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Mindfulness-Based Mind Fitness Training

An Approach for Enhancing Performance and Building Resilience in High-Stress Contexts

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The soul that is bravest and wisest will be least confused or disturbed by external influences.

—Plato, *The Republic*, Book II

The profession of arms is unlike any other profession in the world. Its uniqueness lies in this: It is the only profession that requires leaders to nurture, mentor, train, and prepare their subordinates—in fact, love them—but then to be willing to send these same subordinates into harm's way, to kill and perhaps be killed. And it is the only profession that requires subordinates to respect and trust their leaders enough to willingly follow orders that may lead to their own wounding, dismemberment, or even death. This difficult truth lies at the heart of the profession's institutional capacity for terrible destruction. With this capacity comes great responsibility. The profession of arms provides a container for this incredible capacity—ensuring that it is wielded ethically and in the service of defending the state. Within the profession—understood broadly to include the military, law enforcement, and other first-response organizations—is embedded an ethos that strongly informs each individual's actions, even in the direst of circumstances. Regardless of the vast technological advances that warfare will undergo, its conduct will always be in the hands (and hearts) of human beings. In other words, the warrior's path provides the internal social control to ensure that this incredible capacity for destruction and violence gets harnessed effectively.

Millennia of warrior traditions around the globe have helped individuals to follow this path by focusing their training on two foundational warrior qualities—wisdom and bravery. From the Tibetan warriors and Japanese samurai in the East, to the Spartans and Native American tribes in the West, warrior traditions throughout the ages have offered different practices to train the body and mind to embody these qualities. Historically, warrior traditions have used a variety of practices to cultivate these qualities—from ritual hair-combing to vision quests, martial arts to meditation.

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What these many practices share is a repetitive way to train the body and mind towards mastery and self-discipline. In one of the oldest descriptions of the profession of arms, the Greek philosopher, Plato, argued that the goal of professional training was to make these guardians of the state "god-like"—capable of embodying the Divine in their decisions and actions. Plato was very clear that the path to such god-like behavior was through the cultivation of wisdom and bravery, because "the soul that is bravest and wisest will be least confused or disturbed by external influences" (Hamilton & Cairns, 1987, p. 627).

How does any of this relate to mindfulness? This chapter describes my work following in the lineage of these traditions, offering mindfulness training to troops and others operating in high-stress contexts in order to cultivate the warrior qualities of wisdom and bravery. Mindfulness is the simple practice of paying attention to present-moment experience without the mental filters of judgment, elaboration, or emotional reactivity. In other words, mindfulness is noticing what's happening while it's happening, without all of the filters we usually bring (unconsciously) to our experience. Interestingly, as this chapter will explain, in the course of mindfulness practice, we also cultivate wisdom and bravery. Wisdom is the ability to see clearly how things are right now—not how we want them to be, or expect them to be, but how they actually are—and then to use that information to make the most effective choice in the moment. Bravery (or courage) is the ability to stay present with any experience, even an extremely difficult one, without needing for it to be different. Together, these two qualities are a pathway towards effective action in any sphere, but especially in high-stress environments.

The rest of this chapter is divided into five sections and a conclusion. The first section describes some of the stressors associated with military service and contends that mindfulness training could help to ameliorate the detrimental effects of these stressors. The second section describes the training that I have created, called Mindfulness-based Mind Fitness Training (MMFT)®. The third section discusses the two foundational capacities that MMFT® (pronounced "M-fit") cultivates—attentional control and tolerance for challenging experience—which are not only important for enhancing performance and building resilience, but also micromanifestations of wisdom and bravery. The fourth section summarizes the empirical research to date about MMFT, while the fifth section compares this work with Ellen Langer's approach to mindfulness.

The Detrimental Effects of Stress in the Military

Military service is inherently stressful. Service-members are expected to deal with significant and potentially traumatizing stressors before, during, and after deployment, such as threats to individual safety, the necessity of inflicting harm on others, and exposure to injury, death, and significant human suffering (Adler, McGurk, Stetz, & Bliese, 2003). Troops may experience considerable anxiety and distress in anticipation of deployment (Bolton, Litz, Britt, Adler, & Roemer, 2001; MacDonald, Chamberlain, Long, Pereira-Laird, & Mirfin, 1998), which may place them at higher

risk for mental-health problems after deployment (Maguen et al., 2008). Once deployed, combat exposure has been linked to a range of negative health consequences, including posttraumatic stress disorder (PTSD; Kaylor, King, & King, 1987), depression (Erickson, Wolfe, King, King, & Sharkansky, 2001), substance abuse (Boscarino, 1981), and physical-health problems (Taft, Stern, King, & King, 1999). Combat aside, deployment itself presents a host of additional stressors, including difficult living conditions, boredom, and family separation. Indeed, recent research demonstrates a strong association between mental-health disorders and lower-magnitude deployment stressors (King, King, Vogt, Knight, & Samper, 2006), where chronic stressors can have cumulative negative health consequences similar to experiencing an acute traumatic event.

The wars in Afghanistan and Iraq have exposed troops to unprecedented challenges. Multiple deployments have been costly for service-members, leading to lower morale, more mental-health problems, and more stress-related work problems (Mental Health Advisory Team [MHAT-V], 2008). Moreover, counterinsurgency blurs distinctions between enemy combatants and civilians, leading to excruciating decisions about the use of lethal force (Stanley, 2010). Conservative rules of engagement (ROE) often place troops in dangerous circumstances with limited options; for example, more than 60% of soldiers in Iraq reported experiencing a threatening situation in which the ROE prevented them from responding (Castro, Hoge, & Cox, 2006). Finally, technologically enhanced battlefield medical practices and better body armor have resulted in more combatants surviving highly traumatic events, with veterans returning with unprecedented rates of traumatic brain injury (TBI) and PTSD (Tanielian & Jaycox, 2008).

These challenges of prolonged exposure to stressful environments have resulted in a broad range of psychological and physical-health challenges in military service-members (MHAT-V, 2008). Troops returning from deployment report a broad range of concerns, with cognitive and affective functioning often impaired (Marx, Doron-Lamarca, Proctor, & Vasterling, 2009; Vasterling et al., 2006). Psychological concerns include PTSD, TBI, depression, and anxiety disorders (Hoge, Auchterlonie, & Milliken, 2006; Milliken, Auchterlonie, & Hoge, 2007; Tanielian & Jaycox, 2008). Physiological concerns include disturbed sleep habits, low energy, headaches, chronic pain, cardiopulmonary symptoms, irritable bowel syndrome, and gastroesophageal reflux disease (Levin, 2007; Scaer, 2008). Complicating matters, PTSD is frequently comorbid with other psychological problems (Tanielian & Jaycox, 2008) and is also linked to reported physical problems (Hoge, Terhakopian, Castro, Messer, & Engel, 2007). Indeed, 56% of veterans with mental-health disorders are diagnosed with at least two disorders (Seal, Bertenthal, Miner, Sen, & Marmar, 2007). Relatedly, destructive behavior is on the rise. For example, between 2002 and 2005, alcohol consumption increased in all branches of the armed forces, as did illicit drug use by Soldiers and Marines (U.S. Department of Defense, 2006). Furthermore, combat experience has been significantly linked to decreased marital satisfaction, increased intention to divorce, and increased self-reported spousal abuse (Hoge, Castro, & Eaton, 2006). These myriad dysfunctions are frequently labeled as independent issues and treated separately, but an emerging alternative perspective considers these disparate disorders

to be part of a spectrum of responses to prolonged or extreme stress rather than as illnesses with unrelated causes (Bremner, 2005; Herman, 1992; Scaer, 2005; van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005).

While the stressors of military deployment are widely recognized, comparatively less is known about effective methods for buffering against stress-related dysfunction and disease. What is clear is that the anxiety and distress that troops experience in anticipation of deployment may place them at higher risk for mental-health problems after deployment (Maguen et al., 2008). In light of this finding, providing training to help military personnel manage stress before deployment may ameliorate the long-term health effects of the deployment itself.

In fact, there is significant research that demonstrates how the stress response is malleable and can be modulated with training (Bohnen, Houx, Nicolson, & Jolles, 1990; Lieberman, Tharion, Shukitt-Hale, Speckman, & Tulley, 2002; Morgan, Wang, et al., 2001; Morgan et al., 2002). These studies in military populations demonstrate that, with training, troops can modulate their stress response as indicated by measures of cortisol and neuropeptide-Y. Indeed, these studies provide the rationale for military "stress inoculation" training. The human stress response is greater when stressors are perceived to be novel, unpredictable, and uncontrollable. By exposing troops to stressors they are likely to experience during real-world missions, stress-inoculation training helps them perceive such stressors as more familiar, predictable, and controllable, and to increase their confidence in their ability to take constructive action against those stressors (Dienstbier, 1989).

However, while the aforementioned studies demonstrate links between military stress-inoculation training and decreases in the physiological stress response, related research highlights the cognitive costs of such training. These studies found substantial degradation in cognitive performance as a result of field-training exercises (Lieberman et al., 2002, 2005) or military survival training (Morgan et al., 2004; Morgan, Doran, Steffian, Hazlett, & Southwick, 2006). Exposure to acute stress from sleep deprivation and other environmental stressors resulted in symptoms of dissociation, problem-solving deficits, and significant inaccuracies in working memory and visual-pattern recognition. Thus, while stress-inoculation training may help habituate troops to stressors, there is clearly a need for complementary training to counteract its cognitive degradation consequences.

My understanding of these issues has never been purely academic. While serving in the Balkans as a U.S. Army intelligence officer in the mid-1990s, I experienced first hand the stressors of deployment in a complex operational environment. After leaving active duty, I struggled privately with a variety of symptoms related to the stress of my time in service. One silver lining of this experience was that I received extensive training in mindfulness, and I quickly saw its direct relevance to the particular challenges to which service-members are exposed. As an academic who studies what makes militaries effective, I believed that providing complementary mindfulness and resilience training *before* deployment not only could help with the cognitive degradation associated with military stress-inoculation training, but also might help troops function more effectively while deployed and perhaps shield against health disorders of the stress spectrum.

MMFT

There is now considerable evidence of the efficacy of mindfulness-based training (MT) at reducing distress (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004). The most common and well-validated MT program is mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990). MT has been incorporated as a component in clinical interventions for a range of disorders. MT has also been adapted for use with a variety of healthy populations, such as corporate leaders, nurses, teachers, and elementary-school students. Following this precedent and drawing on my military experience, research expertise, and mindfulness and trauma training, I created MMFT for use with high-stress organizations, such as military units preparing for deployment. I am grateful to John M. Schaldach for providing curriculum-development support.

MMFT contains some features of the well-known MBSR course but differs in its approach to mindfulness training and the scope of the didactic content. Importantly, MMFT provides a novel approach to mindfulness training designed for individuals operating in extreme stress environments, with prior exposure to prolonged or significant stress or trauma. MMFT contains elements intended specifically for members of the (broadly construed) high-stress profession of arms—including ways to integrate practices into their work environment, and didactic components that focus on the relationship between mindfulness, stress-inoculation training, and complex decision-making. MMFT was also designed to provide skills and information for understanding and regulating the effects of stress on the mind and body. The course focuses on enhancing stress resilience, with didactic content and basic skills for supporting self-regulation of the stress response and its effects. These skills and information incorporate and extend concepts from Sensorimotor Psychotherapy (Ogden, Minton, & Pain, 2006), Somatic Experiencing® (Levine, 1997), and the Trauma Resilience Model® (Leitch, 2007; Leitch, Vanslyke, & Allen, 2009), and inform the model of resilience taught in MMFT. In short, MMFT was designed to provide a synthesis of three components: (1) mindfulness training; (2) skills and information about stress resilience and responses to stress; and (3) concrete applications for the operational environment.

MMFT provides skills training in two key areas: mindfulness skills and stress resilience skills. It cultivates mindfulness skills with specific exercises to train attention, concentration, and interoceptive awareness (awareness of sensations in the body). It cultivates stress resilience self-regulation skills with specific exercises to monitor and regulate the physiological and psychological effects of extreme or prolonged stress in the body and mind. These body-based self-regulation skills make MMFT distinct from other mindfulness-based approaches. MMFT applies both the mindfulness and self-regulation skills to the operational environment by emphasizing mission effectiveness and enhanced decision-making in the high-stress context. MMFT is taught in the organizational setting, to existing teams and groups; in the military context, it is usually taught to platoons comprising about 40 troops.

Taught over 8 weeks, the 20-hr MMFT course includes eight 2-hr sessions of classroom instruction, a short individual practice interview in the third week, and a 4-hr workshop with a longer session of silent practice to refine mindfulness skills in the sixth week. The first four 2-hr sessions occur in the first 2 weeks to front-load the didactic

context for the mindfulness and self-regulation resilience skills taught in the course (and thereby increase motivation among participants to practice these skills outside of class). The other four 2-hr sessions are taught in the fourth, fifth, seventh, and eighth weeks.

Participants are also asked to complete daily at least 30 min of mindfulness and self-regulation resilience exercises outside of the class sessions. This daily practice can be divided into several practice periods throughout the day. Participants initially use audio CDs to guide the exercises, but over time they are able to do them without audio support. Some exercises are conducted while sitting quietly or lying down, some are conducted while stretching, and some are designed to be integrated into duty-day tasks.

There are three important reasons why MMFT may be better suited than the traditional MBSR program for MT in the high-stress work environment, such as with the military, law enforcement, or other first-responder populations. First, unlike MBSR participants who typically seek out the program on an individual basis to address a specific concern, such as chronic pain or stress reduction, participants in MMFT are high-functioning troops or other first responders who typically do not actively seek out the training. This requires course content to motivate the desire to engage mind-fitness exercises. Because the training is provided to organic work groups, the participants have a prior history with one another and will be working together after the course. For this reason, power hierarchy and organizational group dynamics are at play in the classroom. As a result, course content is primarily presented in a "top-down" format with material presented as interactive lectures—rather than in a "bottom-up" format with insights emerging from a less-structured group conversation. In addition, most group discussions focus on the application of MMFT skills to the group's mission effectiveness rather than to the participants' personal lives.

Second, MBSR participants are generally coping with an atmosphere of relatively constant stressors—although they may be quite acute—and thus the stated goal of MBSR is stress reduction in a relatively stable stress environment. In contrast, MMFT participants, especially predeployment troops, are usually confronted with an atmosphere of steadily increasing stressors. Troops need to maintain optimal functioning during stress-inoculation training, while also preparing for the future challenges of "real-world" missions like deployment. Because it exposes them to stressors they are likely to experience during such missions, the stress-inoculation training itself can be quite stressful. This necessarily requires extending the course goal from merely reducing stress to maintaining peak functioning during stress and promoting stress resilience. This context is the rationale for including information and skills for regulating the effects of prolonged or extreme stress, as well as didactic content to highlight parallels between physical and mental fitness for mission readiness.

Third, while MBSR develops mindfulness with the body scan, awareness of breathing, and mindful yoga, MMFT acknowledges that these methods for developing mindfulness may initially be too intense for individuals with prior deployment or trauma histories. Interoceptive awareness *is* considered central to MMFT; however, this awareness is developed gradually. MMFT participants often have deployment or work histories or earlier life experiences that exposed them to significant or prolonged stress or trauma. In this context, the acute self-awareness of body sensations

developed through mindfulness can lead to excessive activation of the autonomic nervous system, including flashbacks, nightmares, intrusive thoughts, heightened restlessness, panic attacks, irritation, and hyperarousal. The possibility of these sensitivities is taken into account with a progression of exercises, including some unique to MMFT, that differs significantly from MBSR. Finally, MMFT instructors can adapt the sequence of exercises on an individual basis, to avoid the excessive activation that can result from too much body-centered self-awareness, too quickly. Indeed, one goal of the mandatory individual interview is to allow each participant to discuss symptoms of trauma or distress they are experiencing, which permits the instructor to tailor that participant's exercises to accommodate any exposure sensitivities.

How MMFT May Enhance Performance and Promote Resilience

MMFT trains two foundational, general-purpose capacities that undergird a range of competencies central to enhanced performance and resilience. These two capacities are attentional control and tolerance for challenging experience. Attentional control is the ability to intentionally deploy and sustain the attention on a target object, such as sounds, body sensations, or contact between the body and surrounding objects (e.g., the chair or the floor). Attentional control leads to improved focus and concentration, better ability to inhibit distractions and irrelevant information, and better ability to access, retain, and update relevant information.

The second foundational capacity is tolerance for challenging experience, which is the ability to pay attention to, track, and stay with a challenging experience without needing for it to be different. Such challenging experiences can be external (such as harsh environmental conditions or difficult people) or internal (such as physical pain, stress activation, intense emotions, intrusive thoughts, nightmares, or flashbacks). Without training the physical and mental discipline to tolerate and stay present with challenging experience, most of us default to checking out, dissociating, distracting ourselves, or trying to make the discomfort go away. Importantly, tolerance for challenging experience is different from "sucking it up," which is actually a form of subtly resisting the experience and not being fully present to the information available in the present-moment situation.

MMFT trains these two capacities with mindfulness, which is the ability to pay attention and notice what is happening while it is happening, without the mental filters of judgment, elaboration, or emotional reactivity. Mindfulness differs from a more conceptual mode of processing information, which is often the mind's default way of perceiving and cognizing. In other words, paying attention is not the same thing as thinking, although we often equate the two. While mindfulness is a natural capacity of the human mind, most of us spend most of our lives in a different default mode—living on autopilot. When we are on autopilot, we are not fully present to what is happening, which impedes situational awareness and often leads to habitual or impulsive behavior that may be at odds with our goals. However, with training and repetition, it is possible to rewire the brain to make mindful, present-moment awareness our new default mode.

This rewiring process is the result of the well-documented theory of neuroplasticity, which states that experience changes the brain (Schwartz & Begley, 2003). In this way, mind fitness has a lot in common with physical fitness. Physical fitness relies on repeated exercises to generate specific muscular and cardiovascular changes in the body. Likewise, mind fitness relies on specific exercises to create changes in the brain (Stanley, 2010; Stanley & Jha, 2009). With the engagement and repetition of certain mental processes, the brain becomes more efficient at those processes. Over time, as we choose to build a new mental skill, the repeated engagement of brain regions supporting that skill creates a more efficient pattern of neural activity. In other words, experience and training can lead to functional and structural reorganization of the brain.

In terms of performance enhancement, attentional control and tolerance for challenging experience may lead to more effective decision-making, even in complex, chaotic, ambiguous, and fast-changing environments. These two capacities strengthen our situational awareness, which is the ability to track and take in information accurately and objectively from the external and internal environments. They also strengthen self-control, so that we can interrupt impulsive, habitual, and autopilot behavior when such behavior is not aligned with current goals. Improved situational awareness and self-control assist with consciously choosing the most effective course of action instead of being driven by habitual reactions, emotions, biases, expectations, or other perceptual filters. Situational awareness and self-control allow for the clearest assessment of available information and support effective decision-making, which is the cornerstone of enhanced performance.

Attentional control and tolerance for challenging experience may also improve cognitive performance in stressful environments. Attentional control is related to the neuroscience concept of working memory capacity (WMC). While our research on MMFT's effects on WMC is explained below, it is important to note here that research has linked high WMC to improved cognitive performance and 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 fluid intelligence (i.e., the ability to recall, apply, and use facts; Gray, Chabris, & Braver, 2003; Halford, Cowan, & Andrews, 2007; Kane & Engle, 2002), and better self-regulation of negative emotions (Schmeichel, Volokhov, & Demaree, 2008). In contrast, individuals with low or depleted WMC are more likely to suffer from PTSD, depression, substance abuse, anxiety disorders, and increased affective dysregulation in real-world contexts (Brewin & Smart, 2005; Conway et al., 2005). This research is particularly salient when considered with the fact that stress-inoculation training can degrade cognitive performance, as numerous studies with military populations have shown (Lieberman et al., 2002, 2005; Morgan et al., 2004, 2006).

In terms of resilience, attentional control and tolerance for challenging experience may assist with the self-regulation of the autonomic nervous system (ANS), which is responsible for the fight-or-flight stress response, as well as respiration, circulation, sleep, appetite, sex drive, and rest/recovery. Resilience is the ability to function effectively during stressful experience and recover efficiently back to baseline afterwards. To create resilience, an individual needs to have a stressful experience that deliberately

pushes them outside of their comfort zone and then to recover effectively from that experience. In other words, they need to experience the physical and cognitive symptoms of stress activation and then teach the body and mind to recover from them. In the process, their body and mind learn to tolerate and function effectively amidst more stress activation than before (Scaer, 2005).

MMFT trains individuals to track activation of the fight-or-flight response in their bodies and minds and to tolerate the discomfort of this activation. When individuals bring awareness to the physical sensations and cognitive activity associated with stress activation, the ANS can naturally discharge the energy mobilized for the fight-or-flight response, complete its process of self-regulation, and recover completely back to baseline. However, because stress activation is uncomfortable in the body and mind, individuals on autopilot tend to distract from or suppress this self-regulation process, which can lead to ANS dysregulation. Then, to manage the symptoms of this dysregulation, they frequently resort to maladaptive coping techniques (such as caffeine, nicotine, alcohol, violent video games, or adrenaline-seeking behaviors) that create a vicious cycle by adding additional stress to the system and dysregulating it further. Stress spectrum disorders (including PTSD) result from a lack of complete recovery and subsequent dysregulation of the ANS (Levine, 1997; Scaer, 2005, van der Kolk et al., 2005).

In contrast, MMFT helps individuals learn how to support ANS self-regulation after the dysregulation of prior stressful events and to increase their ANS tolerance for greater stress activation in the future. A well-regulated nervous system can tolerate a larger stress response, which means that it can function more effectively during a stressful experience without dissociating or acting out in ways that impede mission accomplishment. A well-regulated nervous system can also recover back to baseline more efficiently, in preparation for the next stressor. A well-regulated nervous system can respond flexibly and adaptively switch between "survival brain" and "thinking brain" functions. Finally, a well-regulated nervous system is more able to remain present and oriented to what is happening right now, rather than triggered by and perceiving through the filters of past traumatic experiences that can impede effective decision-making (Ogden et al., 2006; Levine, 1997; Scaer, 2005; van der Kolk et al., 2005).

Thus, MMFT may promote resilience and complement stress-inoculation training by teaching skills to help complete the stress-activation cycle of the ANS (Levine, 1997; Ogden et al., 2006). While stress-inoculation training is designed to expose and habituate individuals to stressors (Dienstbier, 1989), evidence suggests improved stress resilience only comes from completing the stress-activation cycle, by returning the ANS to its baseline functioning after exposure to such stressors (Scaer, 2005). Indeed, stress-inoculation training may actually undermine individuals' resilience if their nervous systems do not effectively recover after exposure to the training's stressors. Scaer (2001) summarizes drowning experiments with rats and chicks that show how failure to dissipate a dissociative freeze response undermined resilience, while complete recovery from the freeze enhanced resilience. Interestingly, there is evidence that symptoms of dissociation are common in military personnel exposed to the acute stressors of stress-inoculation training (Morgan, Hazlett et al., 2001; Morgan et al., 2002), which suggests that resilience can be undermined after

stress-inoculation training when complete ANS recovery is lacking. Thus, MMFT could complement stress-inoculation training by helping troops to use focused attention and interoceptive awareness to monitor and regulate physiological and psychological symptoms of stress activation and to effect a complete recovery.

Relatedly, MMFT may promote resilience by helping individuals not to dissociate from overwhelming experiences. Peritraumatic dissociation—dissociation during a stressful experience—has been suggested as a possible predictor and risk factor for PTSD (Bremner, Southwick, Fontana, Rosenheck, & Charney, 1992; Brewin, Andrews, & Valentine, 2000; Hoge et al., 2007; Ozer, Best, Lipsey, & Weiss, 2008) and other stress spectrum disorders (Bremner, 2005; Scaer, 2001, 2005). For example, a recent meta-analysis found that peritraumatic dissociation had the largest effect size for predicting PTSD symptoms (Ozer et al., 2008). Information related to traumatic experiences is often differently encoded during peritraumatic dissociation, resulting in decreased access to that information once the person returns to their baseline state; this may lead to the avoidance of necessary cognitive and affective processing of the trauma afterwards (Lanius et al., 2010; Scaer, 2005). As already noted, there is evidence that symptoms of dissociation are common in military personnel exposed to the acute stressors of stress-inoculation training (Morgan, Hazlett, et al., 2001; Morgan et al., 2002); moreover, peritraumatic dissociation during training is significantly and negatively related to performance (Eid & Morgan, 2006; Morgan, Wang, et al., 2001; Morgan et al., 2002). In contrast, facets of mindfulness are negatively correlated with dissociation (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Thus, during a stressful or traumatic event, mindfulness may allow an individual to maintain a sharper focus on the emergency at hand and reduce the likelihood of peritraumatic dissociation (Smith et al., 2011).

Finally, when recalling a stressful or traumatic event, attentional control and tolerance for challenging experience may increase an individual's ability to tolerate the associated emotional arousal by facilitating the healthy engagement with and processing of distressing emotions (Follette, Palm, & Pearson, 2006). This may decrease the need for avoidant coping mechanisms, such as using alcohol, and may decouple automatic mental processes from behavioral choices that actually prolong activation of the stress response (Ostafin & Marlatt, 2008), both of which dysregulate the nervous system further. Furthermore, in light of the fact that nervous system self-regulation often occurs while the conscious mind is asleep and not inhibiting the self-regulation process (Scaer, 2005), as well as previous research about the correlation between MT and improvements in sleep patterns (Bootzin & Stevens, 2005; Carlson & Garland, 2005; Ong, Shapiro, & Manber, 2009), MMFT may promote improvements in sleep quality as well as increased opportunities for self-regulation to occur while sleeping. In this way, MMFT skills could support the body's and mind's natural self-regulation processes and thereby build stress resilience.

Research on MMFT

One of MMFT's unique strengths is that it has been tested through rigorous neuroscience research. A 2008 pilot study with U.S. Marine reservists preparing for

deployment to Iraq provided preliminary evidence of MMFT's beneficial effects. Conducted in collaboration with neuroscientist Dr. Amishi P. Jha (University of Miami), the pilot study was funded by the John Kluge Foundation and the U.S. Department of Defense Centers for Excellence for Psychological Health and Traumatic Brain Injury. The study included two detachments of Marines preparing for deployment to Iraq, one that received MMFT (31 Marines) and one that did not (17 Marines). The MMFT Marines received 24 hr of MMFT instruction over 8 weeks. There were two differences between this pilot MMFT course and the current 20-hr MMFT course. First, the pilot course included an 8-hr workshop, instead of a 4-hr workshop, in the sixth week. Second, the didactic material was spread out evenly across the 8 weeks, instead of being front-loaded in the first 2 weeks, as the course is now structured. The pilot study measured MMFT's effects through neurocognitive behavioral tasks, self-report measures, and participant logs of MT practice time, of which the instructor did not have knowledge. Data were collected twice before the Marines deployed—before training (T1) and after MMFT or 8 weeks later (T2)—as well as after the deployment (T3). Data were also collected from a civilian control group ($n = 12$), to examine whether the stressors of the predeployment interval were cognitively degrading.

In light of previous research showing that military stress-inoculation training can lead to degradation in cognitive performance (Lieberman et al., 2002, 2005; Morgan et al., 2004, 2006), we hypothesized that the predeployment interval might deplete WMC and lead to cognitive failures and emotional disturbances, because WMC is used both in managing cognitive demands and in regulating emotions. We also hypothesized that the predeployment interval could lead to increases in perceived stress. However, in light of previous civilian research linking MT to reduced distress (Carmody & Baer, 2008; Shapiro Oman, Thoresen, Plante, & Flinders, 2008), improved emotion regulation (Jain et al., 2007; Ortner, Kilner, & Zelazo, 2007), and improved cognitive control (Chan & Woollacott, 2007; Jha, Krompinger, & Baime, 2007), we also posited that MMFT and MT practice outside of class might mitigate some of the deleterious effects associated with the predeployment interval.

WMC was measured with the well-validated Operation Span task (OSPAN; Unsworth, Heitz, Schrock, & Engle, 2005). Although WMC remained stable over time among the civilians, it was degraded in the Marine control group (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010). In the MMFT group, WMC decreased over time in those with low MT practice (on average, 2 hr of practice outside of class over the 8 weeks), but WMC increased in those with high practice time (on average, 10 hr of practice over the 8 weeks). Higher MT practice time also corresponded to lower levels of negative emotion and higher levels of positive emotion (indexed by the Positive and Negative Affect Schedule, PANAS; Watson, Clark, & Tellegen, 1988). The relationship between MT practice time and negative emotion, but not positive emotion, was mediated by WMC; this finding suggests not only that regulating negative emotions is cognitively depleting but also that MT may improve cognitive control of emotion. Higher MT practice time also corresponded to higher levels of self-reported mindfulness (indexed by the Five Facet Mindfulness Questionnaire, 5FMQ; Baer et al., 2006), and increases in mindfulness were associated with decreases over time in perceived stress (indexed by the Perceived Stress Scale, PSS; Cohen, Kamarck, & Mermelstein, 1983; Stanley, Schaldach, Kiyonaga, & Jha, 2011).

In other words, these data support previous research in military populations that cognitive degradation is likely during stress-inoculation training without complementary MT practice. It is important to note that the WMC degradation experienced by the Marine control group and the low-MT practice Marines in the MMFT group occurred before deployment. In other words, these Marines *began* their deployment in this cognitively degraded condition; this degradation does not reflect the additional stressors of the deployment itself. The apparent cognitive and emotional costs of the predeployment context are striking, given that the intention of predeployment training is to prepare service-members physically, emotionally, and cognitively for the stressors of deployment.

However, among those who practiced, MT appears to have mitigated those deleterious effects by bolstering WMC, decreasing negative emotions, increasing positive emotions, and decreasing perceived stress levels. These findings suggest that sufficient MT practice may protect against the functional impairments associated with high-stress contexts. These findings also suggest that MMFT may promote resilience by reducing distress and improving the regulation of emotions associated with high-stress contexts. This final point lends support to other research that argues that mindfulness may allow greater psychological flexibility, reduce emotional avoidance and suppression, and improve emotion regulation in the midst of a range of stressful experiences (Coffey & Hartman, 2008; Follette et al., 2006; Jain et al., 2007; Shapiro, Carlson, Astin, Freedman, 2006; Smith et al., 2011). In sum, these results suggest that MMFT may provide greater cognitive and emotional resources for adaptive functioning during high-stress contexts.

In light of these findings, the U.S. Department of Defense funded three large-scale follow-up studies with active-duty troops. Analysis of the data from these studies is under way, with research publications to disseminate their results in progress. The first study, in collaboration with Principal Investigator Dr. Jha, occurred in 2010 with U.S. Army Soldiers preparing for deployment to Afghanistan. Funded by the U.S. Army Medical Research and Materiel Command, the Schofield Barracks Training and Research on Neurobehavioral Growth study is sponsored by the U.S. Army's Comprehensive Soldier Fitness program. Study participants from the U.S. Army's 25th Infantry Division received training throughout the summer of 2010.

The goal of this randomized-control trial study was to examine different variants of MMFT and to compare MMFT to another resilience training and to "treatment as usual" (predeployment preparation without additional resilience training). The study included 240 soldiers divided into six groups. Four groups received variations of MMFT; the four MMFT variants were designed, in collaboration with John M. Schaldach, to examine course length (24 hr, vs. 16 hr, vs. 8 hr, of classroom instruction) and course composition (focusing on didactics, vs. focusing on mindfulness practice, vs. integrating didactics and practice). The fifth group received another resilience training based on the tenets of positive psychology—Positive Emotions Resilience Training, developed and taught by Dr. Sara Algoe (University of North Carolina, Chapel Hill)—matched for instructor expertise, course length (16 hr), and course composition (integrating didactics and practice). The sixth group received no training. The study is measuring the effects of the training through neurocognitive behavioral tasks, self-report measures, and participant practice logs. A subsample of soldiers also

participated in brain-wave recording (EEG) and peripheral physiology data collection. Data were collected at three time-points before the soldiers deployed: before training (T1), after training or 8 weeks later (T2), and 3–5 months later (T3), right before deployment, to measure the training's enduring effects. The soldiers returned from Afghanistan in spring 2012; Dr. Jha's lab also collected data at two postdeployment time-points.

The second study, in 2011, included U.S. Marines preparing for deployment to Afghanistan, in collaboration with Principal Investigator Dr. D. Chris Johnson (University of California San Diego and Naval Health Research Center), Dr. Tom Minor (UCLA), and Dr. Martin Paulus (UC San Diego). This study was funded by the U.S. Office of Naval Research and the U.S. Department of the Navy's Bureau of Medicine and Surgery. Study participants from the U.S. Marine Corps' 1st Marine Expeditionary Force (IMEF) received training throughout the summer of 2011.

The goal of this randomized-control trial study was to test the effects of providing MMFT to complement the U.S. Marine Corps' existing stress-inoculation training at the Infantry Immersive Trainer (IIT), a simulated training environment for small unit operations, located at Camp Pendleton, CA. The study included 320 Marines divided into two groups: four platoons (160 Marines) received the 20-hr version of MMFT, while four platoons (160 Marines) served as a no-training control group. The study is measuring MMFT's effects through neurocognitive behavioral tasks; blood and saliva biomarkers; self-report measures; participant practice logs; and heart rate, respiration rate, and other measures of individual and small group performance during squad counterinsurgency drills at the IIT. In addition, a subsample of the Marines also participated in functional magnetic resonance imaging (fMRI). Data were collected at three time points before the Marines deployed to Afghanistan: before training (T1), after MMFT or 9 weeks later (T2), and 1 week later, while the Marines conducted 12 hr of immersive field training at the IIT (T3), to measure MMFT's effects during operational stressors. The research team also collected data at one testing time point after the Marines returned from deployment in the summer 2012.

The third study, which began in late 2012 and is still under way, includes U.S. Marines undergoing professional training at the U.S. Marine Corps' School of Infantry-West, in collaboration with Principal Investigator, Dr. D. Chris Johnson (University of California San Diego and Naval Health Research Center), Dr. Tom Minor (UCLA), and Dr. Martin Paulus (UC San Diego). This study was funded by the U.S. Office of Naval Research.

The goal of this randomized-control trial study is to examine the effects of embedding MMFT into one of the professional courses at the U.S. Marine Corps' School of Infantry-West (SOI-W). The study includes Marines who were assigned to three cycles of the same SOI-W course: One cycle (80 Marines) received the 20-hr version of MMFT, one cycle (80 Marines) received an active control training focused on the tenets of sports psychology, and the third cycle (80 Marines) served as a no-training control group. The study is measuring the trainings' effects through neurocognitive behavioral tasks; blood and saliva biomarkers; self-report measures; participant practice logs; and heart rate, respiration rate, and other measures of individual performance during the participants' training at this SOI-W course. In addition, a subsample of the Marines also participated in fMRI. Data were collected at the beginning of the course;

at different time-points throughout the SOI-W course, to measure performance during operational stressors; and after the training.

Comparison to Langer's Approach to Mindfulness

As this chapter has explained, MMFT cultivates mindfulness through specific exercises that train the ability to pay attention and notice what is happening while it is happening, without the mental filters of judgment, elaboration, or emotional reactivity. With repeated practice, it is possible to train the mind away from its default mode of autopilot and into a new mindfulness default mode. And with repeated practice, it is possible to train the two foundational capacities of attentional control and tolerance for challenging experience.

There are similarities and differences between this conceptualization and Ellen Langer's approach to mindfulness. Langer defines mindfulness as "a flexible state of mind—an openness to novelty, a process of actively drawing novel distinctions"; in this state, she argues, "we become sensitive to context and perspective; we are situated in the present," and "we are actively varying the stimulus field" (Langer, 2002, p. 214). Elsewhere, she refers to mindfulness as a "cognitive state," which is "both the result of, and the continuing cause of, actively noticing new things." The "hallmarks" of this cognitive state are "the ability to view both objects and situations from multiple perspectives" and "the ability to shift perspectives depending on context" (Carson & Langer, 2006, p. 30). In contrast, when we are mindless, we "act like automatons" governed by rule and routine, and we "rely on distinctions drawn in the past" (Langer, 2000, p. 220).

From these definitions, it should be clear that Langer and I agree that the opposite of mindfulness is an autopilot state where habit, routines, and understandings from the past are driving our interaction with present-moment experience. However, our definitions of mindfulness and how this state is cultivated seem to differ. In Langer's conceptualization, mindfulness appears to be a state of mind that requires actively noticing new things and constantly updating our mindsets. As she and her coauthors note, mindfulness "is a process in which new stimuli are perceived as having continually emerging meanings, rather than fossilized versions of previous meanings" (Langer, Djikic, Pirson, Madenci, & Donohue, 2010, p. 662). Thus, in Langer's conceptualization, mindfulness is cultivated through active distinction-drawing of all kinds, whether cognitive, olfactory, visual, or auditory—in other words, it is an active way of conceptually processing information.

In contrast, mindfulness, as I have defined it here, is a state of mind that is separate from the conceptual processing of stimuli. It is the direct, full-bodied knowing of present-moment experience, separate from any of the filters, labels, expectations, judgments, and cognitive processes that we usually bring to interpreting stimuli. This state of mind is cultivated by actively paying attention moment by moment to whatever is arising, without perceiving through those filters that can cloud clear-seeing when we are on autopilot. Because moment-to-moment experience is actually a constantly changing stream of stimuli, to see these stimuli clearly (separate from the filters we use to interpret them) requires a strong capacity to stay present with them. This capacity

does not just arise because we want it to. Neuroplasticity suggests that habitual patterns of perception have deep grooves that we default back into—especially when we are in stressful situations.

Thus, in light of the inertia of our deeply conditioned habits of mind, it is extremely helpful to retrain the mind's default mode actively with repeated practice. To train that presence, it is helpful to begin with one target object of attention: when the mind wanders off that target object, the instruction is to notice it has wandered and then to return the attention back to the target object. This instruction cultivates attentional control—the ability to deploy and sustain attention on a chosen target object (even when that target object is difficult, such as uncomfortable physical sensations or emotions). Over time, as attentional control is strengthened, it then becomes possible to let go of one target object and instead allow the attention to track accurately the rapidly changing flow of stimuli—including sensory stimuli, sensations, thoughts, emotions, and the other filters of cognitive processing—through the field of awareness, without falling back into an autopilot default mode. In addition, over time it becomes possible to stay in the new mindful default mode during daily activities, not just while practicing mindfulness exercises. This is neuroplasticity in action, using repeated practice for deep retraining of the mind's default mode so that the mindful state of mind remains accessible even during stressful situations.

Beyond our different ways of cultivating mindfulness, Langer's approach and the MMFT approach may lead to both similar and different effects. Like the effects of MT reviewed in this chapter, Langer's approach has been associated with a variety of positive health-related outcomes among healthy and clinical civilian populations (see Langer, 1989, 1997, 2009, for reviews). Moreover, both approaches place great value on *choice*: using mindfulness to see clearly and then choose the most appropriate and effective response—rather than defaulting (in the autopilot mode) to habit, routine, scripts, or reactive impulse.

However, a unique feature of the MMFT approach is its efficacy among high-stress populations like the predeployment military; Langer's approach has never been examined in the high-stress organizational context. In this regard, the focus in MMFT on training both mindfulness skills and self-regulation stress-resilience skills may be critical. For example, it is not clear whether Langer's approach to mindfulness could lead to the same effects for self-regulation of the ANS that cultivating attentional control and tolerance for challenging experience do. It would be interesting to see if Langer's approach can effectively provide benefits in the high-stress context. Ideally, this would be the case: Since no approach is equally effective for everyone, perhaps those not helped by MMFT could be helped by Langer's approach (and vice versa). Thus, further research comparing our two approaches among high-stress populations is clearly warranted.

Conclusion

In sum, this chapter has introduced MMFT as an approach for improving operational effectiveness in high-stress organizational contexts and perhaps shielding against the physiological, psychological, and behavioral disorders of the stress spectrum. It has

discussed two foundational capacities that MMFT cultivates—attentional control and tolerance for challenging experience—which are important for enhancing performance and building resilience. It has also summarized empirical evidence to date of MMFT's efficacy in the high-stress military context of preparing for combat deployment.

To be sure, this work bringing mindfulness to the military has been somewhat controversial. Variant A of this argument runs something like this: "I can see how mindfulness could be helpful for veterans who have left the military. But how could it ever be ethical to offer mindfulness to troops who are still on active duty? Isn't that just going to help them to suppress their human revulsion for war and thereby help them to become more efficient at killing? Won't this just give the government another way to use the military for aggression and bad foreign policy choices?" Or occasionally, I get Variant B of this argument: "Isn't mindfulness only going to make the troops more touchy-feely and compassionate? Won't it just make them even more mindful of the awful things they are being asked to do, and then they won't have the willpower to do it? Isn't it just better for them to be checked out when they have to kill other people?"

To see through the misunderstanding captured in these arguments requires a comprehension of the interplay between resilience and performance enhancement. For example, troops who screened positive for mental-health problems after returning home from recent deployments in Iraq and Afghanistan were three times more likely to report having engaged in unethical behavior while deployed (MHAT-V, 2008). Such behavior—including unnecessarily damaging private property or insulting or physically harming noncombatants—is obviously counterproductive to "winning the hearts and minds" of the local population. This finding suggests a strong link between the negative effects of stress, which degrades troops' capacity to manage their own emotions and thereby control impulsive, reactive behavior, and a decrease in their ability to perform their mission effectively—not only in counterinsurgency but in all security operations across the full spectrum of peace and conflict. Conversely, it suggests a strong link between resilience and enhanced performance: A resilient individual is more likely to perform their mission effectively, and someone who performs their mission effectively is less likely to have their resilience undermined.

If the nation's leaders have decided to send troops into harm's way, those troops' hearts, minds, and bodies are going to be experiencing the stressors of war—whether they are mindfully paying attention or not. If they are paying attention, however, they are more likely to see the environment around them clearly, without being influenced by the unconscious survival filters that often exaggerate what is really there. They are more likely to regulate their stress response and the reactive impulses that this response can create. As a result, they are more likely to pull the trigger only when they really need to—when imminent harm actually exists in the environment—and less likely to pull the trigger reactively, giving in to strong impulses, such as fear, vengeance, uncertainty, anger, or confusion. In the process, they are less likely to act out in ways that undermine mission accomplishment, such as inadvertently shooting a noncombatant and thereby pushing the local population to side with the adversary. They are also less likely to act out in ways that afterwards they will regret—which often fuels shame,

isolation, survivor guilt, and psychological injury later on. In other words, they are less likely to cause harm to others and to themselves.

In light of this reality, it is clear why millennia of warrior traditions have placed such an emphasis on cultivating wisdom and bravery. Returning to where this chapter began, wisdom is the ability to see clearly how things are right now—not how we *want* them to be, or *expect* them to be, but how they *actually are*—and then to use that information to make the most effective choice in the moment. Bravery is the ability to stay present with any experience, even an extremely difficult one, without needing for it to be different. By now it should be clear that wisdom would be impossible without attentional control, and bravery rests on tolerance for challenging experience. In other words, *attentional control and tolerance for challenging experience are simply the micromanifestations in any moment of the warrior qualities of wisdom and bravery*. Together, these two qualities are a pathway towards effective action, because, as Plato tells us, "the soul that is bravest and wisest will be least confused or disturbed by external influences" (Hamilton & Cairns, 1987, p. 627). A training that deliberately cultivates these qualities among those individuals charged with keeping the nation safe is critical in today's complex, chaotic, ambiguous, and ever-changing security environment.

References

Adler, A. B., McGurk, D., Stetz, M. C., & Bliese, P. S. (2003, March). *Military occupational stressors in garrison, training, and deployed environments.* Paper presented at the NIOSH/APA Symposium, Toronto, Canada. Retrieved from http://www.dtic.mil/cgibin/GetTRDoc?AD=ADA425834&Location=U2&doc=GetTRDoc.pdf

Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*(2), 125–143.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27–45.

Bohnen, N., Houx, P., Nicolson, N., & Jolles, J. (1990). Cortisol reactivity and cognitive performance in a continuous mental task paradigm. *Biological Psychology, 31*, 107–116.

Bolton, E. E., Litz, B. T., Britt, T. W., Adler, A., & Roemer, L. (2001). Reports of prior exposure to potentially traumatic events and PTSD in troops poised for deployment. *Journal of Traumatic Stress, 14*(1), 249–256.

Bootzin, R. R., & Stevens, S. J. (2005). Adolescents, substance abuse, and the treatment of insomnia and daytime sleepiness. *Clinical Psychology Review, 25*, 629–644.

Boscarino, J. (1981). Current excessive drinking among Vietnam veterans: A comparison with other veterans and nonveterans. *International Journal of Social Psychiatry, 27*, 204–212.

Bremner, J. D. (2005). *Does stress damage the brain?* New York, NY: W.W. Norton.

Bremner, J. D., Southwick, E. B., Fontana, A., Rosenheck, R., & Charney, D. S. (1992). Dissociation and posttraumatic stress disorder in Vietnam combat veterans. *American Journal of Psychiatry, 149*(3), 328–332.

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analyses of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*, 748–766.

Brewin, C. R., & Smart, L. (2005). Working memory capacity and suppression of intrusive thoughts. *Journal of Behavioral Therapy and Experimental Psychiatry, 36*, 61–68.

Carlson, L. E., & Garland, S. N. (2005). Impact of Mindfulness-Based Stress Reduction (MBSR) on sleep, mood, stress and fatigue symptoms in cancer outpatients. *International Journal of Behavioral Medicine, 12*(4), 278–285.

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*, 23–33.

Carson, S. H., & Langer, E. J. (2006). Mindfulness and self-acceptance. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 24*(1), 29–43.

Castro, C. A., Hoge, C. W., & Cox, A. L. (2006). Battlemind training: Building soldier resiliency. In Human dimensions in military operations: Military leaders' strategies for addressing stress and psychological support. *Proceedings of NATO Research & Technology Organization Meeting* (pp. 42-41–42-46). France.

Chan, D., & Woollacott, M. (2007). Effects of level of meditation experience on attentional focus: Is the efficiency of executive or orientation networks improved? *The Journal of Alternative and Complementary Medicine, 13*(6), 651–657.

Coffey, K. A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review, 13*, 79–91.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385–396.

Conway, A. R., Kane, M. J., Bunting, M. F., Hambrick, D. Z., Wilhelm, O., & Engle, R. W. (2005). Working memory span tasks: A methodological review and user's guide. *Psychonomic Bulletin & Review, 12*(5), 769–786.

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

Eid, J., & Morgan, C. A. (2006). Dissociation, hardiness, and performance in military cadets participating in survival training. *Military Medicine, 171*(5), 436–442.

Endsley, M. R. (1995). Toward a theory of situation awareness in dynamic systems. *Human Factors, 37*(1), 32–64.

Endsley, M. R. (2000). Theoretical underpinnings of situation awareness: A critical review. In M. R. Endsley & D. J. Garland (Eds.), *Situation awareness analysis and measurement* (pp. 1–24). Mahwah, NJ: Lawrence Erlbaum Associates.

Erickson, D. J., Wolfe, J., King, D. W., King, L. A., & Sharkansky, E. J. (2001). Posttraumatic stress disorder and depression symptomatology in a sample of gulf war veterans: A prospective analysis. *Journal of Consulting and Clinical Psychology, 69*(1), 41–49.

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

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

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57*(1), 35–43.

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

Hamilton, E., & Cairns, H. (1987). *The collected dialogues of Plato.* Princeton, NJ: Princeton University Press.

Herman, J. L. (1992). Complex PTSD: A syndrome in survivors of prolonged and repeated trauma. *Journal of Traumatic Stress, 5*(3), 377–391.

Hoge, C. W., Auchterlonie, J. L., & Milliken, C. S. (2006). Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *Journal of the American Medical Association, 295*(9), 1023–1032.

Hoge, C. W., Castro, C. A., & Eaton, K. M. (2006). Impact of combat duty in Iraq and Afghanistan on family functioning. In Human dimensions in military operations: Military leaders' strategies for addressing stress and psychological support. *Proceedings of NATO Research & Technology Organization Meeting* (pp. 5-1–5-6). France.

Hoge, C. W., Terhakopian, A., Castro, C. A., Messer, S. C., Engel, C. C. (2007). Association of posttraumatic stress disorder with somatic symptoms, health care visits, and absenteeism among Iraq war Veterans. *American Journal of Psychiatry, 164*, 150–153.

Jain, S., Shapiro, S. L., Swanick, S., Roesch, S. C., Mills, P. J., Bell, I., & Schwartz, G. E. (2007). A randomized controlled trial of mindfulness meditation versus relaxation training: Effects on distress, positive states of mind, rumination, and distraction. *Annals of Behavioral Medicine, 33*(1), 11–21.

Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience, 7*(2), 109–119.

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.

Kabat-Zinn, J. (1990). *Full Catastrophe Living*. New York, NY: Delta Books.

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.

Kaylor, J., King, D., & King, L. (1987). Psychological effects of military service in Vietnam: A meta-analysis. *Psychological Bulletin, 102*(2), 257–271.

King, L., King, D., Vogt, D., Knight, J., & Samper, R. (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.

Langer, E. J. (1989). *Mindfulness*. Reading, MA: Addison-Wesley.

Langer, E. J. (1997). *The power of mindful learning*. Reading, MA: Addison-Wesley.

Langer, E. J. (2000). Mindful learning. *Current Directions in Psychological Science, 9*(6), 220–223.

Langer, E. J. (2002). Well-being: Mindfulness versus positive evaluation. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 214–230). New York, NY: Oxford University Press.

Langer, E. J. (2009). *Counterclockwise: Mindful health and the power of possibility*. New York, NY: Random House.

Langer, E. J., Djikic, M., Pirson, M., Madenci, A., Donohue, R. (2010). Believing is seeing: Using mindlessness (mindfully) to improve visual acuity. *Psychological Science, 21* (5), 661–666

Lanius, R. A., Vermetten, E., Loewenstein, R. J., Brand, B., Schmahl, C., Bremner, J. D., & Spiegel, D. (2010). Emotion modulation in PTSD: Clinical and neurobiological evidence for a dissociative subtype. *American Journal of Psychiatry, 167*(6), 640–647.

Leitch, M. L. (2007). Somatic experiencing treatment with tsunami survivors in Thailand: Broadening the scope of early intervention. *Traumatology, 13*(3), 11–20.

Leitch, M. L., Vanslyke, J., & Allen, M. (2009). Somatic experiencing treatment with social service workers following Hurricanes Katrina and Rita. *Social Work, 54*(1), 9–18.

Levin, A. (2007). Multiple physical illnesses common in Iraq war veterans with PTSD. *Psychiatric News. 42*(2), 4. Retrieved from http://pn.psychiatryonline.org/cgi/content/full/42/2/4-a

Levine, P. (1997). *Waking the tiger: Healing trauma*. 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. *Journal of 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 U.S. Navy SEAL training. *Psychopharmacology, 164*(3), 250–261.

MacDonald, C., Chamberlain, K., Long, N., Pereira-Laird, J., & Mirfin, K. (1998). Mental health, physical health, and stressors reported by New Zealand Defense Force peacekeepers: A longitudinal study. *Military Medicine, 163*(7), 477–481.

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.

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*, 840–852.

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, 35*(1), 196–204.

Mental Health Advisory Team (MHAT-V). (2008). *Operation Iraqi Freedom 06–08: Iraq, Operation Enduring Freedom 8: Afghanistan.* Retrieved from http://www.armymedicine.army.mil/reports/mhat/mhat_v/MHAT_V_OIFandOEF-Redacted.pdf

Milliken, C. S., Auchterlonie, J. L., & Hoge, C. W. (2007). Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq War. *Journal of the American Medical Association, 298*(18), 2141–2148.

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. *Journal of Biological Psychiatry, 60*(7), 722–729.

Morgan, C. A., Hazlett, G., Doran, A., Garrett, S., Hoyt, G., Thomas, P., Baranoski, M., & 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., Hazlett, G., Wang, S., Richardson, E., Schnurr, P., & Southwick, S. (2001). Symptoms of dissociation in humans experiencing acute, uncontrollable stress: A prospective investigation. *American Journal of Psychiatry, 158*(8), 1239–1247.

Morgan, C. A., Rasmusson, A., Wang, S., Hauger, R., Hazlett, G., & Hoyt, 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*, 412–422.

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

Ong, J. C., Shapiro, S. L., & Manber, R. (2009). Mindfulness meditation and cognitive behavioral therapy for insomnia: A naturalistic 12-month follow-up. *Explore, 5*(1), 30–36.

Ortner, C. N. M., Kilner, S. J., & Zelazo, P. D. (2007). Mindfulness meditation and reduced emotional interference on a cognitive task. *Motivation and Emotion, 31*, 271–283.

Ostafin, B. D., & Marlatt, G. A. (2008). Surfing the urge: Experiential acceptance moderates the relation between automatic alcohol motivation and hazardous drinking. *Journal of Social and Clinical Psychology, 27*(4), 404–418.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2008). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Trauma: Theory, Research, Practice, and Policy, S*(1), 3–36.

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

Scaer, R. (2005). *The trauma spectrum.* New York, NY: W.W. Norton.

Scaer, R. C. (2001). The neurophysiology of dissociation and chronic disease. *Applied Psychophysiology and Biofeedback, 26*(1), 73–91.

Scaer, R. (Speaker). (2008, December). *Trauma, dissociation and the healing of combat stress.* Presentation to the Conference of the National Institute for the Clinical Application of Behavioral Medicine. Hilton Head Islands, South Carolina. (mp3 recording). Retrieved on June 3, 2009, from http://www.iplayback.com/prod_detail_list/166/2

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.

Schwartz, J. M., & Begley, S. (2003). *The mind and the brain: Neuroplasticity and the power of mental force.* New York, NY: HarperCollins.

Seal, K. H., Bertenthal, D., Miner, C. R., Sen, S., Marmar, C. (2007). Bringing the war back home. *Archives of Internal Medicine, 167*, 476–482.

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*(3), 373–386.

Shapiro, S. L., Oman, D., Thoresen, C. E., Plante, T. G., & Flinders, T. (2008). Cultivating mindfulness: Effects on well-being. *Journal of Clinical Psychology, 64*(7), 840–862.

Smith, B. W., Ortiz, J. A., Steffen, L. E., Tooley, E. M., Wiggins, K. T., Yeater, E. A., Montoya, J. D., & Bernard, M. L. (2011). Mindfulness is associated with fewer PTSD symptoms, depressive symptoms, physical symptoms, and alcohol problems in urban firefighters. *Journal of Consulting and Clinical Psychology, 79*(5), 613–617.

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

Stanley, E. A., & Jha, A. P. (2009). Mind fitness: Improving operational effectiveness and building warrior resilience. *Joint Force Quarterly, 55*, 144–151.

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

Taft, C. T., Stern, A. S., King, L. A., & King, D. W. (1999). Modeling physical health and functional health status: The role of combat exposure, posttraumatic stress disorder, and personal resource attributes. *Journal of Traumatic Stress, 12*(1), 3–23.

Tanielian, T., & Jaycox, L. H. (Eds.). (2008). *Invisible wounds of war: Psychological and cognitive injuries, their consequences, and services to assist recovery.* Washington, DC: RAND Corporation.

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

U.S. Department of Defense. (2006, December). *Department of Defense survey of health related behaviors among active duty military personnel.* Triangle Park, NC: RTI International.

van der Kolk, B. A., Roth, S., Pelcovitz, D., Sunday, S., Spinazzola, J. (2005). Disorders of extreme stress: The empirical foundation of a complex adaptation to trauma. *Journal of Traumatic Stress, 18*(5), 389–399.

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*, 519–529.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063–1070.