Technical Report 1428

Content Validation of the Army Unit Resilience Model

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United States Army Research Institute for the Behavioral and Social Sciences

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For the Behavioral and Social Sciences

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14. ABSTRACT The Army Research Institute for the Behavioral and Social Sciences (ARI) validated a three-phase Unit Resilience (UR) model utilizing a modified Delphi-method approach. ARI invited five subject matter experts (SMEs) to participate in online surveys and a panel discussion. The SMEs provided input with respect to Army team and unit sizes appropriate to measure UR, ARI's multiphasic UR definition, UR factors, and the indicators, antecedents, outcomes, moderators, and mediators of UR. ARI utilized open, axial, and selective coding to analyze the data from the SME panel discussion. Overall, SMEs agreed that units and teams are qualitatively different and that the optimal unit size for the Army could range from the squad (7 to 14 Soldiers) to the company level (100-250 Soldiers), while teams comprise between two and ten Soldiers. SMEs confirmed that ARI's multiphasic UR definition incorporating Prepare, Respond, and Recover phases is consistent with other definitions in the field, but proposed a four-phase definition by adding an Event phase and changing the Recover phase to Post-Event Processing (i.e., Prepare, Event, Respond, Post-Event Processing), with feedback loops between the Post-Event Processing and Prepare phases. Additionally, most SMEs emphasized the model should include only stressful events, not chronic stressors. SMEs discussed UR as a multilevel construct, noting that ARI's UR factors are individual-level factors, but can aggregate to the group level. SMEs validated 31 of ARI's 38 UR factors and provided input on what factors to add, combine, or remove. Furthermore, SMEs sorted UR factors into three UR phases and discussed the factors as indicators, antecedents, outcomes, moderators, and mediators of UR. In sum, the SME panel affirmed that UR is a multiphasic process that consists of both unique and shared factors within each phase, but recommended changes to ARI's definition, phases, model, and factors.

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Unit resilience; Team resilience; Subject matter expert panel; Delphi method

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CONTENT VALIDATION OF THE ARMY UNIT RESILIENCE MODEL

EXECUTIVE SUMMARY

Research Requirement:

Much of the scientific research on resilience has focused on the measurement of individual resilience, with less investigation of unit or team-level resilience. With the critical role of team and small units in the Army, it is essential to develop an empirically supported definition of unit resilience (UR) as well as a UR measure. To support the Army's People Strategy, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) aimed to examine a three-phase model and definition of UR and examine 38 proposed UR factors. This effort will help establish content validity for UR factors as well as map its possible antecedents.

Method:

ARI utilized qualitative and quantitative approaches to examine their proposed unit resilience definition and factors. Our quantitative approach involved an online survey which we administered to six subject matter experts (SMEs), and our qualitative approach involved convening a panel with five SMEs. SMEs were associated with an academic institution, had experience in group-level resilience, and held a doctorate degree in psychology or a related field. The survey and panel addressed seven research questions related to four general areas of Army UR – (a) team and unit size, (b) ARI's UR multiphasic definition, (c) UR factors, and (d) UR concept mapping (antecedents, outcomes, moderators, and mediators). ARI analyzed the qualitative data using open, axial, and selective coding. Quantitative data from the survey were examined by calculating the percentage of agreement and averages of SME ratings on the survey items.

Findings:

SMEs agreed that units and teams are qualitatively different, and the optimal level for measuring UR for Army *units* would be from the squad to the company level, while *teams* comprise between two and ten Soldiers. SMEs indicated that ARI's multiphasic UR definition was generally consistent with other definitions in the field but suggested explicitly adding an *event* element into our conceptualization of UR and changing the *Recover* phase to a *Post-Event Processing* phase. In addition, most of the SMEs emphasized that acute, stressful events are the most suitable to the UR construct, while chronic stressors and situations require a different response than resilience (e.g., coping skills, robustness, endurance, hardiness, adaptability, grit, etc.). Most SMEs indicated that the UR process should emphasize growth after an adverse event, as opposed to simply "bouncing back" and returning to baseline group functioning. Regarding the proposed UR factors, SMEs discussed UR as a multilevel construct, with most of the factors occurring within the individual level and then being aggregated to represent group-level phenomena. SMEs validated 31 of ARI's 38 UR factors, as determined by experts' individual content validity index (I-CVI) scores based on each factor's relevance to UR (Lynn, 1986; Polit et al., 2007), and provided input on what factors to add (e.g., Post-Event Processing, Team Turnover, and Social Identity), combine (e.g., Cohesion and Shared Identity), or remove (e.g.,

Rapidity, Safety Culture, and Leadership-Autonomy). Furthermore, SMEs mapped factors from an ARI factor list onto a factor-phase matrix, determining that many factors are present across the phases, but with different connotations in each phase. SMEs discussed which factors they considered to be antecedents, outcomes, moderators, and mediators of UR. The findings provided support to ARI's proposed definition of UR and ARI's conceptualization of UR as a multiphasic process. The findings also indicate which factors are potentially important to the study and measurement of UR.

Utilization and Dissemination of Findings:

ARI will utilize the information from this report to inform future research into UR. A Team Resilience model and measure was produced for ARI (see Tannenbaum et al., 2022), but the findings in this technical report regard a separate UR model developed by ARI. The three-phase UR model validated in this report is distinct from the Tannenbaum et al. (2022) model in its accounts of the factors, antecedents, outcomes, moderators, and mediators of UR, as well as its distinguishment between teams and units. This report will be useful for ARI or other organizations developing UR models and/or measures in the future. ARI will disseminate the findings to the Army Resilience Directorate (ARD) and enter the final report to DTIC for reference in future UR research.

CONTENT VALIDATION OF THE ARMY UNIT RESILIENCE MODEL

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Introduction

Background

To complete its mission – "to deploy, fight, and win our Nation's wars by providing ready, prompt, and sustained land dominance by Army forces across the full spectrum of conflict as part of the joint force" (Headquarters, Department of the Army, 2019) – the United States Army relies on teams and small units in garrison as well as in deployed environments. When stressful, unpredictable, and traumatic events threaten Army units or teams, they need to effectively respond to and rapidly recover from the events, as well as to prepare for future disruptive events. This process of preparation, response, and recovery from challenging events is termed Army *unit resilience (UR)*.

The U.S. Army Research Institute for Social and Behavioral Sciences (ARI) defines UR as a multiphasic, multidimensional process (Cato et al., 2018). Although UR has similarities to other constructs (e.g., Group Adaption and Cohesion), UR is a distinct construct that is comprised of three distinct phases: Prepare, Respond, and Recover from adverse events.

Multiple Definitions of Resilience

Researchers have used numerous definitions, factors, and measures of group-level resilience (e.g., at the team, unit, and community levels), but there is little consistency among researchers in the field (Cato et al., 2018, Van der Beek & Schraagen, 2015; Zemba et al., 2019). In a systematic literature review, Cato et al. (2018) identified 91 different definitions for nine different types of group-level resilience. Furthermore, the authors found that there is inconsistency not just among group resilience definitions, but also a general lack of group-level resilience research, including research on unit-level resilience training, interventions, and assessments (see Meredith et al., 2011).

Conceptualizing UR as a Process or Outcome

Researchers have studied resilience as a process, an outcome, an ability, and a trait (see Cato et al., 2018; Pfefferbaum et al., 2015; Reivich et al., 2011; Zemba et al., 2019). ARI characterizes UR as a process with its three-phase definition. Examples of other UR-process definitions include, "a set of life processes that enable coping with situations of suffering, with consequent strengthening, personal transformation and overcoming of the adversity of individuals, groups and communities," (Juliano & Yunes, 2014, p. 140) and "a content of processes of sensemaking" (Hutter & Kuhlicke, 2013, p. 296). This distinction is important when measuring a construct as it has implication for how to research resilience.

UR Is a Multiphasic Process

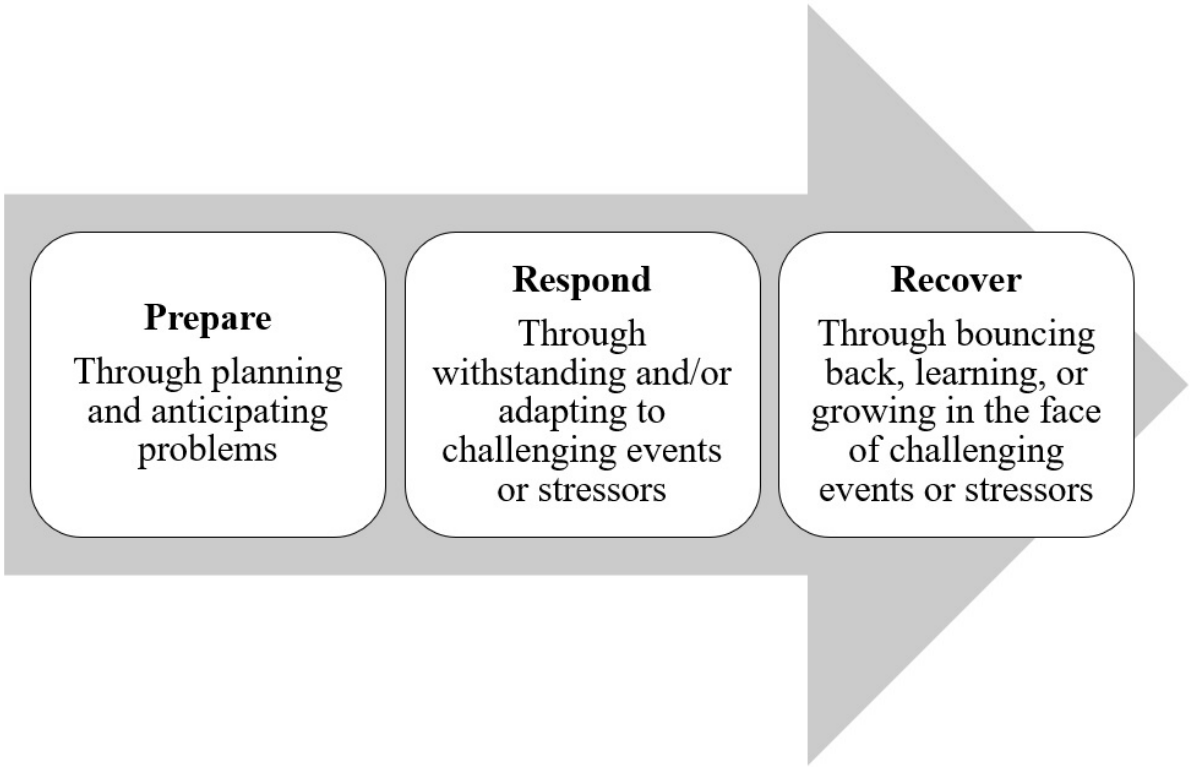
Although research has defined resilience in a variety of ways, defining it as a multiphasic process is consistent with numerous group-level resilience studies. Some researchers have proposed a three-phase model, while other researchers propose four-phase models. Examples of three- and four-phase models can be found in the work by the Community and Regional Resilience Institute (CARRI) and the National Academy of Sciences (NAS):

- CARRI's three-phase model defines "Community resilience [as]… the capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change" (CARRI, 2013, p. 10).
- NAS's four-phase model defines resilience as "The ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events" (NAS, 2012, p. 1).

ARI's three-phase UR model (Cato et al., 2018) defines Unit/Team Resilience as a construct comprising the unit's skills, abilities, and resources, which allow it to: (a) prepare through planning and anticipating problems (Prepare phase); (b) successfully respond through either withstanding or adapting (Respond phase); and (c) recover, which involves and facilitates bouncing back, learning, or growth in the face of challenging events or stressors (Recover phase). See Figure 1 for an illustration of ARI's three-phase UR model.

Figure 1

ARI's Three-Phase UR Model



Theoretical and Practical Implications of UR Literature

Inconsistencies in how the literature defines resilience at the individual versus group level reveal both theoretical and practical implications. Theoretical implications include that future research needs to: (a) explore how UR is defined; (b) determine what constitutes a unit versus a team; and (c) establish whether UR is best conceptualized as a process, an outcome, an ability, or a trait. Practical implications identified in an analysis of the UR literature include that there are

many possible ways to measure UR and that more exploration needs to be done to resolve how to increase it.

Purpose of the Research

ARI's current research addresses identified gaps in the literature and aims to inform the development of a valid measure of UR suitable for use in an Army setting. This effort uses subject matter experts (SMEs) to review ARI's proposed multiphasic UR definition and proposed UR factors. This effort also aims to establish the content validity of our definition and factors. Ultimately, information gained will inform the development and refinement of a UR measure for use in an Army setting.

Research Questions

ARI's work addresses seven research questions (see Table 1). We developed a structured protocol to lead a discussion with resilience SMEs. Each research question corresponded to specific questions in the SME panel protocol and SME panel survey. The protocol and panel are described in detail in the method section.

Table 1

Research Questions

Research Question #	Research Question	Corresponding Panel Protocol and Survey Content
1	What is the appropriate team or group size for the study of Army UR?	Protocol Part 1; Survey Part 1
2	What are common elements that should be in ARI's Army UR definition?	Protocol Part 1; Survey Part 2
3	Does ARI's phasic Army UR definition conform to current group-level resilience literature?	Protocol Part 1; Survey Parts 3 & 4
4	What are the factors of Army UR?	Protocol Part 2; Survey Part 5
5	What Army UR factors map to each phase in ARI's Army UR model?	Protocol Part 3
6	What are the indicators, antecedents, and outcomes of Army UR?	Protocol Part 4
7	What are the moderators and mediators of Army UR?	Protocol Part 4

Method

ARI fielded an online survey and conducted an in-person panel discussion with SMEs to examine the content validity of ARI's proposed UR framework. Researchers analyzed the quantitative data from the survey and the qualitative data from the SME panel.

Participants

Subject Matter Experts (SMEs)

Six SMEs participated in the online survey and five of the six participated in the in-person SME panel discussion. All SMEs possessed extensive experience in group-level resilience or related subjects and were widely published, with a total of over 333 peer-reviewed articles, books, and book chapters among the five SMEs that participated in the SME panel discussion.[1] All SMEs were doctoral-level scientists, with an average of more than 28 years since being awarded their PhD. Two SMEs had prior military experience, while the others had conducted research with military populations. Criteria for selection as a SME included university or academic institution affiliation, familiarity with group-level resilience literature, and U.S. citizenship (due to organizational and installation regulations). The SMEs had extensive expertise with topics such as organizational resilience, hardiness in the military, group-level assessment, groups under stress, and group adaptation.

SME Panel Facilitators, Note-Takers, and Coders

Two senior ARI research psychologists (a Unit Chief and the Unit Resilience Team Leader) facilitated the SME panel discussion, while a total of four PhD-level research psychologists and two research fellows transcribed notes throughout the day long, four-part panel. After we completed the panel discussion, three additional ARI research psychologists and one master's level fellow coded all the SME panel comments. None of the coders had prior familiarity with the content of the SME panel comments apart from the senior research psychologist who conducted quality checks for the coding. One of the ARI research psychologists and a research fellow completed the open coding, while another research psychologist accomplished the axial and selective coding. Refer to the qualitative data analyses section for descriptions of each coding step. Finally, the senior research psychologist conducted quality checks, and reviewed all coding.

Materials

Survey on Unit Resilience for SMEs

ARI's *Subject Matter Expert Panel Survey on Unit Resilience* (Appendix A) included questions covering five general areas of UR – unit or team size; UR definition; UR as a process versus a state; UR phases; and UR factors. Examples of questions for the five areas include "Of the group sizes listed below, select all the group sizes that you consider a unit or team." "How would you define unit/team resilience?" and, "What do you think are the key factors comprising unit/team resilience?"

ARI utilized a modified version of the Delphi method[2] to gather initial data from SMEs as well as to initiate the information exchange between the SMEs and ARI before the in-person

[1] One SME only listed his "selected publications," so the number of publications for the group may be higher than 333.

[2] The RAND Corporation developed the Delphi method to gain consensus about a specified topic, typically where there is no precedent (Dalkey & Helmer, 1963; Linstone & Turoff, 1975).

SME panel. Based upon this methodology, ARI developed a survey titled "*ARI's Subject Matter Expert Panel Survey on Unit Resilience".* Whereas the standard Delphi method involves multiple iterative surveys, ARI employed a single survey and followed-up with an in-person SME panel discussion. ARI sent the online survey to six SMEs on 9 March 2018, and all SMEs returned a completed survey by 16 March 2018, a week before the 23 March 2018 in-person SME panel discussion.

SME Panel Protocol

Based on the results of *ARI's Subject Matter Expert Panel Survey on Unit Resilience*, ARI developed a four-part SME panel protocol (see Appendix B) to facilitate an in-person discussion with the SMEs. Part I of the protocol focused on unit size – incorporating information from the surveys – and asked questions such as "Looking at the [survey] responses now, what, if any, changes would you make to the upper or lower limits of a group's size?" Part I of the protocol also asked participants about the proposed UR definition with questions such as "Are there any terms that are missing from the Unit Resilience definition?" and, "What do you think about the approach of defining Unit Resilience in these phases (i.e., Preparing, Responding, and Recovering)?" Part II of the protocol discussed UR factors, based on the online survey responses. We asked SMEs questions such as: 'Why do you think these factors are "very important"?' and, "Given what we just talked about, which, if any, of the factors would you rate differently?"

Part III of the protocol facilitated categorizing the factors (from Part II of the protocol, above) into ARI's UR phases. We asked SMEs to sort the factors by phase and complete a "factor-phase matrix" (see Appendix C). SME panelists answered questions such as: 'Did anyone add or drop phases when they sorted the UR factors? If so, what phases were added or dropped?" Part IV of the protocol asked participants about indicators, antecedents, outcomes, moderators, and mediators of UR. For example, SME panelists were asked "Which of the factors shown should be considered as an indicator or should be included in a potential measure of UR?" and "What are some other factors, not captured yet today, that could be considered as potential mediators of UR?" Each part of the protocol corresponded to one or more research question(s) (e.g., protocol Part I focused on addressing research questions one through three [see Table 1]).

Survey Administration

ARI utilized the Office of Management and Budget survey tool for survey administration (MAX Survey, n.d.). ARI sent a unique online survey link by email to the six SME panel members, and all SMEs completed the survey within one week (between 9 March 2018 and 18 March 2018).

SME Panel Execution

ARI held the SME panel during a single 8-hour day (23 March 2018, 0900 to 1700) in a conference room on a military installation. SMEs were provided with a 1-hour lunch break and two 15-minute breaks. Two note takers and one facilitator were present for each part of the four-part SME panel protocol, and one additional note taker transcribed notes over the phone. Different note takers were present for the morning sessions versus the afternoon sessions. Each facilitator guided their respective sections of the SME panel protocol.

Data Analysis

Survey Data Analysis

ARI exported data from the *Subject Matter Expert Panel Survey on Unit Resilience* to Microsoft Excel and created a PowerPoint presentation, visually depicting the survey results (see Appendix D). ARI researchers calculated content validity for SME panelists' initial factor ratings. ARI researchers used this to inform the qualitative analysis of the SME panel data as part of their selective coding step.

To examine the content validity for ARI's 38 UR factors, researchers calculated individual content validity index (I-CVI) scores, Kappa statistics, and scale-level content validity index (S-CVI) scores. CVI scores are an accepted way of determining content validity based on expert agreement that a factor is relevant to a scale, with a minimum number of three experts[3] (Lynn, 1986; Polit et al., 2007). Other methods (e.g., content validity ratio [CVR]) require more than three experts to validate factors as being essential to a scale (Frey, 2018), so ARI utilized CVI based on the panel size, as not all panelists rated every factor. In addition to CVI scores, following recommendations from Wynd et al. (2003), ARI calculated Kappa statistics[4] (*K*) for each factor. The Kappa scores were used to determine interrater agreement, taking into account the probability of chance of agreement (*Pc*).

Individual content validity index (I-CVI) scores and Kappa statistics determine item importance or relevance to a scale while S-CVI scores report content validity at the scale level (i.e., S-CVI [average] scores for all items on the original scale and S-CVI [universal agreement] scores for all items retained in the scale based on I-CVI scores).

SME Panel Qualitative Data Analyses

ARI used a five-step process to examine the SME panel data, which included (a) comment consolidation and cleaning; (b) coding skill development; (c) open coding; (d) axial coding; and (e) selective coding. Utilizing open coding, axial coding, and selective coding together is generally associated with grounded theory (Strauss & Corbin, 2015), but is frequently modified to address other research needs that examine qualitative data but do not result in a new theory (Boeije, 2010; Maguire-Jack et al., 2018). The initial "open" coding, known as a general inductive approach (Maxwell, 2005; Silverman, 2005), derived codes directly from the data, rather than creating a coding scheme based on prior knowledge or theory. Axial coding organizes

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[3] I-CVI scores range from 0 to 1.0 and are calculated by dividing the number of SMEs who rated a factor as important by the total number of SMEs who rated the factor (i.e., I-CVI = *ne* /*N*, where *ne* = number of SMEs who rated the factor "Important" or "Very Important" and *N* = the number of SMEs who rated the factor). I-CVI critical value scores for factor retention in a scale rated by three to five experts is 1.0 (i.e., all the SMEs rated the factor rated it as important or very important), or .78 for items rated by six experts (Lynn, 1986; Polit et al., 2007). The S-CVI (universal agreement) score equals the number of all I-CVI factors meeting the inclusion criteria divided by the total number of factors. The S-CVI (average) score equals the sum of all factor ratings divided by the total number of factors.

[4] The equation for calculating Kappa scores is $K= (I\text{-}CVI - PC) / (1- PC)$, where $PC = [N! /A! (N -A)!]^* . 5^N$ (where *N* = number of SMEs on the panel, and *A* = number of SMEs who rated the factor "Important" or "Very Important"). A Kappa statistic value above 0.74 indicates an excellent item, 0.6 to 0.74 indicates a good item, and 0.4 to 0.59 indicates a fair item (Cicchetti & Sparrow, 1981).

the codes into categories (and subcategories if appropriate), while selective coding synthesizes all the data together to answer each research question.

Comment Consolidation and Cleaning.

ARI researchers consolidated all SME panel notes into a single spreadsheet in chronological order, including notes from all note-takers; thus, there were between one to four versions of each statement based on how many note-takers recorded a version of the statement. The final SME panel comments transcript included part and question numbers (e.g., Part II, question 11c), SME ID number (i.e., SME 1-5), comments, and the note-taker's initials, for each SME panel comment. Coders documented instances where there were qualitative differences between the note-takers.

Coding Skill Development.

Both coders underwent training in open-coding techniques before coding the SME comments. The coders practiced open coding steps with random passages from the SME panel comments independently and as a team, until each coder was comfortable with the process. A senior researcher with ARI reviewed the coders' work.

Open Coding.

Two coders independently examined the SME panel comments transcript and developed open codes that captured the meanings behind the statements (see Boeije, 2010, pp. 96-107). Not all comments from the same SMEs were coded if they were redundant or unclear. The coders compared and consolidated codes and resolved discrepancies with the help of a third coder, and generated a final codes list and a comprehensive, open-coded spreadsheet for axial and selective coding.

Axial Coding.

Following open coding, ARI researchers performed axial coding to categorize the open codes for further analysis (see Boeije, 2010, pp. 108-114). A coder examined all codes and created categories that merged similar codes together into a common overarching category that mapped to specific research questions. A senior research psychologist checked the quality of the new categories to ensure the codes and categories aligned with the research questions.

Selective Coding.

In the final step, ARI used selective coding to analyze and synthesize all data (i.e., individual statements, open and axial codes, survey data, and SME recommended literature) to answer the research questions (see Boeije, 2010, pp. 114-118). A senior research psychologist reviewed the final product to ensure the selective codes represented all the data and aligned with the research questions.

UR Factor and Phase Matrix Quantitative Analysis

In addition to analyzing the qualitative data from the SME panel, ARI analyzed UR factors-phase matrices completed by the five SMEs present at the panel (see Appendix C). We calculated I-CVI scores from factor-phases matrices to examine which factors SMEs categorized as relevant within each UR phase. With only five SMEs completing the matrices, we used the recommended I-CVI cutoff of 1.0, which indicates that all SMEs who rated a factor, rated it relevant to a phase (Prepare, Respond, or Recover) (Lynn, 1986; Polit et al., 2007). Only items rated by at least three panelists and with I-CVI scores of 1.0 were checked in the factor-phase matrix that summarizes the SMEs ratings.

Results

Summary of Findings by Research Question

SMEs replied to online survey questions and then to ARI SME panel facilitators' questions during the in-person panel, discussing items of interest regarding each research question. Results are summarized below by research question. Additionally, see Appendix D for the *Subject Matter Expert Panel Survey on Unit Resilience* results.

Research Question 1: What Is the Appropriate Team or Group Size for the Study of UR in the Army?[5]

Team/Unit Size.

Most of the SMEs concurred that an appropriate group size to study UR in the Army ranged from 2 to 200 Soldiers, which in military terms spans from a squad (2-10 Soldiers) up to the company level (up to 200 Soldiers). Regarding *team* size, four SMEs believed teams start at two people, consistent with recommended literature (Kozlowski & Bell, 2003). The other SME believed two people are a partnership, not a team, and that two-person teams are rare in the Army. Regarding *unit* size, most SMEs suggested that the squad, platoon, or company would be the ideal levels to measure UR because these levels best represented a unit's "teamness," collective identity, and collective cohesion. Some SMEs commented that UR could be successfully measured at the battalion level (approximately 600 Soldiers). Other SMEs argued that battalion level data would be too "diffuse, generic" or too varied across the companies within a battalion to be a useful level of measurement. Despite such possible variations within battalions, one SME argued that UR could be examined at these higher levels even up to the brigade level. Nonetheless, SMEs concurred that the platoon or company levels would likely be the most salient for Soldiers because most activities in the military such as training occurs at the platoon or company level.

[5] The SME panel protocol referred to "Team or Group Size," while the SME discussion focused on the sizes of teams versus units. Any discrepancies in the terms *group* versus *unit* in this technical report are explained by the differences in the wording of the questions in the protocol versus what was actually discussed during the SME panel.

"Team" Resilience vs. "Unit" Resilience.

SMEs discussed the appropriateness of using the terms unit versus team when defining resilience. SMEs agreed the terms team and unit should not be used interchangeably. One SME suggested that a team is "cohesive, made of people who know each other well and have routines…. [whereas] a unit is an "organizational, structural arrangement of people who may not know each other well." Consequently, teams would exhibit higher task interdependence and relatedness when compared to units. Teams, they suggested, are not only cohesive but also "mission-based". Some SMEs suggested that a unit larger than 200 Soldiers would likely be less "cohesive, less mission-focused," and have "fewer shared functions" than a smaller team. SMEs went on to say that "using the terms [team and unit resilience] interchangeably could change how it is perceived or understood. Refer to Table 2 for representative quotes from SMEs concerning research question 1.

Table 2

Representative Quotes for Research Question 1 (What is the appropriate team or group size for the study of Army UR?)

Transcribed SME Statements
I thought of a team as 1-10 people, a squad-size unit. Unit is a more general term. A unit could refer to a platoon, battalion, or division. It is problematic to treat unit and team the same.
A team is 3-4 people or more, but not as many as 40 people. A team is cohesive, made of people who know each other well and have routines. A unit is an organizational, structural arrangement of people who may not know each other well. In fact, the people could operate in silos.
I could see examining resilience at the squad level (6-10 people) or the platoon level (12-40 people) or the company level (~120 people?).
Anywhere from 2 people up to a company (between 100 and 200) is manageable. Beyond that, things become too diffused.
… probably up to the company level. The most salient level for Soldiers would be platoon.
I think resilience is not just size-based but also mission-based. Special forces, for example, would display more team-like characteristics (e.g., cohesion, etc.).

Research Question 2: What Are Common Elements That Should be in ARI's Army UR Definition?

To address research question 2, we examined the survey and SME panel data. During the SME panel, ARI showed SMEs the UR definitions they previously provided on their completed surveys (see Table 3). Based upon their responses on the survey, SMEs noted these reoccurring concepts across their proposed UR definitions: (a) UR is a capacity but could also be considered as process and outcome; (b) UR must include a stressful/threatening or adverse event; (c) UR includes behaviors or actions to respond to that stressful event; and (d) UR includes post-event

recovery or successful resolution. Refer to Table 4 for representative quotes from SMEs concerning research question 2.

Resilience as a Process, State, or Capacity.

Overall, four of the six SMEs who completed the survey said that UR is a process and a state, while one SME indicated UR was a process only and one SME believed UR is a state only. SMEs also articulated that ARI's definition could be viewed as both a "process and a capacity," but that it seemed to be more aligned with a unit's capacity to respond to a stressor in the future. The majority of SMEs agreed the ARI's UR definition addressed Soldiers' perceived abilities to demonstrate resilience in the future. Specifically, one SME suggested that ARI's approach seemed to address UR as an attribute or capacity, and that ARI can measure demonstrated resilience through outcome variables such as engagement, entitativity (the view that a group is an "entity" and not just a set of individuals), health, performance, retention levels, etc. Another SME stated that ARI should define UR as an outcome instead of as an attribute. Additionally, another SME noted that typical resilience measures tend to focus on performance in response to a stressor (e.g., "When confronted with stress, I bounce back quickly") and approach resilience as an attribute, not a process.

Resilience Includes an Adverse Event.

Multiple SMEs agreed that a UR definition should incorporate a stressor or adverse event. SMEs noted existing definitions of unit resilience differ regarding the extent or severity of traumatic nature (e.g., from an ongoing annoyance to a debilitating event). SMEs suggested that ARI should resolve and clarify the types of stressors in its definition.

Multiple SMEs believed the event should be included as a distinct phase in the model (i.e., Prepare, *Event*, Respond, Recover). To illustrate this, during the September 11, 2001, World Trade Center Twin Towers attack, systems were in place (i.e., elements of the Prepare phase), the attack (Event) happened, the first responders responded to the event (Respond phase), and recovery set into motion (the Recover phase, which, took years). If the event were "front and center in the model," it would clearly illustrate how different responses and recovery vary in accordance with the variables of the specific event – size, severity, etc. Resilience does not actualize without an event, as there is no response because there is "nothing to respond to." Another SME added that researchers could create "a typology of events where the model would be different each time."

The characteristics (or nature) of an event is an important variable for consideration in the UR model, according to SMEs. There are qualitative differences between an acute, unexpected, traumatic event versus a prolonged, chronic event or chronic stressors. For example, routine patrols in hazardous areas constitute high-stress, chronic conditions, while not being a "single traumatic event." SMEs noted the "surprise factor" of dealing with new events, and the severity, intensity, and "anticipatibility" of events are important event characteristics that determine whether resilience or another construct or mechanism is required. Four SMEs concurred that the Army UR model needs to capture the severity or intensity of the event. SMEs discussed the threshold where an event would require resilience, versus another process (e.g., adaption, robustness, endurance, hardiness, coping skills, etc.). The threshold for differentiating resilience

versus non-resilience events on one level may regard only events that "threaten the viability of the system" (i.e., "The unit will not survive" if it does not deal with the event effectively – see Masten, 2014). In other research cited by SMEs, the threshold for resilience considered the threat to life (e.g., Galatzer-Levy & Bonanno [2014]: "Was the police officer's life ever in danger?"), to categorize whether resilience versus another mechanism (e.g., endurance or coping skill) is needed in dealing with stressors or events. However, SMEs declared that for police officers, a threat to life is part of the job, and most police officers' lives are threatened one or more times in a career. Therefore, the threshold of threat to life may be different when compared with other populations, including members of the armed forces. ARI will have to consider what standard would be appropriate for Army UR (e.g., threat to life versus other levels and severities of traumatic events, or possibly even lower thresholds such as stressful experiences or conditions).

The SMEs did not meet consensus regarding the specific event characteristics that would require resilience, versus adaption, durability, perseverance, endurance, coping behaviors, etc., although four of the five SMEs opted for requiring an acute stressor event, and on no account considering chronic stressors as applicable to UR. The SME who argued against this point of view cited NASA work regarding being isolated in an extreme environment as an example of a stressor (not an event) that requires resilience and noted that the Army considers *resilience* to be necessary for dealing with ongoing stress since stress may have the potential for negative responses. However, other SMEs noted ongoing stress was never enough to warrant resilience, although stress could affect an event that occurs on top of the ongoing, chronic stress. Four of the five SMEs agreed that resilience was not an appropriate term for chronic stressors (e.g., training missions would not meet the traumatic threshold for resilience), and there needs to be an event the unit is responding to demonstrate UR. The fifth SME "agreed to disagree," stating resilience can be framed according to threats to homeostasis such as stressful environments (e.g., see Browning [2007] regarding Ernest Shackleton III's arctic voyage – a classic example of leadership under extreme environmental stressors that may fit as an example of a non-event that would still require a resilient response). Other SMEs disagreed, stating these stressful situations do not demand resilience, but a different skill altogether (e.g., adaption, coping skills, endurance, durability, hardiness, fortitude, etc.).

Resilience Includes Bouncing Back and Growth.

Three SMEs preferred including growth, learning, taking advantage of adversity, and a continuous loop of growing and thriving in the definition, while one SME preferred focusing on returning to baseline functioning in the definition. ARI's definition refers to "bouncing back, learning, or growth in the face of challenging events or stressors," and SMEs noted that "Masten sees the growth trajectory as distinct from resilience," and that resilience is developmental and involves learning from experience as opposed to simply returning to baseline function (see Masten, 2014). SMEs asserted that ARI should determine whether resilience in the Army unit context refers to returning to equilibrium or transforming to respond or be better for the future. One SME argued against a transformative, posttraumatic growth model, stating that "Resilient responding is sufficient if the unit can return to a basic level of performance, not necessarily growth."

SMEs preferred a *Post-Event-Processing* phase over a *Recover* phase, as recovery is objective, relates to how people bounce-back or grow after an event, and does not represent a

phase as much as an *outcome*. Recovery can be separately and objectively measured through performance, health, attitudes, quality of relationships (with the team, family, etc.), etc., but, as a *phase,* which a unit or team progresses through, post-event processing is more appropriate (i.e., recovery refers to a process or phase, not an outcome). Furthermore, there are variations in recovery periods, and recovery can take years in cases (e.g., The World Trade Center and Pentagon terrorist attacks of September 11, 2001, or Hurricane Katrina, August 23-31, 2005), while immediate *post-event* actions would be "more time-bound to the event."

One SME brought up the work of SLA Marshall on event-oriented team debriefing (reconstructing the event after combat exposure), wherein Soldiers have different versions of an event, but debriefing helps to produce a shared understanding of what took place. Team debriefings help unit members gain insight into an event, as well as help the teams grow and function better in the future (see Koshes et al., 1995). A post-event-processing phase would be distinguished from bouncing back or thriving, and would include learning, debriefing/after action reviews (AARs), various support, and other tools and factors related to constructive self-care, recovery, etc. Similarly, frequent, small debriefings done by NASA teams help improve mission readiness while deployed, and improve response when teams confront new stressors. Training units or teams to debrief after stressors can produce a feedback loop, helping the post-event-processing phase, while feeding back to the preparation phase.

Table 3

Unit Resilience Definitions Proposed by SMEs

SME's UR Definition
Cacioppo et al. (2011) defined "social resilience" as the capacity of the group "to foster, engage in, and sustain positive social relationships and to endure and recover from stressors and special isolation" (p. 43) (SME 1).
The result of the adaptive capacity of a team that supports successful achievement of goals and objectives despite adversity (SME 2).
The individual and team/unit cognitive, behavioral, and contextual capabilities that enable members to collectively recognize, acknowledge, and effectively interpret or understand an adverse situation or trigger, figure out how to respond in a way that meets or resolves the immediate challenge and enables the unit to thrive in the future, and take the actions needed to implement the selected response (SME 3).
Capacity of the team to maintain cooperative performance despite sudden or ongoing stressors and changing conditions (SME 4). The capacity for a unit/team to demonstrate positive adaptation in the face of significant adversity (SME 5).
Unit/team resilience is the team's ability to take advantage of situational conditions that could otherwise be considered threatening. This ability is rooted in the team's understanding of the situation, its response choice(s) from a myriad of possible actions, and the structure and system within which action and interactions take place (SME 6).

Table 4

Representative Quotes for Research Question 2 (What Are the Common Elements That Should Be in ARI's Army UR Definition?)

Transcribed SME Statements
There are some commonalities among [the SME proposed UR definitions]: … capacity vs. demonstration of resilience….
Masten (2014) sees growth trajectory distinct from resilience.
[The definitions] all note something threatening or a stressor.
You need a stressor to have resilience. In absence of a stressor, I don't know if you have it.
The [ARI UR] definition is more of a capacity to respond to a stressor that resides in the unit.
Resilience is beyond bouncing back. If you just bounce back, it's not enough because what led to the adverse event persists, so return[ing] [to the prior state] will bring you to recurrence. You need transformation. The idea that you only need return is more of an engineering as opposed to a human view of it. You're not the same person if you've learned from it.
I argue against incorporating post-traumatic growth. Resilient responding is sufficient if the unit can return to a basic level of performance, not necessarily growth. That's what the Army cares about.

Research Question 3: Does ARI's Phasic Army UR Definition Conform to Current Group-Level Resilience Literature?

SMEs discussed whether phases accurately captured UR, how one would measure the phases, and how factors might differ across levels of measurement. Refer to Table 5 for representative quotes from SMEs concerning research question 3.

Overall, the SMEs agreed that ARI's multiphasic definition, which focuses on preparing, responding, and recovering, captured key components of group-level resilience. One SME, however, stated the "recovering, growing, thriving definition of resilience as a process is fine but deviates from other definitions in the literature [at the individual level]." Three SMEs agreed that phase one (Preparing) included factors, which contribute to resilient responding, but it *did not define* UR (two other SMEs agreed with the SME). Another SME recommended adding small group processes that make the group effective to ARI's multiphasic definition.

Regarding the measurement of UR phases, at least one SME noted that measuring UR by phases would be "daunting." SMEs seemed to agree that the "phases seem[ed] irrelevant to measuring how resilient a Soldier's unit is" and that the phases best captured a unit resilience capacity. Additionally, SMEs discussed how measurement techniques vary between measuring resilience capacity versus resilience outcomes.

SMEs noted that the UR definition was missing several phases. Primarily, SMEs proposed explicitly adding an adverse event as a discrete phase. SMEs also suggested adding event recognition and acknowledgement as a phase, and additional phases that focus on (a) monitoring; (b) cognitive process; (c) reviewing response options; (d) understanding

possibilities; and (e) primary/secondary event appraisal. Monitoring involves scanning the environment and seeking early warning signals, while primary/secondary event appraisal includes recognizing the stressor event and reviewing internal and external resources available for response (see Lazarus & Folkman, 1987).

Lastly, SMEs suggested that UR has both individual and group-level factors and hence should be considered as a multilevel construct. At least three SMEs agreed that UR has "individual" factors as well as "compositional" group factors. SMEs went on to state that the current multiphasic definition did not capture interactions between the individuals in the group (team interdependence), or the readiness or deployment status and level of the unit or team. SMEs recommended reading Lim and Ployhart (2004), given that their work focuses on "individual characteristics relate to group-level constructs" such as "hardiness." SMEs argued that many factors are important to all group members equally, versus others that are only important to certain unit members.

Table 5

Representative Quotes for Research Question 3 (Does ARI's Phasic Army UR Definition Conform to Current Group-Level Resilience Literature?)

Transcribed SME Statements
Recovering, growing, thriving definition of resilience as a process is fine but [those elements] deviate from other definitions in the literature.
Resilience capability vs outcome – these are different things that you want to measure differently.
Event – acknowledgement and recognition of event are missing. Adding the stressor and appraisal would make it a full process.
Appraisal and awareness are missing. See Lazarus and Folkman for research on primary and secondary appraisal: recognizing challenge you've confronted and reviewing internal and external resources you have to bring to bear. Some of this is in here but a recognition is required.
What you have under Phase 1 are factors that contribute to resilient responding. You're not defining resilience but discussing factors that contribute to resilience.
Measuring all the phases seems daunting. The phases seem irrelevant to the way it's currently measuring how resilient people think their unit is.
The factors that are more compositional would not be at the individual level.
There is an interactive effect that I'm not sure is being captured. The process of interaction of people in the unit is not captured here.

Research Question 4: What Are the Factors of Army UR?

Part eight of *ARI's Subject Matter Expert Panel Survey on Unit Resilience* had SMEs rate the importance of ARI's 38 UR factors, and then in-person panel facilitators prompted a UR factor discussion. ARI calculated content validity of the 38 UR factors, based on the initial

survey. SMEs discussed additional factors, considerations for factors to fit the military environment, and recommended a multilevel model for UR factors. See Appendix C for ARI's UR factor list.

ARI calculated item content validity scores for all factors, based on the total number of experts from the initial survey rating the item (n = 4-6), and the number of experts rating the factor as "Important" or "Very Important" (see Table 6). Utilizing an I-CVI cutoff score of .78 for factors rated by all six experts, or 1.0 for factors rated by three to five experts (Lynn, 1986; Polit et al., 2007), SMEs rated all factors but seven (Rapidity, Efficiency, Consideration, Team Autonomy, Safety Culture, Leadership-Transformational, and Leadership-Autonomy) as being important to UR. An S-CVI (universal agreement) score, which calculates the proportion of the factors reviewed as "Important" or "Very Important," was 0.816. The S-CVI (average) score, which calculates the average of all the original I-CVI scores, was 0.883. Polit and Beck (2006) recommend S-CVI scores be at least .80 for S-CVI (universal agreement) and .90 for S-CVI (average) scores due to the differences in how each score is calculated. Therefore, both scores indicate that the original 38-item measure for UR is not content valid. Thus, ARI would need to construct a new measure with the valid factors per I-CVI scores before going on to additional steps. However, all retained factors had Kappa statistic ratings above 0.74 indicating those factors were "excellent" items, with the exceptions of Consideration and Leadership-Transformational, which had Kappa scores of .71, indicating those factors were "good" items (Cicchetti & Sparrow, 1981).

Table 6

Factor Ratings and Content Validity Results From ARI's Subject Matter Expert Panel Survey on Unit Resilience

Factor	Number of panelists rating the factor (*Ne*)	Number of panelists rating as "Important" / "Very Important" (*N*)	I-CVI	Probability of Chance (*Pc*)	Kappa Statistic (*K*)
Adaptation	6	6	1.00	0.02	1.00
Anticipation	5	5	1.00	0.03	1.00
Awareness/Monitoring	6	6	1.00	0.02	1.00
Cohesion	6	6	1.00	0.02	1.00
Collective Efficacy	6	6	1.00	0.02	1.00
Collective Positive Emotions	6	5	0.83	0.09	0.82
Commitment	6	6	1.00	0.02	1.00
Communication	6	5	0.83	0.09	0.82
Consideration	5	4	0.80	--	--
Creativity/Innovation	6	5	0.83	0.09	0.82

(continued)

Factor	Number of panelists rating the factor (*Ne*)	Number of panelists rating as "Important" / "Very Important" (*N*)	I-CVI	Probability of Chance (*Pc*)	Kappa Statistic (*K*)
Efficiency	5	3	0.60	--	--
Employee Well-Being and Robustness in Employee Health	5	5	1.00	0.03	1.00
Flexibility (in Structure, Strategy, and Response/Action)	6	6	1.00	0.02	1.00
Improvisation/Problem-Solving/Resourcefulness	6	6	1.00	0.02	1.00
Individual Resilience	6	5	0.83	0.09	0.82
Justice and Equality	6	5	0.83	0.09	0.82
Knowledge and Skill	6	5	0.83	0.09	0.82
Leadership	6	6	1.00	0.02	1.00
Leadership-Autonomy	5	3	0.60	--	--
Leadership-Transformational	5	4	0.80	--	--
Learning	6	6	1.00	0.02	1.00
Planning and Preparation	5	5	1.00	0.03	1.00
Positive Command Climate/Positive Climate	6	5	0.83	0.09	0.82
Rapidity	5	3	0.60	--	--
Resources and Redundancy	6	5	0.83	0.09	0.82
Robustness	4	4	1.00	0.13	1.00
Safety Culture	5	2	0.40	--	--
Sense-Making	6	5	0.83	0.09	0.82
Shared Identity	6	6	1.00	0.02	1.00
Shared Mission	6	6	1.00	0.02	1.00
Shared Values	6	6	1.00	0.02	1.00
Shared Vision	6	6	1.00	0.02	1.00
Social Support and Connections	6	5	0.83	0.09	0.82
Team Autonomy	5	3	0.60	--	--
Team Feedback/Reflection	6	5	0.83	0.09	0.82
Teamwork	6	6	1.00	0.02	1.00
Training	5	5	1.00	0.03	1.00
Trust/Psychological Safety	6	6	1.00	0.02	1.00

Note. Dashes (i.e., --) indicate Not Reported; the factor was removed due to an I-CVI score < .78 for six experts or 1.0 for five or less experts (see Lynn, 1986; Polit et al., 2007).

SMEs provided additional factors to add to ARI's list of 38 UR factors. SMEs noted redundant factors or factors that can be merged (i.e., Shared Vision, Shared Values, and Shared Identity). SMEs noted the following factors as most important to UR included (a) Collective Efficacy; (b) Planning; (c) Preparing; (d) Sense-Making; (e) Nature of Feedback; (f) Quality of Feedback; (g) Flexibility/Improvisation (for stress response); and (h) Environmental Appraisal. Additionally, no negative factors (risk factors) such as Toxic Stability (Soldiers joining and leaving an Army unit), Toxic Leadership, or "incivility which clearly exists in military units" appeared in the factor list provided to SMEs. One SME suggested reading Ployhart and Bliese (2006), who wrote about negative factors in the context of individual adaptability research. SMEs talked about leadership factors and UR, citing a study that found leaders can influence outcomes to stressful situations through appropriate communication and facilitating innovative thinking (no citation given). SMEs identified Deference to Expertise – escalating to higher headquarters or levels above and asking for people with expertise to "step up" as another factor. SMEs recommended adding Social Identity and Transactional Memory Systems or Shared Mental Models. A SME cited literature on the differences of effects for protective factors (largest effect), risk factors (intermediate effect), and demographic factors (smallest effect) on resilience (Lee et al., 2013).

According to one SME, the individual-level factors on the list provided to SMEs were Knowledge, Skills, Abilities, and Other characteristics (KSAOs). Factors to consider at the individual levels, which can be aggregated to group levels, include hardiness of the individual and individuals' family units, leaders' influence on behavior, leaders' lasting influence after leaving the unit, level of past and present experience with similar situations/stressors, etc. Additionally, SMEs recommended incorporating composition and compilation into the model (see Salas et al., 2015).

SMEs discussed the nuances of UR factors in the context of a military environment. One SME noted that, overall, the factors on ARI's list are "things that teams need to perform well in general, and necessary for resilience." SMEs determined that adaptive responses, appropriate team responses to stress, and social support (see Costa & Kahn, 2010) are important considerations for UR. Furthermore, SMEs noted that there are contextual elements to UR factors, as certain factors are specific to certain situations, and not others. For example, a factor's importance relates to the stressor faced; relative significance of the factor is contingent on the conditions facing the unit. Contextual planning (approaching planning in the context of a detailed assessment of the changing operational environment) is important in a military setting, where Soldiers face atypical and extraordinary circumstances that are often unimaginable, or at least not entirely predictable.

SMEs recommended applying a multilevel approach for the UR model as most of the factors in ARI's model occurred at the individual level but could aggregate to represent group-level phenomena. Many of the factors make sense only at the individual level (e.g., Individual Resilience, or Employee Well-Being and Robustness in Employee Health). Other factors only make sense at the collective unit or team levels (e.g., Collective Efficacy and Cohesion). Finally, many factors make sense at both levels (e.g., Adaption and Efficiency). SMEs suggested ARI focus on the unit/team phenomenon, while still considering the individual and interactive effects on the unit (e.g., team interdependence and relatedness). To capture the multilevel nature of UR, ARI could consider including items related to collective identity, cohesion, demographics/unit-

level data, etc. Being part of a group leads to deindividuation and a shared identity, and collective identity keeps groups together (see Shils & Janowitz, 1948; Watson, 1997). SMEs agreed ARI would need to measure group dynamics and know about the team, including the team's history, deployment status, resources, and team lifespan (e.g., short-term or permanent), for a multi-level analysis. Refer to Table 7 for representative quotes from SMEs concerning research question 4.

Table 7

Representative Quotes for Research Question 4 (What Are the Factors of Army UR?)

Transcribed SME Statements
You don't want to waste resources when trying to figure out a response. You want to act rapidly in some instances and deliberately in others.
There aren't really any negative factors represented here. What about toxic leadership, incivility? This clearly exists in military units. You would want to think of a handful of these types of factors as well. Protective and risk-factors.
I might have rated different depending on if I was rating for a larger group. I was thinking at the squad size, but my rating would probably change if it was at a higher level.
Are we talking about team functioning in response to a traumatic experience or routine team functioning?
Flexibility/improvisation is good for stress-rigidity response.
What is "collective positive emotions"? It is strange to think of group emotion. I have heard of emotional contagion.
An example would be active shooter training. Being prepared even if an event is not likely to happen is part of being resilient.
I struggled with leadership. I thought chain of command and hierarchy in the Army. What may matter more is someone leading a response. It could be anyone who is able to exert influence, not just formal leadership.
Rowing a boat in a group (composition) is different from being in an orchestra (compilation). Need items from both. Some factors are important to all equally, and some specific/unique to unit members.
See Shilz & Janowitz "Why Soldiers quit?" about informal structure or group togetherness that reinforces formal structure. It's about connection between the individual and the group. (*Note*: Correct title and author is "When Soldiers Quit" [Watson, 1997]).

Research Question 5: What Army UR Factors Map to Each Phase in ARI's Army UR Model?

SMEs rated the relevance of each factor to each phase and discussed how each factor manifests differently across the phases. The discussion covered the need to add the event as its own phase, changing the *Recover* phase to *Post-Event Processing* phase, the importance of event characteristics to how it affects the model, and the importance of adaptability in all three phases.

The panel facilitator asked SMEs to map the factors onto the three phases of ARI's UR definition (i.e., Prepare, Respond, and Recover). ARI consolidated all SMEs' factor-phase matrices to a single matrix and calculated I-CVIs for each factor in each phase. ARI documented SMEs ratings of factors by phase if at least three of the panelists rated the factor, and the I-CVI score was 1.0. In all, 23 of the original 38 factors (60.5%) mapped to at least one phase. Thirty-nine and five tenths of a percent of the factors did not map to any phase based on I-CVI scores (e.g., Sense-Making or Consideration). Fifty-five and three tenths of a percent of the factors mapped to a single phase (e.g., Improvisation/Problem-Solving/Resourcefulness in the Respond phase, and Awareness/Monitoring in the Prepare phase). Two factors mapped to two phases (i.e., Communication and Leadership each mapped to both the Prepare and Respond phases) and zero factors mapped to all three phases. Refer to Table 8 for I-CVI ratings for each factor by phase and Appendix C for the factor-phase matrix.

Table 8

Relevance of Each UR Factor to Each Phase

Factor	Phase					
	Prepare		Respond		Recover	
	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI
Adaptation	0/5	0.00	5/5	1.00*	3/5	0.60
Anticipation	5/5	1.00*	0/5	0.00	0/5	0.00
Awareness/Monitoring	5/5	1.00*	3/5	0.60	2/5	0.40
Cohesion	1/5	0.20	5/5	1.00*	2/5	0.40
Collective Efficacy	3/5	0.60	5/5	1.00*	0/5	0.00
Collective Positive Emotions	0/3	0.00	3/3	1.00*	1/3	0.33
Commitment	3/5	0.60	5/5	1.00*	1/5	0.20
Communication	5/5	1.00*	5/5	1.00*	4/5	0.80
Consideration	1/3	0.33	1/3	0.33	2/3	0.67
Creativity/Innovation	1/5	0.20	5/5	1.00*	0/5	0.00
Efficiency	1/3	0.33	2/3	0.67	0/3	0.00
Employee Well-Being and Robustness in Employee Health	1/3	0.33	1/3	0.33	2/3	0.67

(continued)

Factor	Phase					
	Prepare		Respond		Recover	
	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI
Flexibility (in Structure, Strategy, and Response/Action)	0/5	0.00	5/5	1.00*	0/5	0.00
Improvisation/Problem-Solving/Resourcefulness	0/5	0.00	5/5	1.00*	1/5	0.20
Individual Resilience	1/3	0.33	2/3	0.67	1/3	0.33
Justice and Equality	1/3	0.33	1/3	0.33	1/3	0.33
Knowledge and Skill	3/4	0.75	4/4	1.00*	3/4	0.75
Leadership	5/5	1.00*	5/5	1.00*	4/5	0.80
Leadership-Autonomy	2/5	0.40	3/5	0.60	0/5	0.00
Leadership-Transformational	2/4	0.50	4/4	1.00*	2/4	0.50
Learning	2/5	0.40	4/5	0.80	5/5	1.00*
Planning and Preparation	4/5	0.80	0/5	0.00	0/5	0.00
Positive Command Climate/Positive Climate	3/3	1.00*	1/3	0.33	2/3	0.67
Rapidity	0/3	0.00	2/3	0.67	0/3	0.00
Resources and Redundancy	4/5	0.80	5/5	1.00*	0/5	0.00
Robustness	0/3	0.00	3/3	1.00*	0/3	0.00
Safety Culture	2/2	1.00	1/2	0.50	0/2	0.00
Sense-Making	4/5	0.80	4/5	0.80	2/5	0.40
Shared Identity	3/5	0.60	4/5	0.80	1/5	0.20
Shared Mission	4/4	1.00*	2/4	0.50	0/4	0.00
Shared Values	4/5	0.80	4/5	0.80	1/5	0.20
Shared Vision	2/3	0.67	2/3	0.67	0/3	0.00
Social Support and Connections	4/5	0.80	5/5	1.00*	4/5	0.80
Team Autonomy	1/5	0.20	5/5	1.00*	0/5	0.00
Team Feedback/Reflection	0/5	0.00	2/5	0.40	5/5	1.00*
Teamwork	4/5	0.80	5/5	1.00*	3/5	0.60

(continued)

Factor	Phase					
	Prepare		Respond		Recover	
	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI	# Panelists Rating Factor Relevant to Phase / *N*	I-CVI
Training	4/5	0.80	0/5	0.00	0/5	0.00
Trust/Psychological Safety	3/5	0.60	4/5	0.80	3/5	0.60

Note. With a group of 3-5 experts, only factors with I-CVI scores of 1.0 are deemed important for retention (Polit & Beck, 2006). Therefore, factors above were deemed relevant for the phases if they were checked by all Subject Matter Experts who rated the factor (n = 3- 5). Items with less than 3 experts rating are not valid with this test. Relevant items are denoted with an asterisk (*).

All SMEs agreed the factors manifest differently across the phases; although a factor is important in multiple phases, the connotations of that factor in each definition and specific phase differs. For example, one SME stated that awareness and monitoring are important in all three phases.[6] In phase one, the team "must be aware of anticipatory challenges for the team and translating that into training activities and must be aware of resources as well." In phase two, the team "needs to be situationally aware of what's happening around them." In phase three, the team requires emotional awareness and sensitivity towards self and team/others – "you must be aware of your own reactions for learning and growth to occur, and also have shared awareness of what just happened." SMEs recommended conducting a Q-Sort to identify the underlying dimensions of the multiple individual factors or to combine factors, if possible (e.g., Cohesion and Shared Identity, or the many factors that relate to Adaption).

Adaption is an important factor for UR. One SME cited research regarding team adaptability factors in isolated/extreme environments (e.g., space, prison, or artic regions) as being a close construct to resilience (Bartone et al., 2018). Adaption occurs after an event takes place, and different events require different adaptions. According to a SME, important factors for adaptability and UR factor-phases should include (a) Intelligence/Cognitive Ability; (b) Conscientiousness (especially important in the Prepare phase); (c) Control (Efficacy); (d) Emotional Stability (or "essentially low Neuroticism"); (e) Openness to Experience; (f) Role Clarity; (g) Hardiness and its three subcomponents (Commitment, Control, and Challenge); and (h) Experience – especially in dealing with challenges. Refer to Table 9 for representative quotes from SMEs concerning research question 5.

[6] None of the factors mapped to all three phases in the content validity survey, but SMEs noted that some are important to all three.

Table 9

Representative Quotes for Research Question 5 (What Army UR Factors Map to Each Phase in ARI's Army UR Model?)

Transcribed SME Statements
If we focus on skills, abilities, and resources, I would include sense making, functional habits, social support/connections, improvisation/problem solving. All these things allow the unit to prepare/respond/recover.
Another kind of obvious one, Awareness/Monitoring for phase 1 (Prepare) – need Anticipatory Monitoring, what challenges lie ahead of team, what's going into, and translation into training. And phase one needs to be aware of the resources each person and the unit brings to table. Phase 3 calls more for Emotional Intelligence and Sensitivity in terms of individual reactions, and a team is composed of individuals so [there is a] need to be aware of yours and others' reactions in order to learn and grow.
I added Intelligence/Cognitive Ability of the individuals composing the team. All the factors I wrote down came out of the literature review I'd done for NASA on what factors contribute to adaptability. I'm relating adaptability to resilience here. Are resilience and adaptability interchangeable? It's questionable. Intelligence contributes to adaptability; as does conscientiousness, in the preparation phase. Control/efficacy. Emotional stability/low neuroticism. That's an individual one again, but it makes up the team, emotional contagion style. Openness to experience. Some of these are related to other factors you already have. Role clarity! Confusion decreases performance and degrades resilience as well, probably, in the preparation and response phases. Hardiness, commitment, control, challenge.
But, anticipated or not anticipated, though? If nothing unanticipated happens, it's something other than resilience that is required.
It depends on additive and interactive effects. It's not just a linear model.

Research Question 6: What Are the Indicators, Antecedents, and Outcomes of Army UR?

During the SME panel discussion, ARI facilitators directed SMEs to focus on indicators, antecedents, and outcomes of ARI's UR model (e.g., "Which of the factors shown should be considered as antecedents of UR?"). SMEs recommended literature that validated their statements on how antecedents affect unit actions, such as the type of event or team cohesion. SMEs emphasized that learning and feedback loops are important to ARI's UR model, and that feedback loops increase capacity for dealing with future event, if the correct lesson is learned.

One SME stated that identifying indicators was difficult because the definition did not include any indicators. However, another SME noted that the entitativity of a unit or team is an indicator of UR – if a group retained entitativity throughout a stressful event, the group is resilient. Nonetheless, SMEs did not identify any other indicators besides entitativity.

In the course of the SME panel discussion, SMEs discussed many antecedents to UR, including ones from ARI's factors and phases and new factors and phases not in ARI's definition or factors list. The event itself can be an antecedent, affecting how the team prepares for,

responds to, and recovers from future events of the same type. Cohesion and social support are antecedents and feed into capacity. One SME suggested Maddi's (2013) work regarding an outside support system allowing individuals to be resilient for further examples of antecedents. Refer to Table 10 for antecedents to UR recommended by the SMEs during the SME panel discussion.

Table 10

Antecedents to UR

Factor
A varied and extensive potential resource base
Access to outside experts
Cohesion
Community, family, and unit support
Core identity/shared identity
Functional habits
Improvisation (or resourcefulness)
Innovation
Knowledge and skill (which lead to flexibility)
Organizational support
Resourcefulness (especially when resources are limited, or absent)
Shared identity
Social support
Social support and connections
Team turnover and attrition
The ability to call on external actors

Many of the KSAOs and factors are antecedents because they increase a unit or team's capability/capacity for resilience. Capability precedes behavior, and resilient behavior occurs in the context of the organization's capabilities. Taken all together, antecedent UR factors comprise the capacity for the unit to be resilient. Hence, skills, abilities, and resources are important for building the capacity or capability for resilience in the future. SMEs noted numerous UR antecedents, such as sense-making, social support, flexibility, structure, strategy, improvisation, group diversity (having more variability and talents to draw upon), shared identity, functional habits, team composition factors, core/shared identity, resources available, and resourcefulness. According to Ployhart and Bleise (2006), resilience-ability is similar to resilience capacity, potential, or adaptability, as opposed to realized resilience, or realized potential. A group can have resilience capacity, or resilience-ability, but, without an event, the group does not actualize or realize resilience. Nonetheless, SMEs agreed that units and teams should prepare/increase

resilience capacity regardless of if the team or unit does not have the chance to demonstrate resilience (e.g., organizations train for active shooter events, fires, etc., even though those events are relatively rare occurrences).

SMEs noted that a preponderance of the factors listed contained individual-level (not group-level) characteristics. Furthermore, according to SMEs, individual-level KSAOs are antecedents to the resilience capacity of a unit or team, as are the majority of the 38 factors on ARI's list. Resilience capacity is an appropriate antecedent at individual and group levels because individual-level factors can "aggregate" to the group level (see Ployhart & Bliese, 2006); researchers measure compositional factors in group-level constructs at the aggregate level, not the individual level.

According to SMEs, resilience is the "consequence of resilient behaviors," and can be observed or measured through different positive and negative UR outcomes (see Table 11). SMEs noted many positive outcome variables to consider, including performance, learning, wellbeing, and Organizational Citizenship Behaviors (OCBs). In addition, SMEs reported numerous negative outcome variables, including counter-productive behaviors, non-OCBs, and disintegration of the group.

Table 11

UR Outcomes

Outcome
Positive Outcomes
Adaption
Aggregated perceptions
Engagement (e.g., measured by a work engagement scale)
Entitativity
Health (individual, family unit, etc.)
Learning
OCBs
Performance (or "*sustained*" performance)
Retention levels
Team cohesion and bond
Wellbeing (which can be an antecedent as well, through a feedback loop)
Negative Outcomes
Counter-productive behaviors (e.g., infractions)

(continued)

Outcome
Disintegration of the group (e.g., alienation [see Watson, 1997], desire to quit, turnover, attrition, lack of entitativity, power politics, etc.)
Non-OCBs
Overconfidence and excessively risky behavior (see Lieth & Baumeister, 1996)

Learning and feedback loops link all elements of ARI's UR model (i.e., phases, indicators, antecedents, outcomes, moderators, and mediators). Experiencing an event leads to conditioning future responses to similar events, changing the team or unit's resilience capacity. Capacity is pertinent to all UR phases – Prepare, Respond, and Recover. However, reinforcing behaviors is only beneficial when future events involve the same types of stressors; applying the same responses for different events (i.e., *rigidity* or *generalizability*) is not a resilient way to respond, so *adaptability* is an important capacity for UR. Refer to Table 12 for representative quotes from SMEs concerning research question 6.

Table 12

Representative Quotes for Research Question 6 (What Are the Indicators, Antecedents, and Outcomes of Army UR?)

Transcribed SME Statements
(That could be) an indicator of resilience- the degree of entitativity the team in the face of adversity. If it remains high, that's resilience.
This is not on any lists, but a varied and extensive potential resource base, (ability to) call upon external actors, to come up with great inventive ideas. You can't do that without extensive resources. A wide variety of social, physical, and intellectual resources; to lean on other individual expertise in times of need. If you have an emergency, you can call on other people to help as well.
It depends on what you learned. The pieces that make you more confident (show) that you can deal with adversity in an effective way. That part is beneficial regardless. But if you try to apply the same solution to new problems, that's rigidity, which is not good. For example, opening it up and asking people for help is a good thing (across situations), but doing a specific thing over and over to address very different situations is a bad thing.
Any measure that points to disintegration of the group (e.g., alienation, desire to quit); look at retention and attrition.
The effects of adversity at the team level: the extent to which the family system of the team is healthy, less conflict? Is that more of an individual outcome?
I like resilience-ability as a word. It signifies that you're separating out the capacity/ability from the test of whether or not you were resilient; however that's measured.

Research Question 7: What Are the Moderators and Mediators of Army UR?

Toward the end of the panel discussion, SMEs discussed moderator and mediators of ARI's Army UR model. SMEs conceptualized moderating and mediating variables as the

independent variables (IV) in our model, with variables such as observed resilience or unit performance being our dependent variables (DV). Refer to Table 13 for representative quotes from SMEs concerning research question 7.

According to SMEs, there are multiple moderating and mediating relationships when conceptualizing UR. Moderating and mediating variables in the model can include the different phases the unit is handling (i.e., Prepare, Respond, and Recover), the factors of UR (e.g., Positive Command Climate, Flexibility/Improvisation, Well-Being, etc.), as well as the unit's capacity to be resilient. The dependent variables include observed resilience as well as how the unit performs in each of the three phases.

Examples from SMEs of the factors moderating the relationships between the IVs and the DVs include conformity/pressure, demographic homogeneity of the team, and length of being a team. Multiple SMEs agreed that resilience is a moderator itself and the study of resilience is a study of moderators between events and outcomes. The nature or the intensity of the event, stressor, or threat can moderate resilience, from response to recovery, preparation to outcome, or recovery to "realized resilience." Events that are more adverse require more in-depth debriefing and more recovery for realized resilience. More intense events strengthen the relationships in the model (i.e., stressful events do not impact Respond and Recover phases as much as life-threatening scenarios do), so the intensity or severity of the event can be a moderator between the response and the recovery. Coping strategy (repertoire) can be a mediator in the UR model, as coping strategies mediate outcomes. The Recover phase can be a mediator between the response phase and an outcome as well. One SME stated that nearly all 38 factors on ARI's UR factor list would be antecedents, or possibly mediators (such as role clarity, at the team level).

Table 13

Representative Quotes for Research Question 7 (What Are the Moderators and Mediators of Army UR?)

Transcribed SME Statements
Coping strategies could be mediators. Resilience ability, through coping/action strategies, to some kind of outcome.
I would say that recovery…the link between recovery and realized resilience will be greater for more significant adversity or a greater disruptive event. You must engage in better debriefing and more time off, etc.
Whereas, some on the slide [panel-added factors from survey] are moderators, in some ways the study of resilience is the study of a moderator already. Also, the nature of the stressful event could be a moderator. Certain resilience factors become more important as the event changes.
The event triggers a response. It is a moderator of the response. The severity/duration of the event moderates the relationship between response and recovery. The nature of the event also moderates the relationship between recovery and the realized resilience and being able to thrive into the future.

Discussion

Summary of the Findings

Seven research questions addressed different topics, but there were three underlying themes behind the research questions: (a) UR definition, phases, and unit size; (b) UR factors; and (c) UR concept mapping. Research questions one through three regarded Army unit and team size and the multiphasic definition of UR. SMEs advised ARI on definitive, specific Army unit and team sizes, as the literature characterizes units and teams as distinct entities. Having definitive team and unit parameters for UR has theoretical as well as practical applications for conceptualizing units and teams in the model and for constructing measures for units and teams. SMEs concluded that Army teams should be 2-10 Soldiers. SMEs distinguished units from teams and identified the appropriate unit of measure for Army UR for units to include squads, platoons, or companies. Units above the company level (i.e., battalion, brigade, and division) have too much within-group variance to study or measure UR due to the different types and missions of the many smaller units that comprise the larger units. For example, an Infantry Brigade Combat Team (IBCT) is composed of multiple battalion-sized units (e.g., engineer battalion, infantry battalion, cavalry squadron, field artillery battalion, and a brigade support battalion), each with multiple company-, troop-, and battery-sized units that have different but complementary missions and identities. According to SMEs, company-sized units align with a distinct mission, have higher cohesion than battalion-and-above echelons, the Soldiers generally share similar backgrounds (e.g., military occupational specialty [MOS], education, training, a sense of "understanding each other" [e.g., shared mental models], similar skill sets, location of residence, and possess more "teamness" overall). However, units and teams are not ultimately size based, and UR will vary between teams and units, based on mission focus, cohesion, collective identity, etc. Unit and team sizes and levels are important for defining and measuring Army UR for both units and teams, according to the SMEs.

SMEs discussed ARI's multiphasic definition of UR in-depth. Overall, the SMEs approved of the multiphasic model, as the model is consistent with others in the literature, although the phases between ARI's model and others were different. SMEs distinguished vital shared concepts to incorporate into ARI's UR definition, including recovery, behavioral capabilities, stressors, responding/action, and social relations and cooperation; however, one SME warned that adding all possible factors and components to UR could become burdensome. SMEs believe that ARI must determine whether ARI's UR definition and measure regard UR as a process, an outcome, or a trait. The literature often defines UR as a process, and it is acceptable to define UR that way, although measuring UR as a process will be complex. Additionally, four of five SMEs preferred including learning, growth, building additional capacity, etc. in the model, as opposed to simply bouncing back, or returning to baseline group function after a traumatic event. Nonetheless, the hazardous nature of the Army's mission, along with the high personnel tempo and operational tempo, and the need to continue a mission during crises, differentiates Army UR from UR for other organizations. Consequentially, returning to baseline group function fits the etymology of the word *resilience* (e.g., from the Latin word resiliens, from re- "back" + salire "to jump, leap," altogether meaning "to rebound, recoil" [Online Etymology Dictionary, n.d.]). Thus, returning to baseline functioning would fit the original, etymological meaning of the word *resilience*, and would be sufficient for demonstrating UR in the Army context.

Research questions four and five addressed factors important to UR as well as how UR factors align across the phases of ARI's UR model. SMEs provided content validity for 31 of 38 factors from ARI's UR factor list and recommended numerous new positive and negative factors. SMEs believed UR is a multilevel construct, and that many of the factors on ARI's UR list are individual-level factors; however, individual-level factors can aggregate to group-level factors for application in ARI's UR model. Moreover, SMEs noted there were no negative factors (e.g., Toxic Leadership or Toxic Stability) incorporated in ARI's UR factor list. SMEs mapped factors to one or more phases and suggested changing the Recover phase to a *Post-Event-Processing* phase, as the term recovery relates to an outcome, versus a phase, while the term post-event processing relates specifically to a process. Furthermore, multiple SMEs noted that the event itself should be an additional phase, as without the event, there is no resilience manifested; the event sets UR into action, and without an event, there is no response because there is "nothing to respond to." Therefore, a measure absent a specific traumatic event (i.e., if the measure related to completing a mission while facing routine obstacles and challenges, or even chronic, stressful conditions, but did not face a specific traumatic event) in effect would not be measuring resilience, but another construct such as endurance, durability, persistence, determination, adaptability, etc. SMEs asserted that researchers generally measure constructs comparable to UR with perceptions, rather than performance of factors. Therefore, a UR measure can have limited validity if the questions regard how resilient team or unit members perceive a team or unit is, and not how resilient the team or unit actually is; accordingly, it would be better to measure UR with performance scores than with self-report measured perceptions, if possible.

While addressing research questions six and seven, SMEs discussed indicators, antecedents, outcomes, moderators, and mediators for ARI's UR model. However, SMEs note the bulk of the factors involved in capacity are individual-level factors that would require aggregation to the group-level, and ARI would have to consider a multilevel approach to express UR as there are interactions at each level (e.g., individual, team, squad, platoon, company, battalion, brigade, etc.). By using a multi-level model approach, ARI would be able to control for differences between units at each level (e.g., different types of units may be more cohesive than other types of units, and going up the chain, the successively higher levels will have differences that affect lower levels [e.g., resource availability, mission, effects from leadership, etc.]). Furthermore, researchers need to control for differences between units in the same hierarchy (locale, weather, deployment status, etc.) with covariates or by using a multi-level approach. Examples of positive outcomes of UR included performance, learning, wellbeing, health, entitativity, adaption, and cohesion. Examples of negative outcomes of UR included counter-productive behaviors, group disintegration, and excessive risky behavior. Examples of moderators in the UR model included the nature or intensity of the event, demographic homogeneity of the team, and the length of time in team status. Examples of mediators in the UR model included coping strategies and role clarity. Furthermore, many of the phases and factors link to one another through learning and feedback loops, and the model has substantial interrelationships among UR's components.

Implications of the Findings

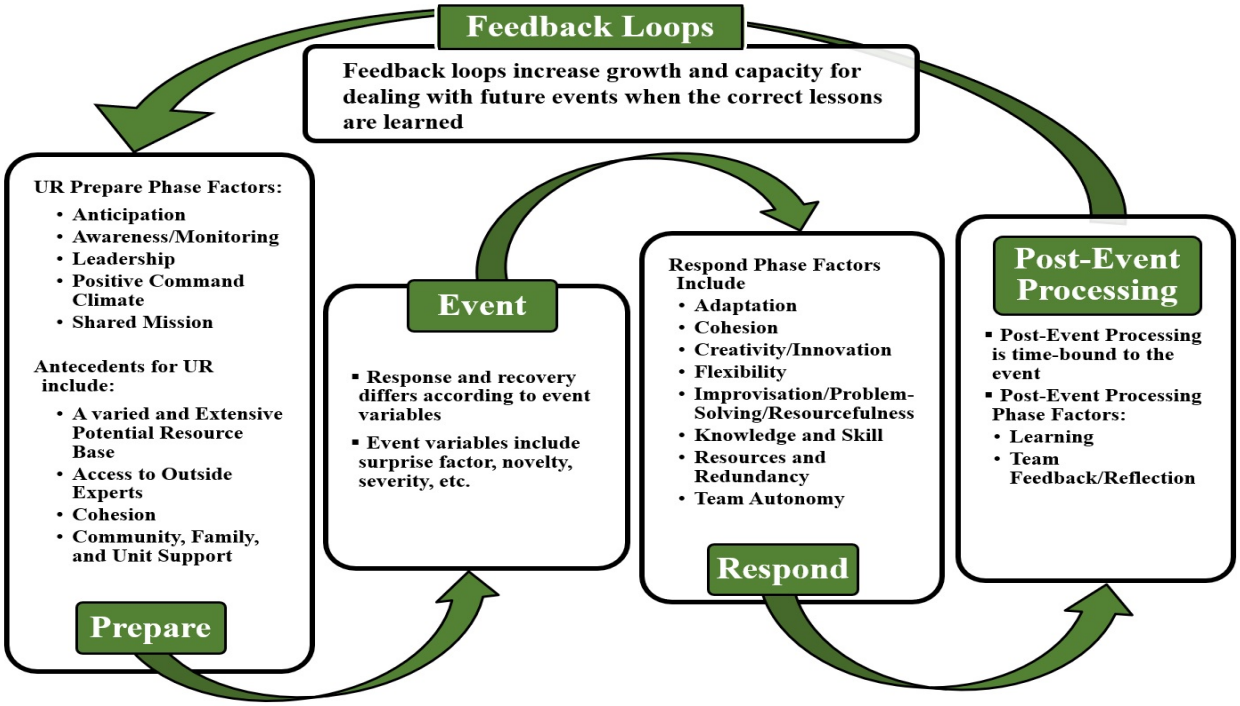
The result of this research includes both theoretical and practical implications for many areas of Army UR, particularly in refining ARI's multiphasic Army UR definition and model, and for developing a multiphasic measure of UR for the Army. Theoretical implications of ARI's UR

SME panel concern ARI's multiphasic UR model and definition. SMEs suggested adding the event to the multiphasic model, changing the Recover phase to a Post-Event Processing phase, and revising the model and definition to include other vital shared concepts that reoccur across unit-level resilience definitions. Furthermore, ARI defines UR as a process, and SMEs stated that doing so is consistent with other group-level multiphasic measures but warned that it could be an intimidating task to measure UR in phases. Another critical decision for an Army UR model and definition regards whether UR concerns bouncing back to equilibrium (i.e., baseline functioning), versus learning and growth after a traumatic event. SMEs also recommended viewing and modeling Army UR as a multilevel construct, and aggregating individual-level UR factors up to the group level. In addition, indicators, antecedents, outcomes, moderators, and mediators are important inclusions to an Army UR model. These are all considerations ARI must address when formulating a multiphasic UR model and definition. Refer to Figure 2 for the New Army UR model proposed by SMEs.

The SME panel discussion has important practical implications for ARI's UR model. One practical implication of the SME panel regards team size and unit of measurement. SMEs strongly believed that teams and units are distinct group classifications and recommended categorizing Army teams in the range of 2-10 Soldiers and Army units to include the squad, platoon, and company levels. Another practical implication from this research was that the content validity exercise validated 31 of ARI's 38 UR factors. In addition, SMEs recommended other UR factors for measuring Army UR. Finally, SMEs recommended utilizing performance-related outcome variables in Army UR research, rather than self-reported perceptions about the team or unit that "dominate the literature".

Figure 2

New Army UR Model Proposed by SMEs



Limitations of the Research

The small number of SMEs participating in the factor content validation exercise (n = 3-5) was a limitation as item content validity methods generally require more experts to confirm a factor is essential to a scale. With more SMEs, ARI could have used different content validity tests instead of I-CVI, such as CVR, which requires a minimum of five panelists rating a factor to be acceptable (although all panelists must be in agreement if there are less than eight panelists rating the factor). Besides the factor content validation exercise, additional SMEs may have also added insight and recommended literature to the discussion. However, by employing a small number of SMEs and controlling for the quality of the SMEs (e.g., requiring a university affiliation and a broad and extensive knowledge of the literature, as demonstrated through over 333 books, book chapters, and peer-reviewed journal publications among the group), ARI was able to turn this limitation to an advantage. With a small panel, ARI was able to calculate I-CVI scores to validate UR factors and gain far-reaching, detailed data without the issues that arise with a larger panel (e.g., persuasive, strong personalities controlling the discussion, or reduced participation, leading to low variability and low consensus).

ARI's *Subject Matter Expert Panel Survey on Unit Resilience* did not differentiate between *unit* and *team*. The survey noted, "In this survey, we use the term unit/team resilience to refer to the construct of unit resilience," and the protocol prompted discussion with questions such as, "When we asked about what group size you considered to be a unit or team, here is how you responded." However, SMEs noted the limitation and extensively discussed the differences between a unit and a team during the in-person panel. SMEs stated that units and teams are different types of groups and indicated that ARI needs to differentiate between the terms unit and team. In addition to this, ARI did not offer any absolute team or unit sizes to the SMEs for consideration of factors, and SME's factor ratings are apt to change based on the size of the group and if they were taking into consideration a team versus a unit. For this reason, SMEs suggested the model incorporate factors by group size, group characteristics, group interaction, group composition, and tenure as a team to deal with the limited amount of contextual information regarding the group.

SMEs observed that many of the rated factors were unknown because the literature does not extensively rate team performance from teams operating in real-world stress and uncertainty. The preponderance of the research into constructs comparable to UR originated from research on business organizations, where stressors can be financial (e.g., bankruptcy or marketing conditions – see Wilson, 2016), and not the threat of loss of life, limb, or eyesight that face an Army team or unit. The contexts are different between the Army UR construct and the similar constructs in the literature (e.g., organizational or community resilience). In any case, researching UR without exposing teams to hazards or real stress is difficult, and SMEs discussed the use of case studies, archival data, simulations, or virtual reality to measure resilience, although the last two can have ethical problems regarding "triggering events."

Although SMEs frequently agreed with each other's ratings of the factors, one SME noted that the ratings were "crude" because ARI did not define the factors for the SMEs. Since SMEs came from different backgrounds and had different understandings and definitions of the terms, the factor-rating results would be different if ARI had provided definitions for each factor. The SMEs lacked operational definitions for the use of each factor, in each case, for each factor

on the list. Examples of factors needing clarification included (a) Consideration; (b) Rapidity; (c) Well-Being; (d) Collective Positive Emotions; (e) Shared Vision; and (f) Psycho-Social Safety Culture. Refer to Table 14 for the full list of factors that SMEs requested ARI to define. However, SMEs noted that many of the factors are "unknown" because most of the literature in the field comes from research regarding routine team performance and not from research with teams exposed to high levels of stress and uncertainty.

Table 14

SMEs Requested Definitions to Clarify These Factors

Factor
Anticipation
Collective Positive Emotions (one SME added that "Shared Mental Models" would fit better)
Commitment to Mission
Commitment to Team
Consideration
Efficiency
Flexibility/Improvisation
Hardiness
Justice and Equality (multiple SMEs agreed Justice and Equality related to leadership as team members' perceptions of fairness affects the cohesion of the team/unit)
Leadership Autonomy
Mission Priority
Positive Command Climate
Psycho-Social Safety Culture
Rapidity
Robustness
Safety Culture
Sense-Making
Shared Vision (two SMEs wanted to change this to "Shared Purpose")
Team Autonomy
Transformational Leadership
Well-Being

Recommendations for Future Research

ARI identified four areas of UR that need further exploration. Future research can examine the literature for each UR factor, including research as to what relevant domain(s) the factor falls under. For example, does Awareness/Monitoring regard a cognitive, affective, or behavioral domain)? Follow-on research can also address how specific phase(s) (i.e., Prepare, Respond, and Recover) affect factors' domain categorization (e.g., Can Awareness/Monitoring be cognitive during the Prepare phase, but become behavioral during the Respond phase?) (see Cato et al., 2018.)

Secondly, this research began to clarify the UR factors and relationships to each other regarding each factor's operational definition, and future research can investigate what the literature expresses about each factor regarding being indicators, antecedents, outcomes, moderators, or mediators to other components of a multiphasic, multilevel UR measure. Future research can examine UR indicators, antecedents, outcomes, moderators, and mediators at the group-level, for inclusion in ARI's model. Research on indicators, antecedents, outcomes, moderators, and mediators for individual-level resilience is prevalent in the literature, but there is a lack of research of these at the unit and team level.

A third area for future research regards team versus unit levels of measurement. Researchers can investigate average group sizes in various team and unit-level research through a literature review (see Zemba et al., 2019).

Lastly, researchers must reconcile the varied definitions in the field regarding the nature of adverse events (or possibly just stressful conditions) that would require UR, versus endurance, hardiness, fortitude, perseverance, grit, adaptability, etc. Four of the five SMEs agreed that UR hinges on a specific, adverse event, while only one SME believed that general stressors might fit the Army UR model as well. This interpretation has considerable implications for ARI's UR definition model and research, as ARI typically collects data from Soldiers in training and garrison environments and collecting data about UR with restrictive parameters about what would demand resilience versus endurance, adaptability, etc., would necessitate ARI researchers inquiring about specifically adverse events and not stressful chronic conditions. Doing so is possible with current ARI data collection practices, but surveys and interview protocols will have to target the types of events that necessitate resilience versus other coping actions. Consequently, ARI needs to avoid defining and measuring UR as dealing with routine day-to-day stressors instead of bouncing back from intense, system-shocking events, which is clearly and categorically different. SMEs defined resilience in the context of adverse events (e.g., "How does a team respond to an event?") and determining what types and severities of events require resilience, would lead to a better fitting Army UR model, more consistent with the etymology and true definition of the word *resilience* (i.e., "bouncing back"). This SME panel determined that the event needs to be part of the model, and different levels and severities of events require different levels of response and recovery. Further research can investigate specific events and severities, possibly through examining the literature regarding events precipitating group-level resilience, or by reviewing Army reports (e.g., AARs or Serious Incident Reports [SIRs]) for a variety of different types and severities of events (e.g., combat action/exposure, first responder situations, suicides or accidents in the unit, or other events or stressors).

Conclusion

In conclusion, through surveys and a panel of SMEs, ARI obtained answers for many of the questions raised in the Cato et al. (2018) systematic literature review. ARI validated Cato et al.'s (2018) multiphasic UR definition (though SMEs advised on adding an Event phase and changing Recover to Post-Event Processing), reached consensus on appropriate team size and unit of measurement for Army UR, established content validity for 31 of 38 of ARI's UR factors, added new factors for consideration, and determined additional directions for future exploration. A modified Delphi method and SME panel resulted in important implications, applications, and a well-founded way ahead for ARI's research into UR. The goal for ARI is to use the information gained from this research to create a multiphasic UR measure, in consideration of the findings and the SMEs' literature recommendations. Small Army teams and units face overwhelming stressors and events in "no-fail" situations, and mission success is consequential to how Army units and teams prepare for, respond to, and recover from disaster, a process ARI titles, "*Army UR"*.

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APPENDIX A

ARI'S SUBJECT MATTER EXPERT PANEL SURVEY ON UNIT RESILIENCE

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) Subject Matter Expert Panel

Survey on Unit Resilience

SURVEY PURPOSE: ARI asked you to participate in a survey and panel meeting to help us further understand the construct of **UNIT RESILIENCE**. This effort will inform the future development of a measure.

The purpose of this survey is to obtain your expert opinion on different aspects of the construct of unit resilience. Specifically, we ask about your perspectives on unit/team resilience, including how it is defined and what factors make up the construct. In this survey, we use the term unit/team resilience to refer to the construct of unit resilience.

It should take about **ONE HOUR** to complete. If you cannot complete the entire survey at one time, your responses will be saved and you can return to it to finish. Please complete the survey by **MARCH 16**.

By clicking "**Next**" you are agreeing to participate in this survey.

- o Next

<<Page Break>>

UNIT/TEAM SIZE

1. Of the group sizes listed below, select all the group sizes that *you* consider a unit or team.

- ☐ 2 people
- ☐ 3-4 people
- ☐ 5-10 people
- ☐ 11-15 people
- ☐ 16-20 people
- ☐ 21-30 people
- ☐ 31-40 people
- ☐ Other (please specify) ***Allow 50 characters***

<<Page Break>>

UNIT/TEAM RESILIENCE DEFINITION

2. How would you define unit/team resilience? ***PLEASE TYPE YOUR RESPONSE BELOW.***

Allow 1000 characters

<<Page Break>>

UNIT/TEAM RESILIENCE DEFINITION (continued)

Currently, we are defining **unit/team resilience** as follows:

Unit/Team Resilience is comprised of *the unit's skills, abilities, and resources, which allow it to:*

- ***PREPARE*** *through planning and anticipating problems,*
- *successfully* ***RESPOND*** *through either withstanding or adapting, and*
- ***RECOVER,*** *which involves and facilitates bouncing back, learning, or growth in the face of challenging events or stressors.*

3. Would you suggest any changes to the above definition of unit/team resilience?

- Yes
- No ***[SKIP TO Q4]***

3b. What would you change in the definition above and why? ***PLEASE TYPE YOUR RESPONSE BELOW.***

Allow 1000 characters

<<Page Break>>

UNIT/TEAM RESILIENCE

4. **Do you think unit/team resilience is a process, a state, or both?**
   - Process
   - State
   - Both a process and a state
   - Not sure
   - Other

5. **Please explain your response below.**

Allow 1000 characters

<<Page Break>>

RESILIENCE PHASES (continued)

In a previous literature review, ARI identified the following three phases of unit/team resilience:

Phase 1 — Preparing is conceptualized to include planning, preparing, anticipating, and garnering resources.

Phase 2 — Responding includes withstanding, absorbing, robustness, innovation, improvisation, creativity, flexibility, adaptability, adjusting, and coping.

Phase 3 — Recovering includes bouncing back, recovering, learning, growing, and thriving.

6. Do you think the above phases adequately capture unit/team resilience? *PLEASE TYPE YOUR RESPONSE BELOW.*

- o Yes ***[SKIP TO Q7]***
- o No

6b. Please explain why you think the above phases do not adequately capture unit/team resilience and provide any suggestions/modifications.

Allow 1000 characters

<<Page Break>>

UNIT/TEAM RESILIENCE FACTORS

Researchers have conceptualized unit/team resilience as consisting of a variety of different factors or subcomponents.

7. What do you think are the key factors comprising unit/team resilience? Below, list as many factors as you can think of and briefly indicate why each is important.

Allow 2000 characters

<<Page Break>>

UNIT/TEAM RESILIENCE FACTORS (continued)

8. How important are the following factors to unit/team resilience? *MARK A RESPONSE FOR EACH FACTOR.*

	Not at all important 1	Slightly important 2	Moderately important 3	Important 4	Very important 5	Don't know 6
Awareness/ Monitoring						
Learning						
Creativity/ Innovation						
Knowledge and Skill						
Sense-Making						
Anticipation						
Resources and Redundancy						
Adaptation						
Flexibility (in Structure, Strategy, and Response/ Action)						
Planning and Preparation						
Communication						
Robustness						
Rapidity						
Improvisation/ Problem-Solving/ Resourcefulness						
Teamwork						
Efficiency						
Training						
Social Support and Connections						
Trust/ Psychological Safety						
Employee Well-Being and Robustness in Employee Health						
Commitment						
Cohesion						
Consideration						

Collective Positive Emotions						
Collective Efficacy						
Justice and Equality						
Team Autonomy						
Individual Resilience						
Shared Values						
Shared Identity						
Shared Mission						
Shared Vision						
Safety Culture						
Team Feedback/ Reflection						
Leadership						
Transformational Leadership						
Leadership Autonomy						
Positive Command Climate/ Positive Climate						

Page break after each 10 factors with header row for each set of items.

UNIT/TEAM RESILIENCE FACTORS (continued)

<<Ask participants the following questions in which participants chose 1=Not at all important in Question 8. Two sample questions (8b and 8c) are below.
If survey participant did not choose 1=Not at all important for ANY item in Question 8, skip to Question 9>>

8b. <<*If FACTOR1=1*>> Please explain below why you think <<factor 1>> is not at all important to the measurement of unit/team resilience.

Allow 500 characters

8c. <<*If FACTOR2=1* >> Please explain below why you think <<factor 2>> is not at all important to the measurement of unit/team resilience.

Allow 500 characters

<<Add similar statements for ALL factors shown in question 8>>

<<Page Break>>

UNIT/TEAM RESILIENCE FACTORS (continued)

9. Are there any additional factors that are important to unit/team resilience that you did not mention or that were not previously listed?

- **Yes <<Go to question 9b >>**
- **No *<<Skip to end of survey thank you>>***

<<Page Break>>

9b. Please list any additional factors that are important to unit/team resilience that you did not mention or that were not previously listed. If you listed factors in a previous question, you do not need to include them here.

Allow 2000 characters

THANK YOU

Submit survey. ***<<insert "submit survey" button>>***

You have successfully submitted the survey. Thank you very much for your time!

Confirmation Email to Participants

Dear Dr. (replace with Dr. SME's last name):

This email is to confirm that you have completed the survey on **Unit Resilience** and your response has been saved. Thank you for participating.

If you have any further questions about this email, please contact the survey administrator (name, email) or the project lead (name, email).

Sincerely,

Name
Survey Administrator

U.S. Army Research Institute for the
Behavioral and Social Sciences (ARI)
6000 6th Street, BLDG 1464
Fort Belvoir, VA 22060-5610
w: 703-545-2438

APPENDIX B

UR SME PANEL PROTOCOL

UR SME PANEL PROTOCOL
23 MARCH 2018 FINAL VERSION

[NOTE for facilitators:] *Instructions appear in italics.*

General Goal: For experts to provide their opinions on unit resilience (UR) that will maximally inform the creation of a measure and model of UR.

Welcome: (2 min)
Good morning and welcome to the unit resilience (UR) subject matter expert panel. My name is _____and these are my colleagues _____. As you know, we work for the U.S. Army Research Institute for the Behavioral and Social Sciences, better known as "ARI". We're very glad you could make it today.

Schedule Review: (3 min)
Let's take a look at the schedule for today. As you can see we have a very full day. So I want to review the schedule briefly and field any general questions you may have before we begin.

This morning, we will cover Parts 1 and 2 of the panel. For Part 1, we'll discuss issues related to UR: Unit group size and the UR definition and proposed phases. For Part 2, we'll discuss the proposed UR factors.

We'll then break for lunch and a few of us can escort you to locations on post to purchase lunch. After lunch, we will discuss Parts 3 and 4. For Part 3 we will attempt to assign the factors we discussed earlier in the day to proposed UR phases. For Part 4, we will discuss potential antecedents, outcomes, mediators, and moderators of UR.

Introductions: (10 min)
Before we jump in and begin working, let's take about 10 minutes and allow everyone to introduce themselves. Most everyone on the panel is here in the room, [but we do have one person on the phone (the panel coordinator)]. I'll start and then we'll go around table, and then the room. ***[Introduction start with Unit Chief]:*** My name is_____and I'm the Chief of the Emerging Research Unit. I've been with ARI for about 8 years, and I've been working off and on in the area of resilience for about 13 years.

(Allow introductions. Start with folks on phone)

Now, I'm going turn things over to my colleague _____and he'll kick off the panel discussion.

SME PANEL

[NOTE:] *Inclusion/exclusion (or other) decisions do not need to be unanimous, but deviations and reasons for them should be well-documented.*

FACILITATOR 1

As we go forward, I want to emphasize that there are no right or wrong answers. The aim of the panel is to elicit from you all as Subject Matter Experts your opinions about Unit Resilience. It is not necessary for us to reach consensus on any given topic, but we do want to understand and thoroughly document your thoughts and feedback.

I will be facilitating the first half of the panel, while my colleagues in the room [and on the phone] will take notes. We will not write down anyone's names. If you unintentionally mention your name, or specific people, we will not include this information in our notes. My colleague will watch the time to ensure we will be able to cover all parts of the panel. Are there any questions before we begin?

(Bathroom location, snacks available)

PART 1: Survey Results Discussion - Unit Size and UR Definition and Phases (45 min)

Prior to meeting today, you all completed a survey on Unit Resilience. Our goal for Part 1 is to review and discuss the survey findings.

We'll display the results on the PowerPoint behind me, and you also have been given a hardcopy of the slides to follow along with me if you like.

Unit Size

To begin, I'd like to talk about Unit Size.

1. When we asked about what group size you considered to be a unit or team, here is how you responded.

   *(SHOW "Unit - **Group Size**" quant slide to begin discussion.)*

   There are some areas where the panel had similar opinions about unit size.

   (Highlight areas of agreement, but focus on areas of disagreement.)

   Most of the panel said groups of **3 - 40 people** could be considered a unit or team.

   Some panel members indicated that **2 people** could be considered a unit or team.

a) ***[QUESTION]***: Looking at the responses now, what, if any, changes would you make to lower limits of a group's size? What is the smallest number of people you would consider a unit or group?

b) ***[QUESTION]***: What, if any, changes would you make to the upper limit of a group's size? Could a group be larger than 40 people and still demonstrate unit resilience?

UR Definition and Phases

Next, I'd like to focus on Unit Resilience definitions and phases.

2. When asked about how Unit Resilience should be defined, here's how the panel responded.

   *(SHOW UR definition **comments** slide)*

   (Ok to read highlights of definitions, but make sure to give them *time to read)*

   a. ***[QUESTION]***: What do you think about some of the definitions shown here?

3. When we looked at your responses to the question on how you would define Unit Resilience, here are some of the terms that you used.

   *(SHOW UR Definition **word cloud** slide.)*

   a. ***[QUESTION]***: What terms, if any, appear out of place or should not be here?
   b. [FOLLOW UP]: What about [TERM X] seems out of place?
   c. ***[QUESTION]***: Are there any terms that are missing from the Unit Resilience definition **word cloud**?

4. When we looked at recurring concepts for the proposed Unit Resilience definitions, we found that some concepts were consistently mentioned.

   (*SHOW UR definition **consensus** slide.)*

   a. ***[QUESTION]***: Why do you think some of these proposed concepts should be included as part of a Unit Resilience definition?

   b. ***[2ND SLIDE - FOLLOW UP]***: These are some of the concepts that were mentioned by one person in their response. Are there any concepts listed here you would like to comment on? Do you see any concepts that you think are particularly important?

5. I want to make sure we've adequately covered the proposed phases we included in our Unit Resilience definition.

   *(SHOW UR **definition phases proposed changes** comment slide.)*

We proposed that **Preparing, Responding, and Recovering** were important phases of Unit Resilience.

a. ***[QUESTION]***: What do you think about the approach of defining Unit Resilience in these phases?

    i. ***[FOLLOW UP]***: Are there phases that you would drop or add?

    ii. ***[FOLLOW UP]***: Tell me more about some other ways Unit Resilience could be examined, if we don't look at it in phases?

PART 2: Survey Results Discussion - UR Factors (75 min)

Now let's take a look at your survey responses to the proposed Unit Resilience factors. When we asked what factors were important to Unit Resilience, here is how you responded.

Consensus on Important and Very Important Factors

(REMEMBER: multiple slides in some sections!)

*(SHOW consensus **"very important"** factor slide)*

General questions

- Why do you think these factors are important or very important?
- Would you change any of your ratings of importance?

6. These are the factors that everyone said were "very important" to Unit Resilience.

   [Read factors on slide]:

   a. ***[QUESTION]***: Why do you think these factors are "**very important"**?

      [Let the panel guide which factors they want to discuss.]

   b. ***[QUESTION]***: Given what we just talked about, which, if any, of the factors would you rate differently?

   These are the factors that everyone said were "**important" to "very important**" to Unit Resilience.

   *(SHOW consensus **"important" to "very important"** factor slide)* ***x3 SLIDES 8-10***

   [Ordered by mean importance with only two importance options chosen]

   (Give them time to review entire slide and discuss factors that stand out to them; don't need to review each factor one at a time)

   c. ***[QUESTION]***: Why do you think these factors are important or very important?

   d. ***[QUESTION]***: Given what we just talked about, which, if any, of the factors would you rate differently?

   (REMEMBER:** SHOW **other 2 SLIDES and ask Q 6 c and d for each slide.)

*(SHOW consensus **"moderately important" to "important"** factor slide)*

7. Let's look at factors that everyone said were "moderately important" to "important" to Unit Resilience.

   (Give them time to review entire slide and discuss factors that stand out to them; don't need to review each factor one at a time)

   a. ***[QUESTION]***: Why do you think these factors are moderately important or important?

   b. ***[QUESTION]***: Given what we just talked about, which, if any, of the factors would you rate differently?

<u>Lower Consensus on Moderately to Very Important Factors</u>

*(SHOW consolidated **"lower consensus on moderately important to very important"** factor slide)* ***x2 SLIDES***

[Ordered by mean importance with three options being chosen]

8. Let's now look at the factors that were rated "moderately important" to "very important" to Unit Resilience.

   [Let the panel guide which factors they want to discuss.]

   a. ***[QUESTION]***: What do you think of the differences in ratings that we see here, with some people rating factors as "moderately important" and others rating them as and "very important"?

(REMEMBER:** SHOW **other 1 SLIDE and ask Q8 a for that slide.)

(**SHOW **Slightly Important to Very Important** Factors**)

Let's now look at the factors that were rated "slightly important" to "very important" to Unit Resilience.

   b. ***[QUESTION]***: What do you think of the differences in ratings that we see here, with some people rating factors as "slightly important" and others rating them as "important" and "very important"?

Don't Know Factors (Survey Q8 don't know)

*(SHOW **"Don't Know" Responses** Slide)*

9. There were some factors where panel members selected "Don't Know" as a response to how important the factor was to Unit Resilience.

    a. I'd like to hear more about why "Don't Know" was selected for the factors shown here. ***[If needed ask]:*** What did you think the factor name meant?

    b. ***[FOLLOW UP]:*** How did other people interpret these factors? What came to mind when you read the term?

Additional Factors
*(SHOW UR **Additional Factors** slide)*

10. Here are some of the additional or different Unit Resilience factors panel members proposed in the survey. Tell me more about why these factors could be important to Unit Resilience?

FACILITATOR 2

PART 3: UR Concept Mapping – Factor and Phase Matrix (120 min)

Welcome back! My name is _____and I'll be facilitating the 2nd half of the panel.

In this part of the panel, we are interested in understanding how you would group or categorize some of the factors we discussed this morning across the proposed phases of UR. Although we may not have had 100% agreement about which factors to include as part of UR, we still want to try understand how you would group these factors across the proposed UR phases. Your Input does not need to be unanimous, but we want to document situations where there is not agreement and the reasons why.

Factor Sorting by Phase Matrix

To facilitate this discussion, we will use a matrix of the factors and proposed phases.
(Hand out matrix print-outs and highlighters. Have panelists write down on the matrix any new factors that were discussed in the morning session.)

In front of you, you have a matrix list of UR factors in the rows and the UR phases in the columns. Using the provided highlighters, take the next **30 minutes** to indicate which UR factors from the list should go within or across the UR phases shown.

DEMO the process: if you want to indicate that a factor belongs in one phase, you would, highlight the cell for that row like this *(Highlight cell)*. If you think the factor belongs in all three phases, you would highlight the cell under each phase for that factor like so *(Highlight cells)*.

If you think there should be alternate phases or categories, please add them to the top column where "other" is written and sort factors into the new phases by highlighting the box corresponding that factor and phase. If you think a phase should not be included, simply make no highlights under that column. You also have the option to highlight the cells that correspond to "Don't Know" or "Not Applicable" for a UR factor, if you think the factor does not fit into any particular phase.

Let's go ahead and **individually** use this process to categorize our factors across the proposed phases. Are there any questions before we begin?

(Allow panel members to complete the matrix using the provided highlighters. If panel members want other highlighter colors for organization, offer them other colors.)

11. Before we talk about why you grouped the factors into the phases that you did, I want to ask:

a. Did anyone add or drop phases when they sorted the UR factors? If so, what phases were added or dropped?

b. Did you find that any of the factors were easy to sort into a phase/phases?

c. Did you find that any of the factors were difficult to sort into a phase/phases?

d. What factors did you put in the: Prepare, Respond, and Recover phases? [big ones to highlight]

e. For those who added an additional phase or grouping category, what were the factors you placed in beneath these?

(Facilitator: USE BIG FLIP NOTEPAD to record responses by phase.)

f. Would you combine any of these factors, and if so, how?

***[NOTES**:]*
Be prepared to accommodate participant thoughts that may not be directly on task (e.g.,, have a place to write possible moderators when discussing factor inclusion/exclusion).

Potential additional question if needed: For factors that you indicated for more than one phase, in what way do these factors appear the same or differently across phases?

PART 4: Concept Mapping - UR Model (90 min)
(SHOW Terminology slide.)

We have completed our sorting process and categorized the factors into the various phases. For this part of the panel, we want to identify factors as potential antecedents, indicators, outcomes, moderators, or mediators of UR. Please keep in mind, that it is possible there may be overlap in how factors are categorized; so a factor could account for unique variance in UR AND also act as a moderator under certain conditions.

Are there any questions about what we mean by classifying the factors before going forward?

(Address any questions that might arise regarding the definitions of moderator, mediator, antecedent, or outcome?)
(USE Factor List from PART 3 and show additional factors that SMEs identified)

UR Indicators, Antecedents, and Outcomes

12. *Indicators*: Which of the factors shown should be considered as an indicator or should be included in a potential measure of UR?

13. *Indicators*: What other factors, not listed here or on the screen, should be considered as indicators of UR? *(Facilitate brainstorming.)*

14. *Antecedents*: Which of the factors shown should be considered as antecedents of UR?

15. *Antecedents*: What are other factors, not listed or shown here, that should be considered as potential antecedents of UR? *(Facilitate brainstorming.)*

16. *Outcomes*: Which of the factors shown should be considered as outcomes related to UR?

17. *Outcomes*: What are some other factors that could be considered potential outcomes of UR? *[**QUESTION:** IF ONLY NEGATIVE OUTCOMES MENTIONED]* What are some POSTIVE OUTCOMES?]

UR Moderators and Mediators
Let's talk a bit now about what factors might contribute as a moderator or mediator to UR versus those that make up the construct directly.

18. *Moderators*: Which of the factors could be considered as a moderator of UR?

19. *Moderators*: What are other factors, not captured yet today, could be considered as potential moderators of UR? *(Facilitate brainstorming.)*

20. *Mediators*: Which of the factors could be considered as a mediator of UR?

21. *Mediators*: What are some other factors, not captured yet today, could be considered as potential mediators of UR?

WRAP-UP: Next Steps (5-15 min)

I think that is about all the time we have today. We really appreciate all the help and insight you have given toward this effort!

Going forward, we plan to consolidate and summarize the findings from the survey and the panel session today. Please let us know if you are interested in receiving these finalized documents and whether you would like to serve as a co-author on this or future resilience related projects. At a minimum, all panelists will be acknowledged in any publication materials, unless you indicate otherwise.

Thank you all for your time and energy today. Again, we sincerely appreciate your input. Safe travels back home!

SCHEDULE

Time	Event
9:00-9:30	Coffee and Light Refreshments (optional)
9:30-9:45	Welcome, Schedule Review, and Introductions
9:45-10:30	PART 1
10:30-10:45	**Break**
10:45-12:00	PART 2
12:00-1:00	**Lunch** (available for purchase) <researchers ADD NEW FACTORS to Factor List>
1:00-3:00	PART 3
3:00-3:15	**Break**
3:15-4:45	PART 4
4:45-5:00	Wrap-up

APPENDIX C

SME RATINGS OF FACTOR RELEVANCE BY PHASE

Factors Influencing Unit Resilience	*Phase 1: Prepare*	*Phase 2: Respond*	*Phase 3: Recover*	*Subject Matter Expert Opinions on Item-Phase Relevancy*
Adaptation		✓		A unit's ability to adjust to situations as they happen and after they occur was found to be crucial in the Respond phase of unit resilience
Anticipation	✓			Being able to predict and/or expect certain outcomes has been deemed an important factor during the Prepare phase of unit resilience
Awareness/Monitoring	✓			Being able to maintain alertness and stay aware of a situation was deemed important in the Prepare phase of unit resilience
Cohesion		✓		A unit's ability to work as a united whole has been identified as an impactful factor on the Respond phase of unit resilience
Collective Efficacy		✓		The ability for a unit to control each of its members to achieve goals was deemed impactful on the Respond phase of unit resilience
Collective Positive Emotions		✓		Group positivity was identified as an impactful factor in the Respond phase of unit resilience
Commitment		✓		Displaying dedication and allegiance to one's unit and the task at hand was determined to have an impact on the on the Respond phase of unit resilience
Communication	✓	✓		Communication skills amongst a unit were found to be relevant across the Prepare and Respond phases of unit resilience
Consideration				Having consideration for others and tasks was not found to have a great impact on any of the phases of unit resilience
Creativity/Innovation		✓		The ability to think creatively and adopt new, original ideas was thought to only be impactful during the Respond phase of unit resilience

Factors Influencing Unit Resilience	*Phase 1: Prepare*	*Phase 2: Respond*	*Phase 3: Recover*	*Subject Matter Expert Opinions on Item-Phase Relevancy*
Efficiency				To work efficiently was not considered to have an important impact on any of the phases of unit resilience
Employee Well-Being and Robustness in Employee Health				Personal health, strength and well-being were not considered to have a significant impact in any of the phases of unit resilience
Flexibility (in Structure, Strategy, and Response/Action)		✓		Being flexible to different and/or changing structures, strategies, and responses to events was deemed an important factor to the Respond phase of unit resilience
Improvisation/Problem-Solving/ Resourcefulness		✓		Problem-Solving skills, making use of the resources available, and contriving a plan without forethought were all factors deemed to have an impact on the Respond phase of unit resilience
Individual Resilience				The factor of individual resilience was not identified as having a significant impact on any of the phases of unit resilience
Justice and Equality				Treatment of unit members fairly and equally was not determined to have relevance to any of the phases of unit resilience
Knowledge and Skill		✓		Having knowledge and the appropriate skills to accomplish tasks was found to be salient relevant in the Respond phase of unit resilience
Leadership	✓	✓		Leadership within a unit was seen as a relevant factor impacting the Prepare and Respond phases of unit resilience
Leadership - Autonomy				Leadership autonomy was not recognized as being relevant to any phase of unit resilience
Leadership - Transformational		✓		Although leadership itself was deemed salient relevant in all phases, transformational leadership was recognized as impactful only in the Respond phase of unit resilience

Factors Influencing Unit Resilience	*Phase 1: Prepare*	*Phase 2: Respond*	*Phase 3: Recover*	*Subject Matter Expert Opinions on Item-Phase Relevancy*
Learning			✓	Gaining knowledge and understanding new information was found to be key in the Recover phase of unit resilience
Planning and Preparation				Planning and preparing for events and potential situations was not seen as having an impact in any unit resilience phase
Positive Command Climate/ Positive Climate	✓			A positive command climate, or positive culture within a unit, was found to have an impact on the Prepare phase of unit resilience
Rapidity				Someone's capacity to be rapid was not found to have an impact on any of the phases of unit resilience
Resources and Redundancy		✓		Availability of appropriate resources when required was determined to be impactful on the Respond phase of unit resilience
Robustness		✓		An individual's ability to be strong and healthy when facing adversity was determined to have impact on the Respond phase of unit resilience
Safety Culture				The factor of safety culture within unit resilience was not seen as significant in any of the phases of unit resilience
Sense-Making				Having the capacity to understand the concepts and experiences a unit encounters was not thought to be crucial to any unit resilience phase
Shared Identity				An individual's ability to identify or relate with their unit was not determined by panelists to have an impact on any phases of unit resilience
Shared Mission	✓			Everyone in a unit having the same goals and mission was found to have an impact on the Prepare phase of unit resilience

Factors Influencing Unit Resilience	*Phase 1: Prepare*	*Phase 2: Respond*	*Phase 3: Recover*	*Subject Matter Expert Opinions on Item-Phase Relevancy*
Shared Values				Having shared values amongst a unit was not found to have an impact on any phases of unit of resilience
Shared Vision				Having a shared vision within the unit was not associated with an impact on any of the phases of unit resilience
Social Support and Connections		✓		Having social support from and connections with others was thought to have an impact on the Respond phase of unit resilience
Team Autonomy		✓		The ability for a unit to work independently was seen as having an impact on the Respond phase of unit resilience
Team Feedback/Reflection			✓	Giving and receiving feedback and reflecting over events was thought to have an impact on the Recover phase of unit resilience
Teamwork		✓		The capability for a unit to work as a team was determined to have an impact on Respond phase of unit resilience
Training				The level and quality of training received was not deemed impactful on any phase of unit resilience
Trust/Psychological Safety				Holding trust in others as well as having no fear to express yourself within the unit was not considered important for any phases of unit resilience

Note. With a group of 3-5 experts, only factors with I-CVI scores of 1.0 are deemed important for retention (Polit & Beck, 2006). Therefore, factors above were deemed relevant for the phases if they were checked by all of the Subject Matter Experts who rated the factor (n = 3-5). Items with less than 3 experts rating are not valid with this test. Relevant items are denoted with a check mark (✓).

APPENDIX D

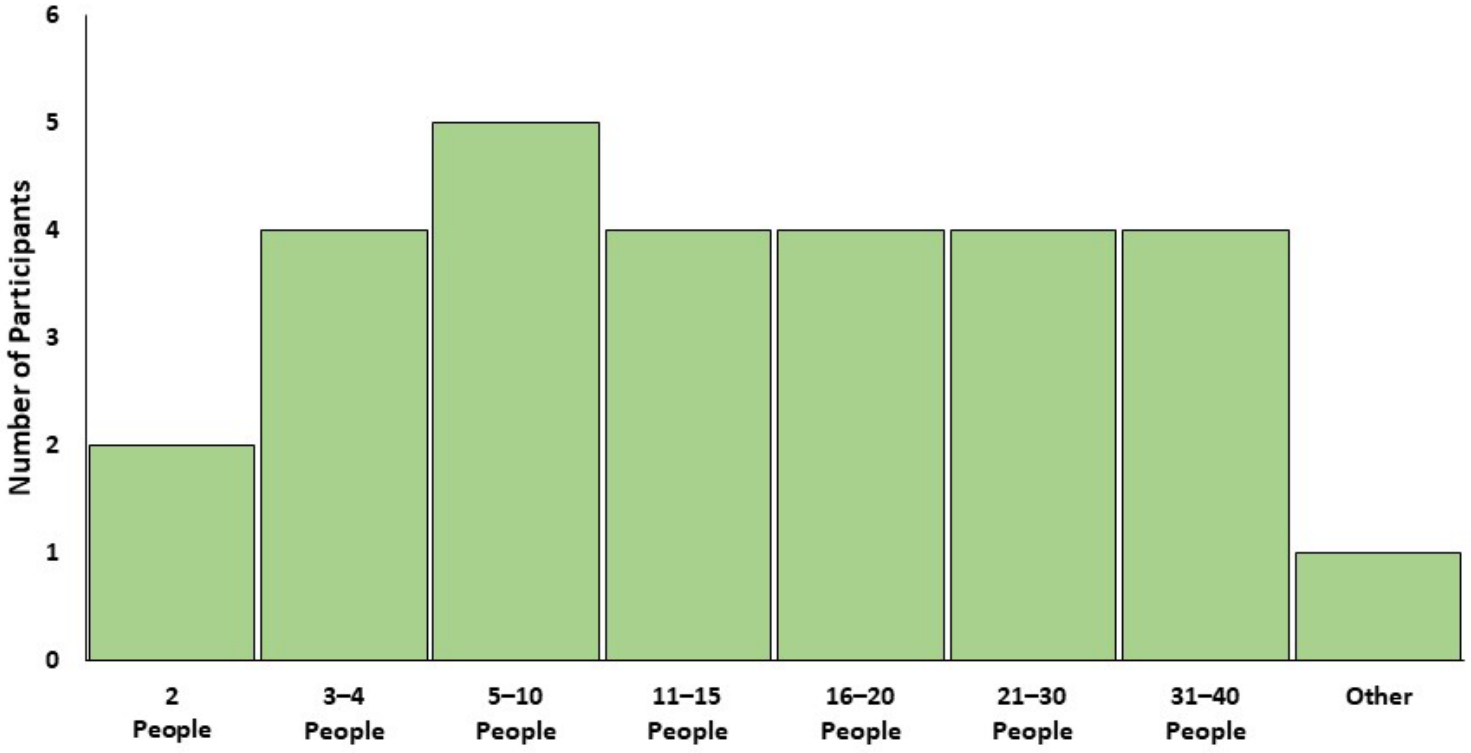
ARI'S SUBJECT MATTER EXPERT PANEL SURVEY ON UNIT RESILIENCE RESULTS

Unit Resilience
Subject Matter Expert (SME) Panel

23 March 2018

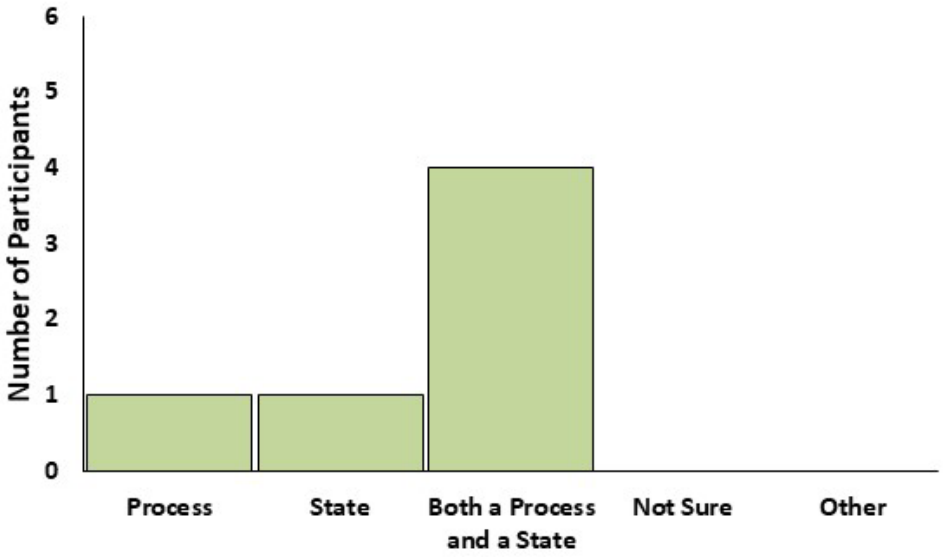
Unit Group Size

Select all **Group Sizes** that you consider a unit or a team.



1 person responded "**Other**" with a range of **3** to **10**

Do you think resilience is **a Process, a State, or Both**?



Unit Resilience Definition Comments

How would you **define unit/team resilience**?

SME 1: Cacioppo et al. (2011) defined "social resilience" as the capacity of the group "to foster, engage in, and sustain positive social relationships and to endure and recover from stressors and special isolation" (p. 43).

SME 2: The result of the adaptive capacity of a team that supports successful achievement of goals and objectives despite adversity.

SME 3: The individual and team/unit cognitive, behavioral and contextual capabilities that enable members to collectively recognize, acknowledge, and effectively interpret or understand an adverse situation or trigger, figure out how to respond in a way that meets or resolves the immediate challenge and also enables the unit to thrive in the future, and take the actions needed to implement the selected response.

SME 4: Capacity of the team to maintain cooperative performance despite sudden or ongoing stressors and changing conditions.

SME 5: The capacity for a unit/team to demonstrate positive adaptation in the face of significant adversity.

SME 6: Unit/team resilience is the team's ability to take advantage of situational conditions that could otherwise be considered threatening. This ability is rooted in the team's understanding of the situation, its response choice(s) from a myriad of possible actions, and the structure and system within which action and interactions take place.

Unit Resilience Definition Consensus

How would you **define unit/team resilience**?

	SME 1	SME 2	SME 3	SME 4	SME 5	SME 6	Consensus*
Unit/team capacity or ability	X	X	X	X	X	X	6 / 6
Stressor or adversity	X	X	X	X	X	X	6 / 6
Respond or take action			X		X	X	3 / 6
Social relations and cooperation	X			X			2 / 6
Collective understanding			X			X	2 / 6
Endure stressor or adversity	X	X					2 / 6

* Consensus: Number of SMEs who included concept in their definition of unit/team resilience

Unit Resilience Definition Consensus

How would you **define unit/team resilience**?

	SME 1	SME 2	SME 3	SME 4	SME 5	SME 6	Consensus*
Succeed at goal or objective		X					1 / 6
Recover from stressors	X						1 / 6
Resolve challenge			X				1 / 6
Maintain performance				X			1 / 6
Individual component			X				1 / 6
Cognitive capabilities			X				1 / 6
Behavioral capabilities			X				1 / 6
Contextual capabilities			X				1 / 6
Enabling future success			X				1 / 6
Actions and interactions						X	1 / 6
Structures and systems						X	1 / 6

* Consensus: Number of SMEs who included concept in their definition of unit/team resilience

Unit Resilience Definition Phases
Proposed Changes

Please explain why you think the **phases do not adequately capture** unit/team resilience and provide any suggestions/modifications

Proposed phases of UR:

Phase 1 — Preparing is conceptualized to include planning, preparing, anticipating, and garnering resources.

Phase 2 — Responding includes withstanding, absorbing, robustness, innovation, improvisation, creativity, flexibility, adaptability, adjusting, and coping.

Phase 3 — Recovering includes bouncing back, recovering, learning, growing, and thriving

Consensus: **6 of 6** panelists Indicated they did not think the above phases capture the "process" of unit/team resilience.

SME 1: Consult research literature on how groups adapt or not to stressful conditions to identify phases.

SME 2: If [Unit Resilience is] phasic as opposed to dynamic process, then these steps are adequate; however, I am not sure they capture the essence of the conditions necessary for resilience to become inculcated in the operating culture of a team... Learning should be an ongoing part of the refinement of processes through incorporation of feedback and adaptation.

SME 3: Phase 1 needs to include scanning/noticing... the external environment so that unexpected, emerging events or situations can be noticed... and recognized as important to address.

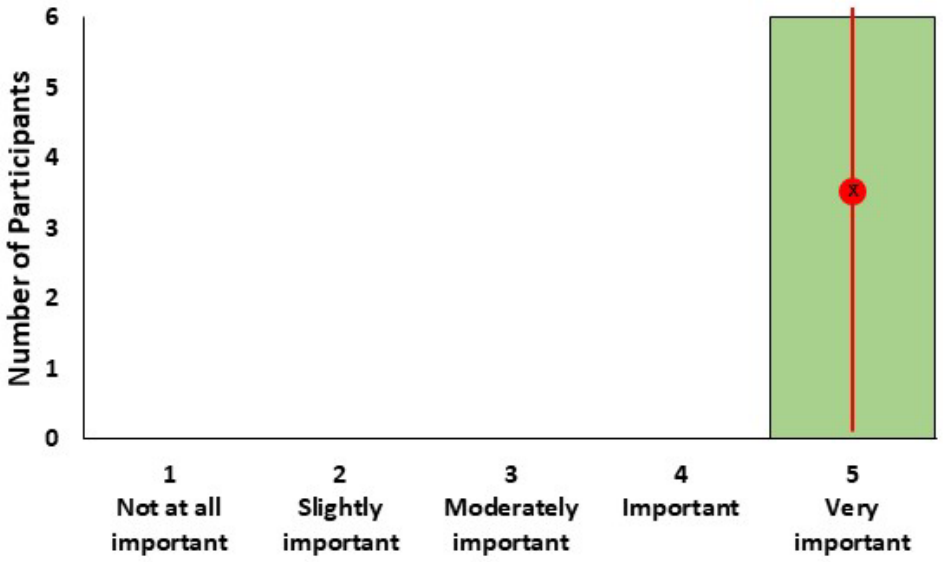
SME 4: The phases are a good conceptualization. I would clarify that Phase 1 elements CONTRIBUTE to team resilience. Phase 2 includes both descriptions of behavioral response to stress (e.g., withstanding, absorbing, innovating) and factors that may INFLUENCE resilient responding (e.g., flexibility, adaptability, creativity). It would be better to keep these separate to avoid confusion. Recovery need not include growing or thriving. Recovery to a level where adequate performance can continue should be enough to constitute Resilience.

SME 5: I think the first two components are processes that increase the likelihood of demonstrating resilience. The third phase appears to be demonstrating resilience. There are a host of unit/team properties that contribute to the capacity for resilience, which should predict the extent to which the team is able to accomplish the first two phases.

SME 6: "Preparing" - seems to exclude some important activities related to interpreting and analyzing the contextual situation. For example, observing, sensing, interpreting, and analyzing could be useful additions to the characterization of the phase. "Responding" - resource allocation; transformation are two elements that seem to be missing.

Consensus on Very Important Factors

How important are the following factors to unit/team resilience?

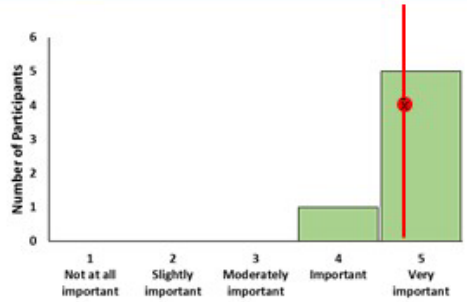


Mean =	5	*SD* =	0.00	r_{wg} =	1.00
Median =	5	Min =	5	*n* =	6
Mode =	5	Max =	5	DK =	0

Rated "Very Important" by <u>ALL</u> SMEs

- Adaptation
- Flexibility (in structure, strategy, and response/action)
- Improvisation/Problem-Solving/Resourcefulness
- Teamwork
- Trust/Psychological Safety
- Shared Mission

Consensus on Important to Very Important Factors



Communication

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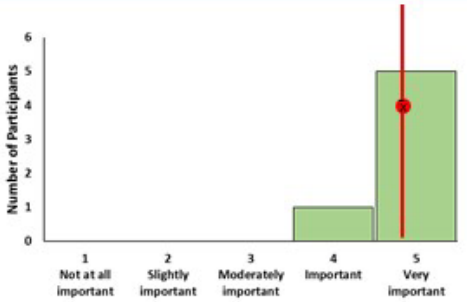
Mode =	5	Max =	5	DK =	0



Cohesion

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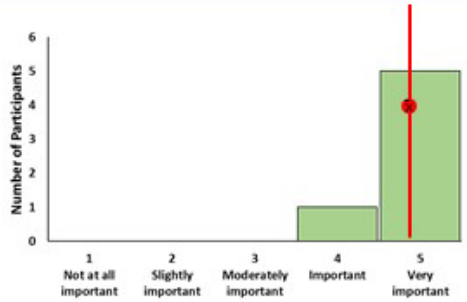
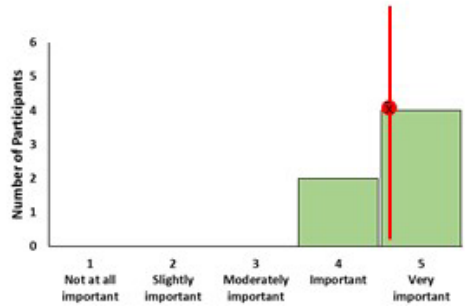
Mode =	5	Max =	5	DK =	0



Shared Identity

Mean =	4.83	*SD* =	0.41	r_{wg} =	0.92
Median =	5	Min =	4	*n* =	6
Mode =	5	Max =	5	DK =	0



Awareness/Monitoring

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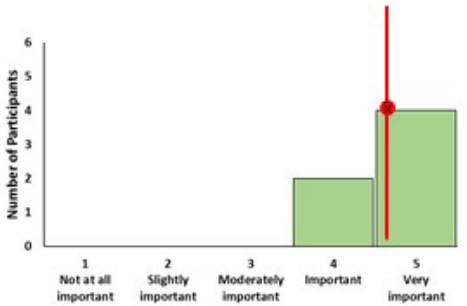
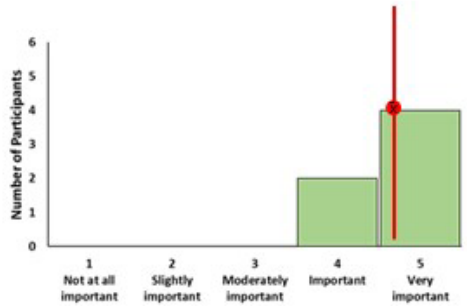
Median =	5	Min =	4	*n* =	6
Mode =	5	Max =	5	DK =	0



Learning

Mean =	4.67	*SD* =	0.52	r_{wg} =	0.87
Median =	5	Min =	4	*n* =	6
Mode =	5	Max =	5	DK =	0



Commitment

Mean =	4.67	*SD* =	0.52	r_{wg} =	0.87
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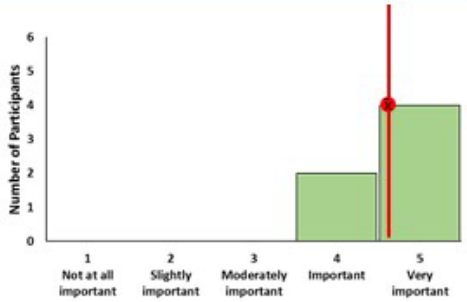
Mode =	5	Max =	5	DK =	0

Consensus on Important to Very Important Factors



Collective Efficacy

Mean =	4.67	*SD* =	0.52	r_{wg} =	0.87
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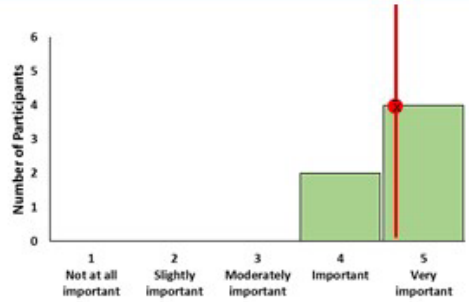
Mode =	5	Max =	5	DK =	0



Shared Values

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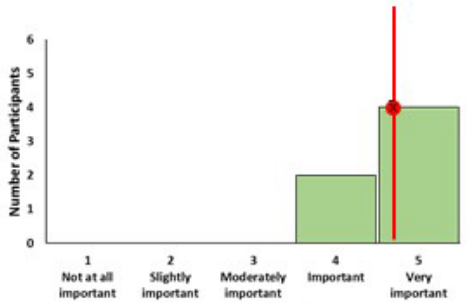
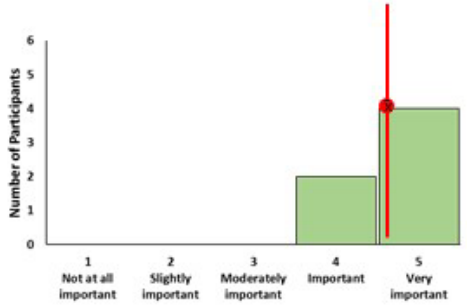
Mode =	5	Max =	5	DK =	0



Shared Vision

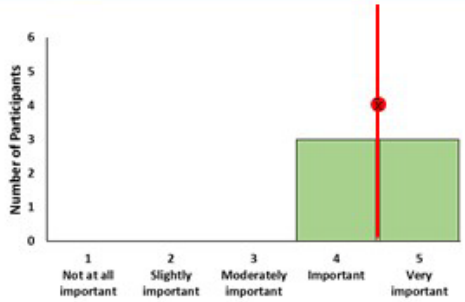
Mean =	4.67	*SD* =	0.52	r_{wg} =	0.87
Median =	5	Min =	4	*n* =	6
Mode =	5	Max =	5	DK =	0



Leadership

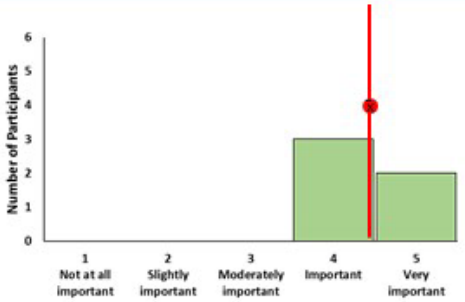
Mean =	4.67	*SD* =	0.52	r_{wg} =	0.87
Median =	5	Min =	4	*n* =	6
Mode =	5	Max =	5	DK =	0

Consensus on Important to Very Important Factors



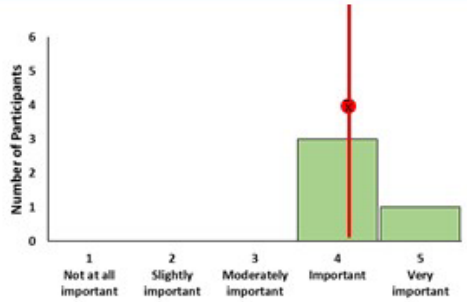
Resources and Redundancy

Mean =	4.5	*SD* =	0.55	r_{wg} =	0.85
Median =	4.5	Min =	4	*n* =	6
Mode =	4,5	Max =	5	DK =	0



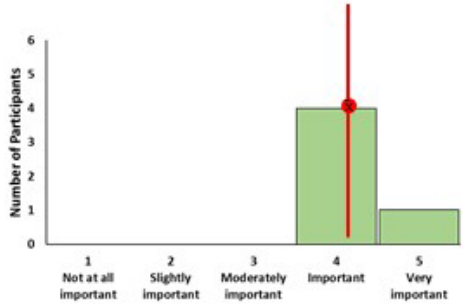
Training

Mean =	4.4	*SD* =	0.55	r_{wg} =	0.85
Median =	4	Min =	4	*n* =	5
Mode =	4	Max =	5	DK =	1



Robustness

Mean =	4.25	*SD* =	0.5	r_{wg} =	0.88
Median =	4	Min =	4	*n* =	4
Mode =	4	Max =	5	DK =	2



Anticipation

Mean =	4.2	*SD* =	0.45	r_{wg} =	0.90
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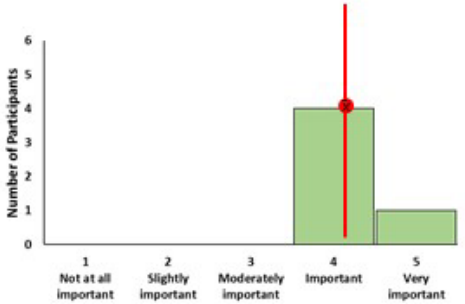
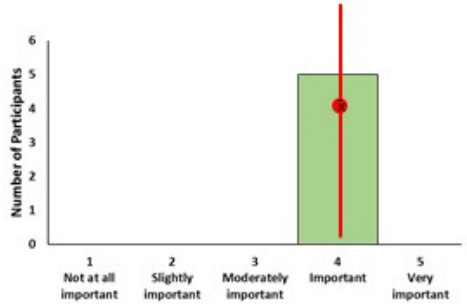
Mode =	4	Max =	5	DK =	1



Planning and Preparation

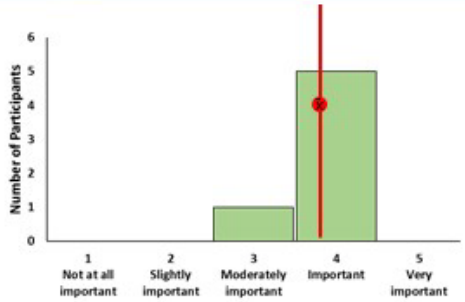
Mean =	4.2	*SD* =	0.45	r_{wg} =	0.90
Median =	4	Min =	4	*n* =	5
Mode =	4	Max =	5	DK =	1



Employee Well-Being/Health

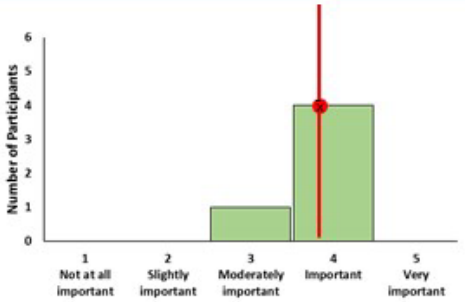
Mean =	4	*SD* =	0.00	r_{wg} =	1.00
Median =	4	Min =	4	*n* =	5
Mode =	4	Max =	4	DK =	1

Consensus on Moderately Important to Important Factors



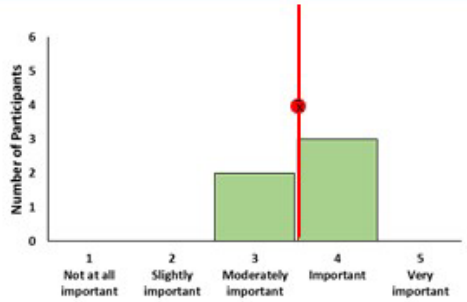
Justice and Equality

Mean =	3.83	*SD* =	0.41	r_{wg} =	0.92
Median =	4	Min =	3	*n* =	6
Mode =	4	Max =	4	DK =	0



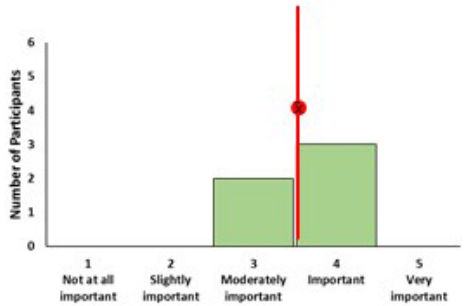
Leadership-Transformational

Mean =	3.8	*SD* =	0.45	r_{wg} =	0.90
Median =	4	Min =	3	*n* =	5
Mode =	4	Max =	4	DK =	1



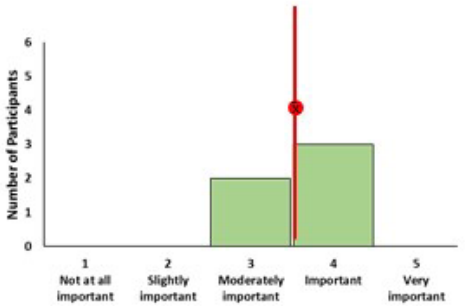
Rapidity

Mean =	3.6	*SD* =	0.55	r_{wg} =	0.85
Median =	4	Min =	3	*n* =	5
Mode =	4	Max =	4	DK =	1



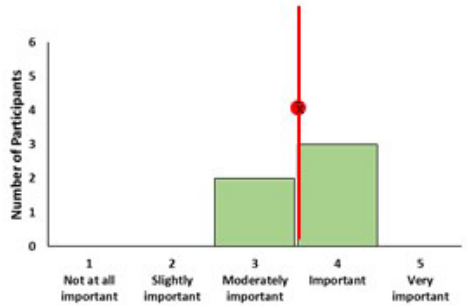
Efficiency

Mean =	3.6	*SD* =	0.55	r_{wg} =	0.85
Median =	4	Min =	3	*n* =	5
Mode =	4	Max =	4	DK =	1



Team Autonomy

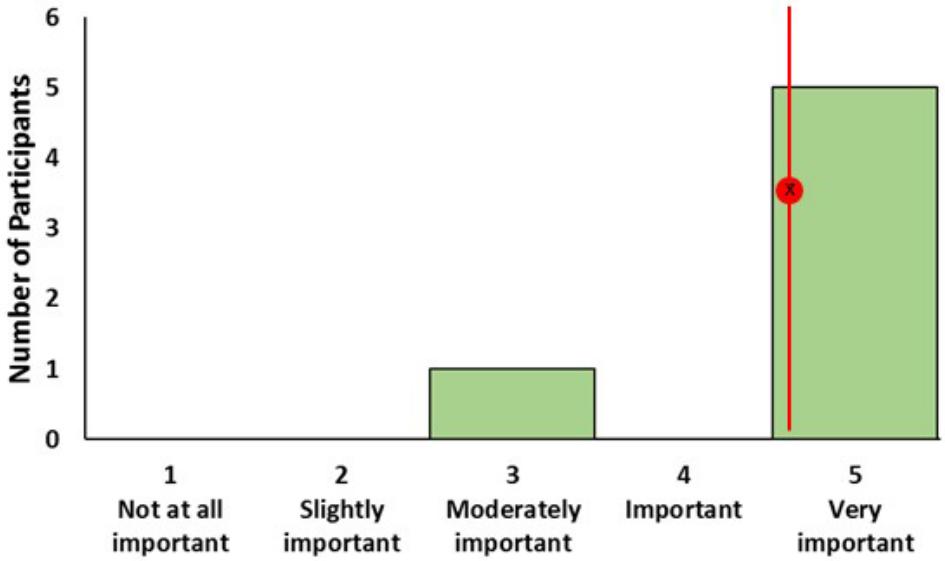
Mean =	3.6	*SD* =	0.55	r_{wg} =	0.85
Median =	4	Min =	3	*n* =	5
Mode =	4	Max =	4	DK =	1



Leadership-Autonomy

Mean =	3.6	*SD* =	0.55	r_{wg} =	0.85
Median =	4	Min =	3	*n* =	5
Mode =	4	Max =	4	DK =	1

Lower Consensus on Moderately Important to Very Important Factors

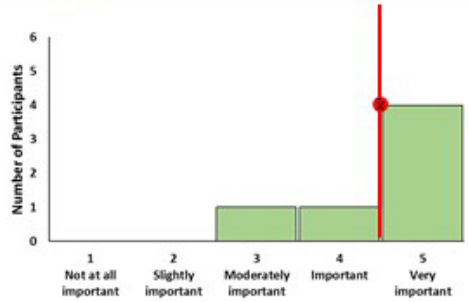


Mean =	4.67	*SD* =	0.82	r_{wg} =	0.67
Median =	5	Min =	3	*n* =	6
Mode =	5	Max =	5	DK =	0

Rated Moderately-Very Important

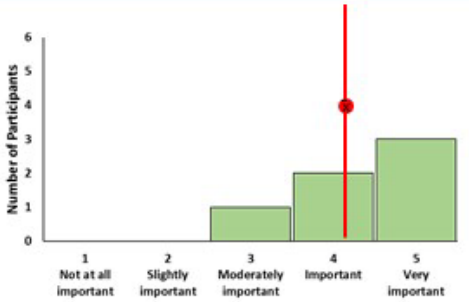
- Social Support and Connections
- Positive Command Climate/Climate

Lower Consensus on Moderately Important to Very Important Factors



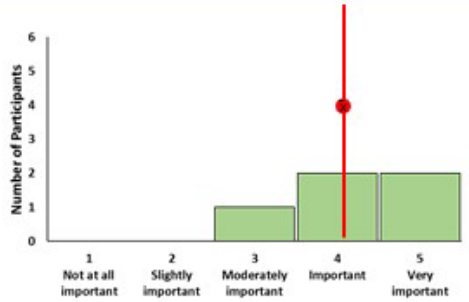
Team Feedback/Reflection

Mean =	4.5	*SD* =	0.84	r_{wg} =	0.65
Median =	5	Min =	3	*n* =	6
Mode =	5	Max =	5	DK =	0



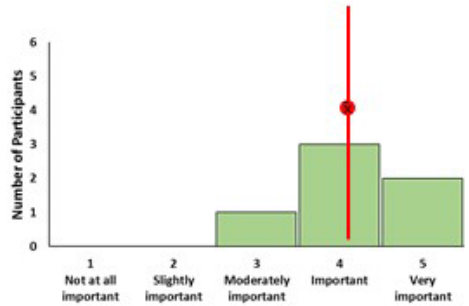
Creativity/Innovation

Mean =	4.33	*SD* =	0.82	r_{wg} =	0.67
Median =	4.5	Min =	3	*n* =	6
Mode =	5	Max =	5	DK =	0



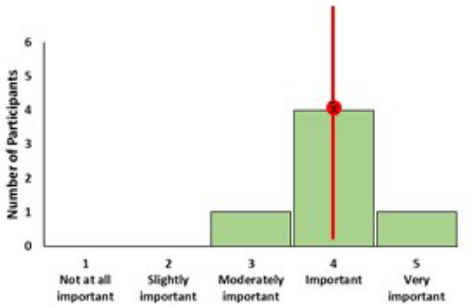
Consideration

Mean =	4.2	*SD* =	0.84	r_{wg} =	0.65
Median =	4	Min =	3	*n* =	5
Mode =	4,5	Max =	5	DK =	1



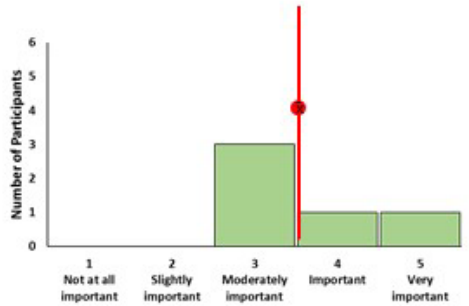
Knowledge and Skill

Mean =	4.17	*SD* =	0.75	r_{wg} =	0.72
Median =	4	Min =	3	*n* =	6
Mode =	4	Max =	5	DK =	0



Collective Positive Emotions

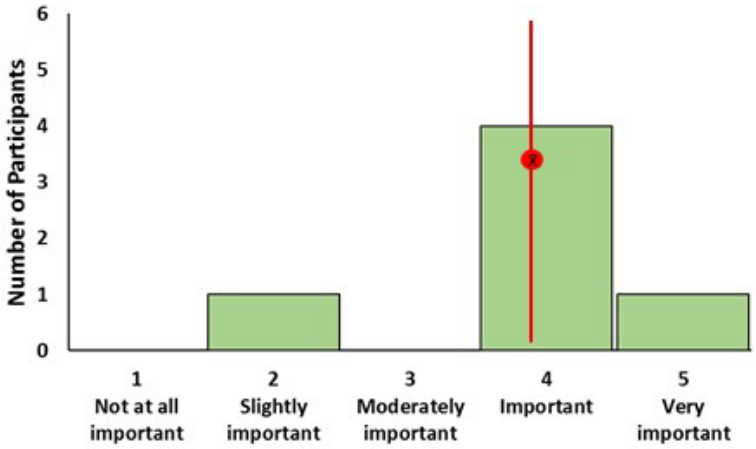
Mean =	4	*SD* =	0.63	r_{wg} =	0.8
Median =	4	Min =	3	*n* =	6
Mode =	4	Max =	5	DK =	0



Safety Culture

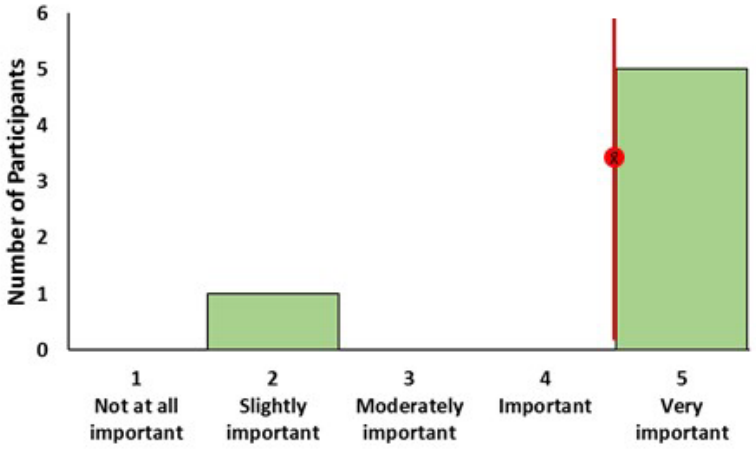
Mean =	3.6	*SD* =	0.89	r_{wg} =	0.60
Median =	3	Min =	3	*n* =	5
Mode =	3	Max =	5	DK =	1

Lower Consensus on Slightly Important to Very Important



Individual Resilience

Mean =	3.83	***SD* =**	0.98	**r_{wg} =**	0.52
Median =	4	**Min =**	2	***n* =**	6
Mode =	4	**Max =**	5	**DK =**	0



Sense-Making

Mean =	4.5	***SD* =**	1.22	**r_{wg} =**	0.25
Median =	5	**Min =**	2	***n* =**	6
Mode =	5	**Max =**	5	**DK =**	0

Unit Resilience Factors
"Don't Know" Responses

Factors with a **"Don't Know"** response

- Robustness (2 Don't Knows)
- Training
- Anticipation
- Planning and Preparation
- Consideration
- Employee Well-Being and Robustness in Employee Health
- Leadership-Transformational
- Leadership-Autonomy
- Team Autonomy
- Safety Culture
- Rapidity
- Efficiency

Unit Resilience
Additional Factors

Please list any **additional factors** that are important to unit/team resilience that you did not mention or that were not previously listed.

Social identity

Sense of urgency (may be included in Rapidity factor)

Priority for mission (may be included in Rapidity factor)

Deference to expertise (independent of hierarchy/command structure)

4 of 6 SMEs indicated additional factors.

Factor Sorting Matrix Example

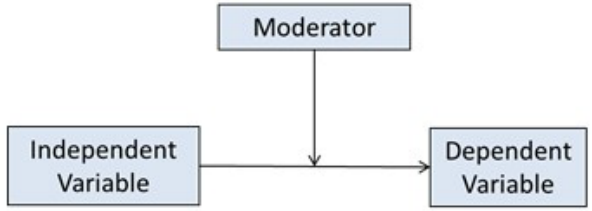
Unit/Team Resilience Factor List							
Factor	**Don't Know**	**N/A**	**Preparing**	**Responding**	**Recovering**	**Other:**	**Other:**
1. Factor name A							
2. Factor name B							
3. Factor name C							
....							

Terminology

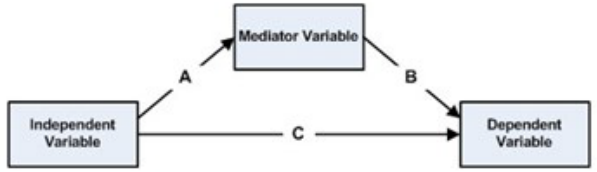
Antecedent: a variable that can help to explain the apparent relationship (or part of the relationship) between other variables that are in a cause and effect relationship (social sciences).[1]

Outcome: (as dependent variable) an output or outcome observed for changes whose variation is the result (in part or in whole) of the variation in an independent variable or variables.[2]

Moderator: An independent variable that interactions with another independent variable in predicting another variable. The effect of each independent variable can be said to be conditional on the other.[2]



Mediator: Variables that stand causally between a predictor and some variable on which it has an effect, and that account, in whole or in part, for that effect.[3]



1: Iobatuyi, M.E. (2006). *A user's guide to path analysis*. University Press of America.
2: 2001. In *Random House Webster's unabridged dictionary*. Random House, Inc. and Gravetter, F.J. & Wallnau L.B. (2000) *Statistics for the behavioral sciences (Fifth Edition)*. Wadsworth.
3: Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences (Third Edition)*. Erlbaum.

Unit Resilience Key Factors

What do you think are the **key factors** comprising unit/team resilience?

agreeableness
artifacts
broad resource network
challenge
cohesion
collective sense of what we want to accomplish
commitment
communication
conformity pressure
consensus seeking
constructive sensemaking
control
core identity
creativity
resourcefulness
deep social capital
earned responses
emotional awareness
experience finding second right answer
experience of stressful event
feedback
flexibility/adaptability
forgiveness
functional habits
future orientation
group development processes
group member transition process
group understanding of environment
hardiness
host nation relationships support
information processing
intelligence
intragroup dominance
keen understanding of the situation
leadership
learn/create quickly
learned confidence
learning orientation
meaningful work
openness
optimism
organizational learning
organizational policies
organizational reorganization
organizational support
past experiences
practice
preparation
relationships
resources
self-control
shared mission
social intelligence
soldiers psychological safety
stakeholder feedback
strong network
systems thinking
ties among groups
ties among members
time together
training
transactive memory systems
trust
uncertainty threat

Text in ***bold italics*** indicates concepts listed multiple times.

Thank You!

Back-up slides

Unit Resilience
Definition Proposed Changes

Would you suggest **changes to the definition** of unit/team resilience?

Unit/Team Resilience is comprised *of the unit's skills, abilities, and resources which allow it to:*

- ***prepare*** *through planning and anticipating problems,*
- *successfully* ***respond*** *through either withstanding or adapting, and*
- ***recover,*** *which involves and facilitates bouncing back, learning, or growth in the face of challenging events or stressors.*

Consensus: **6 of 6** panelists Indicated they would suggest changes to the definition above.

SME 1: Resilience of groups describes how group structure and process remains adaptive and functioning under stressful conditions.

SME 2: Incorporate feedback collected through appreciative inquiry.

SME 3: Additional bullet, "quickly RECOGNIZE unexpected, emerging disruptions or threats." While anticipation and planning are vital, not all problems can be anticipated and surprising shocks may be most difficult to address. Part of preparation may be developing ways to deal with the unexpected but this goes beyond planning and anticipating problems.

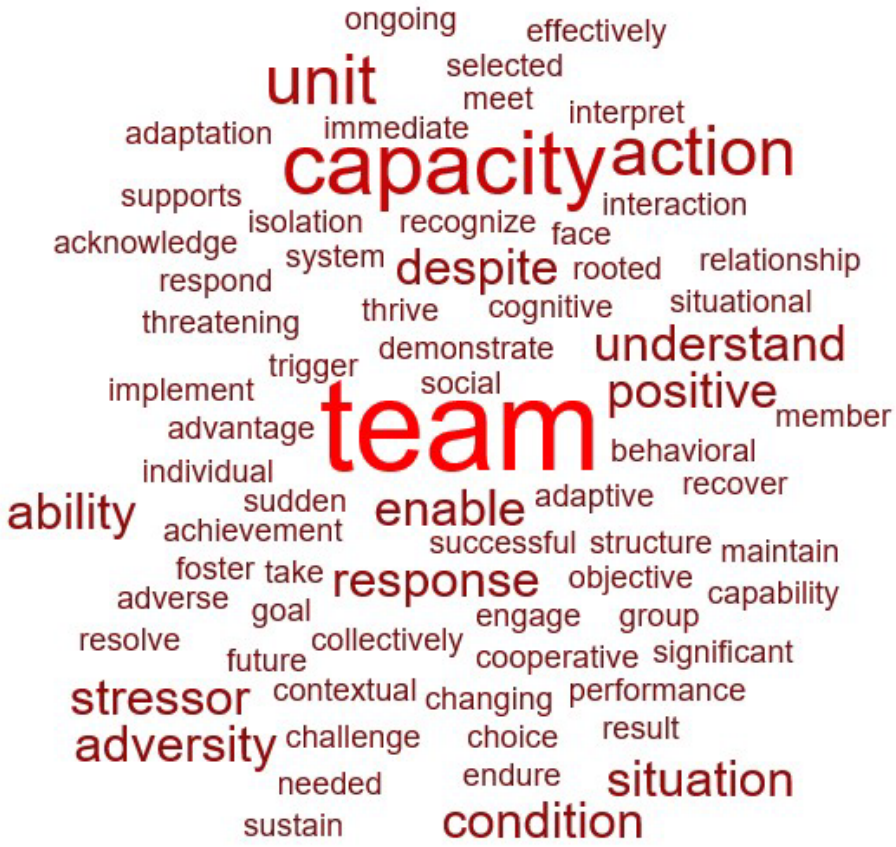
SME 4: Definition makes resilience a quality/characteristic of persons or teams. Better to consider resilience as a process and to ask what are the factors that influence resilient responding. Why not include knowledge along with "skills, abilities and resources"? "Other" could subsume personality characteristics of team members, past experiences, training etc. "Involves and facilitates" is vague and circular. Rather than "recovery facilitates bouncing back" you could say "bouncing back facilitates recovery." I suggest delete "facilitates." "Bouncing back" is also vague. It's used a lot in defining resilience, but what does it really mean? In the current context, aren't we really talking about continued performance of teams?

SME 5: Difference between the capacity for resilience and the demonstration of resilience; these three components appear to processes that make a more likely a unit would demonstrate resilience in the face of adversity.

SME 6: One missing element is the system structure where the preparation, response, and recovery takes place. The structural condition allows further consideration of the setting in which the team interactions take place (e.g., useful network channels, information systems, formal/informal team bonds, climate marked by support and trust, and processes that allow for routine communication flows).

Unit Resilience Definition Word Cloud

How would you **define unit/team resilience**?



* Word cloud created at https://worditout.com/ (one word minimum count; 72 terms identified)

Unit Resilience
Key Factors

What do you think are the **key factors** comprising unit/team resilience?

* Word cloud created at https://worditout.com/ (one word minimum count; 100 terms identified)