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Unit Resilience Measurement Battery Administration Manual

Jamie Levy
Scott Tannenbaum
The Group for Organizational Effectiveness

John Mathieu
University of Connecticut

Bridget Boyle
Cassie Berry
U.S. Army Research Institute

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Department of the Army
Deputy Chief of Staff, G1

Authorized and approved:

MICHELLE L. ZBYLUT, Ph.D.
Director

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Technical review by

Cary Stothart, U.S. Army Research Institute
Kathy Vu, U.S. Army Research Institute

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Levy, Jamie; Tannenbaum, Scott; Mathieu, John; Boyle, Bridget; Berry, Cassie

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The Group for Organizational Effectiveness
727 Waldens Pond Rd.
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To support the Army's interests in understanding and measuring unit resilience, the current effort was designed to produce several theoretically grounded, practical, Army-relevant, and valid measures of unit resilience. To achieve this, we developed the Unit Resilience Measurement Battery (The Battery). The Battery provides team leaders, trainers, observers, and researchers with a set of valid measures of unit resilience and factors that influence unit resilience. This document provides guidance on when and how to use the measures within The Battery.

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Jamie Levy
Scott Tannenbaum
The Group for Organizational Effectiveness

John Mathieu
University of Connecticut

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Cassie Berry
U.S. Army Research Institute

Emerging Research Unit
Alok Bhupatkar, Chief

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UNIT RESILIENCE MEASUREMENT BATTERY ADMINISTRATION MANUAL

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Unit Resilience Measurement Battery Administration Manual

Given the nature of the Army's mission, the Army must take actions to ensure that its collective units, not just individual Soldiers, are highly resilient and able to withstand and adapt to a wide range of challenges. Therefore, it is important for the Army to be able to assess resilience at the unit-level and to understand and examine the factors that can enable or diminish resilience. To achieve this goal of assessing unit resilience, we developed The Unit Resilience Measurement Battery (The Battery), which is a set of valid measurement tools for use with small Army units, such as a team, squad, or platoon (Tannenbaum et al., 2022). The terms "team" and "unit" will be used interchangeably in this document to refer to such small Army units. The Battery includes three alternative measures of team resilience and measures of other factors that influence team resilience, such as stressors, minimizing factors, mending efforts, and resilience manifestations. Team leaders, trainers, observers, or researchers can use these measures, individually or together, with Army teams in research and non-research settings. The development and validation of the measures within The Battery is described within an Army Research Institute (ARI) technical report entitled "Developing and Validating Measures of Army Unit Resilience" (Tannenbaum et al., 2022), and print-ready versions of the measures can be found in an appendix to that report. The purpose of this administration manual is to provide guidance on when and how to use the measures within The Battery. The Unit Resilience Administration Manual is divided into three sections. The first section describes the Unit Resilience Model and provides an overview of the research framework that is the foundation for The Battery and defines unit resilience. The Unit Resilience Battery is described in the second section, including descriptions of each of the measures within The Battery and instructions for administration, scoring, and interpretation. Lastly section 3 provides other administration considerations.

The Unit Resilience Model

The Battery is a set of measures that are based on a theory-driven model of unit resilience. The Unit Resilience Model, depicted in Figure 1, includes unit resilience and factors that enable and diminish it. The Model integrates the Conservation of Resources (COR) theory (Halbesleben et al., 2014; Hobfoll, 1989) and the 3M theory (Alliger et al., 2015) of team resilience. According to COR theory, people are motivated to protect their current resources to avoid losses and to acquire new resources (Hobfoll, 1989; Halbesleben et al., 2014). The 3M theory suggests that teams can take actions to sustain and replenish their "reservoir" of cognitive (e.g., alertness), affective (e.g., moral), and physical (e.g., endurance) resources (Alliger et al., 2015). Specifically, teams can work to **m**inimize the impact of potential challenges on their resources and **m**end themselves after confronting stressors. A team's resilience manifests in the behaviors the team exhibits to **m**anage their resource levels in the face of challenges and stressors.

Unit resilience is defined as:

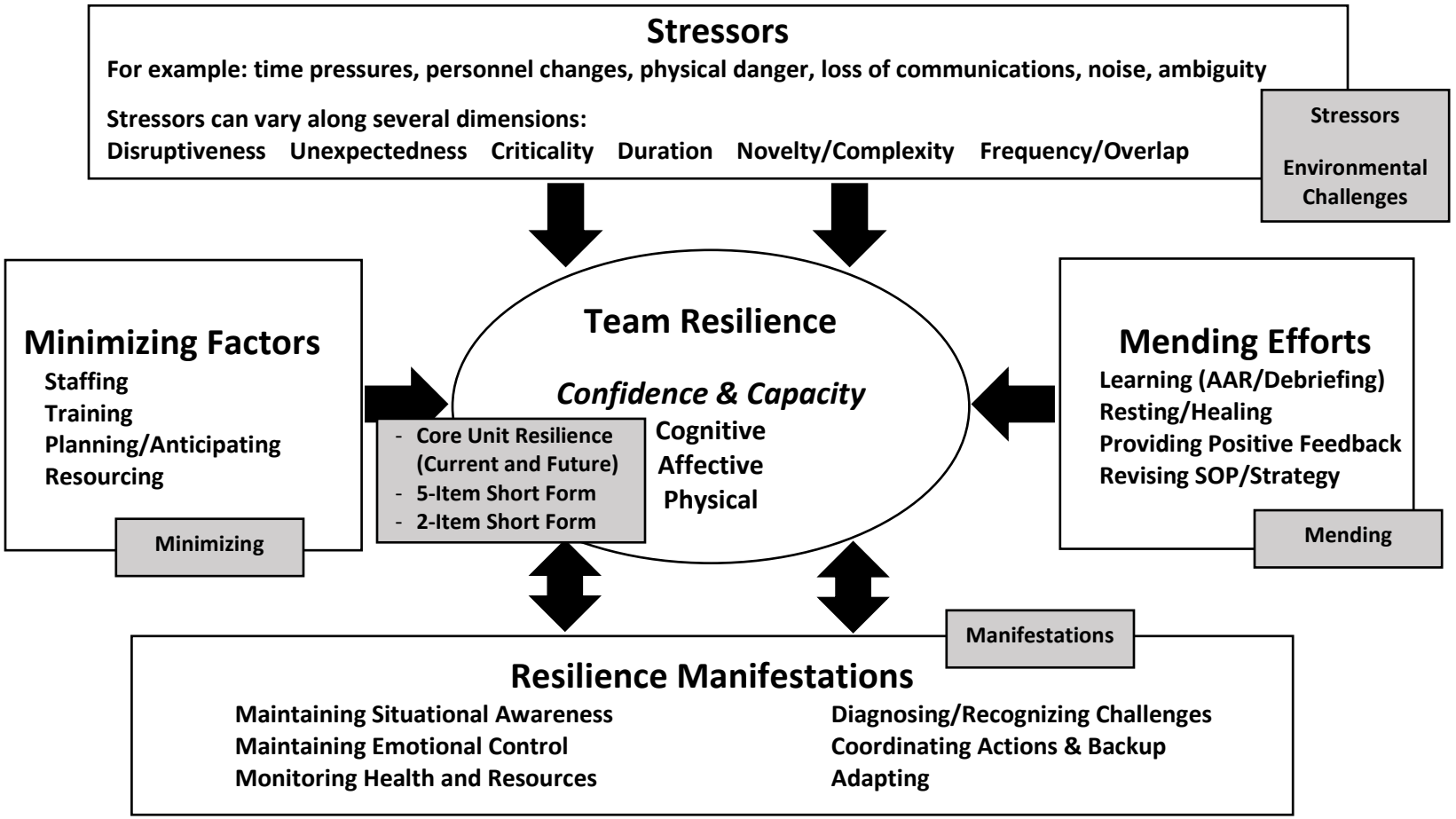
> Team members' collective *confidence* and *capacity* (cognitive, affective, and physical) to withstand and overcome stressors in a manner that enables sustained performance. Resilience helps team members handle and bounce back from challenges that can endanger their cohesiveness and performance.

The Unit Resilience Model, shown in Figure 1, captures both the observable and unobservable elements of unit resilience. A team's collective confidence and capacity are unobservable emergent states (Marks et al., 2001). As emergent states, both confidence and capacity are comprised of cognitive, affective, and physical components. As shown at the bottom of Figure 1, when a team is under stress, we can observe indicators or *manifestations* of their confidence and capacity, such as coordination actions, backup behaviors, and diagnosing challenges.

As illustrated in the Unit Resilience Model, unit resilience is influenced by multiple factors. *Stressors* are challenges within the team environment such as time pressures, loss of communications, or physical dangers, that can work to reduce a team's resilience. Stressors within the team environment can vary along several critical dimensions. Within Figure 1, we highlight several dimensions along which stressors may vary, such as the level of disruptiveness of the stressor, whether it was expected, and the criticality of the stressor for the team (e.g., Morgeson & DeRue, 2006). Holding all else constant, teams that face greater stressors should experience a depletion of the cognitive, affective, and physical resources that keep them resilient. However, teams can engage in a variety of adaptive behaviors to counteract the impact that stressors have on their team resilience. In preparation for expected or unexpected future stressors, team members or leaders can execute a variety of activities, such as training or planning, to *minimize* the impact of future stressors on a team's resilience. Teams who engage in these minimizing activities will have greater confidence and capacity levels. Following a stressful event or time period, teams can engage in behaviors such as conducting after action reviews (AARs) or resting, to *mend* and rebuild their confidence and capacity. In practice, the construct of unit resilience is a dynamic and emergent state. Given that unit resilience is influenced by the presence of stressors, which can ebb and flow, as well as team members' efforts to minimize the impact of future stressors and mend collective confidence and capacity, a team's unit resilience can fluctuate over time.

Figure 1

The Unit Resilience Model



Note. The Unit Resilience Model illustrates unit resilience and the factors that enable and diminish it. The unshaded rectangles and oval represent the constructs, or factors, within the Unit Resilience Model. The grey text boxes list the names of the measures that assess the factors. The measures are described in Section 2 of The Manual.

Applications

The Battery can be adapted for use in multiple settings and for exploring unit resilience at various levels of detail. First, the measures are designed for use in non-research field settings (e.g., deployment), in training and development settings, and for research purposes. In every setting, it is important to establish whether team members and/or team observers are available to complete measures and if so, how much time can be allocated for them to do so.

Regardless of the setting, some situations require and allow for a more detailed exploration, diagnostic, or "deeper dive" into the specific source(s) of resilience gaps and the factors that influence resilience. Other situations (e.g., where time or resources are limited) necessitate a less extensive evaluation and an approach with a "lighter touch." The measures can be used separately or together with other measures within The Battery to meet the needs of the situation. Some example use cases for selecting a subset of measures from The Battery to meet the needs of a situation follow in the next section.

Example Use Cases

- Commanders
    - A commander of multiple intact units that are deployed for 12 months would like periodic information about the unit resilience of each team. The team members do not have a great deal of downtime so the commander does not want to administer a lengthy measure and would prefer to take a "lighter touch" when gathering data from them. The commander decides to administer the 5-item Unit Resilience Short Form to the teams every four weeks as a quick pulse check. The commander also asks the team leaders to complete the Stressors measure. In the event that results for one or more of the teams suggests a decline in resilience, the commander could ask the team(s) to complete the 12-item Core Unit Resilience scale to get deeper diagnostic information about the specific resources that are depleting or draining their resilience. *Note: If interested in trends or results over time for a team, be sure to administer the same measure/version each time. For instance, do not switch back and forth and compare means gathered with the 5-item Unit Resilience Short Form and a (12-item) Core Unit Resilience scale.*

- Trainers
    - A trainer in charge of preparing several recently formed teams is interested in understanding the impact that various training and preparation activities have on a team's resilience. The trainer and other team observers have the time and opportunity to provide assessments of the teams' behaviors and activities, but the teams' availability is somewhat limited. Therefore, the trainer decides to minimize the number of questions they will administer to team members and will gather more data from the observers. They administer the 2-item Unit Resilience Short Form to the team members. They administer the Manifestations measure to the observers because they have a good opportunity to watch and assess the teams' behaviors. A potential drawback of using the 2-item Unit Resilience Short Form rather than longer versions is that this measure provides only a global assessment of resilience. However, by asking the observers to complete the Manifestations scale, the trainer will gain detailed insights on the specific

behaviors the teams are demonstrating. The trainer also asks observers to complete both the Minimizing scale and Mending scale, which may provide insights about how the training exercises influence resilience.

- Team Leads
    - A team leader has noticed that the team's performance and energy seem to suffer at certain times of the year. The leader is interested in maintaining an understanding of the team's current capacity for handling stress as well as their confidence for handling future challenges. The leader believes they can make an accurate assessment of existing stressors as well as what team members are doing to minimize and mend. After reviewing the different options for assessing resilience, the leader decides that although the Five-Item and Two-Item Unit Resilience Short Forms would take less time for the team members to complete, they would not provide the diagnostic detail they are looking for. The leader decides to administer the 12-item Core Unit Resilience Scale to the team on a quarterly basis and will interpret the results in conjunction with other existing assessments of stressors and team minimizing and mending activities.

Unit Resilience Measurement Battery

The Unit Resilience Measurement Battery (The Battery) assesses unit resilience as well as the other factors represented within The Unit Resilience Model. Table 1 provides summary information for each of the measures within The Battery. For each measure, the table provides information on the number of items, estimated time to complete, factors measured, example items, recommended data source (i.e., team members or observers), and recommended use. All measures within The Battery can be administered to members of intact teams with two or more team members. Some of the measures can also be administered to observers of intact teams, such as trainers or Observer Controllers/Trainers (OC/Ts). As shown in the recommended data source column within Table 1, one respondent group is preferred to the other for some measures. For example, both team members and observers can respond to the Minimizing measure. However, for some of the items, such as the one that asks about working relationships between team members, the team members' perspectives might be more useful.

Table 1

Unit Resilience Measurement Battery Summary

Measures (Items/Time)	Factors Measured	Example Items	Recommended Data Source	Recommended Stakeholder	Purpose

Core Unit Resilience: Current Capacity (12 items/ 10 minutes)	Unit Resilience: Team members' collective confidence and capacity to withstand and overcome stressors in a manner that enables sustained performance. Resilience helps team members handle and bounce back from challenges that can endanger their cohesiveness and performance.	…choose the number that describes your team's current resource level for each of the team resources:
		• Physical (items 1-4)
		  ○ E.g., Endurance
		• Affective (items 5-8)
		  ○ E.g., Morale
		• Cognitive (items 9-12)
		  ○ E.g., Mental readiness
			Team Members	Team leads, Trainers	To gather detailed diagnostic data about the specific team resources contributing to team resilience gaps, when the team's current resilience levels are of primary interest

Core Unit Resilience: Future Confidence (12 items/ 10 minutes)	Unit Resilience	…choose the number that describes your team's confidence that it will have enough of each resource to handle future challenges effectively:
		• Physical (items 1-4):
		  ○ E.g., Endurance
		• Affective (items 5-8)
		  ○ E.g., Morale
		• Cognitive (items 9-12)
		  ○ E.g., Mental readiness
			Team Members	Team leads, Trainers	To gather detailed diagnostic data about the specific team resources contributing to team resilience gaps, when the team's confidence about future resilience levels are of primary interest

(continued)

Measures (Items/Time)	Factors Measured	Example Items	Recommended Data Source	Recommended Stakeholder	Purpose
5-item Unit Resilience Short Form (5 items/ 3 minutes)	Unit Resilience	To what extent can your team… • withstand future challenges? • ounce back quickly from setbacks? …describe your team's current resource level for each of the team resources listed below: • Energy • Motivation • Shared situational awareness	Team Members	Commanders, Team leads, Trainers	For a quick assessment of team resilience when some information about the type of resource that is contributing to team resilience gaps is desired, but a resource-specific diagnosis is not needed
2-item Unit Resilience Short Form (2 items/ 2 minutes)	Unit Resilience	To what extent can your team… • withstand future challenges? • bounce back quickly from setbacks?	Team Members	Commanders, Team leads, Trainers	For a quick overall team resilience check when information about the team resources driving unit resilience issues is not needed

(continued)

Measures (Items/Time)	Factors Measured	Example Items	Recommended Data Source	Recommended Stakeholder	Purpose

Stressors (15 items/ 10 minutes)	Stressors: Challenges such as time pressures, loss of communications, or physical dangers that can work to reduce a team's resilience. Stressors can be psychological, environmental, or workload related.	…how often did your team experience:
		• Psychological stressors (items 1-6):
		  ○ e.g., Lack of sleep
		• Environmental stressors (items 7-10,13)
		  ○ e.g., Loud noises)
		• Workload stressors (items 11,12,14,15)
		  ○ e.g., Insufficient resources
			Team observer preferred, Team members can also complete	Team leads, Trainers	To understand/monitor the levels of stressors that can negatively impact unit resilience

Environmental Challenges (6 items/ 8 minutes)	Stressors	…select the option that best describes the nature of those challenges in total. • Disruptiveness of challenges • Expectedness of challenges • Novelty of challenges	Team members preferred, Team observers can also complete	Team leads, Trainers	To understand/monitor the nature of the challenges that can impact resilience
Minimizing (6 items/ 4 minutes)	Minimizing: Activities, such as training or planning, that team members can engage in to build their confidence and capacity levels and reduce the impact of future stressors on team resilience.	To what extent has your team… • been adequately staffed to handle future challenges? • developed plans to handle different potential challenges?	Team members preferred, Team observers can also complete	Team leads, Trainers	• To identify/monitor the extent to which teams(s)/leaders are engaging in activities that can build their resource capacity and confidence • To understand the impact of minimizing activities on resilience

(continued)

Measures (Items/Time)	Factors Measured	Example Items	Recommended Data Source	Recommended Stakeholder	Purpose
Manifestations (11 items/ 8 minutes)	Resilience Manifestations: Observable team behaviors, such as coordination and backup behaviors, that serve as signs of team resilience and a teams' confidence and resource capacity.	How often did your team exhibit this behavior when it was needed? • Alerted one another to potential problems • Responded to challenges when they occurred	Team members or Team observers	Team leads, Trainers	To identify/monitor the frequency in which teams are demonstrating resilience behaviors
Mending (10 items/ 8 minutes)	Mending: Activities, such as debriefs or making changes to processes/procedures, that team members can engage in to rebuild their confidence and capacity levels after a stressful event.	How often did your team exhibit this behavior when it was needed? • Identified lessons learned (e.g., team debrief, After Action Review) • Agreed how to follow up to ensure progress	Team members or Team observers	Team leads, Trainers	• To identify/monitor the extent to which teams(s)/leaders are engaging in activities that can rebuild their resource capacity/confidence • To understand the impact of mending activities on resilience

Note. Recommended Stakeholders are not meant to be an exhaustive list, but are suggestions based on potential need and resources available.

The Battery provides multiple alternatives for assessing team resilience, ranging from a quick two-item scale to more detailed 12-item scales. Descriptions of each alternative, including how to score and interpret results, are directly below. In most cases, a user should choose to administer just one of the team resilience measures for a given administration or purpose. Guidance on deciding which alternative Unit Resilience measure to use is provided after these descriptions.

Core Unit Resilience

The Core Unit Resilience measure, like all the measures within The Battery, is designed to be administered to individual team members (i.e., members of intact teams). To enable the computation of scale scores, teams should include at least two members. The Core Unit Resilience measure includes 12 items that can be administered in two different ways with two alternative scales. The first scale assesses a unit's current resource capacity level (i.e., Current Capacity), and the second scale assesses the team's confidence that they can draw upon or replenish the unit's resources to handle future challenges (i.e., Future Confidence). Research with Soldiers suggests that the Current Capacity and Future Confidence scales are significantly correlated. The rank order of teams' resilience would differ very little if one considered current capacity versus future confidence (e.g., teams who score high on Current Capacity will also score high on Future Confidence). **Therefore, we recommend that users choose and use just one of the 12-item scales for a given administration.** When preparing to use this measure, choose the measure that best meets your needs and purpose for the situation. For example, if you are interested in a periodic "pulse check" of a team's resilience on a monthly basis or a quick "snap shot" of resilience at each point, administer the Current Capacity scale only. Alternatively, if you are interested in a team's confidence for handling future challenges after completing a training, administer the Future Confidence scale only.

Current Capacity

The Current Capacity scale asks the respondent to use a 10 to 100-point scale to rate their current resource level for four physical resources, (rest, energy, physical fitness, and endurance), four affective resources, (mutual trust, moral, motivation, and composure), and four cognitive resources (task- or mission-related knowledge, shared situational awareness, alertness, and mental readiness). Response options range from 10 to 100 in increments of 10, where 10 = *Low* (*Totally spent, nothing in reserve*), 50 = *Medium* (*Somewhat depleted, but something in reserve*), and 100 = *High* (*Fully ready with plenty in reserve*). Respondents can respond to the items by circling the resource level that applies to their team.

Future Confidence

The Future Confidence scale asks the respondent to use a 10 to 100 scale to rate the team's confidence that it will have enough of each resource to handle future challenges effectively. The 12 resources listed with the Future Confidence scale are identical to the list of resources with the Current Capacity scale. Response options range from 10 to 100 in increments of 10, with 10 = *Not confident we'll have enough in the future*, 50 = *Somewhat confident we'll have enough in the future*, and 100 = *Fully confident we'll have enough in the future*. Respondents can respond to the items on both scales by circling the resource level that applies to their team.

Scoring

The Current Capacity and Future Confidence scales can be scored the same way. Responses are scored using a 10-point scale, where a response of 10 is scored as 1, a response of 20 is scored as 2, a response of 30 is scored as 3, etc. A team's score is computed by calculating the mean (i.e., average) team member response. The team mean represents the team score as a whole. Team means can be computed at the individual item level, resource-type (physical, affective, cognitive) level, or the scale level (e.g., Current Capacity).

For each mean score, the standard deviation (*SD*) should also be calculated. The *SD* indicates how spread the scores are around the mean. A smaller *SD* indicates that scores tend to cluster closely around the mean; a larger *SD* indicates that scores tend to range from very low to very high and there is greater spread around the mean (i.e., scores are less clustered around the mean). Again, the larger the *SD*, the greater the spread of scores around the mean. Therefore, a larger *SD* indicates less agreement among respondents, while a smaller *SD* indicates greater agreement among respondents. At a minimum, we recommend computing team means and *SD*s at your level of interest (e.g., item, resource type, current capacity). Many software packages (e.g., Microsoft Excel, R) can be used to calculate the *SD*. In Microsoft Excel, use the formula "AVERAGE" to calculate the mean and the formula "STDEV" to calculate the *SD*.

To calculate the *SD* for a team manually:

1. For each team member, compute the mean of all responses to the scale.
2. Calculate the team mean by computing the mean of each team member's mean.
3. From each team member's mean, subtract the team mean and square the result; these are the "squared differences."
4. Find the sum of the squared differences. Divide that sum by N-1 (where N = number of team means).
5. The *SD* is the square root of the number calculated in the step above.

See an example of computing a *SD* for Current Capacity team scores below in Table 2 for a team with three team members. For further guidance on computing and understanding the *SD*, see a tutorial on the website of the National Library of Medicine (n.d.).

Table 2
Illustrative Example of Computing a Team Current Capacity Mean Score

Current Capacity Item #	Member 1	Member 2	Member 3	Team Mean
1	7	8	10	
2	7	6	8	
3	7	7	9	
4	9	10	9	
5	5	6	7	
6	5	7	6	
7	2	4	4	
8	4	3	4	
9	5	6	7	
10	7	7	8	
11	6	7	8	
12	7	5	6	
Mean	**5.92**	**6.33**	**7.17**	**6.47**
Member Mean - Team Mean	**-0.56**	**-0.14**	**0.69**	
Squared Differences	**0.31**	**0.02**	**0.48**	

N = 3
Team mean = 6.47

SD = square root of the sum of the squared differences/(N-1)
SD = √(0.31 + 0.02 + 0.48)/(3-1)
SD = √0.81/2
***SD* = 0.64**

Future Confidence scale means and *SD*s are calculated in the same way as the Current Capacity means but use the responses to the 12 Future Confidence items (see the example in Table 2 for computing the team mean and *SD*). If you gathered data from multiple teams, calculate the team mean and the *SD* for each team (see Table 3 for example results on the Future Confidence Scores for multiple teams).

Table 3
Illustrative Example of Team Future Confidence Scores

	Team 1		Team 2	
Scale	Mean	*SD*	Mean	*SD*
Future Confidence	6.89	2.20	5.89	1.98

Resource-type Scores. For either the responses to the Current Capacity scale or the Future Confidence scale, calculate resource-type scores if you are interested in generating team scores for each of the three types of resources (physical, affective, cognitive).

First, for each team member compute three mean scores, one for each resource type (physical, affective, cognitive).

- For the physical resources, calculate the mean for items 1-4
- For the affective resources, calculate the mean for items 5-8
- For the cognitive resources, calculate the mean for items 9-12

For each resource type, compute the team mean. For example, to find the team mean for physical resources, compute the mean of all individual team member physical resource means. Next, compute the *SD* for each team mean. As shown in the example in Table 4, this will produce a mean and *SD* for each resource type for each team.

Table 4
Illustrative Example of Team Scores for Current Capacity by Resource Type

	Team 1		Team 2	
Current Capacity by Resource Type	Mean	*SD*	Mean	*SD*
Physical Resources	4.89	1.90	6.65	2.30
Affective Resources	5.56	1.98	6.12	1.73
Cognitive Resources	7.02	2.20	7.89	2.08

Item-level Scores. For even greater specificity, compute means for each of the 12 resource items. For each item, compute the mean and *SD* of all team member responses to each of the 12 items. As illustrated in Table 5, this will produce 12 team means and *SD*s. *Note that these scores use the responses to the items on just one of the 12-item Core Unit Resilience scales (Current Capacity or Future Confidence).*

Table 5
Illustrative Example of Team Scores for Current Capacity by Item

	Team 1		Team 2	
Current Capacity Items	Mean	*SD*	Mean	*SD*
Item 1: Rest	5.59	2.20	7.75	1.98
Item 2: Energy	4.89	1.80	8.21	1.73
Item 3: Physical fitness	5.56	2.08	6.39	1.90
…	…	…	…	…
Item 11: Alertness	6.12	1.73	3.89	2.20
Item 12: Mental Readiness	7.24	1.96	4.75	2.08

Interpreting Results

After the Core Unit Resilience score (either Current Capacity or Future Confidence) for each team is calculated, refer to the guidelines below to help you interpret the scores.

- Means can range from 1-10. Look across the means you calculated for low scores. In general, lower mean scores suggest lower levels of resilience while higher scores represent greater levels of unit resilience.

- If you calculated means at the item-level, flag the lowest 3-5 ratings for a given team. These items are the areas in which the team is experiencing the greatest current resource depletion or is the least confident about the future.
- If you calculated means for each resource type (physical, affective, cognitive), compare the means for reach type. Is the team's current capacity level lower for one type of resource than the others? If so, why might this be the case? If you gathered data for Minimizing, Mending, Stressors, or Environmental Challenges look at whether these results provide any explanations. For example, look to see if the team reported a high level of stress in an area that could explain a depletion of a particular type of resource.
- If you calculated results for multiple teams, compare the results across teams. Are the mean resilience levels for one team (or a few teams) lower than the levels for other teams?
- If you have administered a measure to the same team(s) previously, consider comparing the current scores to previous scores. If they have gone up (or down) since the prior administration, why might this be the case? If you administered other measures in The Battery that examine factors that influence team resilience (e.g., Minimizing, Mending, Stressors), look at look at the results of those measures to see if the scores for those measures have increased or decreased over time and suggest possible reasons for the change in the team resilience levels. For example, if you see that Current Capacity levels have dropped, looked to see if any of the team Minimizing or Mending behaviors have decreased over time. Or, look to see if Stressor ratings have increased.
- Examine the *SD*s. Higher *SD*s suggest a greater spread among team member scores. A large spread of scores could mean that team members are having different experiences with regard to the team's current resource capacity. Is there a reason why team members might have different perspectives from one another about their current resource capacity? Do some members have greater access to resources than others? Have some members (perhaps those in specific positions or roles) experienced greater resource depletion than others on the team? For further guidance on interpreting *SD*s, see a tutorial on the website of the National Library of Medicine (n.d.).

Looking for a point of comparison?

It can be useful to compare the results from your team(s) to the results gathered from other Army teams. The Battery was administered to 680 Soldiers who belonged to 450 intact teams with at least two members per team (Tannenbaum et al., 2022). Teams were from multiple Army installations and represented common units (e.g., Transportation, Artillery). Descriptive statistics for the Core Unit Resilience (Current Capacity and Future Confidence scales), Stressors, Minimizing, Mending, and Manifestations results for these teams are provided in Appendix. Compare the results for your team(s) to the results for the Soldier team sample. Are your teams' mean results lower or higher overall, or perhaps in specific areas (e.g., resources or resource types)?

Tip: While a point of comparison is useful, keep in mind that this sample of teams may not be representative of all teams in the field. **Therefore, they should not be viewed as a "gold standard" or goal results.**

Five-Item Unit Resilience Short Form

This scale is comprised of the two items from the Two-Item Unit Resilience Short Form and one marker (i.e., representative) item from each of the physical, affective, and cognitive components assessed with the Core Unit Resilience measure. This scale can be completed quickly and provides some initial diagnostic insights on whether a team's resource capacity may differ between each resource type (physical, affective, or cognitive). The two items from the Two-Item Unit Resilience Short Form asks respondents to use a 5-point Likert-type scale to indicate the extent to which their team can: 1) withstand future challenges, and 2) bounce back quickly from setbacks. The scale ranges from 1 (*not at all*) to 5 (*to a very great extent*). The three items adapted from the Core Unit Resilience items also use a 5-point Likert-type scale and ask respondents to choose the number that describes the team's current resource level for each of the team resources. The scale ranges from 1 (*totally spent, nothing in reserve)* to 5 (f*ully ready with plenty in reserve*).

Scoring and Interpretation

All five items are on a 5-point scale and the scores for all items can be averaged together. First, for every team member compute the mean of the 5 items. This is the respondent mean score. Then compute the team score by calculating the mean of the respondent mean score. Finally, compute the team *SD*. The mean represents the team's Five-Item Unit Resilience Short Form scale score. Higher scores represent greater levels of unit resilience.

Tip: If a team's scale score is low or lower than expected, calculate and look at the team means for each of the individual items. In particular, examine the means for items 3-5, which represent marker items from each of the physical, affective, and cognitive factors on the Core Unit Resilience scale. If the response to one or more of those items is particularly low, it could be useful to administer the 12-item measure to gain a more detailed understanding of where the unit's resilience can be improved.

Two-item Unit Resilience Short Form

This measure is a two-item measure that obtains a quick, high-level, global assessment of unit resilience. As with the Core Unit Resilience measure, this measure should be completed by individual team members. Respondents use a 5-point Likert-type scale to indicate the extent to which their team can: 1) withstand future challenges, and 2) bounce back quickly from setbacks. The scale ranges from 1 (*not at all*) to 5 (*to a very great extent*). This measure can be useful in situations when you are more interested in a general assessment of unit resilience and do not need to differentiate between the team's level of specific resources. It is also useful when you only have a very limited time to assess resilience.

Scoring and Interpretation

First, for every team member compute the mean of both items. Then compute the team score by calculating the mean of the team members. Finally, compute the team *SD*. The mean represents the team's Two-Item Unit Resilience Short Form scale score. Higher scores represent greater levels of unit resilience. The *SD* represents the spread of the scores from the mean.

Selecting a Unit Resilience Measure

The longer Core Unit Resilience (12-item) versions can be used to diagnose the specific source of unit resilience gaps while the shorter Five-Item Unit Resilience Short Form (5-item) and Two-Item Unit Resilience Short Form (2-item) versions provide a more general resilience check. When deciding which measure to use, consider how much time you can ask of respondents and how important it is to diagnose the specific source of resilience gaps vs. an overall resilience assessment. Further discussion about selecting from the different unit resilience measures is provided in Applications and Use Cases.

Stressors

Teams confront a variety of psychological, environmental, and workload stressors that can impact the team's resilience. The Stressors measure asks respondents to use a 5-point Likert-type scale where responses range from 1 (*never*) to 5 (*constantly*) to rate how often during the last month, the team has experienced 15 common stressful events. The items represent three types of stressors: psychological (e.g., uncertainty and doubt), environmental (e.g., loud noises), and workload (e.g., insufficient resources).

Psychological, environmental, and workload stressors are potential predictors of unit resilience (Tannenbaum et al., 2022). Therefore, the Stressors measure is a useful diagnostic of the team environment that can help you interpret resilience results (e.g., you can anticipate a drop in team resilience if stressors are high). This measure is also useful for conducting research studies involving team resilience.

Scoring and Interpretation

The Stressors measure items are scored on a 5-point scale. Higher numbers represent more frequently experienced stressors. Team means and *SD*s can be computed for stressors overall or for each type of stressor (psychological, environmental, workload).

Stressors overall scores. First, for each respondent compute the mean of their responses to each of the 15 items. Then, to find the team mean, compute the mean of the individual respondent means. Table 6 shows examples of team means and *SD*s calculated for two teams. The means suggest that Team 1 is experiencing a greater level of Stressors than Team 2.

Table 6
Illustrative Example of Overall Team Stressor Scores

	Team 1		Team 2	
	Mean	*SD*	Mean	*SD*
Stressors Overall	3.96	1.8	3.05	1.75

Stressor type scores. Calculate this if you are interested in generating team scores for each of the three types of stressors (psychological, environmental, and workload). First, for each respondent compute three mean scores, one for each stressor type.

- For the psychological stressors, calculate the mean for items 1-6
- For the environmental stressors, calculate the mean for items 7-10, and 13
- For the workload stressors, calculate the mean for items 11,12,14, and 15

Next, for each stressor type, compute the respondent mean scores and compute the mean again. For example, to find the team mean for psychological stressors, compute the mean of all individual member psychological stressor means. Table 7 provides an illustration of means and *SD*s computed for two teams by stressor type and for stressors overall. In this example, both teams are experiencing similar levels of stressors across all of the stressors (both are in the "occasionally/frequently" range). However, upon closer inspection of the results for each type of stressor, the results suggest that Team 1 is experiencing its highest level of stress from psychological stressors while Team 2 is experiencing its greatest levels from environmental stressors.

Table 7
Illustrative Example of Team Stressor Type Scores

	Team 1		Team 2	
Stressor Type	Mean	*SD*	Mean	*SD*
Psychological	4.59	1.90	3.45	2.30
Environmental	2.86	1.98	4.12	1.73
Workload	3.02	2.20	2.59	2.08
Stressors Overall	3.49	0.96	3.39	0.77

Compare the results gathered from your teams to those gathered from approximately 450 Army teams and 680 individuals (Appendix). Are your team scores lower or higher than those gathered from the comparison teams?

Environmental Challenges

This measure was developed to assess the extent of different environmental challenges faced by teams. Based on Morgeson et al.'s (2015) model of event features, the six multiple choice items ask respondents to consider all of the recent challenges the team has faced and to describe the nature of those challenges. Each item focuses on a unique challenge characteristic (e.g., disruptiveness, expectedness, criticality). Research with this measure suggests that environmental challenges are negatively related to teams' resilience and performance (e.g.., teams who face more disruptive challenges within their environment are less resilient and effective; Tannenbaum et al., 2022). This measure can be administered to team members or observers (e.g., trainers, Observer Controllers) who are familiar with the team's environment. In situations where team members are already completing a number or other measures, consider administering this measure to observers rather than team members.

Scoring and Interpretation

The Environmental Challenges measure is scored on a 4-point scale. Higher numbers indicate a more challenging environment. Overall team means and *SD*s can be computed for the Environmental Challenge measure. Team means for individual items can also provide a useful diagnostic about the team's setting by revealing the specific characteristics of the team's challenges that are most amplified. For example, higher scores on the disruptiveness item could suggest that something in the team's work environment is highly disruptive and distracting and in need of attention.

Minimizing

In anticipation of challenges, teams can engage in various activities to minimize the negative impact of stressors. The Minimizing scale asks respondents to use a 5-point Likert-type scale where responses range from 1 (*not at all*) to 5 (*to a very great extent*) to rate the extent to which the team has engaged in six different common minimizing activities (e.g., staffing, training, planning) within the last month. This measure can be administered to team members or observers (e.g., trainers, Observer Controllers) who can observe team behaviors. In situations where team members are already completing a number or other measures, consider administering this measure to observers rather than team members.

Scoring and Interpretation

Calculate team means and *SD*s for the Minimizing scale. For diagnostic purposes item-level results can also be useful (e.g., to identify the extent to which teams are engaging in each individual Minimizing activity). Research with Soldiers and teams suggests that team Minimizing activities are predictive of unit resilience (Tannenbaum et al., 2022). Specifically, teams that engage in more Minimizing activities report greater levels of resilience and demonstrate more observable resilience manifestations.

Manifestations

A team's resilience manifests in the behaviors the team exhibits to manage their resource capacity in the face of challenges and stressors. In general, teams that have higher levels of resilience are more likely to demonstrate these behaviors, and teams that demonstrate these behaviors are more likely to report higher resilience levels.

The Manifestations Scale instructs respondents to use a 5-point Likert-type scale to rate how often, within the last month, the team performed 11 behaviors (e.g., alerted one another to potential problems, sought assistance, monitored team members' health) when it was needed. Scale responses range from 1 (*no need to demonstrate this behavior)* to 5 (*every time*). Respondents can be either team members or observers.

Scoring and Interpretation

Calculate team means and *SD*s for the Manifestations scale. Higher team means indicate a greater number of resilience manifestation behaviors. For diagnostic purposes, calculating item-level results can also be useful (e.g., to identify manifestations activities teams are engaging in least or most).

Mending

Following a stressful period or event that diminished their capacity, teams can make efforts to mend or replenish their resources. The Mending scale includes 10 items that ask respondents to use a 5-point Likert-type scale to rate how often, during the last month, the team exhibited different mending behaviors when needed. Scale responses range from 1 (*no need to demonstrate this behavior)* to 5 (*every time*). Respondents can be either team members or observers.

Scoring and Interpretation

Calculate team means and *SD*s for the Mending scale. Higher team means suggest a greater prevalence of Mending behaviors. For diagnostic purposes, calculating item-level results can also be useful (e.g., to identify Mending activities teams are engaging in least or most).

Other Administration Considerations

Identifying Team(s) for Analysis

The measures within The Battery were developed for intact teams (i.e., sets of two or more people who interact dynamically, interdependently, and adaptively). For analysis purposes, you will need to identify each respondent's team. Each measure within The Battery includes a place for the respondent to indicate their "team/unit identifier." If a respondent's team is not identified their responses cannot be included within the team analyses and results.

There is no upper limit to the number of members who can be included on a team for analysis. However, The Battery users should carefully consider the appropriate level or echelon (e.g., team, squadron, platoon) when scoring and reporting results. The measures within The Battery were validated at the Army team and squadron level (see Tannenbaum et al., 2022), but were not validated at larger levels, such as company and battalions. Researchers could use The

Battery in larger units to determine evidence of validity and reliability of The Battery with large units of Soldiers.

Measure Format

The Battery (Tannenbaum et al., 2022) includes print ready versions of the measures. If these paper versions are used, the responses can be captured directly on the survey and the data can be entered manually into an Excel spreadsheet or a statistical package (e.g., R or SPSS).

Customizing Instructions. Instructions for many of the measures refer to a specific time period (e.g., over the last month). The measures in The Battery refer to "the last month" but this time period should be changed to meet the needs of the situation. When preparing the measures, consider the time period that makes sense for the survey respondent group. If administering the measures once a week, the time period might be modified to say, "during the last week." If administering the measures at the conclusion of a training exercise the instructions might be changed to "during the training exercise".

Other Supporting Measures. Our research with Soldiers and teams suggests that unit resilience predicts team performance. Teams that report higher levels of resilience (both Current Capacity and Future Confidence) tend to perform better. For diagnostic purposes as well as research purposes, it can be useful to measure team performance or other team outcome variables (e.g., team cohesion) together with the measures of unit resilience.

Our research also indicates that levels of unit resilience are driven by characteristics of the team not incorporated within our theoretical model. For example, our research with 449 Army recruiting teams with ≥2 members per team suggest that team member interdependency is positively related to unit resilience. That is, teams with members who work together and rely on one another more have greater unit resilience. Therefore, when planning to examine unit resilience, consider measuring additional factors that could impact it, such as team member interdependency (for a measure of team interdependency see Tannenbaum et al., 2022).

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Appendix

Soldier Unit Resilience Measurement Battery Descriptive Statistics

Measures/Scales	Min	Max	Mean	*SD*
Current Capacity				
Physical	1	10	6.12	1.73
Affective	1	10	5.89	2.20
Cognitive	1	10	6.54	1.98
Overall	1	10	6.19	1.76
Future Confidence				
Physical	1	10	6.24	1.96
Affective	1	10	6.19	2.14
Cognitive	1	10	6.75	2.08
Overall	1	10	6.39	1.90
Stressors				
Psychological	1	5	2.79	0.76
Environmental	1	5	2.87	0.86
Workload	1	5	3.17	0.87
Overall	1	5	2.92	0.72
Challenges[a]	1	4	2.36	0.54
Minimizing	1	5	3.06	0.73
Manifestations	1	5	3.42	0.72
Mending	1	5	3.32	0.75

Note. Based on 435-450 teams with one of more respondents per team (total members = 680). From Tannenbaum et al. (2022)

[a]Challenges refers to Environmental Challenges.