Bulletproofing the Psyche

Preventing Mental Health Problems in Our Military and Veterans

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PRAEGER™ (2018)

An Imprint of ABC-CLIO, LLC
Santa Barbara, California • Denver, Colorado

CHAPTER 14

The Way Forward

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The consistent theme that emerges throughout this volume is that rewiring our brains and nervous systems after prolonged stress or trauma may effectively combat the wide-ranging negative health outcomes caused or exacerbated by military service. Authors across this anthology have repeatedly connected the dots to suggest a powerful cause-effect sequence for "bulletproofing" the mind-body system in various veteran cohorts. Building on these chapters, this conclusion takes a step back to consider whether the mind-body skills training regimens that successfully treat the wounds of service could be effective at helping to prevent those wounds in the first place. If mind-body skills training recalibrates how the mind-body system recovers from prolonged stress and trauma, could moving similar programs into military training environments mitigate the damaging effects of such stress and, in doing so, protect future service members? To answer this important question, we consider the benefits and challenges of implementing mind-body skills training regimens widely throughout active-duty military populations.

The Benefits of Mind-Body Skills Training Regimens during Active-Duty Service

Increased (and routinized) mind-body skills training offers several important benefits to active-duty military populations, the most important being its generalizability. As prior chapters show, mind-body skills training is a true domain-general skill: it cultivates skill sets in individuals that can be easily applied to many environments across a life span. For veterans, this domain-general nature of mind-body skills training ideally means they both learn to reregulate and heal their own postservice dysregulation as well as improve their adaptability and resilience across their personal and professional lives. For active-duty forces, such training could *also* improve their individual and collective performance during fast-changing, complex, and uncertain military missions and thus could multiply its overall return on investment.

Neuroplasticity—the scientific concept that any repeated experience changes the brain and nervous system—grants humans the essential ability to learn from experience. The more we practice a particular task, the more familiar and efficient the brain and body become at performing that specific task—as significant evidence demonstrates across virtually all perceptual, physical/motor, or cognitive tasks in which individuals may be trained (for reviews, see Green & Bavelier, 2008; Slagter, Davidson, & Lutz, 2011). Most training is domain-specific: individuals improve learning in the specific trained context, with little or no transfer of that learning to other tasks or other contexts, no matter how similar. In other words, with most skills training, the benefits are often exceedingly stimulus- or context-specific.

Though most skills-training paradigms rely upon these domain-specific principles, a handful of training paradigms have been empirically shown to confer domain-general learning, in which an individual not only improves on the trained task(s) but is also able to transfer that learning to additional tasks and to other domains. Such domain-general skills training—observed in athletic training, musical training, action video gaming, and *some* forms of mental training—trains these more generalized skills via three important processes (Green & Bavelier, 2008; Slagter et al., 2011; Stanley, in press-a). First, such trainings vary the stimuli and/or the tasks, forcing individuals to learn at more abstract levels and thus understand the general principles for using the skill in different settings. Second, whether in practice or via visualization, these skills trainings tap into cognitive and physical processes in parallel. In other words, it is *embodied* learning, where the practitioner is engaging and developing several perceptual, cognitive, and motor skills in tandem while they practice, such as eye-hand coordination, selective attention skills, and spatial orienting ability. Finally, domain-general skills training regimens usually utilize task progression, advancing incrementally from one level of difficulty to the next. In the process, they aim for moderate stress arousal during skill practice, which is the zone of stress arousal that best allows the learning and consolidation of new skills for skill retention and employment later.

Though traditional military physical fitness training is a handy example of effective domain-general skills training, most military training favors domain-specific skills training. The majority of preparatory programs rely heavily on checklists, templates, and guidelines, offering clear "do" and "don't" scripts for service members to follow based on a given scenario (Stanley, in press-a). Military organizations favor these kinds of domain-specific trainings precisely because such templates can be quickly taught and learned—sometimes only requiring a simple briefing or training module—and easily assessed and tested (one either does or does not perform according to the required "task, condition, and standard"). Domain-specific training can also be scaled across the force quickly, often via widely distributed digital means. Domain-specific learning is favored because it is believed to make service members more knowledgeable, and thus more effective, in conducting specific military tasks or operations. As a basic example, if troops are preparing to deploy to a conflict zone with an unfamiliar language and culture, with domain-specific learning they might be trained to draw on a list of foreign-language phrases and specific cultural rules to follow in that environment and thereby improve their operational effectiveness in that environment. In contrast, training a domain-general skill such as emotional intelligence might improve the troops' ability to read emotions in themselves and others, thus increasing the likelihood they could recognize nonverbal cues during interactions with the host population, see situations from others' point of view, and regulate their own emotions during these interactions. These emotional intelligence skills may also decrease the likelihood of impulsive or reactive behavior when interacting with the host population. Yet, while specific foreign-language phrases and emotional intelligence may both serve important operational functions in a deployed setting, only the latter skill could be similarly used with family members or colleagues in nondeployed contexts.

The military's domain-specific approach to improving operational effectiveness is most notable in stress inoculation. Stress inoculation training (SIT) is underpinned by the philosophy that humans experience a greater stress response when they perceive an event to be unfamiliar, unpredictable, or uncontrollable (McEwen & Lasley, 2002; Sapolsky, 1994). Military stress inoculation aims to minimize the impact of unfamiliarity/unpredictability/uncontrollability by introducing service members to the specific kinds of stressors they are likely to encounter "downrange" during real-world missions (Kavanagh, 2005). The expectation is that, by reducing the novelty of stressors and habituating service members to their effects, SIT will improve service members' ability to perform specific missions in specific environments (Dienstbier, 1989; Driskell & Johnston, 1998; Kavanagh, 2005; Saunders, Driskell, Johnston, & Salas, 1996; Stanley, 2010). However, while SIT may reduce the perception of novelty in these specific situations, its benefits are often limited to the trained scripts and contexts. For instance, in a study of civilian firefighters, although anxiety and cognitive difficulties decreased across repetitions of the *same* scenario in a live-fire training environment, in new (yet structurally similar) scenarios, firefighters experienced anxiety and cognitive difficulties equal to—or even above—first-exposure levels (Baumann, Gohm, & Bonner, 2011). In other words, these firefighters were unable to translate the emotion regulation and cognitive skills cultivated over repetitions of the same scenario to other scenarios, even when the script was only slightly different.

Paradoxically, even in scenarios in which scripted SIT might appropriately prepare service members for specific military operations, the stress exposure inherent in such training may undermine their ability to retain—and later access and employ—the trained skill. After all, the common belief is that military combat training should strive to be *as* stressful, if not intentionally *more* stressful, than actual combat (Cone, 2006). Yet, while SIT may help troops adaptively function during stress—and also minimize their anxiety about future missions—SIT's intensity and lack of focus on recovery may exacerbate depletion of executive functioning, thereby contributing to difficulties with physiological and emotion regulation (Heatherton & Wagner, 2011; Hofmann, Schmeichel, & Baddeley, 2012). Indeed, in high-stress professional environments like the military, executive functioning is subject to temporal impairment or depletion from a range of situational factors, including concurrent task load, sleep deprivation, environmental or social stressors, the management of mortality concerns, or the consequence of prior high-intensity engagement (see Hofmann et al., 2012 for a review; Maguen et al., 2009; Stanley, in press-b).

Broad-based evidence from several SIT programs, including military field training exercises (Kavanagh, 2005; Lieberman et al., 2005; Lieberman, Tharion, Shukitt-Hale, Speckman, & Tulley, 2002), military survival training (Morgan, Doran, Steffian, Hazlett, & Southwick, 2006; Morgan et al., 2004; Morgan et al., 2002; Morgan et al., 2001), and military predeployment training (Jha et al., 2015; Jha, Morrison, Parker, & Stanley, 2016; Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010; Jha, Witkin, Morrison, Rostrup, & Stanley, 2017; Stanley, Schaldach, Kiyonaga, & Jha, 2011), reflects their stressful intensity, with training-related stress exposure linked to mood disturbances and cognitive degradation, including symptoms of dissociation, problem-solving deficits, attention deficits, inaccuracies in visual pattern recognition, and significant declines in working memory capacity (WMC). Declines in WMC may also degrade the broader capacity for emotion regulation (Hofmann et al., 2012; Jha et al., 2010; Pe, Raes, & Kuppens, 2013; Schmeichel, Volokhov, & Demaree, 2008). By undermining such core cognitive and self-regulatory processes associated with executive functioning, SIT may actually inhibit service members' ability to retain and later access the specific military skills they are intending to condition.

Thus, whether because the skills taught are too templated and narrow for the military's increasingly complex, volatile, uncertain, and morally ambiguous missions, or because operating in such stressful training environments (beyond moderate stress arousal levels) may impede service members' ability to learn and retain the trained skills, SIT may not actually deliver its expected operational benefits. As Lieberman et al. (2005, p. 428) note, "The extent and magnitude of the decrements in cognitive performance and mood we observed [in their study during military training] confirm the anecdotal observations that have been made in combat . . . even well-trained leaders exhibit significant degradation in cognitive performance and mood when exposed to severe, multifactorial stress."

In contrast, mind-body skills training may effectively cultivate domain-general skills in active-duty military populations, even during stressful military training. For example, in several studies with active military samples, Mindfulness-based Mind Fitness Training (MMFT)® (Larsen & Stanley, in press; Stanley, 2014b; Stanley et al., 2011) has been associated with improved cognitive performance, better regulation of negative emotions, and better self-regulation of the physiological stress response during stressful predeployment training. MMFT draws from and integrates two lineages: traditional mindfulness skills training (Kabat-Zinn, 2013) and an understanding of the neurobiology of stress and resilience and body-based skills to regulate the autonomic nervous system, drawn from body-based trauma therapies like sensorimotor psychotherapy (Ogden & Fisher, 2015; Ogden, Minton, & Pain, 2006) and Somatic Experiencing® (Levine, 1997; Payne, Levine, & Crane-Godreau, 2015). This blend of mindfulness skills training with body-based self-regulation and resilience skills, relying on a unique sequence of exercises designed to move a participant from dysregulation to regulation, makes MMFT distinct from other mindfulness-based approaches.

U.S. combat troops preparing to deploy to Iraq and Afghanistan who received variants of the eight-week MMFT course (ranging from 8 to 24 hours of classroom training) showed significant benefits on several outcome measures, including protection against working memory degradation (Jha et al., 2017) and improvements in sustained attention (Jha et al., 2015; Jha et al., 2016) and WMC, which was significantly linked to decreased negative emotions (Jha et al., 2010); more efficient physiological stress arousal and recovery, as indexed by neuropeptide Y, heart rate, and breathing rate during stressful combat drills (Johnson et al., 2014); more efficient activation of the insula cortex and anterior cingulate cortex (ACC), brain regions implicated in interoception, emotion regulation, and impulse control, as indexed with fMRI during restricted breathing (Haase et al., 2016) and emotional face processing (Johnson et al., 2014) tasks; and self-reported improvements in sleep (Sterlace et al., 2012), perceived stress (Stanley et al., 2011), and mood (Jha et al., 2010).

The MMFT program trains two domain-general skills that undergird a range of cognitive, emotion regulation, and stress self-regulation capacities, even during stress exposure. First, MMFT develops *attentional control* (the ability to deliberately deploy and sustain attention on a chosen target over time), which may lead to improved focus and concentration; better ability to inhibit distractions; and better ability to access, retain, and update relevant information. Second, MMFT develops *tolerance for challenging experience* (the ability to pay attention to, track, and tolerate challenging experiences without needing for them to be different), whether such experiences are external (e.g., harsh environmental conditions or, difficult people) or internal (e.g., physical pain, intense emotions, intrusive thoughts, flashbacks, or nightmares; Stanley, 2014b). Both of these skills may then improve interoceptive functioning, cognitive performance, and resilience, suggesting MMFT's power as a domain-general training.

Interoception is "the process through which the brain monitors and updates the body about its overall physical state, including its ability to recognize bodily sensations, be aware of emotional states, and maintain physiological homeostasis" (Johnson et al., 2014, p. 844). The insula and ACC provide top-level control to the subcortical processes for regulating emotions and stress (Critchley et al., 2003; Critchley, Wiens, Rotshtein, Öhman, & Dolan, 2004; Garfinkel & Critchley, 2013). By improving the functioning of this regulatory loop through attention to interoception rather than cognition, it may be possible to improve the functioning of these subcortical regulatory processes and minimize the depletion and degradation of executive functioning during high-stress contexts (Stanley, in press-a). In fact, previous (nonintervention) studies among "elite performers" (both military and civilian samples) demonstrated activation patterns in both the insula and ACC consistent with more efficient interoceptive processing during stress, relative to healthy controls (Paulus et al., 2012; Paulus et al., 2010; Simmons et al., 2012; Thom et al., 2014). Troops who received MMFT showed altered brain activation during stress post-MMFT (Haase et al., 2016; Johnson et al., 2014), similar to the pattern observed among the "elite performers" in the earlier studies (Paulus et al., 2012; Paulus et al., 2010; Simmons et al., 2012; Thom et al., 2014). In contrast, compromised interoceptive functioning has been shown to play a critical role in the development of mood and anxiety disorders (Avery et al., 2014; Domschke, Stevens, Pfleiderer, & Gerlach, 2010; Paulus & Stein, 2010) as well as addictions (Paulus & Stewart, 2014). Thus, as the MMFT research shows, mind-body skills training to improve interoceptive processes may facilitate improved responses to both stress and emotions, even in high-stress contexts characterized by depleted executive functioning (Heatherton & Wagner, 2011; Hofmann et al., 2012; Norris & Hutchinson, Chapter 3, this volume).

Because improved interoception may facilitate better self-regulatory performance (Friese, Messner, & Schaffner, 2012), developing the domain-general skills of attentional control and tolerance for challenging experience may also improve overall cognitive performance during high-stress contexts. These cognitive improvements may include better sustained attention

(Jensen, Vangkilde, Frokjaer, & Hasselbalch, 2012; Jha et al., 2015; Jha et al., 2016; Zeidan, Johnson, Diamond, David, & Goolkasian, 2010) and increased WMC (Jensen et al., 2012; Jha et al., 2010; Mrazek, Franklin, Phillips, Baird, & Schooler, 2013; Zeidan et al., 2010), which has also been empirically linked to improved skills associated with effective decision making, including better conflict monitoring and task prioritization (McVay & Kane, 2009; Redick & Engle, 2006); better situational awareness (Endsley, 1995, 2000); better abstract problem solving and ability to recall, apply, and use facts (Gray, Chabris, & Braver, 2003; Halford, Cowan, & Andrews, 2007; Kane & Engle, 2002); and better ability to regulate negative emotions (Hofmann et al., 2012; Jha et al., 2010; Pe et al., 2013; Schmeichel et al., 2008).

Finally, attentional control and tolerance for challenging experience may also improve *resilience* by widening individuals' windows of tolerance to stress arousal. Resilience is the ability to function effectively during stressful experience and recover efficiently to baseline afterward (Stanley, 2014b, in press-a). The stress response is expressed in the body as physical sensations via activation of the autonomic nervous system (ANS) (e.g., increased heart and breathing rate, nausea, and sweaty palms), as well as in the mind via increased cortical activity (e.g., racing or distressing thoughts; see DeSteno, Gross, & Kubzansky, 2013; Ogden & Fisher, 2015; Ogden et al., 2006). When individuals use attentional control and tolerance for challenging experience to bring interoceptive awareness to the physical sensations and cognitive activity associated with stress activation, it becomes possible for the mind-body system to neurocept safety and then discharge the mobilized stress activation, complete its process of self-regulation, and return to baseline equilibrium. Over time, individuals can learn to support ANS self-regulation to recover from the dysregulation of prior exposure to chronic stress or trauma and to increase their tolerance for greater stress activation in the future (Ogden et al., 2006; Porges, 2011; Payne et al., 2015; Stanley, 2014b, in press-a).

In contrast, without these two domain-general skills, because stress activation is uncomfortable in the mind-body system, individuals may distract from or suppress this self-regulation process, which over time can lead to ANS dysregulation and allostatic load. To manage symptoms of dysregulation, they then frequently resort to maladaptive coping techniques (i.e., tobacco use, substance use, or adrenaline-seeking behaviors) that create a vicious cycle by adding additional stress to the mind-body system and dysregulating it further (Stanley, in press-a). Stress spectrum disorders (including posttraumatic stress disorder [PTSD]) result from a lack of complete recovery and subsequent dysregulation of the ANS (Levine, 1997; Ogden & Fisher, 2015; Ogden et al., 2006; Payne et al., 2015; Scaer, 2005; van der Kolk, 2015).

In sum, as the empirical evidence from MMFT demonstrates, domain-general mind-body skills training may yield broad-based and important improvements in cognitive performance, distress tolerance, self-regulation, resilience, and recovery.

Challenges in Providing Mind-Body Skills Training Regimens during Active-Duty Service

Of course, while the theory and evidence reviewed present a persuasive case for increased integration of mind-body skills training regimens into active-duty training, there are several important content-related and format-related issues to be considered before widespread implementation can take place.

The first challenge is determining precisely where and when in the overall professional development trajectory such training would be most effective. Each phase of service is associated with distinct stressors (Kavanagh, 2005; Pincus, House, Christenson, & Adler, 2005). During predeployment intervals, service members may face anxiety and family tension over pending deployment and the aforementioned stress associated with stress inoculation and field exercises (Cigrang, Todd, & Carbone, 2000; Jha et al., 2010; Lieberman et al., 2005; Maguen et al., 2008; McNulty, 2005; Stanley et al., 2011). Meanwhile, deployment can subject service members to unfamiliar environments, languages, and cultures; exhaustive physical/mental exertion; the need to manage mortality concerns; and combat exposure (Adler, McGurk, Stetz, & Bliese, 2003; Hoge et al., 2004; Junger, 2015; Killgore et al., 2008; King, King, Vogt, Knight, & Samper, 2006; Maguen et al., 2009; Stanley, 2014b). Finally, postdeployment can introduce stress over reestablishing household relationships and reintegrating into nondeployed daily life (Junger, 2015; Lincoln, Swift, & Shorteno-Fraser, 2008; Pincus et al., 2005). Moreover, as seen following increases in the military's operational tempo since 2001, the stressors inherent in each of these phases are often experienced at faster and more frequent intervals (Bonds, Baiocchi, & McDonald, 2010; Castro & Adler, 2005).

Thus, early integration of domain-general mind-body skills training is key for effective active-duty implementation. The earlier troops are exposed to mind-body skills training, the more effectively they could utilize such skills throughout training and "real-world" missions, ideally to effect complete recovery after each stress exposure and to minimize the enduring effects of such exposure. Indeed, they could then use SIT as the setting in which to practice these domain-general skills associated with recovery and resilience. This early integration could also serve as a social reinforcement of its import: just as basic training seeks to begin refining the military-specific skills that enhance overall performance, early integration of mind-body skills training would signal resilience and mental fitness as foundational capacities for performance, and ones that require a long-term daily commitment. This kind of cultural shift will require command support, from the highest levels down through the non-commissioned officer (NCO) corps. It will also require understanding that mental fitness is not just for "fixing" the "problems" of suicide, psychological injury, and other stress-spectrum disorders. Thus, it is essential that any mind-body skills training not be introduced to leaders and units *only* as a stress resilience training (at which point it is likely to be perceived as remedial training for individuals who cannot deal with stress). Rather, for effective long-term integration of such practices, *it must be framed as the domain-general performance enhancement training it actually is.*

The second major challenge to implementing mind-body skills training programs with active-duty troops is weighing the effects of previous exposure to chronic stress and trauma and selecting programs that are capable of working effectively with such exposure. Prior combat/deployment experiences may lead to adaptive survival-based changes in troops' mind-body systems, which may then manifest as ANS dysregulation and depletion of executive functioning skills (Marx, Doron-Lamarca, Proctor, & Vasterling, 2009; Stanley, in press-a; Vasterling et al., 2006). Indeed, in the MMFT pilot study, approximately 59 percent of troops showed active symptoms of distress and dysregulation, related to prior prolonged stress and trauma exposure, before their predeployment training cycle even started (Stanley et al., 2011). Furthermore, even incoming military recruits do not have "blank slate" nervous systems. For example, adverse childhood experiences (ACEs)—including sexual, physical, and emotional abuse; physical and emotional neglect; and family dysfunction during childhood—have been shown to increase the risk for many mental and physical health problems in adulthood (Brodsky & Stanley, 2008; Bruffaerts et al., 2010; Felitti, 2009; Kessler et al., 2010; Mann & Currier, 2010). ACEs lead to life-long sensitization and dysregulation of the ANS and the hypothalamic-pituitary-adrenal (HPA) axis, which increase the susceptibility to stress-related physical illnesses and mood and anxiety disorders in adulthood (see Neigh, Gillespie, & Nemeroff, 2009, for a review). Importantly, in contrast to the draft era, U.S. military personnel during the All-Volunteer Force (AVF) era are more likely to have experienced ACEs, and disproportionately more ACEs, than their civilian counterparts (Blosnich, Dichter, Cerulli, Batten, & Bossarte, 2014). These findings are consistent with earlier research suggesting ACE prevalence may be higher in military populations because individuals may enlist to escape violent, abusive, or dysfunctional home environments (Iversen et al., 2007; Kelly, Skelton, Patel, & Bradley, 2011; Schultz, Bell, Naugle, & Polusny, 2006; Woodruff, Kelty, & Segal, 2006).

Thus, whether from exposure to ACEs and/or occupational stressors during deployment, overcoming the effects of prior stress and trauma exposure in active-duty populations requires experienced instructors to support and guide the reregulation of the mind-body system. These mind-body practices may stir some deep psychological and physiological processes, and out of a commitment to not causing harm, they must be taught by experienced instructors who have already deeply engaged in the process themselves (Creswell & Lindsay, 2014; Norris & Hutchinson, Chapter 3, this volume; Polusny et al., 2015; Stanley, 2014a, in press-a; Williams et al., 2014).

The third challenge to implementing mind-body skills training effectively with active-duty troops is creating and maintaining a cadre of experienced instructors. Ideally, instructors will come from within the chain of command, as NCOs or junior officers are best capable of leading daily mind-body skills practice sessions and integrating self-regulation skills practice into military SIT. Yet, because of the responsibilities and ethical obligations of not inadvertently causing harm, developing a cadre of uniformed, experienced instructors will necessarily take time. As such, this training may initially require recruiting experienced practitioners from outside of the military to help train uniformed instructors, implement the program, and ensure quality control.

The fourth challenge to implementing mind-body skills training effectively with active-duty troops is recognizing that not all mind-body skills training regimens may be equally effective in helping to reregulate the mind-body system in this high-stress context. For instance, many mindfulness-based training programs were not designed in a dysregulation-informed or trauma-sensitive manner and thus may cause risks for individuals currently suffering from psychopathology or other symptoms of dysregulation (Dobkin, Irving, & Amar, 2011; Folette, Palm, & Pearson, 2006; Larsen & Stanley, in press; Lindahl, Fisher, Cooper, Rosen, & Britton, 2017; Shonin, Van Gorden, & Griffiths, 2014; Stanley, in press-a; Strauss, Cavanagh, Oliver, & Pettman, 2014). Indeed, some mindfulness-based programs are contraindicated for individuals actively suffering from posttraumatic stress or trauma. For example, the University of Massachusetts' Center for Mindfulness explicitly states that mindfulness-based stress reduction (MBSR) courses are not indicated for anyone currently suffering from PTSD or other mental illness and recommends seeking other training or treatment if someone has "a history of substance or alcohol abuse with less than a year of being clean or sober, thoughts or attempts of suicide, recent or unresolved trauma" or if one is "in the middle of major life changes" (Center for Mindfulness in Medicine, 2014; Santorelli, 2014). All of these criteria are notably common in the high-stress, active-duty military context.

In contrast, positive psychology and cognitive reappraisal techniques involve actively reinterpreting stimuli before emotional responses become fully activated in order to modify the emotion's impact and trajectory (Fredrickson, 2003; Seligman, 2002). However, because these techniques rely on top-down (lateral prefrontal) regulation of subcortical emotional and stress arousal systems (Hariri, Mattay, Tessitore, Fera, & Weinberger, 2003;

Ochsner & Gross, 2005; Ogden et al., 2006), they may deplete prefrontal executive functioning resources (Heatherton & Wagner, 2011; Hofmann et al., 2012), especially in high-stress contexts associated with cognitive depletion and that tend to elicit negative emotions. Thus, perhaps it is not surprising that military programs relying on such techniques have not shown much empirical efficacy. For example, the Army's Comprehensive Soldier and Family Fitness (CSF2) program has been criticized for universal adoption without pilot testing (Eidelson, Pilisuk, & Soldz, 2011; Eidelson & Soldz, 2012; Institute of Medicine, 2014) and for lack of subsequent peer-reviewed empirical evidence of its effectiveness (Denning, Meisnere, & Warner, 2014; Institute of Medicine, 2014; Smith, 2013; Steenkamp, Nash, & Litz, 2013). Likewise, a recent evaluation of the Marine Corps' Operational Stress Control and Readiness (OSCAR) program found that while the program increased awareness and peer social support, there was no demonstrable improvement in mental health outcomes (Vaughan, Farmer, Breslau, & Burnette, 2015). Given the theoretical mismatch between cognitively taxing strategies like positive psychology and the cognitively depleting military training environment, service members may be unable to reregulate their mind-body systems using such techniques, which, as several authors suggest, may lead those service members to think something is "wrong" with them (Braswell & Kushner, 2012; Smith, 2013). As Braswell and Kushner (2012, p. 535) note, "The implication of this method is to pathologize not only traumatic life circumstances, but also negative *responses* to those circumstances. . . . Positive Psychology may lead traumatized soldiers to castigate themselves for what, in reality, may be the shortcomings of the therapeutic technique" (emphasis in original).

The final challenge to implementing mind-body skills training effectively with active-duty troops is determining which outcome measures are most appropriate for evaluating the regimens' effectiveness on a large scale. Most evaluations of mind-body skills training programs rely on self-report measures, such as the Army's Global Assessment Tool (GAT) online questionnaire, one component of CSF2. However, such self-report surveys may not be effective in evaluating overall progress in building domain-general skills (Institute of Medicine, 2014; Vaughan et al., 2015), and some of these instruments lack the empirical validation found in the scales used in the broader mental health arena (Eidelson & Soldz, 2012). In addition, because of mental health stigma and privacy concerns, troops may be unwilling to answer completely and honestly—indeed, many Marines in the MMFT pilot study admitted to withholding important information on such self-report surveys administered by the Marine Corps for fear of what their chain of command might do with the information (Stanley et al., 2011).

A more robust evaluation may be possible when self-report measures are supplemented and correlated with performance on cognitive tasks and/or individual biomarkers of resilience. (They could also be correlated with brain activation patterns during fMRI scans, as was done in some MMFT research (Haase et al., 2016; Johnson et al., 2014), although brain imaging for widespread evaluation would be prohibitively expensive.) Cognitive behavioral tasks, such as the Sustained Attention to Response Task (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997) to measure attention skills or the Operation Span task (OSPAN; Unsworth, Heitz, Schrock, & Engle, 2005) to measure WMC, could potentially be used as a cognitive equivalent of the services' physical fitness tests used to assess physical fitness twice annually. Of course, using such behavioral tasks to assess cognitive performance could be confounded by applied mental effort (Jha et al., 2010). While this may pose challenges to teasing out *theoretically* whether the mind-body skills training directly causes functional changes in cognitive processes, it should not present an issue for assessing *practically* the usefulness of the mind-body skills training in cultivating domain-general skills for improved performance.

Moreover, while performing combat drills, troops could wear bio-harnesses to measure heart rates and breathing rates during stress arousal and recovery, as was done in one MMFT study (Johnson et al., 2014). Furthermore, measures such as blood-plasma concentrations of neuropeptide Y, a protein released during stress arousal, may yield additional relevant information about the mind-body system's efficiency in recovering and reregulating after the challenge has passed (Johnson et al., 2014), especially when correlated with self-report measures of resilience, perceived stress, or mood. Likewise, blood-plasma concentrations of insulin-like growth factor (IGF-1) may be an indicator of restful sleep—particularly when correlated with self-report measures of sleep quality or data from simple activity trackers—since IGF-1 is produced when the body is getting restful sleep. For instance, in one MMFT study, self-reported improvements in sleep quality, including longer sleep duration and decreased use of over-the-counter and prescription sleep aids, correlated with significantly higher blood-plasma levels of IGF-1 after combat drills (Sterlace et al., 2012). On the other hand, alternatives such as saliva cortisol levels may be a less useful measure of resilience, because fluctuations in the diurnal cortisol cycle make it extremely challenging to measure and evaluate these levels across time.

Conclusion

Implementing mind-body skills training throughout active-duty forces has the potential to shift the entire "bulletproofing" paradigm of military mental health. Such programs may not only complement and reduce the shortcomings of traditional domain-specific military SIT but may also strengthen domain-general skill sets. As evidence from MMFT with active-duty populations shows, the range of potential benefits to cognitive performance, emotion regulation, and physiological self-regulation is substantial.

Nonetheless, the key question remains: Are the methods, practices, and skills to be implemented aligned with the desired outcome? Implementing mind-body skills training effectively in active-duty military populations will demand intentional program design. The greatest potential lies in early interventions, offered by appropriately experienced trainers, and teaching techniques aligned with the high-stress, cognitively depleting military context and compatible with troops' dysregulation from prior prolonged stress and trauma. Using the chain of command to socialize and integrate these programs into the warrior culture and interweave these mind-body skills into military-specific training will be essential.

Of course, while evidence in favor of such active-duty programs continues to accumulate, we must also remember that no program is a silver bullet solution. There are no shortcuts for rewiring the brain and nervous system, and any approach will necessarily take time, commitment, and patience. The human mind-body system's response to prolonged stress and trauma is not an issue to "solve"; viewing it from this perspective would actually deny the constant interaction between the mind-body system and performance. Therefore, if mind-body skills training is implemented with active-duty forces without consistent, repeated practice of the skills, without a cultural embrace on the part of the chain of command, and without appropriate scientific empirical evaluation of its efficacy, it is unlikely to shift the powerful and enduring rates of dysregulation seen among active-duty and veteran cohorts today. In other words, military leadership faces an important decision point. In order to reap the benefits that mind-body skills training may yield in uncertain and complex scenarios, leaders must commit to the creative integration and consistent practice of mind-body skills on a regular—realistically, daily—basis.

References

Adler, A. B., McGurk, D., Stetz, M. C., & Bliese, P. D. (2003). *Military occupational stressors in garrison, training, and deployed environments*. Paper presented at the NIOSH/APA Symposium Modeling Military Stressors: The WRAIR Occupational Stress Research Program, Toronto, Ontario.

Avery, J. A., Drevets, W. C., Moseman, S. E., Bodurka, J., Barcalow, J. C., & Simmons, W. K. (2014). Major depressive disorder is associated with abnormal interoceptive activity and functional connectivity in the insula. *Biological Psychiatry, 76*(3), 258–266.

Baumann, M. R., Gohm, C. L., & Bonner, B. L. (2011). Phased training for high-reliability occupations live-fire exercises for civilian firefighters. *Human Factors, 53*(5), 548–557.

Blosnich, J. R., Dichter, M. E., Cerulli, C., Batten, S. V., & Bossarte, R. M. (2014). Disparities in adverse childhood experiences among individuals with a history of military service. *JAMA Psychiatry, 71*(9), 1041–1048.

Bonds, T., Baiocchi, D., & McDonald, L. (2010). *Army deployments to OIF and OEF.* Santa Monica, CA: RAND Corporation.

Braswell, H., & Kushner, H. I. (2012). Suicide, social integration, and masculinity in the US military. *Social Science & Medicine, 74*(4), 530–536.

Brodsky, B. S., & Stanley, B. (2008). Adverse childhood experiences and suicidal behavior. *Psychiatric Clinics of North America, 31*(2), 223–235.

Bruffaerts, R., Demyttenaere, K., Borges, G., Haro, J. M., Chiu, W. T., Hwang, I., . . . Nock, M. K. (2010). Childhood adversities as risk factors for onset and persistence of suicidal behaviour. *The British Journal of Psychiatry, 197*(1), 20–27.

Castro, C. A., & Adler, A. B. (2005). Preface to the special issue. *Military Psychology, 17*(3), 131–136.

Center for Mindfulness in Medicine, Health Care, and Society. (2014). FAQ—Stress Reduction. Retrieved from https://www.umassmed.edu/cfm/mindfulness-based-programs/faqs-mbsr-mbct/

Cigrang, J. A., Todd, S. L., & Carbone, E. G. (2000). Stress management training for military trainees returned to duty after a mental health evaluation: Effect on graduation rates. *Journal of Occupational Health Psychology, 5*(1), 48–55.

Cone, R. W. (2006). The changing national training center. *Military Review, 86*(3), 70–79.

Creswell, J. D., & Lindsay, E. K. (2014). How does mindfulness training affect health? A mindfulness stress buffering account. *Current Directions in Psychological Science, 23*(6), 401–407.

Critchley, H. D., Mathias, C. J., Josephs, O., O'Doherty, J., Zanini, S., Dewar, B. K., . . . Dolan, R. J. (2003). Human cingulate cortex and autonomic control: Converging neuroimaging and clinical evidence. *Brain, 126*, 2139–2152.

Critchley, H. D., Wiens, S., Rotshtein, P., Öhman, A., & Dolan, R. J. (2004). Neural systems supporting interoceptive awareness. *Nature Neuroscience, 7*(2), 189–195.

Denning, L. A., Meisnere, M., & Warner, K. E. (2014). *Preventing psychological disorders in service members and their families: An assessment of programs.* Washington, DC: National Academies Press.

DeSteno, D., Gross, J. J., & Kubzansky, L. (2013). Affective science and health: The importance of emotion and emotion regulation. *Health Psychology, 32*(5), 474–486.

Dienstbier, R. A. (1989). Arousal and physiological toughness: Implications for mental and physical health. *Psychological Review, 96*(1), 84–100.

Dobkin, P. L., Irving, J. A., & Amar, S. (2011). For whom may participation in a mindfulness-based stress reduction program be contraindicated? *Mindfulness, 3*(1), 44–50.

Domschke, K., Stevens, S., Pfleiderer, B., & Gerlach, A. L. (2010). Interoceptive sensitivity in anxiety and anxiety disorders: An overview and integration of neurobiological findings. *Clinical Psychology Review, 30*(1), 1–11.

Driskell, J., & Johnston, J. (1998). Stress exposure training. In J. Cannon-Bowers & E. Salas (Eds.), *Making decisions under stress: Implications for individual and team training* (pp. 191–217). Washington, DC: APA Press.

Eidelson, R., Pilisuk, M., & Soldz, S. (2011). The dark side of comprehensive soldier fitness. *American Psychologist, 66*(7), 643–644.

Eidelson, R., & Soldz, S. (2012). *Does comprehensive soldier fitness work: CSF research fails the test*. Working Paper Number 1. Coalition for an Ethical Psychology. Bala Cynwyd, Pennsylvania.

Endsley, M. R. (1995). Toward a theory of situation awareness in dynamic systems. *Human Factors: The Journal of the Human Factors and Ergonomics Society, 37*(1), 32–64.

Endsley, M. R. (2000). Theoretical underpinnings of situation awareness: A critical review. In M. R. Endsley & D. Garland (Eds.), *Situation awareness analysis and measurement* (pp. 3–32). Mahwah, NJ: Lawrence Erlbaum Associates.

Felitti, V. J. (2009). Adverse childhood experiences and adult health. *Academic Pediatrics, 9*(3), 131–132.

Folette, V., Palm, K., & Pearson, A. (2006). Mindfulness and trauma: Implications for treatment. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 24*(1), 45–61.

Fredrickson, B. L. (2003). The value of positive emotions: The emerging science of positive psychology is coming to understand why it's good to feel good. *American Scientist, 91*(4), 330–335.

Friese, M., Messner, C., & Schaffner, Y. (2012). Mindfulness meditation counteracts self-control depletion. *Consciousness and Cognition, 21*(2), 1016–1022.

Garfinkel, S. N., & Critchley, H. D. (2013). Interoception, emotion and brain: New insights link internal physiology to social behaviour. Commentary on: "Anterior insular cortex mediates bodily sensibility and social anxiety" by Terasawa et al. (2012). *Social Cognitive and Affective Neuroscience, 8*(3), 231–234.

Gray, J. R., Chabris, C. F., & Braver, T. S. (2003). Neural mechanisms of general fluid intelligence. *Nature Neuroscience, 6*(3), 316–322.

Green, C. S., & Bavelier, D. (2008). Exercising your brain: a review of human brain plasticity and training-induced learning. *Psychology and aging, 23*(4), 692–701.

Haase, L., Thom, N. J., Shukla, A., Davenport, P. W., Simmons, A. N., Stanley, E. A., . . . Johnson, D. C. (2016). Mindfulness-based training attenuates insula response to an aversive interoceptive challenge. *Social Cognitive and Affective Neuroscience, 11*(1), 182–190.

Halford, G. S., Cowan, N., & Andrews, G. (2007). Separating cognitive capacity from knowledge: A new hypothesis. *Trends in Cognitive Sciences, 11*(6), 236–242.

Hariri, A. R., Mattay, V. S., Tessitore, A., Fera, F., & Weinberger, D. R. (2003). Neocortical modulation of the amygdala response to fearful stimuli. *Biological Psychiatry, 53*(6), 494–501.

Heatherton, T. F., & Wagner, D. D. (2011). Cognitive neuroscience of self-regulation failure. *Trends in Cognitive Sciences, 15*(3), 132–139.

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in Cognitive Sciences, 16*(3), 174–180.

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine, 351*(1), 13–22.

Institute of Medicine. (2014). *Preventing psychological disorders in service members and their families: An assessment of programs*. Washington, DC: The National Academies Press.

Iversen, A. C., Fear, N. T., Simonoff, E., Hull, L., Horn, O., Greenberg, N., . . . Wessely, S. (2007). Influence of childhood adversity on health among male UK military personnel. *The British Journal of Psychiatry, 191*, 506–511.

Jensen, C. G., Vangkilde, S., Frokjaer, V., & Hasselbalch, S. G. (2012). Mindfulness training affects attention—Or is it attentional effort? *Journal of Experimental Psychology: General, 141*(1), 106–123.

Jha, A. P., Morrison, A. B., Dainer-Best, J., Parker, S., Rostrup, N., & Stanley, E. A. (2015). Minds "at attention": Mindfulness training curbs attentional lapses in military cohorts. *PLoS ONE, 10*(2), e0116889.

Jha, A. P., Morrison, A. B., Parker, S. C., & Stanley, E. A. (2016). Practice is protective: Mindfulness training promotes cognitive resilience in high-stress cohorts. *Mindfulness, 8*(1), 46–58.

Jha, A. P., Stanley, E. A., Kiyonaga, A., Wong, L., & Gelfand, L. (2010). Examining the protective effects of mindfulness training on working memory capacity and affective experience. *Emotion, 10*(1), 54–64.

Jha, A. P., Witkin, J., Morrison, A., Rostrup, N., & Stanley, E. (2017). Short-form mindfulness training protects against working memory degradation over high-demand intervals. *Journal of Cognitive Enhancement, 1*(2), 154–171.

Johnson, D. C., Thom, N. J., Stanley, E. A., Haase, L., Simmons, A. N., Pei-an, B. S., . . . Paulus, M. P. (2014). Modifying resilience mechanisms in at-risk individuals: A controlled study of mindfulness training in Marines preparing for deployment. *American Journal of Psychiatry, 171*(8), 844–853.

Junger, S. (2015). How PTSD became a problem far beyond the battlefield. *Vanity Fair*. Retrieved from http://www.vanityfair.com/news/2015/05/ptsd-war-home-sebastian-junger

Kabat-Zinn, J. (2013). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness* (Revised ed.). New York, NY: Bantam.

Kane, M. J., & Engle, R. W. (2002). The role of prefrontal cortex in working-memory capacity, executive attention, and general fluid intelligence: An individual-differences perspective. *Psychonomic Bulletin & Review, 9*(4), 637–671.

Kavanagh, J. (2005). *Stress and performance: A review of the literature and its applicability to the military*. Santa Monica, CA: RAND Corporation.

Kelly, U. A., Skelton, K., Patel, M., & Bradley, B. (2011). More than military sexual trauma: Interpersonal violence, PTSD, and mental health in women veterans. *Research in Nursing & Health, 34*(6), 457–467.

Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., . . . Williams, D. R. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *The British Journal of Psychiatry, 197*, 378–385.

Killgore, W. D., Cotting, D. I., Thomas, J. L., Cox, A. L., McGurk, D., Vo, A. H., . . . Hoge, C. W. (2008). Post-combat invincibility: Violent combat experiences are associated with increased risk-taking propensity following deployment. *Journal of Psychiatric Research, 42*(13), 1112–1121.

King, L. A., King, D. W., Vogt, D. S., Knight, J., & Samper, R. E. (2006). Deployment Risk and Resilience Inventory: A collection of measures for studying deployment-related experiences of military personnel and veterans. *Military Psychology, 18*(2), 89–120.

Larsen, K. L., & Stanley, E. A. (in press). Mindfulness-based Mind Fitness Training (MMFT): Mindfulness training for high-stress and trauma-sensitive contexts. In I. Ivtzan (Ed.), *The handbook of mindfulness-based programs: Every established intervention, from medicine to education*. Abingdon, UK: Routledge.

Levine, P. A. (1997). *Waking the tiger: Healing trauma: The innate capacity to transform overwhelming experiences*. Berkeley, CA: North Atlantic Books.

Lieberman, H. R., Bathalon, G. P., Falco, C. M., Kramer, F. M., Morgan, C. A., & Niro, P. (2005). Severe decrements in cognition function and mood induced by sleep loss, heat, dehydration, and undernutrition during simulated combat. *Biological Psychiatry, 57*(4), 422–429.

Lieberman, H. R., Tharion, W. J., Shukitt-Hale, B., Speckman, K. L., & Tulley, R. (2002). Effects of caffeine, sleep loss, and stress on cognitive performance and mood during US Navy SEAL training. *Psychopharmacology, 164*(3), 250–261.

Lincoln, A., Swift, E., & Shorteno-Fraser, M. (2008). Psychological adjustment and treatment of children and families with parents deployed in military combat. *Journal of Clinical Psychology, 64*(8), 984–992.

Lindahl, J. R., Fisher, N. E., Cooper, D. J., Rosen, R. K., & Britton, W. B. (2017). The varieties of contemplative experience: A mixed-methods study of meditation-related challenges in Western Buddhists. *PLOS One, 12*(5), e0176239. doi:10.1371/journal.pone.0176239

Maguen, S., Metzler, T. J., Litz, B. T., Seal, K. H., Knight, S. J., & Marmar, C. R. (2009). The impact of killing in war on mental health symptoms and related functioning. *Journal of Traumatic Stress, 22*(5), 435–443.

Maguen, S., Turcotte, D. M., Peterson, A. L., Dremsa, T. L., Garb, H. N., McNally, R. J., & Litz, B. T. (2008). Description of risk and resilience factors among military medical personnel before deployment to Iraq. *Military Medicine, 173*(1), 1–9.

Mann, J. J., & Currier, D. M. (2010). Stress, genetics and epigenetic effects on the neurobiology of suicidal behavior and depression. *European Psychiatry, 25*(5), 268–271.

Marx, B. P., Doron-Lamarca, S., Proctor, S. P., & Vasterling, J. J. (2009). The influence of pre-deployment neurocognitive functioning on post-deployment

PTSD symptom outcomes among Iraq-deployed Army soldiers. *Journal of the International Neuropsychological Society, 15*(06), 840–852.

McEwen, B., & Lasley, E. (2002). *The end of stress as we know it.* Washington, DC: Joseph Henry Press.

McNulty, P. A. F. (2005). Reported stressors and health care needs of active duty Navy personnel during three phases of deployment in support of the war in Iraq. *Military Medicine, 170*(6), 530–535.

McVay, J. C., & Kane, M. J. (2009). Conducting the train of thought: Working memory capacity, goal neglect, and mind wandering in an executive-control task. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 35*(1), 196–204.

Morgan, C. A., Doran, A., Steffian, G., Hazlett, G., & Southwick, S. M. (2006). Stress-induced deficits in working memory and visuo-constructive abilities in special operations soldiers. *Biological Psychiatry, 60*(7), 722–729.

Morgan, C. A., Hazlett, G., Doran, A., Garrett, S., Hoyt, G., Thomas, P., . . . Southwick, S. M. (2004). Accuracy of eyewitness memory for persons encountered during exposure to highly intense stress. *International Journal of Law and Psychiatry, 27*(3), 265–279.

Morgan, C. A., Rasmusson, A. M., Wang, S., Hoyt, G., Hauger, R. L., & Hazlett, G. (2002). Neuropeptide-Y, cortisol, and subjective distress in humans exposed to acute stress: Replication and extension of previous report. *Biological Psychiatry, 52*(2), 136–142.

Morgan, C. A., Wang, S., Rasmusson, A., Hazlett, G., Anderson, G., & Charney, D. S. (2001). Relationship among plasma cortisol, catecholamines, neuropeptide Y, and human performance during exposure to uncontrollable stress. *Psychosomatic Medicine, 63*(3), 412–422.

Mrazek, M. D., Franklin, M. S., Phillips, D. T., Baird, B., & Schooler, J. W. (2013). Mindfulness training improves working memory capacity and GRE performance while reducing mind wandering. *Psychological Science, 24*, 776–781.

Neigh, G. N., Gillespie, C. F., & Nemeroff, C. B. (2009). The neurobiological toll of child abuse and neglect. *Trauma, Violence & Abuse, 10*(4), 389–410.

Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. *Trends in Cognitive Sciences, 9*(5), 242–249.

Ogden, P., & Fisher, J. (2015). *Sensorimotor psychotherapy: Interventions for trauma and attachment.* New York, NY: W. W. Norton & Company.

Ogden, P., Minton, K., & Pain, C. (2006). *Trauma and the body: A sensorimotor approach to psychotherapy.* New York, NY: W. W. Norton & Company.

Paulus, M. P., Flagan, T., Simmons, A. N., Gillis, K., Potterat, E. G., Kotturi, S., . . . Davenport, P. W. (2012). Subjecting elite athletes to inspiratory breathing load reveals behavioral and neural signatures of optimal performers in extreme environments. *PLoS ONE, 7*(2), e29394.

Paulus, M. P., Simmons, A. N., Fitzpatrick, S. N., Potterat, E. G., Van Orden, K. F., Bauman, J., & Swain, J. L. (2010). Differential brain activation to angry faces by elite warfighters: Neural processing evidence for enhanced threat detection. *PLoS ONE, 5*(4), e10096.

Paulus, M. P., & Stein, M. B. (2010). Interoception in anxiety and depression. *Brain Structure and Function, 214*(5–6), 451–463.

Paulus, M. P., & Stewart, J. L. (2014). Interoception and drug addiction. *Neuropharmacology, 76*, 342–350.

Payne, P., Levine, P. A., & Crane-Godreau, M. A. (2015). Somatic experiencing: Using interoception and proprioception as core elements of trauma therapy. *Frontiers in Psychology, 6*, 1–18.

Pe, M. L., Raes, F., & Kuppens, P. (2013). The cognitive building blocks of emotion regulation: Ability to update working memory moderates the efficacy of rumination and reappraisal on emotion. *PLoS ONE, 8*(7), e69071.

Pincus, S., House, R., Christenson, J., & Adler, L. (2005). The Emotional Cycle of Deployment: A Military Family Perspective. Retrieved from https://msrc.fsu.edu/system/files/The%20Emotional%20Cycle%20of%20Deployment%20-%20A%20Military%20Family%20Perspective.pdf

Polusny, M. A., Erbes, C. R., Thuras, P., Moran, A., Lamberty, G. J., Collins, R. C., . . . Lim, K. O. (2015). Mindfulness-based stress reduction for posttraumatic stress disorder among veterans: A randomized clinical trial. *JAMA, 314*(5), 456–465.

Porges, S. W. (2011). *The Polyvagal Theory: Neurophysiological foundations of emotions, attachment, communication, and self-regulation.* New York, NY: W. W. Norton.

Redick, T. S., & Engle, R. W. (2006). Working memory capacity and attention network test performance. *Applied Cognitive Psychology, 20*(5), 713–721.

Robertson, I. H., Manly, T., Andrade, J., Baddeley, B. T., & Yiend, J. (1997). Oops!: Performance correlates of everyday attentional failures in traumatic brain injured and normal subjects. *Neuropsychologia, 35*(6), 747–758.

Santorelli, S. (2014). *Mindfulness-Based Stress Reduction (MBSR): Standards of practice.* Worcester, MA: The Center for Mindfulness in Medicine and Society, University of Massachusetts Medical School.

Sapolsky, R. M. (1994). *Why zebras don't get ulcers.* New York, NY: W. H. Freeman.

Saunders, T., Driskell, J. E., Johnston, J. H., & Salas, E. (1996). The effect of stress inoculation training on anxiety and performance. *Journal of Occupational Health Psychology, 1*(2), 170–186.

Scaer, R. C. (2005). *The trauma spectrum: Hidden wounds and human resiliency.* New York, NY: Norton.

Schmeichel, B. J., Volokhov, R. N., & Demaree, H. A. (2008). Working memory capacity and the self-regulation of emotional expression and experience. *Journal of Personality and Social Psychology, 95*(6), 1526–1540.

Schultz, J. R., Bell, K. M., Naugle, A. E., & Polusny, M. A. (2006). Child sexual abuse and adulthood sexual assault among military veteran and civilian women. *Military Medicine, 171*(8), 723–728.

Seligman, M. E. P. (2002). Positive psychology, positive prevention, and positive therapy. In C. Snyder & S. Lopez (Eds.), *Handbook of positive psychology* (pp. 3–9). New York, NY: Oxford University Press.

Shonin, E., Van Gordon, W., & Griffiths, M. D. (2014). Are there risks associated with using mindfulness in the treatment of psychopathology? *Clinical Practice, 11*(4), 398–392.

Simmons, A. N., Fitzpatrick, S., Strigo, I. A., Potterat, E. G., Johnson, D. C., Matthews, S. C., . . . Paulus, M. P. (2012). Altered insula activation in anticipation of changing emotional states: Neural mechanisms underlying cognitive flexibility in Special Operations Forces personnel. *Neuroreport, 23*(4), 234–239.

Slagter, H., Davidson, R., & Lutz, A. (2011). Mental training as a tool in the neuroscientific study of brain and cognitive plasticity. *Frontiers in Human Neuroscience, 5*, 1–12.

Smith, S. L. (2013). Could Comprehensive Soldier Fitness have iatrogenic consequences? A commentary. *The Journal of Behavioral Health Services & Research, 40*(2), 242–246.

Stanley, E. A. (2010). Neuroplasticity, mind fitness, and military effectiveness. In M. Armstrong, C. Loeb, & J. Valdes (Eds.), *Bio-inspired innovation and national security* (pp. 257–279). Washington, DC: National Defense University Press.

Stanley, E. A. (2014a). Cultivating the mind of a warrior. *Inquiring Mind, 30*(2): 16–31.

Stanley, E. A. (2014b). Mindfulness-based Mind Fitness Training (MMFT): An approach for enhancing performance and building resilience in high stress contexts. In A. Le, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley-Blackwell handbook of mindfulness* (pp. 964–985). London, UK: Wiley-Blackwell.

Stanley, E. A. (in press-a). *Widen the window: Training the brain and body to thrive during stress, uncertainty, and change*. New York, NY: Avery Books.

Stanley, E. A. (in press-b). War duration and the micro-dynamics of decision making during stress. *Polity*.

Stanley, E. A., Schaldach, J., Kiyonaga, A., & Jha, A. P. (2011). Mindfulness-based mind fitness training: A case study of a high-stress predeployment military cohort. *Cognitive and Behavioral Practice, 18*(4), 566–576.

Steenkamp, M. M., Nash, W. P., & Litz, B. T. (2013). Post-traumatic stress disorder: Review of the Comprehensive Soldier Fitness program. *American Journal of Preventive Medicine, 44*(5), 507–512.

Sterlace, S. R., Plumb, T. N., El-Kara, L., Van Orden, K. A., Thom, N. J., Stanley, E. A., . . . Johnson, D. C. (2012). Hormone regulation under stress: Recent evidence from warfighters on the effectiveness of Mindfulness-Based Mind Fitness Training in building stress resilience. Society for Neuroscience Poster Presentation.

Strauss, C., Cavanagh, K., Oliver, A., & Pettman, D. (2014). Mindfulness-based interventions for people diagnosed with a current episode of an anxiety or depressive disorder: A meta-analysis of randomised controlled trials. *PLOS One, 9*(4), e96110.

Thom, N.J., Johnson, D.C., Flagan, T., Simmons, A.N., Kotturi, S.A., Van Orden, K.F., . . . Paulus, M.P. (2014). Detecting emotion in others: Increased insula and decreased medial prefrontal cortex activation during emotion processing in elite adventure racers. *Social Cognitive and Affective Neuroscience, 9*(2), 225–231.

Unsworth, N., Heitz, R.P., Schrock, J.C., & Engle, R.W. (2005). An automated version of the operation span task. *Behavior Research Methods, 37*(3), 498–505.

van der Kolk, B. (2015). *The body keeps the score: Brain, mind, and body in the healing of trauma.* New York, NY: Penguin Books.

Vasterling, J.J., Proctor, S.P., Amoroso, P., Kane, R., Heeren, T., & White, R.F. (2006). Neuropsychological outcomes of army personnel following deployment to the Iraq war. *Journal of the American Medical Association, 296*(5), 519–529.

Vaughan, C., Farmer, C., Breslau, J., & Burnette, C. (2015). *Evaluation of the Operational Stress Control and Readiness (OSCAR) program.* Santa Monica, CA: RAND Corporation.

Williams, J.M.G., Crane, C., Barnhofer, T., Brennan, K., Duggan, D.S., Fennell, M.J., . . . Von Rohr, I.R. (2014). Mindfulness-based cognitive therapy for preventing relapse in recurrent depression: A randomized dismantling trial. *Journal of Consulting and Clinical Psychology, 82*(2), 275–286.

Woodruff, T., Kelty, R., & Segal, D.R. (2006). Propensity to serve and motivation to enlist among American combat soldiers. *Armed Forces & Society, 32*(3), 353–366.

Zeidan, F., Johnson, S.K., Diamond, B.J., David, Z., & Goolkasian, P. (2010). Mindfulness meditation improves cognition: Evidence of brief mental training. *Consciousness and Cognition, 19*(2), 597–605.