Bringing Science to Bear

An Empirical Assessment of the Comprehensive Soldier Fitness Program

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This article outlines the U.S. Army's effort to empirically validate and assess the Comprehensive Soldier Fitness (CSF) program. The empirical assessment includes four major components. First, the CSF scientific staff is currently conducting a longitudinal study to determine if the Master Resilience Training program and the Comprehensive Resilience Modules lead to lasting resilience development in soldiers. Second, the CSF program has partnered with other researchers to conduct a series of longitudinal studies examining the link between physiological, neurobiological, and psychological resilience factors. Third, the CSF program is also incorporating institutional-level data to determine if its material influences health, behavioral, and career outcomes. Fourth, group randomized trials are being conducted to ensure that resilience training incorporated under the CSF program is effective with soldiers. A specific rationale and methodologies are discussed.

Keywords: assessment, resilience, longitudinal, testing

As outlined by several authors in this special issue, the Comprehensive Soldier Fitness (CSF) program likely represents the largest deliberate psychological intervention in history and signals the U.S. Army's attempt to bring science to bear on a complex problem—shaping and accelerating human development and performance. The program is massive in scale and will directly impact three distinct populations—U.S. Army soldiers, their family members, and civilians employed by the Army. The purpose of this article is to outline how the CSF program will chart its progress and assess its effectiveness over time.

Overview of the Assessment

Though the concept of CSF was established in the fall of 2008, proof-of-concept testing and content development lasted more than a year. This lead time allowed the CSF program's scientific staff to examine several potential methods for determining program efficacy. The end result is an integrated assessment approach with four major components. First, a longitudinal quasi-experimental trial will examine the effectiveness of the Master Resilience Training course and the online Comprehensive Resilience Modules. Second, a series of longitudinal experiments will examine the link between psychological and physiological resilience. Third, analyses will link the first two components to data already tracked by Army Headquarters, such as health, behavior, and career outcomes. Fourth, additional components of CSF resilience training are being assessed through group randomized trials. Key here is the recognition that determining program efficacy should not rest on a single experiment; rather, we must look to a series of efforts that will result in a triangulation of indicators. The cornerstone of our assessment approach rests on the notion that we should cast a wide methodological net and apply scientific rigor from a variety of specialties within psychology to assess the CSF program.

The Quasi-Experimental Trial

Our scientific staff began a quasi-experimental trial of two major components of the CSF program in January 2010. This longitudinal study is scheduled to last approximately 15 months and have three data points.

Experimental Design and Sample

As outlined by Cornum, Matthews, and Seligman (2011, this issue), resilience development content is delivered to the Army community in two ways. First, every member of the Army community currently has the opportunity to complete Web-based resilience modules. Second, master resilience trainers currently receive in-depth training taught by the University of Pennsylvania and impart lessons from their training to other soldiers, family members, and Army civilians. Wanting to assess the impact of both delivery methods simultaneously, we developed a four-group experimental design with approximately 8,750 soldiers per group. This design not only allows us to examine the unique contribution each delivery method provides toward developing resilience but also, and more importantly, allows us to determine the impact of the interaction between both methods, as we believe that each method will reinforce the other. All data will be collected electronically via

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the Soldier Fitness Tracker (SFT), discussed in greater detail by Fravell, Nasser, and Cornum (2011, this issue).

The sample consists of active duty soldiers serving in eight brigade combat teams (BCTs) across the Army and in a variety of locations ($N \approx 31{,}000$). Active duty soldiers serving in BCTs were chosen for several reasons. First, soldiers from the active component are fully employed by the Army, as opposed to National Guard and Army Reserve soldiers, who tend to serve as soldiers for short periods of time and do so intermittently. Second, active duty soldiers tend to deploy to combat more often. Third, BCTs are now the Army's standard unit of deployment to combat—a BCT forms and trains for approximately 12–18 months, deploys to combat for 12 months, reintegrates at home for 3–4 months after combat, and then largely disbands as soldiers are reassigned to other units, are selected for educational opportunities, or leave the Army at the end of an enlistment. When taken together, soldiers from the active component serving in BCTs clearly represent our best opportunity to maximize experimental control for a longitudinal study.

Randomized assignment of soldiers to conditions was not a realistic option. As with most field studies, cross-contamination posed a significant challenge because of soldier proximity. There is a high probability that soldiers will talk to each other about CSF material in the barracks, at work, or in social settings. Indeed, one goal of the Master Resilience Trainer course is to guide and encourage such communication. As such, we opted for a quasi-experimental design and randomly assigned entire BCTs to the conditions, thus ensuring that all soldiers from a particular BCT would receive the same resilience training regimen, which minimizes the probability of cross-contamination. All BCTs selected to participate in the assessment were combat units (e.g., infantry, armor, cavalry), which helped establish initial equivalence between conditions. Finally, units selected to participate in the assessment were at roughly the same point in the cycle that drives scheduling units for deployment to war. This criterion suggests that all units in the assessment pool will conduct similar training at similar times, which ensures that the soldiers will broadly share similar experiences, thus helping to limit history effects on the sample.

The Ethics of a Control Group

We spent several months exploring options for a viable method to identify and field a control group. As General Casey (2011) and others in this special issue have pointed out, the challenges our soldiers, family members, and Army civilians face are significant and pervasive. Given the impact that targeted resilience development has had on other populations (Cutuli, Chaplin, Gillham, Reivich, & Seligman, 2006; Gillham & Reivich, 1999), and the results of some initial research using soldier samples (Adler, Bliese, McGurk, Hoge, & Castro, 2009), withholding resilience training from soldiers posed a significant ethical dilemma. In short, how could we ethically justify withholding resilience training from soldiers slated for combat duty? The solution to this dilemma emerged when we examined the Army's ability to rapidly produce master resilience trainers and assign them to units across the Army. Because the Army can currently only train approximately 3,000 master resilience trainers per year, some units will not receive a trainer for quite some time. This throughput constraint naturally created a wait-list design, so we leveraged this delay to create the control group.

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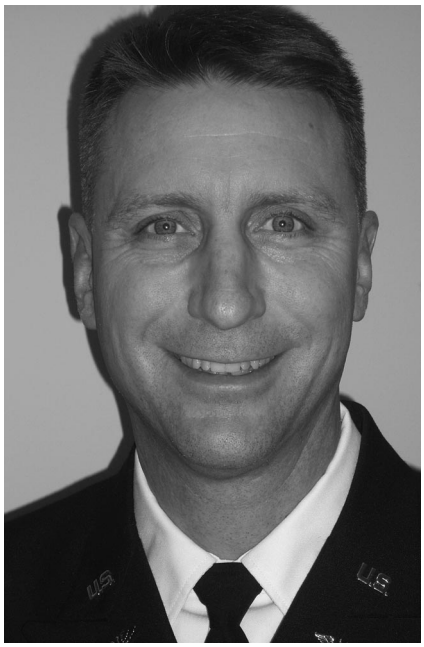

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The "GAT+"

The key outcome associated with CSF program efficacy will be measured through an alternative version of the Global Assessment Tool (GAT). A review of the development of the GAT is provided by Peterson, Park, and Castro (2011, this issue). Broadly stated, the GAT is a self-report measure covering a variety of variables that are grouped into four dimensions of resilience: social, emotional, spiritual, and family fitness. Although the current GAT is a powerful self-awareness tool, it tells us very little about the organizational context, and understanding this context is critical for assessing program efficacy.

Research by Avolio (2005) suggests that contextual variables significantly influence the long-term impact of developmental interventions on individuals. Avolio pointed out that while training individuals may be well-intended and proximally beneficial, the distal effect is diminished significantly if the organizational leaders do not institute policies that serve to reinforce the importance of the training initiative—and this reinforcement must come not only from senior leaders but also from junior leaders, who have more contact with the individuals who received the training. This notion was echoed by Hannah and Lester (2009), who theorized that leaders at multiple levels of an organization play a critical role in the diffusion of new knowledge across an organization and that their intervention assists members in making meaning of the change. Concomitantly, Masten and Coatsworth (1998) and Masten and Obradovic (2008) suggested that an individual's connectedness to social systems is a significant factor in human resilience. Specifically, Masten and Obradovic (2008) stated that "social groups hold the potential for providing social capital and augmenting the adaptive capacity of the individuals in the group" (p. 8) when resilience is needed.

The success of the CSF program at the unit level rests in part with the quality of unit leadership behavior and in part with unit cohesion. We believe that the CSF program will best succeed when unit leaders endorse the program, place emphasis and resources behind it, and assist soldiers in making meaning of CSF principles. Unit cohesion may also serve as an adaptive capacity when traumatic events occur because individual unit members turn to each other for help in stressful or traumatic times. Therefore, we anticipate that both unit leadership and unit cohesion will serve to moderate the link between proximal resilience training and distal resilience development. With this in mind, we developed an alternate expanded version of the GAT, referred to as the GAT+, which will be completed semiannually by soldiers in the assessment pool. Currently consisting of 180 questions, the GAT+ contains a shortened version of the Multifactor Leadership Questionnaire (Bass & Avolio, 1989) to measure the full range of leader behaviors within the unit; a multifactor measure of military unit cohesion (Griffith, 1988); and other contextual variables that will not only assist the research team in determining efficacy but also illuminate the conditions under which the CSF program will see the greatest success. Understanding these conditions may prove critical in shaping the lessons learned and pointing Army strategic leaders toward changes to the CSF program in the future.

Physiological and Neurobiological Assessment

A review by Southwick, Vythilingam, and Charney (2005) provides an important overview of the link between psychobiology, depression, and stress resilience. Research on exercise (Brosse, Sheets, Lett, & Blumenthal, 2002), serotonin (Hasler, Drevets, Manji, & Charney, 2004), neuropeptide Y (NPY; Yehuda, Brand, & Yang, 2006), dopamine activity (Depue & Iacono, 1989), and dehydroepiandrosterone (DHEA; Morgan, Southwick, Hazlett, Rasmusson, & Hoyt, 2004) all converges to suggest that there is a relationship between physiological, neurobiological, and psychological resilience factors. However, much more exploration is needed to properly identify effective interventions that target neurobiological risk and resilience factors.

The CSF program recognizes the physiological–neurobiological–psychological resilience linkage and will incorporate findings from intramural research into its assessment program. Specifically, the CSF program has partnered with the Department of Behavioral Sciences & Leadership at West Point to spearhead a series of longitudinal studies examining physiological and neurobiological resilience. Here, the aim is to focus on applied research that will lead to a series of empirically valid interventions that can later be incorporated into the CSF program of instruction.

In an effort to integrate our assessment efforts, West Point's research team will draw its sample from the same sample used in the quasi-experimental assessment of the Master Resilience Training program described previously. While assessing the same sample for two studies presents

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its own set of challenges (e.g., monitoring the quasi-experimental trial data for a Hawthorne effect from those soldiers selected by the West Point team), the advantages are significant. Of primary importance is the linking of physiological and neurobiological data to GAT+ data. In addition, because every BCT in the assessment pool is slated to deploy to combat in the future; the West Point team will have the opportunity, if warranted, to deploy to Iraq and Afghanistan to collect data when tactically feasible.

This partnership also heralds another important benefit: undergraduate students conducting research. Michael Matthews and James Merlo, faculty members of the West Point's Department of Behavioral Sciences & Leadership, have designed course material around the partnership's goals. Beginning in the Spring 2010 semester, West Point cadets who major in engineering psychology have the opportunity to conduct studies in support of the CSF program's mission as part of the cadets' capstone course. Here, we hope to plant the seeds for a future crop of military psychologists and researchers.

Institutional Indicators

The third component of the CSF assessment program rests in the examination of institutional indicators, such as health, behavioral, and career outcomes at an Army-wide level. The Department of the Army's Headquarters tracks a massive amount of data, and we hope to tap into several data sources to provide yet another point of triangulation in determining CSF efficacy. Broadly, we hope to determine if the CSF program influences rates of suicide, divorce, posttraumatic stress disorder, crime, reenlistment, and promotion, to name only a few variables. We clearly recognize that determining a causal relationship will likely prove too challenging because this is an Army-wide analysis rather than an analysis that accounts for behavioral change at an individual level over time. We further recognize that even if we focus on the sample selected for the quasi-experimental study (as opposed to the entire Army), the incident rate of certain outcomes such as suicide likely will not be large enough for us to make reliable inferences. After all, the 31,000 soldiers in the assessment pool represent less than 4% of the entire Army. Nevertheless, marrying GAT data to incident rates will be a worthwhile endeavor simply because it could identify at-risk populations within the Army. Moreover, doing so may also identify populations prepared to flourish if proper resources are brought to bear. For example, initial analyses of data from the GAT suggest that individuals who score in the bottom 20% on the emotional dimension scale comprise approximately 40% of respondents who meet the screening criteria for posttraumatic stress disorder.

Additional Research Efforts

The final component of the CSF assessment program is designed to examine the efficacy of additional resilience training. This assessment effort was launched with two group randomized trials conducted during basic combat training in 2009. The studies, led by the Walter Reed Army Institute of Research, assessed training modules that targeted existing programs. The first study assessed a two-hour module that targeted mental health. This module was based on the former Battlemind program (e.g., Adler et al., 2009) and was adapted from the Australian Defence Force's program for recruit training (Cohn & Pakenham, 2008). The second study assessed an eight-hour program that targeted performance and performance-related mental skills (e.g., Krane & Williams, 2006). This program was developed by the Army Center for Enhanced Performance and was integrated across the 10 weeks of basic combat training.

Key methodological issues were addressed in both studies. First, given the need to control for unit-level variance when assessing key health and organizational outcomes (Bliese & Hanges, 2004), randomization to the intervention condition occurred at the platoon level, and mixed-effect models were used to ensure adequate control of group-level differences. Second, a comparison condition consisting of relevant military history stories was developed for both studies in order to control for the impact of nonspecific effects associated with an interruption in the basic combat training routine. Third, outcome measures included self-report survey data and performance data. Taken together, these studies set a methodological standard for Army research, guide future training development, and demonstrate the CSF program's commitment to ensuring an empirical basis for resilience training initiatives integrated into the CSF program's larger effort.

Last, The CSF program actively collaborates with other members of the scientific community who are field testing resilience interventions that one day may fit within the CSF developmental framework. For example, the CSF program most recently assisted Amishi Jha (see Algoe & Fredrickson, 2011, this issue) in securing a large sample of

soldiers to participate in a randomized-controlled trial of emotional fitness intervention that focuses on mindfulness training. While mindfulness training is not part of the CSF regimen at this time, it may one day be integrated into the program if it shows efficacy in the current and subsequent studies. The CSF program has taken similar approaches with researchers at the United States Military Academy at West Point and the University of Chicago.

Conclusion

This brief article represents an overview of the empirical assessment of the CSF program, and we believe that the integrated research approach it describes is our best hope for determining program efficacy. In addition, this assessment program marks the Army's desire to apply scientific rigor to its training methodologies, the significance of which cannot be understated. In short, this assessment will not only help us determine if the CSF program develops psychological resilience in soldiers, but it will also give us insight into the CSF program's level of effectiveness over time.

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