Handbook of Mindfulness-Based Programmes

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Chapter 6

Mindfulness-Based Mind Fitness Training (MMFT)

Mindfulness training for high-stress and trauma-sensitive contexts

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Introduction

As evidenced in this handbook, there is considerable empirical evidence of the benefits of mindfulness-based interventions (MBIs) in both clinical and healthy populations (for reviews, see Chiesa & Serretti, 2009; Creswell, 2017). However, high-stress environments – where individuals are subjected to prolonged stress and trauma, often by virtue of serving in high-demand occupations like the military, law enforcement, firefighting, medicine, and first response – come with distinct challenges that many traditional MBIs are not designed to address. These populations typically bear heavy allostatic loads from prolonged stress and trauma exposure, frequent legacies of childhood adversity, stressful professional training regimens, and culturally ingrained coping strategies, all of which demand a more robust approach.

Mindfulness-Based Mind Fitness Training (MMFT)® was explicitly designed to offer such an approach. Originally conceived for implementation with the U.S. military, MMFT draws from two lineages – mindfulness training and body-based trauma therapies – to address the complex constellation of stressors that accompany these high-stress, high-demand roles. As this chapter will show, MMFT tackles the powerful effects of prolonged stress and trauma exposure – with the goal of training participants to achieve better functioning during stressful experiences and more complete recovery afterwards.

Intended population and targets of MMFT

Unlike many other MBIs, MMFT is explicitly intended for individuals working in high-stress occupations, who frequently have high allostatic loads – i.e., large cumulative effects of stress on the mind-body system – due to the many environmental stressors of their work. Evidence of high allostatic loads can be seen in elevated rates of mood and anxiety disorders, sleep disorders, substance use/misuse, and suicidal ideation and behavior across these professions (see Berger et al., 2012; Bray et al., 2009; Carey, Al-Zaiti, Dean, Sessanna, & Finnell, 2011; Denhof & Spinaris, 2013; Institute of Medicine, 2014; Nock et al., 2014; Stanley, Hom, & Joiner, 2016).

Several common stressors across these professions may contribute to this higher allostatic load. For instance, sleep deprivation and/or variable sleep patterns due to shift work are common, with evidence of cognitive, emotional, and motor impairments among such cohorts (Barger, Lockley, Rajaratnam, & Landrigan, 2009; Rajaratnam et al., 2011), and demonstrated negative effects on decision-making and risk assessment capacity (Vila, Morrison, &

Kenney, 2002). Additionally, these individuals must cope with threats to individual safety and mortality, exposure to the injury/death of others, and sometimes the need to inflict harm (Adler, McGurk, Stetz, & Bliese, 2003; Kavanagh, 2005). Managing such mortality concerns not only consumes self-regulation capacity, but also, in doing so, further increases vulnerability to disturbing thoughts and feelings about death (Gailliot, Schmeichel, & Baumeister, 2006). Additionally, individuals in high-stress environments often employ emotional labor to align with organizational objectives – masking already-developed emotions or manufacturing new emotions to align with role expectations and improve overall performance – which may increase psychological strain, deplete mental resources, and detract energy from additional cognitive tasks (see Hülsheger & Schewe, 2011 for a review).

Furthermore, these professions engage in stressful occupational training – stress inoculation training (SIT) – to habituate members to the stressors they are likely to encounter during "real-world" missions and thereby improve their performance (Kavanagh, 2005; Larsen & Stanley, in press). Yet, while SIT may help members adaptively function during stress, its intensity and lack of focus on recovery (Larsen & Stanley, in press) may exacerbate temporal impairment and depletion of executive functioning – thereby contributing to difficulties with physiological and emotion regulation (Heatherton & Wagner, 2011; Hofmann, Schmeichel, & Baddeley, 2012). Indeed, evidence from internal medicine residency training (Gohar et al., 2009), firefighter live-fire drills (Baumann, Gohm, & Bonner, 2011), military field training (Kavanagh, 2005; Lieberman et al., 2005), military survival training (Morgan, Doran, Steffian, Hazlett, & Southwick, 2006; Morgan et al., 2004; Morgan et al., 2002), and military pre-deployment training (Jha, Witkin, Morrison, Rostrup, & Stanley, 2017; Jha et al., 2015; Jha, Morrison, Parker, & Stanley, 2016; Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010) significantly links inoculation training regimens to mood disturbances and cognitive degradation, including problem-solving deficits, attention deficits, and declines in working memory capacity.

Meanwhile, these populations are often characterized by culturally-sanctioned and deeply-socialized suppressive coping mechanisms. In particular, because suppression of emotions and physical pain can be adaptive in the short-term and increase the team's likelihood of survival (Bonanno, 2004), managing distress through "suck it up and drive on" techniques is a cultural expectation reinforced in high-demand roles (see Berg, Hem, Lau, & Ekeberg, 2006; Braswell & Kushner, 2012; Bryan, Jennings, Jobes, & Bradley, 2012). Yet, when employed habitually and continually, such suppression may have maladaptive effects, including higher rates of depression, self-destructive behaviors, and suicide (Braswell & Kushner, 2012). Cultural norms may deny the trauma of challenging experiences, stigmatize psychological injury as "weakness," and prevent individuals from seeking help (Berg et al., 2006; Bryan et al., 2012; Stanley et al., 2016). This undermined ability to access social support may also extend to personal relationships, resulting in disrupted communication and increased isolation (Butler et al., 2003; Gross & John, 2003), and contributing to decreased marital satisfaction, increased intention to divorce, and increased self-reported spousal abuse (Hoge, Castro, & Eaton, 2006; Teten et al., 2010). This distress may also lead to maladaptive coping strategies, like heavy alcohol consumption and illicit drug use (Bray et al., 2009; Institute of Medicine, 2014; Violanti, Marshall, & Howe, 1985); increased tobacco use (Biggs et al., 2010); and inappropriate aggressive behavior, violent outbursts, or the abuse/harassment of others (Braswell & Kushner, 2012; Hoge et al., 2006; Nillni et al., 2014; Teten et al., 2010).

Finally, it bears noting that a large subset of individuals in these populations were exposed to adverse childhood experiences (ACEs) – such as sexual, physical, and emotional abuse;

physical and emotional neglect; and/or childhood family dysfunction – which have been shown to increase the risk for many mental and physical health problems in adulthood (Bruffaerts et al., 2010; Felitti, 2009; Kessler et al., 2010; Mann & Currier, 2010; Neigh, Gillespie, & Nemeroff, 2009). ACE exposure is significantly linked with early-life developmental alterations in neurobiological systems, leading to life-long dysregulation and sensitization of the hypothalamic-pituitary-adrenal (HPA) axis and autonomic nervous system (Neigh et al., 2009). In the U.S. military, there is evidence that service members during the All-Volunteer Force era are disproportionately likely to come from such backgrounds (Blosnich, Dichter, Cerulli, Batten, & Bossarte, 2014), and many other high-stress professions draw from veteran pools. Empirical research in these professions shows links between ACE exposure and significantly larger physiological and emotional responses after stressful occupational experiences – as well as significantly higher risk of PTSD and other mood disorders – compared with colleagues without ACE exposure, including among paramedics (Maunder, Halpern, Schwartz, & Gurevich, 2012), police (Pole et al., 2007), and the military (Cabrera, Hoge, Bliese, Castro, & Messer, 2007; Fritch, Mishkind, Reger, & Gahm, 2010; Sareen et al., 2013).

Though some exceptions exist (e.g., Dialectical Behavioral Therapy, DBT; Linehan, 1993), most MBIs were not designed to accommodate and/or re-regulate such deep-seated mind-body dysregulation. However, without complementary skills to re-regulate the nervous system, mindfulness alone may actually flood the mind-body system with heightened attention on the stress response – which, paradoxically, may worsen the ability to self-regulate and thereby exacerbate symptoms of dysregulation (Stanley, in press). Indeed, some MBIs note their contraindication for individuals actively suffering from post-traumatic stress or trauma. For instance, the University of Massachusetts' Center for Mindfulness states that mindfulness-based stress reduction (MBSR) is not advised during active PTSD or other mental illness, suggesting that individuals seek other training or treatment if they have "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 they are "in the middle of major life changes" (Center for Mindfulness in Medicine, 2014; Santorelli, 2014). Importantly, *all* of these criteria are quite common in high-stress environments.

Overview of MMFT

Given the complex stressors typically encountered by MMFT's intended populations, MMFT was designed with two overarching goals in mind: to widen individuals' windows of tolerance for stress arousal, and to do so in a trauma/dysregulation-sensitive manner. Thus, MMFT seeks to improve functioning before and during stressful experiences – as well as provide for more effective recovery afterwards – with special attention given to the fact that varying levels of pre-existing chronic stress and trauma exposure may exist among training cohorts.

MMFT has three parts: (1) mindfulness skills training; (2) an understanding of the neurobiology of stress and resilience, and body-based self-regulation skills training to regulate the autonomic nervous system; and (3) concrete applications of both types of skills to participants' personal and professional lives. This blend of mindfulness skills training with body-based self-regulation skills is crucial for increased psychological and physiological resilience and enhanced performance in high-stress situations. It also facilitates individuals widening their windows of tolerance for stress arousal, so that they can interact more

effectively with their complex external environments. Thus, a major goal of MMFT is to improve individuals' self-regulation and resilience, at both the micro- and macro-levels.

At the micro-level, this means improving individual self-regulation in the mind-body system – with better functioning during stress and more complete recovery back to "baseline" afterwards. As individuals learn to direct their attention in ways that support discharging the effects of prior stress arousal, they may facilitate their mind-body system returning to a functioning allostasis and thereby decrease both their allostatic load and cognitive, emotional, and/or physiological symptoms of dysregulation. As allostatic functioning improves, individuals may actively redirect focus from inner symptoms towards the outward environment. Thus, awareness, physiological and emotional self-regulation, and impulse control – hallmarks of self-regulation at the micro-level – each pave the way for more successful, connected, and supportive interpersonal interactions and more agile and adaptive decisions in complex environments – hallmarks of self-regulation at the macro-level (Stanley, in press).

Conversely, it is not surprising that ineffective micro-level self-regulation has shown cascading negative effects in the external environment. For instance, police officers suffering from a sleep disorder – a common symptom of micro-level mind-body dysregulation – were significantly more likely to display uncontrolled anger towards citizens and suspects, and significantly more likely to have citizen complaints filed against them (Rajaratnam et al., 2011; see also Shermer, 2015). Likewise, U.S. troops who screened positive for mental health problems after deployments in Iraq and Afghanistan were almost three times more likely to report having engaged in unethical behavior while deployed, such as unnecessarily damaging property or insulting, harming, or killing noncombatants (Office of the Surgeon Multi-National Force-Iraq, 2006).

To achieve its tailored goals, MMFT draws from two lineages: mindfulness training and body-based trauma therapies for re-regulating the nervous system and survival brain after trauma, such as sensorimotor psychotherapy (Ogden & Fisher, 2015; Ogden, Minton, & Pain, 2006), Somatic Experiencing (Levine, 1997; Payne, Levine, & Crane-Godreau, 2015), and the Trauma Resilience Model (Leitch, Vanslyke, & Allen, 2009). This integration of mindfulness skills with body-based self-regulation skills sets MMFT apart from other mindfulness training programs. Using these diverse lineages, MMFT aims to cultivate two core skills: *attentional control* and *tolerance for challenging experience*. Attentional control is the ability to direct and sustain attention deliberately on a chosen target over time. Tolerance for challenging experience is the ability to pay attention to, track, and stay with such experience without needing for it to be different. Such challenging experiences can be external (e.g., harsh environmental conditions or difficult people) or internal (e.g., physical pain, stress activation, intense emotions, distressing thoughts, nightmares, or flashbacks). These core skills undergird other competencies needed for agile and adaptive decision-making in high-stress environments, such as situational awareness, emotion regulation, impulse control, and mental agility (Stanley, in press).

Theoretical background of MMFT

In cultivating these core skills, MMFT emphasizes the gradual development of interoception, "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). Some authors argue that the insula cortex and anterior cingulate cortex (ACC) – brain regions implicated

in interoception, emotion regulation, and impulse control – may provide top-level control to the subcortical processes that regulate stress and negative emotions (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 subcortical functioning regarding stress and emotions. Indeed, non-intervention studies among military and civilian "elite performers" demonstrate insula and ACC activation patterns 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). 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) and addiction (Paulus & Stewart, 2014).

As previously noted, there are several reasons why individuals in high-stress environments may suffer from declines in executive functioning, which could compromise the effectiveness of top-down self-regulation techniques (Heatherton & Wagner, 2011; Hofmann et al., 2012). In contrast, interoceptive awareness may help counteract already depleted states. For example, a recent study (Friese, Messner, & Schaffner, 2012) found that individuals experiencing self-regulatory depletion were able to counteract the effects of that depletion with a brief period of mindfulness practice – demonstrating similar performance on a subsequent task requiring self-control as a control group not experiencing self-regulatory depletion. In contrast, a third group, in a state of self-regulatory depletion without mindfulness practice, showed the expected performance impairment on the subsequent task requiring self-control.

Thus, mind-body skills training to improve interoceptive processes – such as MMFT – may facilitate improved responses to both stress and emotions, even in high-stress contexts characterized by depleted executive functioning. For this reason, MMFT emphasizes building interoceptive awareness, but in a gradual manner so as not to flood the mind-body system and exacerbate dysregulation. Indeed, troops who received MMFT showed altered brain activation post-training indicative of improved interoceptive functioning during stress (Haase et al., 2016; Johnson et al., 2014), similar to the pattern observed among "elite performers" in earlier studies (Paulus et al., 2012; Paulus et al., 2010; Simmons et al., 2012; Thom et al., 2014).

Structure of the MMFT program

Research has tested different MMFT variants, ranging from 8–24 hours of classroom instruction delivered over eight weeks. Arguably the most effective variant is 20 hours of classroom instruction, which includes eight 2-hour sessions, a short individual practice interview in the third week, and a 4-hour practicum in the sixth week to refine mindfulness and self-regulation skills. The first four 2-hour sessions occur in the first two weeks, to front-load the neurobiology context for skills taught in the course. The other four 2-hour sessions are taught in the fourth, fifth, seventh, and eighth weeks. (In addition to this 8-week format, MMFT has also been taught as a week-long intensive course, or through introductory subsets of course material as part of daylong or weekend workshops. In these formats, participants learn the didactic context intensively and then complete the 8-week exercise sequence afterwards, on their own.)

As noted, a major goal of MMFT is self-regulation at the micro- and macro-levels. Thus, the first half of MMFT focuses on micro-level self-regulation, providing the scientific

foundation of the neurobiology of stress and resilience and teaching the basic exercises for self-regulation in the mind-body system. The second half focuses on macro-level self-regulation, providing didactic content about habitual reactions, decision-making, emotions, interpersonal interactions, and conflict, and teaching more advanced exercises for self-regulation in relationship to others (Stanley, in press).

MMFT's efficacy may come from its unique developmental sequence of exercises, specifically designed to move someone from dysregulation to regulation. This is particularly important for high-stress environments, where participants are often dysregulated from prior exposure to chronic stress or trauma without adequate recovery. Participants are asked to complete daily at least 30 minutes of mindfulness and self-regulation skills exercises, divided into several practice periods throughout the day. MMFT's exercises range from 5 to 30 minutes – which is notably (and deliberately) shorter than practices in many other MBIs. Participants initially use audio tracks to guide the exercises, but over time are able to do them without audio support. Some exercises are conducted while sitting quietly or lying down, some while stretching, and some are designed for integration into daily-life tasks.

The first exercise in the sequence is the Contact Points Exercise. By developing the ability to notice the physical sensations of contact between their body and their surroundings, participants gain a portable grounding skill. By directing attention to sensations of contact, participants may not only develop attentional control, but also cue the survival brain and nervous system towards a neuroception of safety (Porges, 2011), even during stress activation or dysregulation. In contrast, when someone is activated or dysregulated, breathing sensations may not be neutral stimuli, and awareness of breathing may inadvertently create more stress activation. This is why interoceptive awareness needs to be developed gradually, to protect a dysregulated individual from flooding and re-traumatizing their mind-body system. For these reasons, the ability to bring steady awareness to the contact points is a fundamental skill, on which all other MMFT exercises build (Stanley, in press).

To try Contact Points yourself, find a comfortable place to sit, preferably with your back towards a solid wall. Sit with your feet shoulder-width apart and flat on the ground. If it feels comfortable to you, you can close your eyes; if not, simply direct your gaze softly at the ground in front of you. Sit so that your spine is both upright yet relaxed. Allow yourself to notice the feeling of being supported by the chair and ground. Aim for the *felt sense* of this support, in your body, rather than trying to *think about* or analyze this support. Notice the physical sensations of contact between the body and your surroundings, such as pressure, hardness or softness, heat or coolness, tingling, numbness, sweatiness or dampness. Notice these sensations at three different places: (1) between your legs or lower back with the chair; (2) between your feet with the ground; and (3) between your hands touching your legs or each other. Select the place where you can notice sensations of contact most strongly; this one contact point will now be your target object of attention. Anytime you notice your attention wandering, simply choose to begin again without judgment – redirecting your attention back to the sensations at your chosen contact point. In the beginning, aim to practice for 5 minutes. To conclude the exercise, widen your attention to take in the whole body seated in the chair. Notice if anything has changed in your mind-body system from having done this exercise. Over time, you can build up to practicing Contact Points for 10–20 minutes (Stanley, in press; Stanley & Schaldach, 2011).

Research About MMFT

One of MMFT's strengths is that it has been tested through rigorous neuroscience and stress physiology research – through four studies, funded by the U.S. Department of Defense and other foundations, with results published in peer-reviewed journals. U.S. combat troops preparing to deploy to Iraq and Afghanistan who received variants of the 8-week MMFT course showed significant benefits on several outcome measures, including improved cognitive performance, better regulation of negative emotions, and better physiological self-regulation and resilience during stressful pre-deployment training. These findings are notable because pre-deployment training is a form of SIT, which previous empirical research has associated with declines in mood, self-regulation capacity, and cognitive performance (for a review, see Kavanagh, 2005; Larsen & Stanley, in press).

In terms of cognitive performance, compared with control groups, troops trained in MMFT saw significant improvements in sustained attention (Jha et al., 2015; Jha et al., 2016), protection against working memory degradation (Jha et al., 2017), and improvements in working memory capacity, which was significantly linked to decreased negative emotions (Jha et al., 2010). In terms of self-regulation, compared with controls, MMFT participants demonstrated significantly more efficient physiological stress arousal before and during combat drills, followed by more complete recovery afterwards, as indexed by blood-plasma levels of neuropeptide Y and by heart-rate and breathing-rate during the drills (Johnson et al., 2014). They also showed significantly more efficient activation under stress of the insula cortex and ACC, as indexed with fMRI during restricted breathing (Haase et al., 2016) and emotional face processing (Johnson et al., 2014) tasks. Moreover, MMFT participants reported significant improvements in sleep quality – including longer sleep duration and decreased use of over-the-counter and prescription sleep aids – which was significantly correlated with higher blood-plasma levels of insulin-like growth factor, a biomarker of health produced during restful sleep (Sterlace et al., 2012). Finally, MMFT participants reported significant improvements in their perceived stress levels (Stanley, Schaldach, Kiyonaga, & Jha, 2011) and mood (Jha et al., 2010), even during the increasing demands of the pre-deployment interval.

In sum, this research suggests that MMFT may provide greater cognitive, emotional, and physiological resources to widen an individual's window of tolerance and facilitate adaptive functioning before, during, and after high-stress and high-demand contexts.

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