviewed team commanders individually and separate from their teams. In total, we conducted two team interviews and two commander interviews. Discussion questions focused on the nature and structure of typical recruiting teams and the recruiting team mission, the interdependency of recruiting teams, challenges and stressors faced by recruiting teams and their commanders, and outcomes/metrics (for the full group interview protocol with questions, see Appendix A).

Results and Discussion

Stressors and Challenges. Our discussions with the recruiting team members and commanders suggest that recruiting teams execute a stressful mission with both acute and chronic stressors at the individual and team levels. For example:

- A variety of stressors are tied to external factors (e.g., economy, unhappy public), lack of tools/resources, long hours, and work-life balance struggles.
- Many recruiters, who are re-assigned from their primary military occupation and area of expertise, find it stressful to start over in a new career.
- Team members feel accountable to the team to perform well (e.g., poor individual performance can feel like you have let the team down).
- Teams operating with fewer members are still expected to meet the same goal.
- It can be stressful for some who feel they are an “outsider” to the rest of the team (fault lines).

Also, participants shared that some stressors are predictable/expected (e.g., those tied to certain times of the year, events, and locations) while others are “pop up” stressors (e.g., recruits changing their minds; getting yelled at by people in public; last minute tasks assigned; team members getting sick).

Given that we were planning to use a longitudinal research design for our subsequent validation work, we were interested in learning about their mission flow and stress inflection points. We learned that recruiting teams work within monthly “phase lines” or windows. Most teams need to “make mission” each month, but no one week within the monthly cycle is perceived as universally more stressful than the rest. The first quarter of the year tends to be the busiest (creating more stress) and the workload tends to taper off toward the end of the summer. Teams also need to meet annual goals. Commanders feel a constant flow of stress throughout the year.

Of note, our discussions revealed that recruiting teams engage in an assortment of activities to handle stressors. For example, team members often talk about their stress and “vent” to one another, helping each other decompress. Some take breaks while others use humor to reduce stress. Some team members offer advice and support to other team members who need it. Also, team commanders can act as a buffer from some stressors (e.g., can “take the heat” from above). We heard that some teams may engage in more of these activities than others, but most recruiting teams engage in at least some “minimizing” and “mending” activities.

Interdependency. Our discussions with the teams and commanders suggest that most Army recruiting teams are at least somewhat interdependent and would be suitable for our validation research. However, interview participants stated there are likely to be distinctions between teams in terms of the extent to which the members work interdependently and rely on one another. Given that team interdependency could influence how a team minimizes and mends in the face of stressors, this suggested a need to examine interdependency in our research.

Summary of Theory Development and Grounding Activities

Our literature review confirmed our understanding of our theoretical framework (e.g., unit resilience as a latent construct which manifests in observable behaviors) as well as our awareness of existing measures of unit resilience and other related constructs. Our interviews with Army recruiting teams grounded our theory within the Army unit context and confirmed the suitability of Army recruiting teams for our research. Army recruiting teams encounter a variety of stressors and challenges and the nature of these challenges can differ (e.g., challenges can differ in terms of their expectedness or novelty). Teams often take actions to “minimize” and “mend” the impact of those stressors, but the exact actions they take and the extent to which they take them may differ. Moreover, these actions could be influenced by team interdependency. Based on these insights, and our theoretical framework of unit resilience, we set out to develop measures of unit resilience (current capacity and future confidence), manifestations, minimizing behaviors, mending behaviors, stressors, environmental challenges, and interdependency.

Chapter 3. Measurement Development

Item Pool Development

Introduction

Based on the literature and our conversations with Army teams we developed draft measures of unit resilience and the other supporting constructs within our theoretical framework. During early development stages the items were discussed and reviewed multiple times by the gOE and ARI project teams. At this stage, items and scales were primarily reviewed and revised for clarity and simplicity (e.g., simplify double-barreled items), and to remove redundancies. Also, items for most measures were “mapped” to the sub-dimensions within our Model of Unit Resilience in an initial attempt to develop content-valid or at least face-valid items. For example, we identified the items on the Manifestation scale that represented each of the Manifestation dimensions within the Unit Resilience Model (e.g., Maintaining situational awareness, maintaining emotional control, monitoring health and resources). Draft items were then distributed to a small number of Army Soldiers for their feedback. A general description of each of the initial draft measures, the development process, and the review process and feedback are described below. The final set of measures are in The Unit Resilience Measurement Battery (See Appendix B).

Initial Draft Measures

Core Unit Resilience. Team resilience is comprised of two dimensions (current capacity and future confidence). It also includes three content domains: 1) Affective includes team psychological states relating to feelings, attitudes, and emotions; 2) Cognitive consists of team states that concern members’ thoughts or beliefs regarding a specific factor; and 3) Somatic states refer to members’ physical and mental conditions at any given time. Therefore, we developed two 10-point scales, each of which asks team members to rate their team’s level of team resilience specific to three types of resources: affective, cognitive, and somatic (note that the term “physical” is used in place of “somatic” on the final set of measures to reflect feedback during review stages). The first scale asks members to choose the number that describes the team’s current resource level for each of the resources (10 = Low [Totally spent, nothing in reserve]; 50 = Medium [Somewhat depleted, but something in reserve]; 100 = High [Fully ready with plenty in reserve]). The second scale asks team members to choose the number that describes the team’s confidence that it will have enough of each resource to handle future challenges effectively. Each scale includes 12 items, where 4 items represent affective resources, 4 items represent cognitive resources, and 4 items represent physical resources.

Two-Item Unit Resilience Short Form. We also developed two items that were designed to gather a more general or overall assessment of unit resilience. The items were developed to represent two key components to our definition of team resilience. Specifically, team members are asked to rate the extent to which the team can 1) withstand future challenges, and 2) bounce back quickly from setbacks. This measure employed a 5-point Likert-type extent scale from 1-5. The reason for developing and validating a shorter measure was to provide users with an alternative that could be used

in situations where there is not enough time to administer the longer Core Unit Resilience Measure or when information about specific resilience dimensions or resources is not desired.

Five-Item Unit Resilience Short Form. While this measure was not drafted until after our psychometric and validation efforts, we have described it here for parsimony. This measure was created to provide users with a third option for assessing unit resilience. It combines the two items from the Two-Item Unit Resilience Short Form with three “marker” resource items from the Core Unit Resilience measure. The markers are items that evidenced strong CFA factor loadings on each of the three resource type factors: Motivation (affective), Shared Situational Awareness (cognitive), and Energy (physical). On this Five-Item Unit Resilience Short Form team members are asked to use a 5-point scale (1-5) to rate the team’s current resource level for each resource, this was reduced from the 10-point scale used on the Core Unit Resilience measure for consistency within the shortened measure and ease of scoring

Team Actions and Preparations. Based on Alliger et al. (2015), we drafted three sets of items that ask about team member actions and preparations. Each measure can be completed by either team members or observers. The Manifestations scale asks how often the team exhibited 11 different behaviors when needed (1 = NO NEED to demonstrate this behavior; 5 = Every time). The items were developed to reflect each of the 6 Manifestation areas reflected in our theoretical framework (e.g., maintaining situational awareness, maintaining emotional control, adapting).

The 6-items on the Minimizing scale were developed to reflect the common team Minimizing behaviors reflected in our Unit Resilience Model (e.g., staffing, training, planning/anticipating). Respondents are asked to rate to what extent the team exhibited each behavior (1 = Not at all; 5 = To a very great extent).

The 10 Mending items were developed and mapped to the Mending dimensions from our model: Learning, resting/healing, providing positive feedback, revising SOP/strategy, and rebuilding relationships. Respondents are asked to rate how often the team exhibited each behavior when it was needed (1 = NO NEED to demonstrate this behavior; 5 = Every Time).

Stressors. Prior work has theorized about the importance of different types of stressors/disruptions (e.g., Maynard et al., 2015). Based on the literature, we developed 15 items that ask about the extent to which the team experienced a variety of stressors. These items were customized to focus on stressors relevant to Army teams (e.g., loud noises, prolonged separation from family, time pressures, personnel changes, physical demands). Respondents, who can be team members or observers, are asked how often the team experienced each stressor (1 = Never; 5 = Constantly).

Environmental Challenges. Based on Morgeson and DeRue’s (2006) event characteristics, we developed six items that ask respondents to consider the variety of challenges that the team confronted and the nature of those challenges. Each item was developed to feature a different dimension along which stressors may vary (e.g., disruptiveness, expectedness, criticality). Each item includes four multiple-choice options that are tailored to the particular challenge.

Methods and Results

Draft items were reviewed by Soldiers and scholars knowledgeable about Army populations for their review and feedback. Reviewers included a Sergeant Major from the United States Army Reserve, a Chief Warrant Officer 4 from the Army National Guard, a First Lieutenant from the National Guard, a Captain within the United States Army Reserve, an Active Duty Major in the United States Army, an Army Sergeant First Class, and one civilian. A majority of the reviewers had deployed to Afghanistan or Iraq at least once and three were experienced team observers (Observer/Controller Trainers).

Following their review of the measure, ARI researchers spoke with each individual reviewer and asked them questions to elicit their feedback on the clarity and relevance of the items to Army teams (see Appendix C for the list of questions that guided these discussions). Based on the input gathered from the reviewers, we revised item wording and instructions. An example of changes made within the instructions included the development of a simpler or “operational” definition of team resilience within the instructions for the Core Unit Resilience measure. Also, instructions within the Core Unit Resilience measure initially included an analogy to a tank of resources where one’s tank could be empty, partially full, completely full, etc. However, reviewer feedback suggested that this analogy was confusing to many and therefore, it was removed. The revised measure was then reviewed by two members of ARI’s Emerging Research Unit as well as an Army National Guard Soldier. Based on their feedback, items were further edited and refined. The revised measures were prepared for validation activities.

Content Validation of Core Unit Resilience

As the core focus of the current effort, we wanted to ensure that the measure of Core Unit Resilience is relevant to and representative of the targeted unit resilience construct. Therefore, we also gathered evidence of this measure’s content validity. Haynes et al. (1995) define content validity as the extent to which “elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose” (p. 238). To assess the content validity of our measure of the three team resilience domains, we followed the general recommendations set out by McKenzie et al. (1999) and Rubio et al. (2003).

Sample and Method

We employed a methodology outlined by Anderson and Gerbing (1991) for assessing substantive (i.e., content) validity of items and collected subject matter expert’s (SMEs) categorizations of the items. Specifically, we solicited input from 36 colleagues from 12 institutions (89% academic, 11% applied) who were well-versed in the team literature and applications. The sample was 72% women and ranged in age from 22 to 49 (mean = 30.83, SD = 6.65). Their education levels ranged from bachelor’s degrees (39%), to master’s degrees (25%), to doctorates (36%). Seventy-five percent of the sample reported their primary discipline as psychology, and 25% as management.

Results

We prepared an on-line questionnaire that presented the 12 items from the Core Unit Resilience measure, randomized per respondent, and asked them to classify each one into one of three domains using the following definitions: 1) Affective includes team psychological states relating to feelings, attitudes, and emotions; 2) Cognitive consists of team states that concern members' thoughts or beliefs regarding a specific factor; or 3) Somatic states refer to members' physical and mental conditions at any given time. The results of their classifications are summarized in Table 3.

On average, items were classified as belonging to their intended dimension 80% of the time (also termed the proportion of substantive agreement; Anderson & Gerbing, 1991). Eleven of the 12 items were accurately categorized significantly more often than chance, with the exception being *Alertness*, which was intended as an indicator of Cognitive (11%) but was actually classified more often as Somatic (23%).

Anderson and Gerbing (1991) described the use of a *coefficient of substantive-validity* (C_{SV}) which ranges from -1 to 1, with larger values indicating greater item substantive validity. More specifically, using the SMEs' item categorizations, items have higher C_{SV} values to the extent that they are classified consistently as belonging to their intended construct as compared against their next most commonly used category. This provides a more stringent test than does a comparison against a random baseline. As shown in the right most column of Table 3, nine of the 12 C_{SV} values were significant using this more stringent criteria. The three nonsignificant C_{SV} values included the problematic *Alertness* item, *Composure* (58% Affective as intended, but 33% Somatic), and *Mental Readiness* (61% Cognitive as intended, but 36% Somatic).

In summary, all four Somatic items were classified significantly more often as intended (average = 92.25%) as compared to chance or the next most frequent category (average C_{SV} = .86). All four Affective items were classified significantly more often as intended (average = 77.50%) as compared to chance, and three of four significantly more often than the next most frequent category (average C_{SV} = .60). Three of the four Cognitive items were classified significantly more often as intended (average = 70.00%) as compared to chance, and two of four significantly more often than the next most frequent category (average C_{SV} = .42).

Conclusion

The results suggest that the 12 items can be tested as part of planned construct validation efforts. Although the content analysis intimated that one item may be problematic, the team measurement literature suggests a need to examine this item and measure further empirically. Mathieu et al. (2020) found that some items that were considered weak in terms of content validity (using this approach), can turn out to be acceptable when subjected to empirical scrutiny. Hence, empirical testing with a sample of responses from our target population(s) is important before making any changes.

Table 3.*Subject Matter Expert Classifications of Team Resilience Core Items*

Item	SME Classifications			%	χ^2	C _{SV}
	Somatic/Physical ^a	Affective	Cognitive			
Somatic/Physical						
1. Rest	36	0	0	100	72.00***	1.00***
2. Energy	31	4	1	86	45.13***	0.75***
3. Physical fitness	36	0	0	100	72.00***	1.00***
4. Endurance	30	5	1	83	40.50***	.69***
Affective						
1. Mutual trust	1	26	9	72	24.50***	0.47**
2. Morale	2	34	0	94	60.50***	0.89***
3. Motivation	2	31	3	86	45.13***	0.78***
4. Composure	12	21	3	58	10.13**	0.25
Cognitive						
1. Task or mission related knowledge	1	0	35	97	66.13***	0.94***
2. Shared situational awareness	3	1	32	89	50.00***	0.81***
3. Alertness	23	2	11	31	0.13	-0.33
4. Mental readiness	13	1	22	61	12.50**	0.25

Note. N = 36, % = Percentage intended classification, C_{SV} = coefficient of substantive-validity

^aThe term “somatic” was changed to “physical” in later versions of the measures, the Unit Resilience Model, and other supporting materials. ** $p < .01$. *** $p < .001$

Chapter 4. Measurement Validation

Study 1: Army Soldier Teams at Army Installations

Introduction and Methodology

To establish the psychometric properties and construct validity of the Core Unit Resilience and supporting measures, we administered the measures to Soldiers in intact teams within squads at multiple Army installations.

Sample and Procedures. Researchers administered paper scannable questionnaires to the participating Soldiers during one-hour sessions. Across the Army installations, ARI personnel collected a total of 705 questionnaires during multiple sessions conducted at multiple Army installations in the summer and fall of 2019. Participants were asked to report their battalion, company, platoon, squad, and team memberships, yet all individual responses remained confidential. We dropped 26 of the questionnaires that were collected: (a) two for excessive missing data (>50% nonresponses); and (b) 24 that lacked sufficient identification to identify their squad or team, or who represented a single response from a unit. This resulted in 679 useable questionnaires. This sample was mostly Private First Classes, Specialists, and Sergeants. Most participants had been members of their team for between one month and one year.

Aggregation Level. The multi-level paradigm suggests that data may be aggregated to represent the same or different constructs at different levels of analysis (Rousseau, 1985). However, modern-day applications have emphasized the importance of specifying the focal theoretical level(s) of constructs being investigated and then producing evidence that the measures employed in an investigation support the use of data at that (those) level(s) (cf., Chen et al., 2005; Mathieu & Chen, 2011).

As emphasized throughout our theoretical foundation, we are interested in creating a construct valid measure of team resilience. Therefore, the measure instructions and item referents consistently referred to “your current team.” Additionally, researchers defined “your current team” as the two-to-five-person team within the squad when verbally introducing the questionnaire and reviewing the instructions. From the data collected, we had one or more questionnaires from members of 449 teams which will constitute our focal level of analysis. Included in this total are data from two or more members of 129 teams (encompassing 353 respondents). The multi-member responses for the 129 teams enable us to calculate agreement indices and intra-class correlations, the latter of which refer to the relative within vs. between group variance in participants’ responses. For the factor structure and substantive analyses, the N of analysis is 449 which includes item averages (across) members for the 129 teams with multiple responses, along with 320 teams for which we had a single member response. We should note that had we focused exclusively on the multi-respondent teams ($n = 129$), the same pattern of effects would have been evident – but of course with substantially lower power to detect differential validity.

Finally, we should also note that many times Soldiers equate “team” with their squads. In other words, some respondents may have considered the squad working relationships when responding to the team referenced items. Our sample could be aggregated in terms of 152 squads for which we had two or more questionnaires (encompassing 537 respondents) and another 143 squads for which we had a single questionnaire. Accordingly, we ran parallel analyses as reported below at the squad level of analysis and the results are summarized in Appendix D.¹ Generally, the squad level analyses yielded results that replicated the team level results.

Analysis Strategy. To justify aggregating multiple members’ responses to represent a higher-order construct, it is important to first demonstrate that they agree with one another beyond what would be expected by chance. Thus, the primary determinant of whether evidence exists to support aggregating individuals’ referent-shift style measures (as we have here), are agreement indices (Chen et al., 2005; James, 1982). James (1982) submitted that “[t]he use of aggregates for this purpose is predicated on demonstrating perceptual agreement because agreement implies a shared assignment of psychological meaning and provides a composition theory for climate [or team constructs in this case] at different levels of analysis” (p. 228). That was the reasoning behind James et al.’s, (1984) development of the r_{wg} index. Accordingly, given that these scales are referent shift (i.e., wording aligned with team level phenomena), we report the median r_{wg} agreement index (James et al., 1984) to justify aggregating individual members’ responses to the team-level. We adopted the rectangular distribution for these tests because we saw no basis for anticipating skewed distributions, nor were they prominent in the data. Traditionally median r_{wg} values $>.70$ for multi-item scales are considered sufficient agreement to justify aggregation. This strategy aligns the measurement reliability information with the level of analyses used for substantive tests (see Chen et al., 2005).

We also calculated ICCs for the scales. ICC1 is the reliability of an individual’s rating of the group mean, which is also the proportion of total variance attributable to team membership. In contrast, ICC2 represents the reliability of the group average rating (Chen et al., 2005). LeBreton and Senter (2008, p. 838) suggested that ICC1 values of .01 might be considered small, $\geq .10$ as medium, and $\geq .25$ as large. Although ICCs provide information about the relative between team variance inherent in individual members’ ratings, they are a type of interrater reliability and are not equivalent to, and should not be confused with, measures of agreement or internal consistency (LeBreton & Senter, 2008). Therefore, we also report scale internal consistency measures using members’ average response per item as the indicators at the team level of analysis.

We conducted CFA using the 12 items of the three lower-order team resilience dimensions (i.e., physical, affective, and cognitive) to determine their relative convergent and discriminant validity. We first fit the items to a three-factor latent model and compared the results against a single-factor latent model. To gauge model fit for these and later analyses, we report the standardized root mean square residual (SRMR) and the comparative fit index (CFI). We also report chi-square values which provide a statistical basis for comparing the relative fit of nested models. We adopted the following cutoffs for model fit suggested by Mathieu and Taylor (2006): models with CFI values $< .90$ and SRMR values $> .10$ are *deficient*, those with CFI $\geq .90$

¹ Appendix D also includes results from item-level analyses, which are consistent with the results reported at the construct level for both teams and squads (see Tables D5 – D10).

to $< .95$ and SRMR $> .08$ to $\leq .10$ are *acceptable*, and those with CFI $\geq .95$ and SRMR $\leq .08$ are *excellent*.

Results

Table 4 presents the team resilience subscale and scale internal consistencies, intercorrelations, and descriptive statistics. These are reported separately for the measures that referred to *current team resilience levels* and those that referred to *future confidence resilience levels*. Some clear patterns were evident. First, all subscales and overall composites evidenced sufficient member agreement to warrant aggregating data. Second, save for the current physical levels of resilience subscale, all other subscales and the composites exhibited significant ICCs of moderate levels. Third, all subscales and the overall composites evidenced high internal consistencies. Fourth, the three subscales (physical, affective, and cognitive) were highly correlated in terms of current levels (mean $r = .69, p < .001$) and future confidence levels (mean $r = .78, p < .001$). Finally, the subscales and overall composites for current and future levels were all very highly and significantly correlated (physical: $r = .83, p < .001$; affective: $r = .85, p < .001$; cognitive: $r = .85, p < .001$; overall: $r = .90, p < .001$). What this implies is that there would be very little difference between results produced by the current capacity and future confidence scales (e.g., the rank of teams based on the two scales would be essentially the same). In other words, the two scales are interchangeable.

Table 4*Team Resilience Scales Descriptives and Correlations for Current and Future Scales*

Scale	1	2	3	4	5	6	7	8
Current								
1. Physical	(0.83)							
2. Affective	.67	(0.91)						
3. Cognitive	.63	.77	(0.92)					
4. Overall	.84	.92	.90	(0.94)				
Future								
5. Physical	.83	.72	.67	.82	(0.9)			
6. Affective	.66	.85	.75	.85	.79	(0.92)		
7. Cognitive	.61	.72	.85	.82	.72	.83	(0.95)	
8. Overall	.75	.83	.82	.90	.90	.95	.92	(0.96)
Mean	6.12	5.89	6.54	6.19	6.24	6.19	6.75	6.39
SD	1.73	2.20	1.98	1.80	1.96	2.14	2.08	1.90
Median r_{wg}	.82	.77	.84	.92	.80	.75	.84	.91
ICC1	.05	.20**	.13*	.12*	.12*	.14**	.12**	.14**
ICC2	.13	.41	.29	.27	.28	.31	.27	.31

Note. Correlations based on 449 teams with one or more respondents per team. All correlations $p < .001$. Agreement indices and ICCs based on 353 members in 129 teams with ≥ 2 respondents per team. Scale alphas on diagonal.

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

Resilience Factor Structure. Table 5 presents the results of the confirmatory factor analyses, again conducted separately for the current capacity versus future confidence resilience levels. As for the current capacity levels, a three-factor CFA model evidenced a deficient fit in terms of the CFI, yet an acceptable fit in terms of the SRMR index [$\chi^2(51) = 666.83$, $p < .001$; CFI = .87, SRMR = .08]. All items loaded significantly and substantially ($>.60$) on their respective latent variables. In contrast, the single-factor model evidenced a poor fit [$\chi^2(54) = 1249.96$, $p < .001$; CFI = .75, SRMR = .08] which was significantly worse [$\Delta\chi^2(3) = 583.13$, $p < .001$] than the 3-factor model. These results suggest that the three factors do exhibit discriminant validity, but the overall model fit could be improved. Indeed, the three latent factors were highly correlated [physical – affective: $r = .73$, $p < .001$; physical – cognitive: $r = .62$, $p < .001$; affective – cognitive: $r = .81$, $p < .001$] which suggests that they may relate significantly to a higher-order single factor. We fit such a model (which has identical degrees of freedom as

the 3-factor model, and therefore identical overall fit indices), and each first-order construct evidenced a significant loading on the single second-order construct [physical: $\Gamma = .75, p < .001$; affective: $\Gamma = .97$; cognitive: $\Gamma = .83$]. In sum, these findings support the use of the “current resilience” scale as either a 3-dimensional construct or a single overall composite depending on the purpose of the data collection.

Not surprisingly, the CFA findings using the future confidence team resilience levels yielded results that paralleled the current levels findings. The three-factor CFA model evidenced a deficient fit in terms of the CFI, yet an acceptable fit in terms of the SRMR index [$\chi^2(51) = 1023.25, p < .001$; CFI = .84, SRMR = .08], with all items loading significantly ($>.85$) on their respective latent variables. The single-factor model evidenced a poor fit [$\chi^2(54) = 1640.65, p < .001$; CFI = .74, SRMR = .07] which was significantly worse [$\Delta\chi^2(3) = 617.40, p < .001$] than the 3-factor model. The three latent factors were again highly correlated [physical – affective: $r = .83, p < .001$; physical – cognitive: $r = .71, p < .001$; affective – cognitive: $r = .87, p < .001$]. If fit to a higher-order model, each first-order construct evidenced a significant loading on the single second-order construct [physical: $\Gamma = .83, p < .001$; affective: $\Gamma = 1.00$; cognitive: $\Gamma = .87$]. In sum, these findings also support the use of the “future confidence resilience” scale as either a 3-dimensional construct or a single overall composite depending on the purpose of the data collection.

Table 5*Confirmatory Factor Analysis of Current and Future Team Resilience Items*

Item	Resilience Factor Structures					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
Rest	.86			.91		
Energy	.90			.95		
Physical fitness	.62			.71		
Endurance	.64			.73		
Mutual trust		.77			.77	
Morale		.89			.88	
Motivation		.90			.92	
Composure		.83			.86	
Task or mission related knowledge			.83			.92
Shared situational awareness			.91			.94
Alertness			.91			.91
Mental readiness			.83			.85

Note. Based on 449 teams with one or more respondents per team. Tables values are standardized loadings, all $p < .001$.

Present Fit Indices

1 Factor: $\chi^2(54) = 1249.96, p < .001$; CFI = .75; SRMR = .08

3 Factor: $\chi^2(51) = 666.83, p < .001$; CFI = .87; SRMR = .08; $\Delta\chi^2(3) = 583.13, p < .001$

Future Fit Indices

1 Factor: $\chi^2(54) = 1640.65, p < .001$; CFI = .74; SRMR = .07

3 Factor: $\chi^2(51) = 1023.25, p < .001$; CFI = .84; SRMR = .08; $\Delta\chi^2(3) = 617.40, p < .001$

Nomological Network Relations. Participants also completed measures of the other construct domains depicted in Figure 1. We ran exploratory factor analyses using the items within each of the domains, and only the stressors category suggested more than one dimension. Inspection of the item loadings revealed that the stressors could be represented as emanating from *psychological, environmental, or workload* factors (see Table 6 for the items that loaded on each factor). We also assessed environmental *challenges* following Morgeson et al.'s (2015) conception of event features. As outlined previously, we also measured actions that teams and

leadership may take to *minimize* the impact of environmental factors on team resilience, as well as actions that they may take following stressful events to *mend* or quickly recover from such instances. Recall that team resilience is a latent construct that cannot be directly observed. Therefore, we included a measure of resilience *manifestations* which represents observable actions that more resilient teams are believed to exhibit when under duress. Finally, we included a measure of team *interdependence* to gauge the extent to which the Army units actually functioned as teams, and a self-report measure of how well they achieved important *outcomes*. In terms of relationships consistent with the nomological network, we anticipated that team resilience would correlate negatively with environmental stressors and challenges, and positively with minimizing, mending, and manifestation behaviors, as well as with team outcomes.

Table 6 summarizes the psychometric properties of these additional measures. Note that all scale internal consistencies and agreement indices were in acceptable ranges, save for a low median r_{wg} for workload stressors. The ICCs were low to modest with the majority nonsignificant. This suggests that there was relatively little between-team variance to model, which may attenuate correlations among team-level constructs. Table 7 provides descriptive statistics for all scales. Note that the resilience measures were responded to using 10-point scales, challenges using 4-point scales, and the remaining scales using 5-point scales. In all instances, higher values imply greater amounts of the variables.

Table 6*Team Aggregate Variables Psychometric Properties*

Variable	Items	Alpha ^a	Median r_{wg} ^b	ICC1 ^b	ICC2 ^b
Stressors	15	.90	.89	.09	.21
Psychological	6	.80	.83	.04	.11
Environmental	5	.85	.74	.13*	.29
Workload	4	.79	.55	.11*	.24
Challenges	6	.73	.83	.04	.09
Minimizing	6	.84	.88	.12*	.27
Manifestations	11	.90	.92	.10*	.23
Mending	10	.91	.90	.01	.04
Interdependence	5	.84	.88	.03	.08
Outcomes	4	.91	.87	.00	.00

Notes. ^a Based on 449 Teams with one or more respondents per Team (total members = 680)

^b Based on 353 members in 129 Teams with ≥ 2 respondents per Team and limited missing values

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

Stressor items that loaded on each factor per an exploratory factor analysis:

 Psychological Stress items: 1, 2, 3, 4, 5, 6

 Environmental Stress items: 7, 8, 9, 10, 13

 Workload Stress items: 11, 12, 14, 15

Table 7*Team Aggregate Variables Descriptive Statistics*

Scale	Min	Max	Mean	SD
Current Capacity				
1. Physical	1	10	6.12	1.73
2. Affective	1	10	5.89	2.20
3. Cognitive	1	10	6.54	1.98
4. Overall	1	10	6.19	1.76
Future Confidence				
5. Physical	1	10	6.24	1.96
6. Affective	1	10	6.19	2.14
7. Cognitive	1	10	6.75	2.08
8. Overall	1	10	6.39	1.90
Stressors				
9. Psychological	1	5	2.79	0.76
10. Environmental	1	5	2.87	0.86
11. Workload	1	5	3.17	0.87
12. Overall	1	5	2.92	0.72
Challenges	1	4	2.36	0.54
Minimizing	1	5	3.06	0.73
Manifestations	1	5	3.42	0.72
Mending	1	5	3.32	0.75
Interdependence	1	5	3.57	0.76
Outcomes	1	5	3.73	0.80

Note. Based on 435-450 Teams with one or more respondents per Team (total members = 680)

Table 8 presents the correlations between the correlates and the current and projected future resilience levels. As anticipated, all stressors and environmental challenges related negatively, whereas minimizing, mending, and manifestations all related positively to both measures of resilience. Resilience levels also correlated positively with self-reported team outcomes. Interestingly, team interdependence evidenced a positive correlation with resilience. We interpret this finding as suggesting that Army units who function more as a team, with members' relying upon one another, tend to be more resilient. Finally, we also asked two overall resilience questions in terms of teams' ability to *withstand future challenges* and to *bounce back quickly from setbacks*. Both of these items evidenced substantial correlations ($r_s > .50, p < .001$) with the present and future overall team resilience measures.

Table 8

Variable and Item Correlations and with Overall Present and Future Resilience Levels

Correlates	Correlations with Resilience	
	Present	Future
Stress – Psychological	-.49	-.51
Stress – Environmental	-.29	-.33
Stress – Workload	-.29	-.30
Environmental Challenges	-.41	-.41
Minimizing	.62	.60
Manifestations	.58	.57
Mending	.57	.57
Interdependence	.46	.45
Outcomes	.58	.57
Overall Resilience Items		
To what extent can your team.....		
...withstand future challenges?	.52	.51
...bounce back quickly from setbacks?	.54	.52

Note. Based on 449 teams with one or more respondents per team.

All values are significant at $p < .001$

Table 9 presents the results of multiple regression analyses predicting resilience and team outcome levels. The present and future resilience equation produced almost identical results. In both instances, all stressors and environmental challenges exhibited significant unique negative relationships, whereas minimizing, mending, manifestations, and interdependence all evidenced positive significant unique relationships. This pattern of relationships is entirely consistent with our nomological network expectations and accounted for 57% of the team resilience variance in both equations.

Table 9

Regression Analyses Predicting Overall Present and Future Resilience Levels and Outcomes

Predictor	Team Resilience		Team Outcomes
	Present	Future	
Stress – Psychological	-.49***	-.51***	-.16**
Stress – Environmental	-.29***	-.33***	.02
Stress – Workload	-.29***	-.30***	.07
Environmental Challenges	-.41***	-.41***	-.02
Minimizing	.62***	.60***	.08
Manifestations	.58***	.57***	.03
Mending	.57***	.57***	.18**
Interdependence	.46***	.45***	.28***
Team Resilience (current)	----	----	.23***
R ²	.57	.57	.49

Notes. Based on 449 teams with one or more respondents per team.

* $p < .05$; ** $p < .01$, *** $p < .001$. Table values are standardized beta weights.

Finally, as shown in the right most column of Table 9, we regressed team outcomes simultaneously onto current team resilience and the predictors. Interestingly, team resilience, interdependence, and mending all evidenced unique positive relationships, and psychological stressors had a significant negative relationship with team outcomes. In sum, these findings suggest that team resilience operates as a partial mediator of the relationships between the correlates and team outcomes. These findings are consistent with our expectations and support the construct validity of our team resilience measure.

Alternative Forms. We recognize that alternative measures of team resilience might be desirable for different circumstances. Certainly, the results that we presented above support the use of the 12-item Core Resilience measure for assessing the three subdimensions and providing a comprehensive overall composite. Our findings also suggested that measuring reported current resilience levels and anticipated future levels provides much of the same information. Therefore, researchers might be well served in choosing which particular focus is most consistent with their purpose(s) for collecting the data.

We also recognize that there may be instances when shorter measures are preferable, and we suggest two such alternatives. As noted earlier, the composite measures correlated significantly with the *future challenges* and *bounce back* overall items. Consequently, we created a 2-item short form using those two overall items. In addition, we paired the two overall items with the primary loading items from each of the three dimensions of the overall scale (i.e., energy, motivation, and situational awareness) to create a 5-item short form. Table 10 presents the internal consistencies and correlations among the alternative forms, as well as with self-reported team outcomes (e.g., team performance). As shown, all forms exhibited acceptable internal consistencies and were highly correlated with one another. Equally interestingly, all forms correlated between $r = .51, p < .001$ and $r = .61, p < .001$ with performance. In sum, these findings suggest that alternative forms may yield findings that are highly correlated with one another. The choice of which to use should hinge on the purpose for gathering the data and the value of brevity versus more thorough diagnostic information (cf., Luciano et al., 2018).

Table 10

Correlations of Alternative Measures of Team Resilience

Measure	1	2	3	4	5	6
Full Measure						
1. Resilience_Current	(0.94)					
2. Resilience_Future	.90	(.96)				
5-Item Short Form ^a						
3. Resilience_Current	.90	.84	(0.83)			
4. Resilience_Future	.85	.92	.95	(.85)		
2-Item Overall ^b						
5. Resilience	.58	.56	.83	.81	(.83)	
6. Outcome	.58	.57	.61	.61	.51	(0.91)

Notes. Based on 433 teams with one or more respondents per team.

Diagonal values are scale alphas. All correlations $p < .001$.

^a Comprised of *future challenges* and *bounce back* overall items, and energy, motivation, and situational awareness items from the full scale.

^b Comprised of *future challenges* and *bounce back* overall items.

Study 2: Army Recruiting Teams

Introduction

Although encouraging, the findings from the sample of Army teams at installations were based on data collected concurrently from the same source (i.e., members) and are subject to method variance and questions as to the causal order of variables. To overcome these methods effects, we gathered data from a sample with two different sources of data, Army recruiters and their station commanders. Specifically, recruiters provided responses to the Core Unit Resilience and 2-Item Unit Resilience Short Form and the station commanders completed the measures of all other constructs within our nomological network – The Unit Resilience Model (Figure 1). In addition, existing sources of team performance data, provided by recruiting station leadership, were used for validation purposes.

Method

Researchers administered online questionnaires to approximately 1,629 recruiters and 291 recruiting station commanders at approximately 275 recruiting stations in 49 companies, within 8 battalions. As described earlier in the report, this sample was selected because they are representative of other Army teams with members who work interdependently to overcome challenges and achieve their mission. The focal units of analysis are teams, not individuals.

To have sufficient power and variance necessary for testing the psychometric properties and construct validity of our team level measures, we gathered data from teams during three sequential month-long periods. Specifically, recruiting team members from 275 stations (i.e., teams) and station commanders were invited to respond to the questionnaires at three points in time over a period of approximately three months. Recruiters and commanders were recruited to participate via email. They received additional emails with links to the online questionnaire at each of the data collection points. Participants individually completed the online questionnaires.

The recruiters and station commanders completed questionnaires with different subsets of measures. At all three points in time, the recruiters completed the measures of Core Unit Resilience (both the current resource level scale and the confidence level scale) and the 2-Item Unit Resilience Short Form (i.e., Overall Resilience). The Station Commander questionnaire included the measures of Stressors, Environmental Challenges, Minimizing, Mending, Manifestations, and Team Performance. We asked the recruiters to complete the measures of Unit Resilience and the station commanders to complete all of the other measures within our model to minimize methods effects.

Aggregation. The level of aggregation for this sample is straight-forward as each recruiting station is a self-contained functioning entity responsible for a given territory. As shared with us during our focus groups with recruiting teams, station members consider themselves a team and their work involves interdependence between station members. Accordingly, stations are akin to teams and serve as our theoretical and operational level of aggregation (Chen et al., 2005; Mathieu & Chen, 2011).

Design. We employed a longitudinal design where data were collected from multiple sources over three roughly month-long periods. This afforded us the opportunity to model relationships in a predictive design over time. Moreover, the repeated observations per teams enabled us to generate far greater statistical power than afforded by a strictly between-team design. Table 11 outlines the overall design and the data collected. Performance information was available from archival records for over 140 teams, over time, totaling 494 monthly measures. Two or more recruiter questionnaires, aggregated to the team level of analysis, were available for 148, 131, and 106 teams for phases 1-3, respectively. Station commander questionnaire information was available for 83, 72, and 58 teams for phases 1-3, respectively. Whereas we used all of the information that was available for evaluating the psychometric properties of our measures, for testing the relationships between constructs, the above data yielded 385 instances (i.e., phases) for which we had both team performance and at least one recruiter questionnaire available. Of those instances, 210 also had station commander questionnaire data available.

Table 11

Recruiter Research Design and Team-Level Yields

Data Source and Variables	Phase			Totals
	1	2	3	
Archives				
Performance	186	166	142	494
Performance paired with >1 Recruiter questionnaire	148	131	106	385
Recruiter questionnaire				
Team Resilience	148 (239)	131 (207)	106 (137)	385 (583)
Station Commander questionnaire				
Situational Stressors	83	72	58	213
Team Actions (Minimizing, Mending, Manifestations)	83	72	58	213

Note. Values within parentheses are the number of aggregated individual questionnaires

Analysis Strategy. Our analysis strategy parallels that employed with the sample from Army teams at installations. First, to justify aggregating multiple members' responses to represent a higher-order construct, we calculated and report median r_{wg} agreement indices (Chen et al., 2005; James et al., 1984). We also calculated ICCs for the scales, and report scale internal consistency measures using members' average response per item as the indicators at the team level of analysis.

We conducted CFA using the 12 items of the three lower-order team resilience dimensions (i.e., physical, affective, and cognitive) to determine their relative convergent and discriminant validity. We first fit the items to a three-factor latent model and compared the results against a single-factor latent model. To gauge model fit for these and later analyses, we report the SRMR and the CFI. We also report chi-square values which provide a statistical basis for comparing the relative fit of nested models. We adopted the following cutoffs for model fit suggested by Mathieu and Taylor (2006): models with CFI values $< .90$ and SRMR values $> .10$ are *deficient*, those with CFI $\geq .90$ to $< .95$ and SRMR $> .08$ to $\leq .10$ are *acceptable*, and those with CFI $\geq .95$ and SRMR $\leq .08$ are *excellent*.

Results

Recruiter Questionnaires. Station recruiters were asked to complete monthly questionnaires containing our team resilience items. We received responses from 239, 207, and 137 of them representing 148, 131, and 106 teams, respectively, for phases 1-3. We used the combined set of responses to evaluate the psychometric properties of the resilience scales.

Table 12 presents the team resilience subscale and scale internal consistencies, intercorrelations, and descriptive statistics. These are reported separately for the measures that referred to *current team resilience levels* and those that referred to *future confidence resilience levels*. Some clear patterns were evident. First, all subscales and overall composites evidenced sufficient member agreement (i.e., $r_{wgs} > .70$) to warrant aggregating data. Second, all subscales and the composites, except for anticipated future cognitions, exhibited significant ICCs of moderate levels. Third, all subscales and the overall composites evidenced high internal consistencies (i.e., Cronbach's $\alpha s > .90$). Fourth, the three subscales were highly correlated both in terms of current levels (mean $r = .81, p < .001$) and future confidence levels (mean $r = .88, p < .001$). Finally, the subscales and overall composites for current and future levels were all very highly and significantly correlated (physical: $r = .90, p < .001$; affective: $r = .94, p < .001$; cognitive: $r = .93, p < .001$; overall: $r = .95, p < .001$). Again, this implies that the current capacity and future confidence scales provide essentially the same information and are interchangeable.

Table 12*Team Resilience Scales Descriptives and Correlations for Current and Future Scales*

Scale	1	2	3	4	5	6	7	8
Current								
1. Physical	(0.93)							
2. Affective	.81	(0.94)						
3. Cognitive	.75	.87	(0.95)					
4. Overall	.91	.96	.93	(0.97)				
Future								
5. Physical	.90	.83	.81	.90	(0.95)			
6. Affective	.77	.94	.87	.92	.87	(0.96)		
7. Cognitive	.73	.86	.93	.90	.84	.92	(0.96)	
8. Overall	.83	.92	.91	.95	.94	.97	.96	(0.98)
Mean	6.57	6.59	7.18	6.78	6.65	6.71	7.16	6.84
SD	2.10	2.41	2.07	2.05	2.25	2.49	2.22	2.22
Median r_{wg}	.86	.78	.84	.92	.81	.73	.84	.90
ICC1	.22**	.20**	.12*	.18**	.17*	.16*	.07	.13*
ICC2	.39	.36	.23	.33	.31	.30	.15	.25

Notes. Correlations based on 385 teams per phase with one or more respondents per team. All correlations $p < .001$.

Agreement indices and ICCs based on 311 members in 137 teams with ≥ 2 respondents per team per time.

Scale alphas on diagonal. * $p < .05$. ** $p < .01$

Table 13 presents the results of the confirmatory factor analyses, again conducted separately for the current versus future resilience levels. As for the present levels, a three-factor CFA model evidenced an acceptable fit in terms of both the CFI and SRMR indices [$\chi^2(51) = 556.29, p < .001$; CFI = .91, SRMR = .04]. All items loaded significantly and substantially ($>.75$) on their respective latent variables. In contrast, the single-factor model evidenced a poor fit [$\chi^2(54) = 1146.16, p < .001$; CFI = .81, SRMR = .06] which was significantly worse [$\Delta\chi^2(3) = 589.71, p < .001$] than the 3-factor model.

Table 13

Confirmatory Factor Analysis of Current and Future Team Resilience Items

Item	Resilience Factor Structures					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
Rest	.90			.93		
Energy	.95			.98		
Physical fitness	.78			.81		
Endurance	.88			.88		
Mutual trust		.85			.86	
Morale		.93			.93	
Motivation		.91			.94	
Composure		.90			.94	
Task or mission related knowledge			.87			.89
Shared situational awareness			.91			.92
Alertness			.95			.95
Mental readiness			.90			.93

Notes. Based on 385 Teams per Time with one or more respondents per Team.

Tables values are standardized loadings, all $p < .001$.

Present Fit Indices

1 Factor: $\chi^2(54) = 1146.16, p < .001$; CFI = .81; SRMR = .06

3 Factor: $\chi^2(51) = 556.29, p < .001$; CFI = .91; SRMR = .04; $\Delta\chi^2(3) = 589.71, p < .001$

Future Fit Indices

1 Factor: $\chi^2(54) = 1246.12, p < .001$; CFI = .84; SRMR = .04

3 Factor: $\chi^2(51) = 799.74, p < .001$; CFI = .90; SRMR = .08; $\Delta\chi^2(3) = 446.38, p < .001$

Not surprisingly, the CFA findings using the future team resilience levels yielded results that paralleled the current levels findings. The three-factor CFA model evidenced an acceptable fit [$\chi^2(51) = 799.74, p < .001$; CFI = .90, SRMR = .08], with all items loading significantly ($>.80$)

on their respective latent variables. The single-factor model evidenced a poor fit [$\chi^2(54) = 1246.12, p < .001$; CFI = .84, SRMR = .04] which was significantly worse [$\Delta\chi^2(3) = 446.38, p < .001$] than the 3-factor model. As was true with the sample from Army teams at installations, the first-order latent variables were highly correlated using both the current [physical – affective: $r = .86, p < .001$; physical – cognitive: $r = .78, p < .001$; affective – cognitive: $r = .91, p < .001$] and the future [physical – affective: $r = .91, p < .001$; physical – cognitive: $r = .86, p < .001$; affective – cognitive: $r = .96, p < .001$] team resilience levels. If fit to a higher-order CFA model, all first order factors exhibited substantial loadings on the second factor [current: physical: $\Gamma = .86, p < .001$; affective: $\Gamma = 1.00$; cognitive: $\Gamma = .91$; future: physical: $\Gamma = .91, p < .001$; affective: $\Gamma = 1.00$; cognitive: $\Gamma = .96$]. In sum, these findings also support the use of the 12-item resilience measure as either a 3-dimensional construct or a single overall composite depending on the purpose of the data collection.

Station Commander Questionnaires. Station Commanders were asked to complete all the measures of the other construct domains depicted in Figure 1 except for the measures of Unit Resilience so as to minimize methods effects (i.e., measuring different constructs from the same source of measurement). We received 83, 72, and 58 useable questionnaires for phases 1-3, with each questionnaire referring to a separate station's properties.

We again ran exploratory factor analyses using the items within each of the domains, and only the stressors category suggested more than one dimension. Inspection of the item loadings revealed that the stressors could be represented as emanating from *psychological, environmental, or workload* factors. We also indexed the environment in terms of the *challenges* it imposed following Morgeson et al.'s (2015) conception of event features. As outlined previously, we also measured actions that teams and leadership may take to *minimize* the impact of environmental factors on team resilience, as well as actions that they may take following stressful events to *mend* or quickly recover from such instances. Recall that team resilience is a latent construct that cannot be directly observed. Therefore, we included a measure of resilience *manifestations* which represents observable actions that more resilient teams are believed to exhibit when under duress.

Team outcomes were obtained from station monthly archives. We indexed station performance in terms of their recruiting yield relative to their station goal for the month. Goals were determined by a complex formula that considered population density, average area incomes, etc., and were designed to provide comparable metrics across stations. In terms of relationships consistent with the nomological network, we anticipated that team resilience would correlate negatively with environmental stressors and challenges, and positively with minimizing, mending, and manifestation behaviors, as well as with team outcomes.

Table 14 summarizes the psychometric properties of the measures collected from the station commanders. Note that all scale internal consistencies were at acceptable levels. Table 15 presents the correlations between the correlates and the current and projected future resilience levels for the instances where both resilience and correlate measures were available.

Table 14*Team Aggregate Variables Psychometric Properties from Station Commanders*

Variable	Items	Alpha ^a	Mean	SD
Stressors	15	.90	2.31	.75
Psychological	6	.80	2.41	.86
Environmental	5	.85	2.22	.78
Workload	4	.79	2.26	.86
Environmental Challenges	6	.73	2.17	.64
Minimizing ^b	6	.84	3.69	.72
Manifestations	11	.90	3.97	.61
Mending	10	.91	3.76	.75

Notes. The scale for Environmental Challenges ranged from 1-4. Scales for all other measures listed ranged from 1-5.

^a Based on 219 Station Commanders' ratings of the Teams that they oversee per time.

^b Measured only at Time 2, N = 73.

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

Table 15*Variable and Item Correlations and with Overall Present and Future Resilience Levels**Controlling for Time*

Correlates	Correlations with Resilience	
	Present	Future
Stress – Psychological	.02	-.02
Stress – Environmental	.20†	.19†
Stress – Workload	.23*	.19†
Environmental Challenges	.17	.18†
Minimizing	-.19†	-.17
Manifestations	.14	.15
Mending	.10	.10
N of Total Phase Score Pairs:	103	101

Overall Resilience Items (N = 385 Teams)

To what extent can your team

...withstand future challenges?	.74***	.77***
... bounce back quickly from setbacks?	.73***	.76***

Notes. Derived from 449 teams with one or more recruiter responses per team across phases and accounting for missing values.

† $p < .10$; * $p < .05$; ** $p < .01$, *** $p < .001$

The correlations were low with few reaching traditional significant levels. Some evidence (i.e., $p < .10$) suggested positive relationships between stressors and resilience, especially anticipated future levels. It could be that recruiters were reporting greater resilience levels when they were subject to greater stress levels. In any case, these relationships were modest and not significant. Of note, however, as was the case with the Army installation sample, our overall measures of current and future team resilience levels correlated highly ($r_s > .70$, $p < .001$) with the two overall (i.e., *overcome future challenges* and *bounce back*) resilience items.

Substantive Relations. For purposes of evaluating the psychometric properties of our measures, we have treated all of the data that we had available as independent observations of the constructs in question. However, the fact that many of the observations are repeated measures from the same teams means that their error terms are not independent and may bias significance tests of substantive relationships. There are many ways to take such nonindependence into account and to calculate and apply the proper error terms. These include repeated measures ANOVA techniques and longitudinal growth modeling techniques as implemented by HLM or R software packages.

Table 16 presents a correlation matrix of the temporal variable pairings that were available in the data that we had available. The n for pairings ranged from 384 for performance – resilience, to 101 for resilience and the correlates. Unfortunately, the longitudinal growth modeling packages available in the R software require complete information at the lowest-level of analysis which would drop the effective N to 101 if using listwise deletion of missing values. We therefore did not feel comfortable imputing values for $>70\%$ of the relations if we attempted to estimate their likely values. Consequently, we analyzed our observed data using repeated measures multiple regression (RMMR) techniques.

RMMR essentially treats repeated measures as independent observations in traditional multiple regression analyses and then applies adjustments to correct the error terms. First, RMMR regression designs essentially “stack” observations from each team over time to create a unified (sometimes referred to as “tall”) data base. For instance, if one had three temporal pairings from each of 10 teams, this stacked data set would have $N = 30$. Second, analyses of substantive relationships among variables are performed using this stacked data and traditional multiple regression techniques. Finally, one then adjusts the results for the fact that the observations from the same teams over time are not independent. This analytic strategy provides a far more powerful alternative as compared to a series of within time analyses, and also allows one to partition total variance in to that which exists *across* teams and that which occurs *within* teams across time. It also allows us to handle substantial missing values by employing pairwise deletion of missing values.

Table 16*Repeated Measures Multiple Regression Correlations*

Variable	1	2	3	4	5	6	7	8	9
1. Performance	---	384	384	210	210	210	210	210	210
2. Time	0.01	---	384	210	210	210	210	210	210
3. Current Capacity	0.15	0.03	---	101	101	101	101	101	101
4. Stress – Psychological	-0.05	-0.09	0.01	---	210	210	210	210	210
5. Stress – Environmental	-0.04	-0.07	0.17	0.73	---	210	210	210	210
6. Stress – Workload	0.04	-0.03	0.21	0.65	0.73	---	210	210	210
7. Challenges	-0.09	-0.10	0.16	0.68	0.62	0.59	---	210	210
8. Minimize	0.12	0.08	-0.12	-0.35	-0.29	-0.41	-0.45	---	210
9. Mending	0.18	0.01	0.18	-0.08	0.02	0.03	-0.13	0.42	---

Note. Values in the lower left triangle are correlations, corresponding upper right values are the corresponding Ns per correlation

Using the correlations in Table 16, we regressed recruiters reported present and projected future levels of team resilience on the team correlates provided by the station commanders. Presented in Table 17, the results across the two equations were quite parallel, and in both cases accounted for 14% of total variance in resilience with only psychological stressors exhibiting unique negative effects (current: $\beta = -.39, p < .05$; and future: $\beta = -.45, p < .05$). Next, controlling for time (i.e., phase of each pairing) we regressed team performance onto team resilience and the correlates. The relationship with current resilience levels was positive and significant as expected, ($\beta = .19, p < .05$), as was a negative relationship with environmental stressors ($\beta = -.33, p < .05$) and a positive relationship with minimization actions ($\beta = .27, p < .05$). Yet, contrary to expectations, there were also significant positive relationships with psychological ($\beta = .30, p < .05$) and workload ($\beta = .31, p < .05$) stressors. All totaled, 17% of team performance was accounted for by the combined predictor set.

Table 17

Repeated Measures Multiple Regression Analyses Predicting Overall Present and Future Resilience Levels and Outcomes

Predictors	Team Resilience		Team Outcomes
	Current ^a	Future ^a	
Time	.01	.02	-.02 ^b
Stress – Psychological	-.39*	-.45**	.30* ^c
Stress – Environmental	.22	.28	-.33* ^c
Stress – Workload	.20	.13	.31* ^c
Environmental Challenges	.10	.15	-.20 ^c
Minimizing	-.18	-.16	.27* ^c
Mending	.15	.12	.02 ^c
Team Resilience (present)	----	----	.19* ^b
	R ²		
	.14*	.14*	.17*

Notes. ^a N = 103 ^b N = 384 ^c N = 210 pairings over time

* $p < .05$; ** $p < .01$, *** $p < .001$. Table values are standardized beta weights.

Alternative Forms. As we noted with the sample from Army teams at installations, we recognize that alternative measures of team resilience might be desirable for different circumstances. Therefore, we again created a 2-item short form using the: 1) *overcome future challenges*; and 2) *bounce back* overall items. In addition, we paired the two overall items with a high loading item from each of the three dimensions of the overall scale (i.e., the same items as used in the sample from Army teams at installations: energy, motivation, and situational awareness) to create a 5-item short form. Table 18 presents the internal consistencies and correlations among the alternative forms, as well as their correlations with the team performance measure. As shown, all forms exhibited acceptable internal consistencies and were highly

correlated with one another. Equally interestingly, all forms correlated modestly, but significantly, with performance ($r_s = .13$ to $.16$, $p_s < .05$). In sum, these findings suggest that alternative forms may yield findings that are highly correlated with one another. The choice of which to use should hinge on the purpose for gathering the data and the value of brevity versus more thorough diagnostic information (cf., Luciano, et al. 2018).

Table 18

Correlations of Alternative Measures of Recruiter Team Resilience

Measure	1	2	3	4	5	6
Core Unit Resilience						
1. Current Capacity	(.97)					
2. Future Confidence	.94	(.98)				
5-Item Short Form ^a						
3. Current Capacity	.95	.92	(.92)			
4. Future Confidence	.91	.96	.97	(.94)		
2-Item Overall ^b						
5. Resilience	.76	.77	.91	.91	(.96)	
6. Outcome	.14	.13	.16	.14	.14	---

Notes. Based on 380 team instances with one or more respondents per instance.

Diagonal values are scale alphas. All correlations $>|.13|$, $p < .01$.

^a Comprised of *future challenges* and *bounce back* overall items, and energy, motivation, and situational awareness items from the full scale.

^b Comprised of *future challenges* and *bounce back* overall items.

Chapter 5. Modify and Finalize Measures and Tools

The results from our psychometric and validation studies did not suggest the need for any major modifications to the content of the measures. This is not entirely surprising given the multiple stages of reviews and revisions by both measurement experts and Army team members during the development phase. Following the conclusion of the validation efforts, the measures were finalized and pulled together to form The Unit Resilience Measurement Battery (The Battery, see Appendix B). The Battery includes print-ready versions of all three measures of unit resilience (Core Unit Resilience [current and future scales], the 2-Item Short Form and 5-Item Short Form) and the measures of all other constructs or factors represented within our Unit Resilience Model (Figure 1).

While the results did not suggest the need for many measure modifications, they do provide some somewhat unexpected insights that impact how to use the measures. For example, somewhat unexpectedly, the results from our validation efforts with both samples suggest that the information provided by the current capacity resilience scale and the future confidence resilience scale is highly correlated and that if both were administered they would provide redundant information. Therefore, users can simply administer one scale or the other and look at the average score for the 12-item measure or perhaps the 3 unique dimensions (affective, cognitive, physical). Also, the three alternate forms (measures) of unit resilience are highly correlated with one another and exhibited comparable correlations with performance. The tempting conclusion is to simply use the shorter forms in practice. Yet we would submit that the purpose and needs of the data collection should guide which measure(s) are used. These sort of considerations and instructions for administering the measures within The Battery are included within The Unit Resilience Measurement Battery Administration Manual (Levy et al., 2022).

Finally, as we conducted our validation efforts we documented the syntax we used to conduct our statistical analyses which includes the “code” to create and describe the variables. These products could be useful for those interested in conducting future psychometric or validation research with the measures within The Battery.

Chapter 6. General Discussion

Synopsis of Results from Both Samples

The findings from the two samples provide ample evidence for the construct validity of each of the 12-item scales of team resilience. Recall that a sample of subject matter experts consistently sorted most items according to their intended latent constructs. Our empirical analyses also supported the convergent validity of items intended to measure each of the three first-order dimensions of team resilience (i.e., physical, affective, and cognitive). The scale internal consistencies were acceptable at both the subscale and overall composite levels in both samples. Team members exhibited high levels of agreement among their ratings of their team resilience, and, with a few exceptions, significant between team variance (i.e., ICCs) was evident among their responses.

The CFAs results were also very consistent across the two samples. In both cases, analyses of the ratings of *current resilience levels* paralleled those using *future confidence levels*. The 3-factor CFA models fit the data well and significantly better than single factor lower-order models. However, the three first-order dimensions also mapped positively to a second-order overall resilience composite. In other words, these data support the use of the 12-item measure for measuring team resilience in terms of three highly correlated first-order dimensions (i.e., physical, affective, and cognitive) or in terms of an overall composite measure of resilience.

As for relationships with other constructs in the nomological network depicted in Figure 1, the results from the two samples were encouraging. First, the Army installation team sample yielded findings entirely consistent with our expectations in that team resilience correlated negatively with environmental stressors and challenges, and positively with team minimizing, mending, and manifestations behaviors. Moreover, in an equation predicting self-reported team outcomes, current team resilience levels partially mediated the influence of environmental factors and team actions on team performance. Although encouraging, these findings were based on data collected concurrently from the same source (i.e., members) and are subject to method variance and questions as to the causal order of variables. The recruiters sample helped to overcome those limitations.

The station commanders' ratings of environmental stressors and challenges, as well as team resilience related actions, showed limited correlations with recruiters' reports of team resilience. In fact, the only consistent finding was that psychological sources of stress tended to relate negatively to team resilience. These findings are no doubt attributable, in part, to the fact that we had separate sources of information for the correlates and resilience levels, and the fact that we only had slightly over 100 instances in which both scores were available. Notably, a power analysis indicated that a multiple regression model with seven predictors and $N = 104$ has .88 power to detect a $f^2 = .14$ or greater, as observed here.

The predictions of recruiting station team performance were more in keeping with our expectations. First and foremost, although of modest absolute values, team resilience exhibited significant predictive validity over the 384 instances when we could pair it with team performance. These results are both predictive (i.e., team resilience measures were collected at

the beginning-middle of the month well before monthly recruiting yields were finalized) and not method bound. Moreover, environmental stressors and team minimizing, as reported by the station commanders, exhibited negative and positive relationships, respectively, with subsequent performance. Interestingly, station commanders' reported psychological and workload stressors related positively to team performance. In other words, recruiters appear to be able to respond to immediate workplace stressors and deliver in terms of short-term performance. However, the longer-term tolls associated with doing so remain to be investigated.

Finally, we reported the convergent and predictive validity of three different versions of our resilience measures. The three forms correlated highly with one another, and exhibited comparable correlations with team performance. The tempting conclusion is to simply use the shorter forms in practice. Yet we would submit that the purpose of the data collection should guide which measure(s) are collected. Both of the longer 12-item scales provide reliable measures along three first-order dimensions (i.e., physical, affective, and cognitive) and detailed diagnostic information. The 5-item version does so too, but to a much lesser extent as it includes only a single item per dimension along with two overall items. And finally, the 2-item overall scale might be used in short questionnaires (e.g., pulse checks) as early leading indicators or warning signs that gathering greater information is warranted. In short, we submit that different versions are likely to be more or less suitable for different purposes, and the choice of measure(s) should be guided by the purpose of the data collection (cf., Luciano et al., 2018).

Applications/Technical Feasibility

Team resilience is an increasingly important construct for understanding team dynamics and performance, and until the completion of this effort no validated measures were available. The Battery (Appendix B) includes three validated measures of team resilience as well as measures of other important factors that enable or diminish team resilience. The development of these instruments fills important research gaps and applied needs. Validated unit resilience measures can be used by team leaders, observers, or others in training and operational contexts. The measures have numerous practical applications including use during unit training, as a means of accelerating team or leadership development, and as a diagnostic tool in field settings. The Battery offers users multiple measurement options that can be chosen to meet the purpose and needs of the data collection, with varying levels of diagnostic information and brevity as detailed in the previous section.

Also, the majority of the measures can be used to gather perspectives about the team(s) from team members or informed observers. Finally, the measures, although delivered in print-ready format within The Battery have been successfully programmed, administered, and validated via an online format. While a ready for use online questionnaire was not delivered as part of this effort, future users can easily transition the content of the measures to an online format if interested in a more automated approach.

Benefits/Relevance to the Army

Our research builds upon existing theoretical and empirical findings and yields several theoretically grounded, validated measurement instruments for assessing team resilience. Input

from Army team subject matter experts throughout the measure development, revision, and validation process ensures that the measures are grounded in Army team contexts and needs. Our research products and deliverables go beyond the scope of the initial RFP by also providing valid measures of constructs that enable or diminish team resilience in Army units. It offers validated measures that allow for data collection from team members as well as from outside observers and short- and longer-form alternatives to measuring team resilience to fit different needs. Such validated measures have clear benefits for use in future research, contributing to ARI's research mission. Beyond this technical report the final deliverables include The Battery (see Appendix B), the Unit Resilience Measurement Battery Administration Manual (Levy et al., 2022), and syntax for use by future Army researchers.

Well designed, validated measures of team resilience, such as those developed during this effort, can contribute to Army mission effectiveness by boosting training effectiveness (e.g., providing insights to instructors as to how their training strategies impact team resilience trajectories), leadership effectiveness (e.g., as a source of team leader feedback and education), and unit effectiveness (e.g., triggering targeted interventions to ensure unit readiness). While the primary deliverable is a set of validated team resilience measures, the other measures that we developed (i.e., Stressors and Minimizing) will provide additional benefits. They will be available for use in subsequent ARI team research and in conjunction with the team resilience scales, will form a more complete diagnostic battery for use in those instances when it is important to understand team stressors and actions being taken (or not taken) to boost a team's resilience.

Limitations

One possible limitation of our research includes the limited extent to which the results are generalizable to other types of Army teams or to Army teams (organizations) at different levels (e.g., Company). The measures were validated on just two samples of Army Soldiers. It is possible that the results could differ (e.g., items could behave differently) with teams from different contexts who use different terminology, are faced with different kinds of stressors, or engage in different kinds of activities to reduce stress. Though the results were generally consistent between the two samples there were some differences and there is no way to determine whether those differences were due to measurement effects or differences between the samples. Also, due to operational constraints we were unable to obtain background (demographic) data that might help us compare the characteristics between the teams in the two samples. Although it is possible, we have no reason to believe that the results would not generalize to other levels of the organization and it is noteworthy that the results for the squad-level analysis of the data collected from Army teams at installations provided similar patterns to the results for the team-level analyses.

A limitation tied to the recruiting team sample is the fact that we only had slightly over 100 instances when both scores were available. We believe that this is likely part of why the station commanders' ratings of environmental stressors and challenges, as well as team resilience related actions, showed limited correlations with recruiters' reports of team resilience. An additional limitation is the cross-sectional nature of the data collected from Army teams at installations, which did not allow for assessing changes in resilience over time.

Suggestions for Future Research

As indicated, research with teams at different levels of the organization (e.g., Company) or with different types of Army teams (e.g., combat teams) would be useful for further testing the measures and for a deeper understanding of the relationships among the constructs within the Unit Resilience Model. Future research should also explore more closely team stressors and the actions teams take (or do not take) to manage their influence on team resilience. This research could result in important team resilience interventions to identify team vulnerabilities or gaps or to alert teams of instances where more or less of certain kinds of minimizing or mending activities are needed. We can readily envision the measures developed in this study transitioning into dashboard indicators for leaders/decision makers in the future.

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Appendix A
Recruiting Team Interview/Focus Group Questions

**Unit Resilience Measure Development and Validation (URMDV):
Sample Suitability Interviews and Focus Groups
with Army Recruiting Command Subject Matter Experts (SMEs)**

Protocol & Questions

Date & time _____

Number of Participants _____

Interview Leader _____

Note-taker(s) _____

Hello, I'm Dr. _____ and this is _____. I'm from the U.S. Army Research Institute for the Behavioral and Social Sciences (better known as ARI) at Ft. Belvoir, Virginia and Dr. _____ and Mr. _____ are from the Group for Organizational Effectiveness (called "gOE"). In addition to the resilience of individual Soldiers, the Army is interested in group-level resilience; that is, the resilience of teams and units. We are part of a team that plans to develop a measure of unit resilience.

We are talking with you today to learn how recruiters work in teams and to hear about the types of challenges recruiting teams typically face. Information from this interview will help us find appropriate team to participate in future research for a unit-based measure of resilience.

Participation, Confidentiality, and Rules of Engagement

- Your participation is voluntary and there are no consequences if you choose not to participate. You are free not to answer any or all of the questions if you choose. However, we hope you do participate as it will help us learn about the work of recruiting teams.
- **[If focus group:].** You may agree or disagree with others in the group, and that's okay. We welcome a wide range of opinions and viewpoints.
- We'll keep this discussion confidential, and we ask that you do the same. We cannot prevent you from discussing this conversation with others, but let's agree that what's said in this room, stays in this room. Although we will take notes, we do not record names and ask that you do not use names/units or other information that might identify Soldiers outside this room.
- It's important to know, however, that confidentiality does not apply to confessions about UCMJ violations or intentions to harm yourself or others, which we are required to report.

Project Summary Statement

[If focus group:] Before we begin, is anyone in the direct chain of command of someone else in this room?

If yes:

Explain that since participation is voluntary, our procedures state that we need to review certain information separately for Soldier(s) and those in their Chain of Command. Ask Soldier to follow one of the notetakers to a separate area (preferably outside of the room) to review additional information. The notetaker will:

- Hand out Project Summary sheet.
- State, “We are providing you with a summary of the project which explains the purpose and use of this session, confidentiality, and your rights about participating. Let’s review the information.”
- Review information aloud and allow opportunity for questions.

If the Soldier wants to participate, he/she can join the focus group.

If he/she does not want to participate or if a private area is not available outside the presence of his/her Chain of Command, thank the Soldier for his/her time and dismiss him/her from the focus group.

[Hand out Project Summary sheet.]

We are providing you with a summary of the project which explains the purpose and use of this session, confidentiality, and your rights about participating. Let’s review the information.

[Review information aloud and allow opportunity for questions.]

The Team

1. How many Soldiers are on a typical recruiting team? What are the typical roles and responsibilities on a recruiting team?
 - a. **[PROMPT:]** Are all team members recruiters? If not, what are the other members' roles?
 - b. **[PROMPT:]** What is the role of the team leader?
2. **[OPTIONAL:]** How long do recruiters typically serve on a team?

Interdependency

3. How often do recruiters interact/collaborate with other recruiters on the team?
4. Do recruiting team members have shared objectives/goals? If yes, please explain.
5. **[OPTIONAL:]** Do recruiters need to rely or help one another and if so, under what circumstances?
 - a. **[PROMPT:]** Do recruiters share advice, information, or ideas? If yes, when does this typically occur?
 - b. **[PROMPT:]** Do recruiting team members discuss recruiting strategies and techniques? And if so, how often are recruiting strategies and techniques discussed?

Challenges and Responses

6. What are the biggest challenges and stressors recruiting teams typically face and how are they handled?
 - a. **[PROMPT:]** To what extent, if at all, can the challenges that recruiting teams encounter be anticipated?

Outcomes

7. How is recruiting team performance/success evaluated?
[PROMPT:] Are recruiting teams evaluated as a team (vs. individually)?
8. **[FOR TEAM LEADERS:]** What performance metrics are available to team leaders, if any?
[PROMPT:] What do these performance metrics measure?

Thank you for participating.

Appendix B
Unit Resilience Measurement Battery

Team/Unit Identifier: _____

Core Unit Resilience – Current Capacity

INSTRUCTIONS: Please read the team resilience definition below, then use the scale to answer survey items #1 to #12.

Team Resilience Definition: A team's ability to deal with and bounce back from challenges. Resilience is based on a team's current resources and the team's confidence that they can draw upon or replenish its resources to handle future challenges.

Using the 10-100 current resource level scale, please **choose the number** that describes your team's **CURRENT RESOURCE LEVEL** for each of the team resources listed below.

Current Resource Level Scale										
10 = Low			50 = Medium					100 = High		
Totally spent, nothing in reserve			Somewhat depleted, but something in reserve					Fully ready with plenty in reserve		

Team Resources	Low				Medium				High	
1. Rest	10	20	30	40	50	60	70	80	90	100
2. Energy	10	20	30	40	50	60	70	80	90	100
3. Physical fitness	10	20	30	40	50	60	70	80	90	100
4. Endurance	10	20	30	40	50	60	70	80	90	100

Team Resources	Low				Medium				High	
5. Mutual trust	10	20	30	40	50	60	70	80	90	100
6. Morale	10	20	30	40	50	60	70	80	90	100
7. Motivation	10	20	30	40	50	60	70	80	90	100
8. Composure	10	20	30	40	50	60	70	80	90	100

Team Resources	Low				Medium				High	
9. Task- or mission-related knowledge	10	20	30	40	50	60	70	80	90	100
10. Shared situational awareness	10	20	30	40	50	60	70	80	90	100
11. Alertness	10	20	30	40	50	60	70	80	90	100
12. Mental readiness	10	20	30	40	50	60	70	80	90	100

Team/Unit Identifier: _____

Core Unit Resilience – Future Confidence

INSTRUCTIONS: Please read the team resilience definition below, then use the scale to answer survey items #1 to #12.

Team Resilience Definition: A team’s ability to deal with and bounce back from challenges. Resilience is based on a team’s current resources and the team’s confidence that they can draw upon or replenish its resources to handle future challenges.

Think about the FUTURE challenges your team might face. Using the 10-100 confidence level scale below, please **choose the number** that describes your team’s **CONFIDENCE** that it will have **enough** of each resource to handle **FUTURE CHALLENGES** effectively.

Confidence Level Scale		
10 = Not confident -----	50 = Somewhat confident -----	100 = Fully confident
we’ll have enough in the future	we’ll have enough in the future	we’ll have enough in the future

Team Resources	Not Confident-----Somewhat Confident-----Fully Confident									
1. Rest	10	20	30	40	50	60	70	80	90	100
2. Energy	10	20	30	40	50	60	70	80	90	100
3. Physical fitness	10	20	30	40	50	60	70	80	90	100
4. Endurance	10	20	30	40	50	60	70	80	90	100

Team Resources	Not Confident-----Somewhat Confident-----Fully Confident									
5. Mutual trust	10	20	30	40	50	60	70	80	90	100
6. Morale	10	20	30	40	50	60	70	80	90	100
7. Motivation	10	20	30	40	50	60	70	80	90	100
8. Composure	10	20	30	40	50	60	70	80	90	100

Team Resources	Not Confident-----Somewhat Confident-----Fully Confident									
9. Task- or mission-related knowledge	10	20	30	40	50	60	70	80	90	100
10. Shared situational awareness	10	20	30	40	50	60	70	80	90	100
11. Alertness	10	20	30	40	50	60	70	80	90	100
12. Mental readiness	10	20	30	40	50	60	70	80	90	100

Team/Unit Identifier: _____

Five-Item Unit Resilience Short Form

INSTRUCTIONS: Use the scale below to rate your **team**.

To what <u>extent</u> can your team...	Not at All	Very Little	To Some Extent	To a Great Extent	To a Very Great Extent
1. withstand future challenges?	1	2	3	4	5
2. bounce back quickly from setbacks?	1	2	3	4	5

INSTRUCTIONS: Using the scale below, choose the number that describe your team's **CURRENT** resource level for each of the team resources listed below.

	1 Totally spent, nothing in reserve	2	3 Somewhat depleted, but something in reserve	4	5 Fully ready with plenty in reserve
3. Energy	1	2	3	4	5
4. Motivation	1	2	3	4	5
5. Shared Situational Awareness	1	2	3	4	5

Team/Unit Identifier: _____

Two-Item Unit Resilience Short Form

INSTRUCTIONS: Use the scale below to rate your **team**.

To what <u>extent</u> can your team...	Not at All	Very Little	To Some Extent	To a Great Extent	To a Very Great Extent
1. withstand future challenges?	1	2	3	4	5
2. bounce back quickly from setbacks?	1	2	3	4	5

Stressors

INSTRUCTIONS: Please use the scale below to assess the **challenges and stressors** your team experienced at work during the **last month**.

During the last month how often did your team experience:	Never	Rarely	Occasionally	Frequently	Constantly
1. information overload?	1	2	3	4	5
2. uncertainty or doubt?	1	2	3	4	5
3. lack of sleep?	1	2	3	4	5
4. emotional stressors?	1	2	3	4	5
5. interpersonal conflicts or disagreements?	1	2	3	4	5
6. prolonged separation from family?	1	2	3	4	5
7. time pressures?	1	2	3	4	5
8. loud noises?	1	2	3	4	5
9. confined spaces?	1	2	3	4	5
10. heavy workload?	1	2	3	4	5
11. insufficient resources?	1	2	3	4	5
12. physical demands?	1	2	3	4	5
13. hazardous conditions?	1	2	3	4	5
14. staffing or skill shortages?	1	2	3	4	5
15. personnel changes?	1	2	3	4	5

Environmental Challenges

INSTRUCTIONS: Consider **ALL the challenges** that your team experienced during the **last month**. For each of the following items, please select the option that best describes the nature of those challenges in total.

1. Disruptiveness of Challenges
 - a. **Minimal** – experienced little or no disruptions
 - b. **Minor** – required attention but not changes to normal functioning
 - c. **Moderate** – required some changes to normal functioning
 - d. **Severe** – required major changes to normal functioning
2. Expectedness of Challenges
 - a. **Fully Expected** – challenges were anticipated in advance
 - b. **Generally Expected** – challenges were anticipated, but not how or when the challenges would occur
 - c. **Somewhat Unexpected** – some challenges were anticipated, but some were more unexpected
 - d. **Largely Unexpected** – challenges were largely or completely unexpected
3. Criticality of Challenges
 - a. **Very minor** – if not handled properly would pose little or no threat to mission accomplishment
 - b. **Minor** – if not handled properly would pose a modest threat to mission accomplishment
 - c. **Moderate** – if not handled properly would pose a moderate threat to mission accomplishment
 - d. **Severe** – If not handled properly would pose a severe threat to mission accomplishment
4. Novelty of Challenges
 - a. **Not at all** – my team has faced the same challenges in the past
 - b. **Somewhat** – my team has faced highly similar challenges in the past
 - c. **Moderate** – my team has faced somewhat similar challenges in the past
 - d. **Extreme** – my team faced new challenges, unlike anything we confronted in the past
5. Time to Recover from Challenges
 - a. **Plenty of time** – my team had ample time to recover from challenges
 - b. **Marginally enough** – my team had just enough time to recover from challenges
 - c. **Somewhat inadequate** – my team didn't have quite enough time to recover from challenges
 - d. **Inadequate** – my team clearly did not have enough time to recover from challenges
6. Challenge Overlaps
 - a. **None** – work challenges did not overlap, so my team could handle each one individually
 - b. **Few** – only a few overlapping work challenges required multi-tasking
 - c. **Many** – several work challenges overlapped, often requiring my team to multi-task
 - d. **Most** – most work challenges overlapped, so my team consistently needed to multi-task

Minimizing

INSTRUCTIONS: Use the scale below to rate your team.

During the last month, <u>to what extent</u> has your team...	Not at All	Very Little Extent	To Some Extent	To a Great Extent	To a Very Great Extent
1. been adequately staffed to handle future challenges?	1	2	3	4	5
2. been adequately resourced to manage future challenges?	1	2	3	4	5
3. been adequately trained to manage future challenges?	1	2	3	4	5
4. developed plans to handle different potential challenges?	1	2	3	4	5
5. developed strong working relationships with one another?	1	2	3	4	5
6. adequately assessed its preparedness for future challenges?	1	2	3	4	5

Team/Unit Identifier: _____

Manifestations

INSTRUCTIONS: Use the scale below to answer the questions about your team.

During the last month, <u>how often</u> did your team exhibit this behavior when it was needed?	NO NEED to demonstrate this behavior	Never or Rarely	Some of the Time	Most of the Time	Every Time
1. Alerted one another to potential problems	1	2	3	4	5
2. Communicated about situational changes (for example: mission, resources)	1	2	3	4	5
3. Responded to challenges when they occurred	1	2	3	4	5
4. Sought assistance	1	2	3	4	5
5. Ensured all team members were comfortable speaking up	1	2	3	4	5
6. Offered backup or support when team members needed help (for example: overloaded, competing	1	2	3	4	5
7. Maintained regular, necessary work routines while under stress	1	2	3	4	5
8. Intentionally switched to and from “normal” mode to “ emergency ” mode	1	2	3	4	5
9. Relied upon team members with the most relevant expertise	1	2	3	4	5
10. Identified "what was not working" in managing a challenging situation and made real-time changes	1	2	3	4	5
11. Monitored team members’ health	1	2	3	4	5

Mending

INSTRUCTIONS: Use the scale below to answer the questions about your team.

During the last month, <u>how often</u> did your team exhibit this behavior when it was needed?	NO NEED to demonstrate this behavior	Never or Rarely	Some of the Time	Most of the Time	Every Time
1. Identified lessons learned (for example: team debrief, After Action Review)	1	2	3	4	5
2. Worked through areas of conflict that may have developed between team members as a result of the challenges or stressors	1	2	3	4	5
3. Communicated appreciation for helpful actions taken by team members when facing the challenges or stressors	1	2	3	4	5
4. Helped individual team members who were affected by the challenging event or stressor	1	2	3	4	5
5. Repaired relationships with people outside the team that might have been strained	1	2	3	4	5
6. Thanked people outside the team for their help and support	1	2	3	4	5
7. Identified how to address future challenges (for example: who will fill in or help out if X happens, how they will address future needs)	1	2	3	4	5
8. Agreed how to follow up to ensure progress	1	2	3	4	5
9. Made changes to processes, procedures, or resources	1	2	3	4	5
10. Took actions to address deficits (for example: insufficient sleep, distrust)	1	2	3	4	5

Appendix C
Army Unit Resilience Survey: Questions for Survey Feedback Discussions

Thank you for taking the time to review the Unit Resilience Survey. I'd like to ask you a few questions about the survey content, instructions, scales, and format.

1. In general, what did you think about the survey?
 - a. What, if anything, was **unclear** or didn't make sense?
 - b. Were any of the **instructions** unclear? If so, which part(s) were unclear and why?
2. Were the **survey items** understandable? Were they relevant for Army teams?
 - a. Do you have any **questions** about any of the survey content?
 - b. Were any survey items or scales unclear or difficult to use? If so, which ones and why?
3. What, if anything, about the survey **formatting** or **design** was distracting or odd?
4. Approximately **how long** did it take you to complete the survey? [if we aren't there to time them]
5. Is there anything that you have experienced about Army unit resilience that was **not captured by the survey**?
 - If so, what was missing? What should be deleted?
6. For the items in Section 2, what, if any, actions should be added or deleted?
7. I'd now like to ask you about some specific words/phases used on the survey. **Please describe what each of the words mean to you?**

[NOTE: For each word/phrase listed below, read the associated instructions, scale, and full item to the respondent to place the word into context]:

Team Member Survey

- Section 1, within the instructions: "Replenish"
- Section 1: Team Resilience.
 - #4, Team Resources:
 - #8, Endurance:
 - #12, Composure:
 - #12, Mental Readiness
- Section 2: Team Actions and Preparations
 - #34, "emergency" mode
 - #37, Health:

- #38, resourced
- #38, resourced:
- #47 – adversely:
- #50, constraints/needs

Observer Survey

- Section 1, Challenges and Stressors: #3 – Physical demands; #5 – Physical danger; #15 – insufficient resources; #20 – wording for all response options
- Section 2: #29 – “emergency” mode; #32 – health; #36 – adversely; #39 – constraints

Appendix D

Army Installation Sample - Squad Level of Analysis Tables

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Table D1*Squad Resilience Scales Descriptives and Correlations for Current and Future Perspectives*

Variable	1	2	3	4	5	6	7	8
Current								
1. Physical	(.84)							
2. Affective	.63	(.91)						
3. Cognitive	.60	.77	(.95)					
4. Overall	.82	.92	.90	(.94)				
Future								
5. Physical	.82	.74	.69	.84	(.88)			
6. Affective	.65	.85	.74	.85	.81	(.92)		
7. Cognitive	.60	.74	.84	.83	.74	.84	(.95)	
8. Overall	.73	.84	.81	.90	.91	.95	.93	(.96)
Mean	6.15	5.90	6.51	6.19	6.24	6.17	6.74	6.39
SD	1.53	2.02	1.84	1.59	1.70	1.95	1.90	1.72
Median r_{wg}	.82	.74	.83	.92	.80	.69	.80	.88
ICC1	.01	.16**	.12**	.10**	.04	.14**	.10**	.10**
ICC2	.04	.42	.33	.29	.12	.37	.29	.29

Notes. Correlations based on 295 squads with one or more respondents per squad. All correlations $p < .001$

Agreement indices and ICCs based on 516 members in 145 squads with ≥ 2 respondents per squad

Scale alphas on diagonal. ** $p < .01$

Table D2*Confirmatory Factor Analysis of Current and Future Squad Resilience Items*

Item	Resilience Factor Structures					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
Rest	.87			.88		
Energy	.92			.94		
Physical fitness	.57			.67		
Endurance	.58			.72		
Mutual trust		.78			.77	
Morale		.86			.86	
Motivation		.88			.92	
Composure		.85			.89	
Task or mission related knowledge			.83			.94
Shared situational awareness			.92			.96
Alertness			.92			.89
Mental readiness			.85			.85

Notes. Based on 294 squads with one or more respondents per squad. Tables values are standardized loadings, all $p < .001$.

Present Fit Indices

1 Factor: $\chi^2(54) = 964.17, p < .001$; CFI = .71; SRMR = .10

3 Factor: $\chi^2(51) = 597.33, p < .001$; CFI = .83; SRMR = .11; $\Delta\chi^2(3) = 336.84, p < .001$

Future Fit Indices

1 Factor: $\chi^2(54) = 1096.50, p < .001$; CFI = .75; SRMR = .07

3 Factor: $\chi^2(51) = 791.12, p < .001$; CFI = .82; SRMR = .08; $\Delta\chi^2(3) = 305.38, p < .001$

Table D3*Squad Aggregate Variables Psychometric Properties*

Variable	Means	SD	Items	Alpha ^a	Median r_{wg} ^b	ICC1 ^b	ICC2b
Stressors	2.92	.64	15	.90	.89	.09	.25
Psychological	2.79	.68	6	.79	.81	.07*	.20
Environmental	2.86	.77	5	.71	.71	.12**	.34
Workload	3.17	.78	4	.78	.55	.06	.19
Challenges	2.37	.49	6	.73	.83	.04	.14
Minimizing	3.05	.66	6	.84	.88	.14**	.36
Manifestations	3.40	.67	11	.91	.91	.09*	.26
Mending	3.30	.68	10	.90	.89	.02	.07
Interdependence	3.57	.73	5	.86	.87	.06	.18
Outcomes	3.73	.75	4	.92	.87	.05	.15

Notes. ^a Based on 295 squads with one or more respondents per squad

^b Based on 516 members in 145 squads with ≥ 2 respondents per squad and limited missing values

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

Table D4

Variable Correlations and Regression Weights as Related to Overall Current and Future Squad Resilience Levels

Correlates	Correlations with Resilience		Predicting Squad Outcomes	
	Current	Future	Beta Weights	
			Current	Future
Stress – Psychological	-.52***	-.52***	-0.12	-0.12
Stress – Environmental	-.31***	-.35***	-0.07	0.05
Stress – Workload	-.32***	-.30***	.15*	0.14
Environmental Challenges	-.38***	-.37***	-0.03	-0.03
Minimizing	.59***	.56***	.13*	.14*
Manifestations	.58***	.53***	-0.04	-0.02
Mending	.53***	.52***	.20**	.19**
Interdependence	.41***	.39***	.33***	.33***
Outcomes	.53***	.53***	---	---
Resilience			.20**	.18**
R ² = .46 R ² = .46				

Notes. Based on 295 squads with one or more respondents per squad.

* $p < .05$; ** $p < .01$, *** $p < .001$

Per an exploratory factor analysis of the Stressor Items:

Psychological Stress items: 1, 2, 3, 4, 5, 6

Environmental Stress items: 7, 8, 9, 10, 13

Workload Stress items: 11, 12, 14, 15

Table D5*Stressors Correlations with Squad Resilience Scores*

Item	Resilience Scores					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
During the last month, how often did your team experience ...						
information overload	-.11	-.05	-.04	-.04	-.09	-.10
uncertainty or doubt	-.28	-.37	-.41	-.34	-.40	-.43
lack of sleep	-.45	-.31	-.25	-.42	-.33	-.32
emotional stressors	-.44	-.46	-.43	-.48	-.46	-.46
interpersonal conflicts or disagreements	-.40	-.48	-.48	-.43	-.50	-.48
prolonged separation from family	-.34	-.27	-.17	-.34	-.28	-.25
time pressures	-.37	-.31	-.24	-.36	-.33	-.35
loud noises	-.17	-.12	-.02	-.17	-.18	-.14
confined spaces	-.25	-.20	-.10	-.29	-.25	-.21
heavy workload	-.33	-.24	-.20	-.29	-.24	-.22
insufficient resources	-.29	-.29	-.27	-.26	-.29	-.26
physical demands	-.21	-.16	-.14	-.20	-.17	-.14
hazardous conditions	-.28	-.25	-.21	-.27	-.30	-.25
staffing or skill shortages	-.29	-.22	-.23	-.25	-.28	-.27
personnel changes	-.22	-.19	-.12	-.21	-.17	-.13
Stressor Composite	-.46	-.39	-.33	-.45	-.44	-.41

Notes. Based on 295 squads with one or more respondents per squad. Correlations $\geq .12$, $p < .05$; $\geq .15$, $p < .01$

Table D6*Challenges Correlations with Squad Resilience Scores*

Item	Resilience Scores					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
Unique anchors with higher values signifying greater challenges						
Disruptiveness of Challenges	-.27	-.25	-.21	-.26	-.27	-.23
Unexpectedness of Challenges	-.30	-.31	-.29	-.26	-.30	-.29
Criticality of Challenges	-.21	-.16	-.07	-.17	-.19	-.15
Novelty of Challenges	-.21	-.10	-.05	-.16	-.13	-.12
Time to Recover from Challenges	-.37	-.31	-.24	-.38	-.31	-.30
Challenge Overlaps	-.24	-.21	-.16	-.22	-.23	-.16
Challenge Composite	-.42	-.33	-.26	-.37	-.36	-.31

Notes. Based on 295 squads with one or more respondents per squad. Correlations $\geq .12$, $p < .05$; $\geq .15$, $p < .01$

Table D7*Resilience Minimizing Correlations with Squad Resilience Scores*

Item	Resilience Scores					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
During the last month, <u>to what extent</u> has your team...						
been adequately resourced to manage future challenges	.27	.30	.29	.28	.31	.28
been adequately trained to manage future challenges	.23	.33	.28	.27	.32	.28
been adequately staffed to handle future challenges	.40	.47	.47	.46	.43	.44
developed plans to handle different potential challenges	.41	.48	.49	.43	.45	.48
developed strong working relationships with one another	.29	.54	.42	.35	.49	.41
adequately assessed its preparedness for future challenges	.36	.49	.45	.41	.47	.45
Minimize Composite	.43	.59	.54	.49	.55	.52

Notes. Based on 295 squads with one or more respondents per squad. Correlations $\geq .12$, $p < .05$; $\geq .15$, $p < .01$

Table D8*Resilience Manifestations Correlations with Squad Resilience Scores*

Item	Resilience Scores					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
During the last month, <u>how often</u> did your team exhibit this behavior when it was needed?						
Alerted one another to potential problems	.25	.33	.33	.28	.30	.32
Communicated about situational changes (for example: mission, resources)	.34	.46	.48	.41	.43	.43
Responded to challenges when they occurred	.35	.40	.44	.39	.39	.40
Sought assistance	.31	.42	.40	.33	.38	.40
Ensured all team members were comfortable speaking up	.30	.46	.48	.36	.41	.40
Offered backup or support when team members needed help (for example: overloaded, competing demands)	.35	.52	.49	.41	.50	.47
Maintained regular, necessary work routines while under stress	.27	.40	.38	.28	.36	.36
Intentionally switched to and from “normal” mode to “emergency” mode	.02	.18	.15	.08	.14	.10
Relied upon team members with the most relevant expertise	.17	.33	.33	.19	.27	.28
Identified "what was not working" in managing a challenging situation and made real-time changes	.34	.51	.48	.42	.45	.43
Monitored team members' health	.35	.57	.48	.47	.50	.44
Identified lessons learned (for example: team debrief, After Action Review)	.28	.41	.38	.34	.39	.37
Worked through areas of conflict that may have developed between team members as a result of the challenges or stressors	.21	.33	.31	.31	.34	.27
Manifestations Composite	.38	.58	.55	.45	.52	.50

Notes. Based on 295 squads with one or more respondents per squad. Correlations $\geq .12$, $p < .05$; $\geq .15$, $p < .01$

Table D9*Resilience Mending Correlations with Squad Resilience Scores*

Item	Resilience Scores					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
During the last month, <u>how often</u> did your team exhibit this behavior when it was needed?						
Identified lessons learned (for example: team debrief, After Action Review)	.28	.41	.38	.34	.39	.37
Worked through areas of conflict that may have developed between team members as a result of the challenges or stressors	.21	.33	.31	.31	.34	.27
Communicated appreciation for helpful actions taken by team members when facing the challenges or stressors	.21	.44	.33	.31	.44	.38
Helped individual team members who were affected by the challenging event or stressor	.21	.41	.35	.31	.39	.38
Repaired relationships with people outside the team that might have been strained	.18	.26	.17	.21	.21	.18
Thanked people outside the team for their help and support	.32	.44	.37	.39	.40	.38
Identified how to address future challenges (for example: who will fill in or help out if X happens, how they will address future needs)	.30	.45	.41	.38	.44	.41
Agreed how to follow-up to ensure progress	.30	.52	.45	.39	.48	.46
Made changes to processes, procedures, or resources	.23	.35	.30	.30	.33	.30
Took actions to address deficits (for example: insufficient sleep, distrust)	.37	.42	.37	.42	.39	.35
Mending Composite	.36	.55	.47	.46	.52	.48

Notes. Based on 295 squads with one or more respondents per squad. Correlations $\geq .12$, $p < .05$; $\geq .15$, $p < .01$

Table D10*Team Interdependence and Outcomes Correlations with Squad Resilience Scores*

Item	Resilience Scores					
	Current Levels			Future Levels		
	Physical	Affective	Cognitive	Physical	Affective	Cognitive
Rate whether you agree or disagree with the following statements						
Team members frequently have to coordinate their efforts with each other	.22	.27	.27	.23	.25	.28
Team members have to work together to get team tasks done	.23	.31	.28	.22	.29	.32
Team members' work goals come directly from the goals of the team	.26	.41	.37	.32	.37	.42
Team members get feedback about how the team is doing	.31	.41	.34	.33	.38	.39
Individual team members get more feedback about how the team is doing than about how they are doing	.14	.23	.15	.18	.16	.18
Interdependence Composite	.29	.42	.36	.33	.37	.40
During the last month, <u>to what extent</u> has your team...						
accomplished its primary goal(s)	.29	.39	.40	.34	.38	.42
performed important tasks to standards	.36	.49	.49	.43	.46	.52
performed efficiently	.31	.49	.47	.39	.46	.50
performed well overall	.31	.49	.47	.38	.47	.51
Outcome Composite	.35	.52	.51	.43	.49	.55

Notes. Based on 295 squads with one or more respondents per squad. Correlations $\geq .12$, $p < .05$; $\geq .15$, $p < .01$.