Mindfulness and Self-Regulation

The Science of Resilience

**RRC - Evaluation
and Training Institute**

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Definition

Mindfulness involves a non-judgemental, non-reactive awareness and acceptance of all occurrences in the present moment, whether they are thoughts, emotions, or visceral sensations (Bishop et al., 2004). By adopting a dispassionate position between perception and reactions, mindful individuals are more likely to adopt more mindful states in their everyday lives, and become more able to respond to such occurrences in a reflective rather than reflexive manner (Crescentini & Capurso, 2015). For this reason, Bishop and colleagues (2004) refer to mindfulness as self-regulation of attention on the immediate moment, with an orientation toward openness, curiosity, and acceptance. Self-regulation, more generally, refers to an awareness and intention to have influence over the automatic thoughts or physiological responses to stimuli, which an individual can be made aware of through reflective self-awareness or feedback from others (Brockman et al., 2017; Farb et al., 2012; Robbins et al., 2017).

While the self-awareness of one's predispositions and subconscious responses that occur in mindfulness practices are components of self-regulation, the two differ in that self-regulation requires more of a judgement call and effortful control over altering aspects of one's thoughts and behaviours (Baumeister et al., 2015). Self-regulation requires conscious awareness of the factors related to one's automatic responses to stimuli, a judgement call to improve reactionary emotional states or behaviour, and a plan to follow (e.g., in becoming more reflective and less reactionary; Crocker & Wolfe, 2001; Harris, 2007). While mindfulness is useful for self-regulatory practices, and some may argue is a requirement, there are also other important factors and approaches involved in successful self-regulation, such as proper sleep and diet (Baumeister et al., 2015). While this write-up discusses both protective factors, it will mostly be focusing on the concept of mindfulness in its association with self-regulatory practices. For more on self-regulation itself, we recommend reading the works of Roy Baumeister and colleagues (1993, 1994, 1996, 2011, 2015, 2018), Albert Bandura (1991), and Barry Zimmerman and Dale Schunk (Toering et al., 2012; Zimmerman & Schunk, 2001).

Mindfulness Theory

Most of the current psychological understanding of mindfulness comes from the Buddhist concept of *sati* or *smrti*, an essential component of the path to enlightenment, true nature of existence, or correct view of the world (Cairncross & Miller, 2020; Hölzel et al., 2011; Tanay & Bernstein, 2013; Van Gordon et al., 2015). The core of this belief is that all emotional experiences, positive or negative, are of the world, that everything including oneself is in relation to everything else, and *sati* is a call to the practitioner "to remember" and bring awareness to this concept.[1] The act of remembering is itself an awareness of thought, an

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[1] "the word *sati*, rendered mindfulness… derives from a verb, *sarati*, meaning "to remember" … But when it is used in relation to meditation practice, we have no word in English that precisely captures what it refers to. An early

introspection either automatic or effortful. By bringing attention to these thoughts without judgement toward them being good or bad, and instead just 'being' in a mindful state, one can distance oneself from the reactive effects and improve well-being (Brown et al., 2007).

While awareness of thoughts and emotions is emphasized over any judgement ("e.g., I shouldn't be thinking those thoughts!"), traditional meditative practices do tend to occur within a lifestyle of developing a 'correct view' of the world and one's place in it. While one's thoughts within meditation ought not to be judged, how one conducts oneself in relation to others is a form of judgement itself. A mindful individual, whether in meditation or daily life, recognizes the emotional response to stimuli, whether from thoughts, memories, or others' actions, but, by bringing awareness to them, can recognize they are distinct from oneself and do not need to fully characterize one's self-identity (e.g., an "angry person" is someone who just tends to get angry). Bringing awareness to the triggers or reasons for these emotional reactions is an important aspect of mindfulness meditation as it further connects to this notion of how to better orient oneself in relation to the larger society and world. Therefore, mindfulness is not purely letting thoughts or ideas float in and out while sitting in silence, but bringing intentional awareness to those thoughts for the purpose of identifying them for future understanding of their origins in order to be a better self for others (Garland et al., 2014).

> "By over-emphasizing the nonjudgmental nature of mindfulness and arguing that our problems stem from conceptuality, contemporary authors are in danger of leading to a one-sided understanding of mindfulness as a form of therapeutically helpful spacious quietness. I think that it is important not to lose sight that mindfulness is not just a therapeutic technique but is a natural capacity that plays a central role in the cognitive process. It is this aspect that seems to be ignored when mindfulness is reduced to a form of nonjudgmental present-centered form of awareness of one's experiences". (Dreyfus, 2010)

When individuals are overcome with emotions, whether positive or negative, they have difficulty seeing things as they are, both within themselves and their surroundings. Seeing things "as they are" is a type of wisdom that is difficult to attain and thus one of the goals of Buddhist practices, along with cultivating self-knowledge through learning, meditating, and contemplating (Karunamuni & Weerasekera, 2019; Ñanamoli & Bodhi, 1994). In this way, although not exactly the same, Eastern-based mindfulness is in line with ancient Western philosophical notions of ethics, morality, and virtues, and questions of how to live a good and happy life (Garfield, n.d.; Murguia & Díaz, 2015), as passed down through teachers like Aristotle, Plato, and Seneca. These and other various forms of modern philosophy and contemplation shaped modern psychology and their therapeutic interventions, such as

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translator cleverly drew upon the word mindfulness, which is not even in my dictionary. This has served its role admirably, but it does not preserve the connection with memory, sometimes needed to make sense of a passage."
(*Interview with Bhikkhu Bodhi: Translator for the Buddha*. (2019, July 21). Inquiring Mind. https://www.inquiringmind.com/article/2202_w_bodhi-interview-with-bhikkhu-bodhi-translator-for-the-buddha/)

cognitive behavioural therapy (CBT) and self-regulation therapies, with a growing popularity for mindfulness practices (Bishop et al., 2004; Garland et al., 2014; Murguia & Díaz, 2015; Semple et al., 2009).

For stoics, the path to *eudaimonia*, i.e., purposeful happiness, blessedness, or general welfare, is achieved by accepting the moment as it presents itself; not giving into the feelings and desires of pleasure or anxiety of pain; accepting there are things in nature beyond humans' control, and relying on reason and intellect for the things able to be controlled; and working with others in the name of fairness, justice, and goodness. One cannot control certain things but can control one's thoughts and actions to avoid unhelpful emotional distress. The idea is not that emotions are bad, but that some (e.g., anger or lust) need to be self-regulated to protect one's reason. Constant practice and self-reminders can be strengthened through certain practices, including journaling, reflection, and abstaining from certain pleasures.

> "[E]udaimonic well-being is characterized by a sense of purpose and meaningful, positive engagement with life that arises when one's life activities are congruent with deeply held values even under conditions of adversity… through the mechanism of reappraisal, mindfulness may generate eudaimonic meaning and foster flourishing in life . . . [M]indfulness connects daily life events with deeper meanings (eudaimonics), not by eschewing negative life experience and hedonics but instead by situating adversity and hedonics into a deeper and more extensive meaning system. This meaning system is robust against positive and negative experiences in that it acknowledges the transitory and somewhat impersonal nature of all experience" (Garland et al., 2014, p. 294, 306)

Robertson & Codd (2019) show parallels between Stoicism and CBT, including the application of self-monitoring, group therapy, self-help, life-coaching, the use of coping statements, and the practice of journal keeping. Similarly skills to improve mindfulness capabilities include focused breathing, and gratitude, journaling, yoga, and mindful movement during ordinary activities such as walking, standing, and eating (Arch & Craske, 2006; Baer, 2003; Cigolla & Brown, 2011; Grabbe & Miller-Karas, 2017). While some consider stoicism to be about suppressing emotions, Robertson and Codd (2019) state that (upper-case) "Stoic philosophy teaches a far more nuanced approach to emotional self-regulation, which is more consistent with the aims of psychotherapy", and focuses on awareness and acceptance of emotions that arise in response to issues out of one's control, such as the feelings in relation to experiences of trauma or developmental and neurological issues.

In contemporary psychology, mindfulness practices are used to improve awareness and prompt the individual to identify and respond to the physiological and psychological processes that occur in maladaptive behaviors and emotions (Bishop et al., 2004; Cairncross & Miller, 2020). A number of modern-day researchers view mindfulness as a multifaceted construct (Baer et al., 2004, 2006; Lau et al., 2006), and that it is "an inherent capacity in human beings that can be trained" (Sliwinski et al., 2015). Mindfulness practice involves developing and improving the ability to bring one's focus or attention to whatever is happening in the present

moment (Karunamuni & Weerasekera, 2019). Mindfulness can be viewed as a path to enlightenment, wisdom and self-knowledge, as well as a strategy for self-regulation of emotions that differs from other strategies of avoiding emotions or overly engaging with emotions (e.g., distraction, denial, cognitive distortion, suppression, repression, disengagement, dissociation, and rumination), which can lead to negative consequences such as self-harm, substance abuse, or even suicide (Hayes & Feldman, 2006; Karunamuni & Weerasekera, 2019).

Mindfulness can be viewed both as the set of skills, practices, tools, and techniques, as well as a mental state (Brown et al., 2007). As a mental state, mindfulness has further been viewed in terms of it being a dispositional characteristic 'trait', (i.e., having a mindful disposition, or the ability to more frequently and easily enter into mindful states), or as a momentary 'state' (e.g., entering into the state of present awareness following mindfulness practices, such as meditation). While most measures tend to focus on trait or "dispositional mindfulness" (Brown et al., 2007), recent scales have been developed to measure this state mindfulness, e.g., the State Mindfulness Scale (SMS; Tanay & Bernstein, 2013) and the Toronto Mindfulness Scale (TMS; Lau et al., 2006). While seated and still meditation is one way of achieving mindful states, some psychological approaches such as Dialectical Behaviour Therapy (Linehan et al., 1999) and Acceptance and Commitment Therapy (Hayes & Feldman, 2006; Harris, 2006, 2011) apply similar principles and techniques in everyday settings, such as practicing awareness and body scans.

In developing their State Mindfulness Scale (SMS), a tool to measure mindfulness, Tanay and Bernstein (2013) based their conceptualization of mindfulness from traditional Buddhist definitions, and through contemporary psychological concepts like Bishop et al.'s (2004) two-component definition of mindfulness. This definition states that mindfulness involves (a) "self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment", and (b) "adopting a particular orientation toward one's experiences in the present moment, an orientation that is characterized by curiosity, openness and acceptance" (Bishop et al., 2004, p. 232). Bishop and colleagues write that the first component can be strengthened through the practice of maintaining vigilant awareness over lengthy periods of time. This 'sustained attention' can be achieved by maintaining focus on the breath as thoughts and emotional experiences continue to come and go.

The distinction between trait and state is important, as such studies may show that individuals with higher trait mindfulness also tend to be more likely to experience state mindfulness (Baer et al., 2006). This may also be true vice versa, as Gu et al. (2016) note that within the popular trait-mindfulness measure, the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), such subscales as 'observation' (or awareness without judgment) are likely to change based on the participant's background and experience with meditation practice. Similar findings occurred in the development of the Toronto Mindfulness Scale (TMS;

Lau et al., 2006), which measures state-mindfulness of the mind (Curiousness) and the body (Decentering), and which found that individuals with experience of Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 2003) training had greater 'Curiosity' subscale scores, and the 'Decentering' subscale was more attuned to measuring and predicting perceived stress and distress (Lau et al., 2006). The authors of the TMS also point out that although it is useful as a measure of state mindfulness in a single point of time and is not intended to act as a measure of the individual's overall ability to enter into a state of mindfulness (i.e., an aspect of trait mindfulness), it may be the case that multiple testing times may provide an indication of this trait-like ability (Lau et al., 2006). The importance of this differentiation between dispositional trait mindfulness and state mindfulness is that while having a mindful disposition has been shown to be associated with a wide variety of positive outcomes, those without high 'natural' mindful dispositions who were still able to enter into a mindful state (e.g., through a period of meditation) have been shown to have improved life outcomes, such as higher positive affect and lower negative affect (Brown et al., 2007; Lau et al., 2006). Still, also worth noting, research has shown that individuals with higher dispositional mindfulness do appear more likely to report higher states of mindfulness on a day-to-day basis (Brown et al., 2007), meaning they are even more likely to experience these positive outcomes. Citing a long list of research studies, Keng et al. (2011, p. 1043) find that trait mindfulness has been shown to be associated with higher levels of: "life satisfaction… agreeableness… conscientiousness… vitality… self-esteem…empathy… sense of autonomy…competence… optimism… and pleasant affect", and with lower levels of "depression… neuroticism… absentmindedness… dissociation… rumination… cognitive reactivity… social anxiety… difficulties in emotion regulation… experiential avoidance… alexithymia… intensity of delusional experience in the context of psychosis… and general psychological symptoms."

Baer (2003) describes a number of ways to meditate, with one common method being to sit cross legged on a floor or cushion (or in a chair), close one's eyes, and simply breathe normally while paying attention to the breath flowing in and out. As thoughts circulate and attempt to dominate the attention, the idea is to not judge them, but to accept that they are there and return attention to the breath. Another method, body-scan meditation, involves paying attention to various parts of the body, including minute body parts such as one's toes or eyelids, and any bodily sensations that arise in the present moment.

In an examination of mindfulness and personality traits, Hanley & Garland (2018) found that of the Big 5 personality traits, conscientiousness showed the strongest, positive relationship with dispositional mindfulness (measured with the unidimensional Mindful Attention Awareness Scale (MAAS) and multidimensional FFMQ), and neuroticism had the strongest, negative relationship, suggesting that emotional stability and conscientious self-regulation play strongly into the characteristics of a mindful personality type. Giluk (2009) conducted a metanalysis of 32 samples from 29 studies on mindfulness and personality traits and concluded that conscientiousness was strongly associated with mindfulness. Other research has suggested that mindfulness meditation interventions may adjust personalities and

self-concepts, or the self-reports of them, in healthy ways (Crescentini & Capurso, 2015). Thompson & Waltz (2007) also found that greater mindfulness was negatively associated with characteristics of the trait of neuroticism, including anxiety, worrying, moodiness, impulsiveness, and self-criticism, but was positively associated with characteristics of agreeableness (e.g., trustworthiness and altruism) and conscientiousness (the tendency to be efficient, organized and self-disciplined). [See our write-ups on Conscientiousness].

In testing for implicit and explicit mindfulness, Brown and Ryan (2003) found that the Mindful Attention Awareness Scale (MAAS) worked to predict harmony between implicit and explicit affect, and that mindfulness had "prereflexive" qualities of being perceptive yet non-evaluative, which contributed to positive well-being and positive affect from practicing self-focused attention and awareness of one's behaviour, in contrast to the negative effects from other "reflexive" qualities, e.g., rumination. The authors posit that mindfulness serves an important self-regulatory function, with MAAS predicting stronger concordance between implicit and explicit emotional states of self-awareness in adults, and that MAAS was related to more autonomous and momentary (i.e., state-level) behavioral regulation and emotional well-being. In an experiment testing the possibility of increasing state-mindfulness in individuals with breast and prostate cancer, the increase in mindfulness practices correlated with a decrease in stress and mood disturbances, even when factoring in changes in physical symptoms. Worth noting, Brown and Ryan (2003) make a point of stating that an emphasis put on increasing well-being through mindful meditation is not the important aspect or point of mindfulness, in that this would only act to limit an individual's awareness and ability to be in the present.

Self-regulation Theory

While mindfulness is more of a non-judgemental awareness of the occurrences of the present moment, self-regulation has to do with the recognition that one's automatic responses to those occurrences in everyday life have in the past been unhelpful in some form and therefore require a degree of regulation. These reactions may be due to past experiences, or from physiological differences which cause one to experience higher or lower levels of reactivity to certain stimuli more intensely than others. Upon coming to this recognition on one's own or through others, individuals can set goals for how they want to live and apply strategies to regulate reactive thoughts or emotions before they spin out of control. As Farb et al. (2012) describe, the point is not to judge the emotions, thoughts, attitudes or bodily reactions as negative attacks on oneself, but recognize they are there due to some reason quite out of one's control (e.g., historical trauma, injury, or developmental disability), and that the ability to recognize this will calm areas of the brain associated with distress, and reduce the negative effects of rumination, such as anxiety and depression (Desbordes et al., 2012; Hofmann et al., 2010; Teasdale et al., 2000). People who self-regulate are more likely to see the good in others, see challenges as opportunities, keep open communication with others, remain

flexible, have better emotional regulation, and act in accordance with their values (Goleman et al., 2003).

Karunamuni and colleagues (2020) describe how subjective experiences (e.g., a life event or interpersonal experience) play a role in conditioning an individual's feelings, perceptions, or volitions, and how this plays a role in individual's moment-to-moment sensory consciousness. The experience of these individual "social factors" may bring about various reactions that evoke rumination, which in turn can influence biological changes, e.g., in neural circuits, or in an increase in inflammatory markers related to stress. Every individual must self-regulate to some degree, but negative past experiences can make it more difficult. While goal setting is an integral component of self-regulation, how one sets those goals and how they line up with one's values are equally important (Schunk, 2001; Harris, 2011).

Self-regulation arises out of a desired sense of control over the standards that individuals hold for themselves. These self-standards that represent the kind of person individuals want to be (and be known as) are described in the psychological literature as "*ideal selves, self-guides, possible selves*, and so on" and regulate behaviour by "by shaping affective reactions to actual or anticipated behavior that meets or falls short of those standards" (Crocker & Wolfe, 2001, p. 605). Once children learn and embody these standards, they are self-regulatorily by applying sanctions on themselves and social sanctions on others, by doing things that give them a sense of satisfaction and self-worth, and refraining from doing things that would result in self-censure. The standards act as guides, and the self-sanctions act as motivators, thereby keeping the individual's conduct in line with their personal values.

Similar to how memory is associated with mindfulness, as mentioned earlier, working memory is important in self-regulation. Barkley's (1997) model of executive functioning focuses on self-regulation and four main functions, the first being working memory which prevents external stimuli and information from interfering with and causing the individual to forget the immediate task at hand and its relation to longer term goals. The others are self-regulation of affect-motivation-arousal, i.e., the experience of something as negative or positive, the consequence of that, and the drive to maintain or improve; the internalization of speech to guide one's behaviour; and the reconstitution, or inhibition and reorganization of behaviours. Barkley's work on self-regulation and executive functioning in relation to attention-deficit/hyperactivity disorder (ADHD) is described more below in the section on Resilience.

Self-regulation and Self-esteem

Roy Baumeister, one of the key contributors to self-regulation theory, states that self-regulation is the self's ability to control personal thoughts, emotions, and behaviours (Baumeister et al., 1994). Everyone self-regulates in some form or another, but he was interested in why so many individuals fail at self-regulation, which he connects with self-control and willpower, and then how they regulate the amount of intake that they do indulge in (e.g., for people cheating on a diet, how much they give in to eating). Baumeister divides willpower

into four categories: control of thoughts, control of emotions, impulse control, and performance control (i.e., the ability to focus on tasks; Baumeister & Tierney, 2011). Through his 'strength model' of self-regulation, Baumeister argues that willpower is a limited resource, highly dependent on factors like sleep, stress levels, and nutrition, particularly glucose levels which when depleted lead to less self-control (Baumeister et al., 2015, 2018). To better self-regulate, individuals need proper sleep, nutrition, and exercise [see our write-ups on each of these protective factors]. Exercise or good night's sleep, for example, not only reduces the body's demand for glucose, but improves its ability to make use of glucose in the bloodstream (Baumeister et al., 2015). Baumeister also contributed terms like 'underregulation' and 'misregulation' to the field of self-regulation in outlining his 'strength (limited resource) model' of self-regulation (Baumeister & Heatherton, 1996). Lambird & Mann (2006) replicated Baumeister et al.'s (1993) study that had found that individuals with high self-esteem (HSE) showed poor self-regulation following a threat to their ego, thereby challenging the conception that HSE can only be positive. The updated study found that this was the case only when the individuals with HSE had defensive traits, characterised by high self-presentation bias. Measures for self-presentation bias and implicit self-esteem were used to create a subtype for defensive HSE individuals. Compared to individuals with 'secure' HSE, these defensive individuals were more likely to suffer self-regulation failure following ego-threat. The authors posit that this distinction of discriminate types of high and low self-esteem is important for understanding the criticism against seeing self-esteem only as a positive (Baumeister et al., 2003), and its role in relation to self-regulation failure and a variety of other factors [see our write-up on Self-Esteem for more information about this protective factor].

Crocker & Wolfe's (2001) work on 'contingencies of self-worth' also links self-esteem to the self-regulation of behaviour, by focusing on their goals. Goals that are based on contingencies of self-worth are particularly potent in affecting sustained or failed self-regulation. Failing to achieve these goals results not only in negative emotions like disappointment, but in low self-esteem, which can make it harder not only to continue the task in, but the lack of progress in satisfying these goals can make them hard to disengage from as the individual has staked their whole self-worth on them. These contingencies of self-worth act as powerful guides or 'self-standards' for behaviour in approaching these goals, which can have powerful affective, emotional, and cognitive consequences. This has been shown in studies of graduate students' state and trait self-esteem scores differing based on how much they tie their self-worth into their work or being accepted into a program (Crocker & Wolfe, 2001). This appears to tie into the above-mentioned concepts of 'misregulation' and defensive factors around self-esteem (Baumeister et al., 19993; Lambird & Mann, 2006).

Relationship to Resilience

Mindfulness practices have been shown to be associated with a number of positive outcomes for mental and physical health conditions, including anxiety, depression, obsessive-

compulsive disorder, and drug addiction (Siegel, 2007). While neuroscientific studies of mindfulness are still in their infancy, Paulus (2016) writes that there are already some interesting findings being shown in its association with stress, mental health, and resilience. Reducing stress through mindfulness can improve athletic performance (Colzato & Kibeli, 2017), and build patience, self-esteem, and self-regulation in prisoners (Samuelson et al., 2007). Mindfulness interventions have been shown to reduce activity in the neural regions associated with narrative self-reference (related to self-esteem) and increase attention regulation (Kumar et al., 2017). Mindfulness meditation practices has even been associated with a reduction in pain response (Hölzel et al., 2011; Zeidan et al., 2011; Zeidan & Vago, 2017), and may also prevent future mental health issues (Cheng, 2016; Tang & Leve, 2016).

Hölzel et al. (2011) cite studies reporting that mindfulness meditation has been used to treat anxiety, depression, eating disorders, enhance cognitive functioning, as well as have a beneficial impact on physical issues, such as chronic pain. Mindfulness meditation has been shown to have positive effects on the immune system, lower blood pressure and cortisol levels, and increased telomerase activity, which have been shown to decline with prolonged psychological stress. Mindfulness-based therapies have been shown to be effective in reducing anxiety, stress, and depressive symptoms in adults (Baer, 2003). Joss et al. (2020) showed that the promotion of acceptance, non-judgement, and self-compassion through a mindfulness-based intervention on improving empathy contributed to an increase in nonattachment, which in turn led to a decrease in rejection sensitivity. The authors also posit that the group format of the Mindfulness-Based Cognitive Therapy (MBCT) intervention may have contributed to this positive outcome, as it provides a sense of belonging and inclusion.

One qualitative study on the neuroscience of mindfulness (Choudhury & Moses, 2016) begins with a more critical or uncertain impression of the rise in popularity of mindfulness-based interventions, stemming from the suspicion of it arising as a religious American conception of 'hope'. However, it develops into seeing mindfulness as a useful tool, especially for its potential of building resilience in at-risk youth:

> "Mindfulness practices, particularly in relation to children who might otherwise be considered broken or unredeemable, fill a critical niche – one that allows its advocates to imagine a world where people can change, become more compassionate, resilient, reflective, and aware; a world with a viable future" (Choudhury & Moses, 2016, p. 603).

The authors also liken the rise of mindfulness alongside the growth in secular research and literature on strengthening resilience. Referencing Ungar's (2004) work, Choudhury & Moses (2016, p. 603) state that in this "New Age of Anxiety", resiliency provides an updated, more secular version of "scientized hope" that fits with classic religious views of work ethic, or 'grit' (the ability to bounce back and persevere), and redemption despite past experiences (i.e., that one's past does not define them). It is also worth adding that Ungar's socioecological, secular view of resilience also fits with an ecumenical discourse regarding the need for relationships

and community resources. To paraphrase one of the authors' qualitative interviewees, a mindfulness teacher, both mindfulness and resiliency offer a scientific and hopeful narrative.

While mindfulness tends to be a personal practice, the development of self-regulation may be fostered by the actions of others. Parents and caregivers can help to establish self-regulation practices and by implementing routines for mealtimes, chores, and bedtimes (Ungar, 2017; Ungar & Ikeda, 2017). When children know what to expect, it helps them to feel more comfortable and they are less primed to view the task as a threat to fight against or run from. When they feel comfortable and safe, they are better able to self-regulate (Porges, 2011). When youth act agitated and demanding, the role of the parent in helping to develop their self-regulation is to have them return to a state of calm in addressing others before responding to them, thereby instilling in them the importance of being able to self-regulate.

ADHD

In terms of the neurological activity occurring with self-regulation, the subthalamic nucleus appears to play a critical role in inhibitory control, an executive function of the ability to delay impulses (Diamond, 2013). Mindfulness awareness practices have been shown to improve executive functioning, behavioural regulation, and metacognition in children (Flook et al., 2010). Executive functioning and inhibition control issues have been reported as common symptoms of individuals with ADHD, with some authors like Malenka et al. (2009, p. 315) describing ADHD as less of an attention deficit disorder, than "a disorder of executive function… characterized by reduced ability to exert and maintain cognitive control of behavior… to suppress inappropriate prepotent responses to stimuli (impaired response inhibition)… [and] to inhibit responses to irrelevant stimuli (impaired interference suppression)." ADHD has been shown to be associated with decreased self-control and lower conscientiousness. Diamond (2005), however, argues that individuals with the inattentive but not hyperactive sub-type (once called ADD) have neurological and behavioural issues regarding "underarousal," or a lack of motivation, rather than problems with inhibition control. Such individuals are more prone to the feeling of boredom in certain tasks and situations rather than distractibility, which then manifests to being distracted by something more engaging. This may be why individuals with ADHD and poor inhibitory control and self-regulation issues have a higher tendency to have substance abuse (Diamond et al., 2013). To feel motivated, such individuals may require the feeling of "challenge or risk, something to literally get their adrenaline pumping, [which] can be key to keeping their attention and to eliciting optimum performance" (Diamond et al., 2005). While the prevalence of ADHD has been estimated to occur in approximately 4% of the adult population in the United States, a study by Ginsberg et al., (2010) tested for and estimated the prevalence of ADHD in long-term adult male inmates in a Swedish prison to be 40%, nearly all had a history of substance abuse, and nearly none of those identified of having ADHD through the study had childhood diagnoses. Finding healthy ways to motivate and pique the interest of these individuals may therefore be more important for keeping these individuals from criminal pursuits.

The term '*hyperfocus*' is used as a way to describe an individual with ADHD's ability to become enamoured with a topic or activity for a prolonged period of time, it is also known as 'dysregulated focus' or 'periodic overconcentration' as it often occurs when an individual has another task at hand. As such, some researchers refer to ADHD as "attention *dysregulation* disorder" (Asherson et al., 2018, p. 182-83). Baumeister might describe this as 'misregulation'. The ability to concentrate is there, but the ability to concentrate at the moment that it is needed can be more difficult. Similarly, another core symptom of ADHD is 'emotional dysregulation', which includes low frustration tolerance, irritability, and mood changes (Asherson et al., 2018). Such individuals may also have difficulties with overactivity and poor impulse control. Although these symptoms may fade with age, distractibility and impulse behaviours tend to remain into adulthood (Cairncross & Miller, 2020). For these reasons, other researchers have described ADHD as both a self-regulation deficit disorder (SRDD) and executive function deficit disorder (EFDD; Barkley, 2011).

In a recent metanalytic review of mindfulness-based interventions for individuals with ADHD, Cairncross & Milller (2020, p. 628) write that "ADHD is often described as a developmental delay in internal self-regulation of behavior and motivating goal-directed behavior." As such, behavioural-based intervention therapies, such as CBT, tend to be used and have been found to be effective in providing external information to guide behavior, which then enhances motivation. While these behavioral interventions do not tend to decrease core ADHD symptoms, they do tend to decrease disruptive behavior and increase social skills. Other studies on mindfulness interventions with ADHD in adolescents and adults have proven mostly promising, especially when they also involve the adolescents' caregivers (Van der Oord et al., 2012). In a review of 27 research studies, Leyland et al. (2018) found that mindfulness was effective in improving attention of individuals, which in turn helped to regulate executive functioning and negative emotions (Leyland et al., 2018).

School Contexts

Mindfulness is not solely an individual's focus on the present moment or the ability to withhold passing judgement, but is a cognitive activity and practice associated with working memory, which is used in emotional self-regulation and the management of cognitive demands, and is shaped by interpersonal relationships (Jha et al., 2010). Mindfulness is the ability to maintain awareness or remind oneself of the relevant information necessary to live in accordance with agreed upon social standards and value-based goals (Crocker & Wolfe, 2001; Harris, 2011). Besides parents, teachers also play an important role in child development. Mindfulness has been gaining popularity in schools, with such programs as the Mindful Movement Program[2], Mindful Life Project[3], MindUP[4], and Mindfulness in Schools Project

[2] https://hlfinc.org/programs-services/mindful-moment-program/
[3] http://mindfullifeproject.org/
[4] https://mindup.org/

(MiSP)[5]. Studies of mindfulness interventions for teachers showed increases in teacher-student relationships, teacher morale, self-compassion, and reduced burnout (Becker et al., 2017; Flook et al., 2013; Garner et al., 2018; Pülschen & Pülschen, 2015). Such mindfulness interventions may increase the retention of teachers, as well as improve students' educational outcomes by having increased quality relationships (Flook et al., 2013).

Mindfulness training in education is important for reducing stress, building empathy, and enhancing compassion for others and oneself[6]. Mindfulness has also been used to improve attention in adolescent students with anxiety issues (Semple et al., 2009). This can be especially important in specialized populations, such as working with individuals with learning and developmental disabilities (Pülschen & Pülschen, 2015), with some reports saying that mindfulness meditation may improve academic performance and lessen anxiety for youth with learning disabilities (Beauchemin et al., 2008). In one study of mindfulness programs for preschoolers, the reported outcomes included improved social and emotional awareness, and improved report card results for learning, health, and social-emotional development compared to the control group which displayed more selfish behaviour (Flook et al., 2015). The study notes the beneficial promotion of early prosocial behaviour and self-regulation qualities through the Mindfulness Based Intervention (MBI). Similarly, a study by Lim et al. (2015) showed evidence for the ability of MBIs to improve compassion and community-building prosocial behaviours. A more recent study by Joss et al. (2020) reported that young adults with histories of childhood maltreatment who participated in an MBI were significantly more likely to show improvements in mindfulness, nonattachment and empathy compared to their peers in a non-MBI intervention. Further, these positive increases contributed to lowered anxiety, interpersonal distress, rejection sensitivity, and other psychological symptoms. Crescentini & Capruso (2015) state that mindfulness meditation promotes a healthy and coherent sense of identity with increased cooperativeness.

A 2014 systematic review and meta-analysis of MBIs in schools concluded that the application of MBIs for children and youth can "increase cognitive capacity of attending and learning by nearly one standard deviation" (Zenner et al., 2014, p. 18). The effect was strongest among those with mindfulness training experience and home practice. In Jha et al.'s (2010) study on the association of mindfulness training and working memory capacity (WMC), the authors found that individuals who reported longer mindfulness training practice time showed increases in WMC, higher levels of positive affect, and lower levels of negative affect. The study was done with military personnel during a high-stress pre-deployment period.

Self-regulation has also been shown to be associated with critical thinking and increasing both is a desired outcome of educational institutions (Concannon et al., 2018; Dunn et al., 2014; Wang et al., 2017). Sahranavard et al. (2018) report a significant correlation

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[5] https://mindfulnessinschools.org/
[6] https://canadianteachermagazine.com/2019/04/22/mindful-schools-mindful-communities-participating-in-the-promise-of-mindfulness-based-teaching-and-learning/

between self-regulation and educational performance. As mindfulness is a component of self-regulation, it makes sense that the non-reactivity facet of dispositional mindfulness is in part associated with the facilitation of critical thinking (Noone et al., 2016). Critical thinking and other 'soft skills' are becoming ever more attractive for employers, and research has shown that both critical thinking and self-regulation have a positive association with academic help-seeking, which is also important in relation to the increasing trend in distance education (Dunn et al., 2014). As help-seeking tends to decrease with age, promoting critical thinking and self-regulation skills to young children is important (Dunn et al., 2014).

Employment

In terms of employment, trait mindfulness has been shown to be important for workplace settings that require focused attention, self-regulation, and interpersonal sensitivity (Good et al., 2016). In terms of state mindfulness, Good and colleagues cite research showing that just five minutes of mindfulness training was able to increase negotiation performance, just 15 minutes improved decision making, neural efficiency increased after three hours of training, and structural neural changes occurred after 11 hours of training (Good et al., 2016). The authors also discuss the important consideration of altering physical workplaces to facilitate mindful states.

Concerning the definition of resilience that has to do with the ability to "bounce back", Good et al. (2016) state that mindfulness can help to improve it in the workplace by employees adopting a "decentered perspective" (Bishop et al., 2004) during stressful events to remove one's ego from the scenario. Such "flexible cognition" can allow employees to limit the perception of events as threats and shift perceived hindrances into challenges to overcome. The act of "decoupling" the external experiences from automatic psychological and physical reactions is what Good and colleagues argue is the first step of bounce-back resilience, i.e., the ability to recover from adverse events. The second step or aspect of this form of resilience is growth in the face of adversity, which mindfulness can help to improve by facilitating the experience of being aware of and sitting through uncomfortable scenarios without reacting. Mindfulness can also improve behavioural and emotional regulation, and contribute to greater experience of positive emotions, which the authors note prove crucial in an individual's ability to recover from adverse events.

Interventions

In terms of substance use issues, Garland et al. (2014) argue that mindfulness practices target mechanisms in the brain related to craving and addiction, and Witkiewitz et al. (2013) report that MBIs can be effective for preventing drug use and relapse, especially among racial and ethnic minorities. Their study showed that a mindfulness-based relapse prevention (MBRP) intervention proved significantly more effective than a general relapse prevention program after a 15-week follow-up for women in a non-profit residential centre for criminal offenders.

Worth noting, attempts to improve mindfulness through mindfulness practices do not always work (e.g., Johnson et al., 2016), but even so the extended positive outcomes are encouraging (Simpson et al., 2018). In their scoping review of a variety of mindfulness-based interventions (MBIs) for youth in prison and rehabilitation programs, Simpson et al. (2018) found that the application of either breath awareness, body awareness, or mindful movement showed no significant changes in terms of mindfulness measurements (n = 842 pooled numbers, 99% male, ages 14-23). However, the authors also report quantitative and qualitative improvements in participants' mental health, stress reduction, self-regulation, emotional and behavioural management, problematic behaviour, substance use, quality of life, social skills, and criminal propensity.

Mindfulness-Based Stress Reduction (MBSR)

Formed in 1979 by Jon Kabat-Zinn (2003), MBSR was designed to treat chronically ill patients and continues to be used to treat a variety of conditions various settings, such as hospitals, schools, and prisons (Huang et al., 2016). Kabat-Zinn was one of the first to apply Buddhist mindfulness practices to medicine, such as body scans and breath awareness meditations. MBSR is an eight-session, group-based program in which participants take part in formal and informal mindfulness meditation practices together and at home. A recent study by Joss et al. (2020) looked at the effects of an MBSR-based intervention on mindfulness, nonattachment, empathy, and rejection sensitivity among a sample of young adults with a history of childhood maltreatment. Compared to the control group, these youth showed an increase in mindfulness and nonattachment, and a reduction in rejection sensitivity and PTSD symptoms. MBSR has also been shown to be effective in regulating glycemic levels in diabetes patients (Rosenzweig et al., 2007) and dispositional mindfulness may be associated with improved glucose regulation, shown through using the MAAS in individuals with diabetes (Loucks et al., 2015).

Mindfulness-Based Cognitive Therapy (MBCT)

The eight-week, Mindfulness-Based Cognitive Therapy (MBCT) program is a group-based therapy used to lower and prevent the relapse of depression in people with major depressive disorder (MDD), and alleviate stress, anxiety and pain in people with chronic health problems (Gu et al., 2016). Like MBSR, MBCT is an eight-session, group-based program in which participants take part in formal and informal mindfulness meditation practices together and at home, as well as more traditional CBT practices which educate the individual about their condition. The theory behind MBCT is that individuals who have already experienced a depressive episode may return to the same automatic cognitive processes when they have similar stressful experiences (Felder et al., 2012). By bringing awareness to those negative, repetitive thoughts, mindful practices will help the individual to be able to confront, accept, and disengage from them, and instead be aware and accept them without judgement.

One study by King et al. (2013) showed that the "three-minute breathing space" exercise of the MBCT program was particularly helpful for combat veterans with PTSD. However, worth noting, a recent study found that after a two-year (26 month) follow-up, MBCT did not prove more effective than a 'rigorous active control condition' (ACC) group at preventing relapses or recurrences of depression (Shallcross et al., 2018). Another recent study by Janssen et al. (2019) found that mindfulness-based cognitive therapy (MBCT) sessions proved effective for adults with ADHD, but the authors suggest that the therapy may be more feasible for patients on ADHD medication, as those who did not take them were more likely to drop out, citing similar findings in other research studies.

Mindfulness-based cognitive therapy for children (MBCT-C; Semple et al., 2009) is a group psychotherapy for children ages 9–13 years old, which uses mindful attention enhancement practices to increase social-emotional resiliency by reducing attention and behavioural problems and anxiety. The study included 25 English-speaking children (15 girls, 10 boys) in the United States who completed all three assessments and at least 8/12 training sessions. Twenty-one participants were ethnic minorities, and most were from low-income, inner-city households. Parents of four of the children spoke little to no English, but had translators to assist with completing assessments, such as the Child Behavior Checklist. Participants were matched by age and gender before being randomly assigned to one of four groups. Participants in the intervention group showed fewer attention problems than those in the control, which were maintained at three-months follow-ups. Attention issues were strongly associated with anxiety and behavioural problems, which also reduced.

Acceptance and Commitment Therapy

Another form of mindfulness or self-regulation therapy is Acceptance and Commitment Therapy (ACT; Harris, 2006, 2011; Hayes & Feldman, 2006). An important component of this model is the phenomenon of the "struggle switch", which involves an individual's reaction to feeling distress (e.g., anger or anxiety) over something external, and then additional distress from the experience of distress, i.e., feeling angry about feeling angry, or feeling angry about feeling anxious, or feeling anxious about how to get over feeling anxious, or sadness and guilt about feeling angry and anxious ("I shouldn't let myself get so worked up! I should know better. Once again, I'm acting like a child"; Harris, 2007, p. 134). These secondary emotional responses are unpleasant, unhelpful, and add to a vicious self-deprecating cycle by the individual then feeling bad about experiencing them. Harris (2007) argues that ACT provides individuals with the tools to not give energy and wasted time to the secondary reaction by turning the struggle switch 'off' for the initial emotional response to be free to float around. Instead of struggling with anxiety, the individual accepts that it is occurring and is unpleasant, and will rise and fall, but is not enough to overwhelm thoughts and other emotional responses or executive functioning. ACT states that this form of "clean discomfort" is natural for everyone to experience, and "dirty discomfort" occurs when the struggle switch is on and individuals get overwhelmed by the secondary emotional reactions to the primary reaction, which can lead

into unhealthy ways of trying to get rid of those discomforts, such as excessive eating, shopping, sex, or alcohol and drug use.

ACT has proven effective in facilitating acceptance and regulating stress, anxiety, and other emotional reactions to negative emotions or experiences, including in improving wellbeing for individuals who have learned of having cancer (Datta et al., 2016). In one such study of 107 patients with cancer (65% female), 8-weeks of and stress management group therapy showed improvements in patients' reports of 'acceptance' and 'meaning of life', leading to increased psychological flexibility and happiness (Datta et al., 2016). Patients also showed non-significant improvements in stress and quality of life scales, with the researchers noting that other stressors are due to economical factors and the deterioration of health, and ACT would work well as a method of psychotherapy or complementary medical treatment.

A large part of ACT and the concept of the struggle switch has to do with individual's instinctive, visceral view of some emotional reactions being bad (e.g., guilt, anger or anxiety) and others good (e.g., happiness or love), because that is how individuals experience them, i.e., 'I feel good when I'm happy, I feel bad when I'm anxious.' ACT contends that much of how individuals view and experience emotions has to do with how they viewed others displaying or struggling with such emotions in their childhood. ACT does not aim to get rid of the negative emotions, but the struggle one has with them that often results in further negative emotions. While ACT takes a socially constructed 'nurture' view of how struggling over emotions results in negative emotions and wellbeing, the polyvagal theory (Porges, 2007, 2011) takes a physiological, evolutionary 'nature' approach.

Polyvagal Theory-based Interventions

Stephen Porges contends that humans evolved a third form of nervous system response aside from the earlier, and better-known, fight/flight and freeze/feint. In contrast to the latter two which developed out of the need for survival in the face of threat, the social engagement system developed out of a sense of comfort, safety and community, and the need to work together for survival and 'thrival', i.e., "moving individuals and society toward a state of optimum health and well being" (Fitch, 2006, p. 575). To do this, homo sapiens developed social communicative gestures which are both enacted through and evoke automatic visceral responses, such as smiling and feeling safe and calm when someone smiles back, or concern and fear when being angrily glared at. The muscles involved in regulating these facial features and gestures are connected to a branch of the vagus nerve, which also extends to the inner ear, which is responsible for amplifying human voices over background noises. In this way, the polyvagal theory states that humans are primed to socialize, and base much of what we think about ourselves off of the opinions, automatic responses, and anticipated reactions of others. We are also primed to experience the visceral emotional responses mentioned above regarding ACT.

The branches of the vagus nerve are also connected to muscles and organs like the heart and lungs associated with the mechanisms responsible for the more ancient defense mechanisms mentioned above. When the nervous system senses danger, the social engagement system becomes deactivated as a 'vagal break' triggers fight-or-flight responses with a rush of cortisol and increased heart rate. The importance of this theory is that often this can occur without the individual having cognitively perceived a threat, especially when they have experienced trauma. The polyvagal theory also provides an explanation for the 'freeze' phenomenon that survivors of sexual abuse recount having experienced during their ordeal. In order to survive and protect itself, the nervous system reverted to its most ancient defense mechanism, freeze-or-feint, after 'deciding' it could not deal with the threat socially, nor fight off or run away from it. As most individuals feel guilt, anger and confusion at their body from this response to trauma, the polyvagal theory instead offers the individual the viewpoint that their body had done everything it could to keep it safe. Similar defensive rather than social features may also occur in a variety of psychiatric disorders, such as an inability to communicate or adverse reaction to audible or visual stimuli.

Like the principles in ACT, the polyvagal theory can help individuals to recognize that attempting to self-regulate their secondary emotional responses may prove unhelpful, and may instead fare better by accepting the initial reaction and the responses that it evokes, but not let it overtake the rest of their lives. Both recognize that the primary emotional responses are unable to be contained, so it is better to be aware of them when they arise, and to not employ negative self-talk about oneself, specifically when in relation to past traumatic events. The novelty of the polyvagal theory is in providing physiological explanations for visceral occurrences, in contrast to Stoic philosophies of disturbances originating from within the mind. The distinction with ACT is that once individuals find this self-acceptance, they then make commitments to stop fighting the past and instead set goals for the future that are in line with their own world values (Harris, 2006). This tends to include improved self-regulation of behaviour in relation to those thoughts of the past, yet without dwelling or ruminating by instead shifting focus to those value-based goals to become more self-confident and optimistic.

Ruminating on stressful scenarios (AKA 'perseverative cognition') has been shown to be associated with physiological changes, hence the expression of feeling 'sick with worry', (Verkuil et al., 2010). Mindfulness meditation practices that reduce rumination may alter these biological pathways to stress (Karunamuni et al., 2020; Pascoe et al., 2017). Other physiological effects associated with decreased rumination and stress from mindfulness-based practices include improved immune system support, the possibility of decreased inflammation (although results are mixed), and lowered likelihood of developing mild cognitive impairment, dementia and Alzheimer's disease (Creswell, 2017; Creswell et al., 2019; Karunamuni et al., 2020, Larouche et al., 2015). Recent research has found that mindfulness-based interventions show positive results for adults with cardiovascular disease (Scott-Sheldon et al., 2020).

Also similar to ACT, the polyvagal framework has been applied to interventions for cancer patients using mindfulness practices, such as Lucas et al.'s (2016) study using Mindfulness-Based Movement (MBM) therapy to achieve "acceptance of the highs and lows of life" (p. 9) through increased awareness of physical movement within a framework of feeling safe. Rather than physical activity being something that needs to be 'done', it can be an ongoing 'experience of being' a part of life in being fully engaged with one's surroundings. Within this way, MBM is an active neural exercise that enhances resilience and calming aspects of the vagus system. The awareness of these bodily states and visceral distresses is being studied in ways to increase resilience (in terms of the ability to bounce back) and emotional regulation.

Sullivan et al. (2018) argue that with the knowledge of the physiological aspects of polyvagal theory, these physical bodily movement practices may be necessary to interact with the nervous system to stimulate and reengage the social engagement system, compared to purely mindful practices like CBT. Sullivan and colleagues study the effects of yoga therapy on resilience (i.e., the ability to bounce back) and self-regulation, and argue that the polyvagal theory framework has similarities with ancient yogic philosophies, or *gunas*, that emphasize the connection between behaviour, psychology, and physiology within the aim of cultivating eudemonic well-being. The focus of being conscious of one's emotions and bodily responses through yoga, and the emphasis on achieving calm and tranquil states, may have similar effects to polyvagal-related interventions which aim to foster a sense of calm and safety to stimulate the social engagement system. Sullivan et al. (2018) also cite studies showing that low vagal regulation has been associated with "poor self-regulation, less behavioral flexibility, depression, generalized anxiety disorder, and adverse health outcomes including increased mortality in conditions such as lupus, rheumatoid arthritis and trauma" (p. 4). They also state that low resilience has been shown to be linked to dysregulation of the autonomic nervous system, and that yoga interventions have shown improvement in measures of psychological resilience and improved vagal regulation.

Another form of 'body-based' therapies is Somatic Mindfulness Therapy, as found within the Trauma Resiliency Model (Grabbe & Miller-Karas, 2018). For victims of trauma, this 'bottom-up' sensory-awareness approach to emotional self-regulation may be more useful than cognitive 'top-down' therapies or exposure therapies. Grabbe & Miller-Karas (2018) write that the stress brought on by trauma can cause additional adverse conditions, and that looking inside oneself through "interoception" may be critical in both preventing these sequelae and healing the trauma. Awareness of the bodily reactions, such as heart rate variability, may contribute to the ability to self-regulate one's mood or emotional response that results from the heart being stimulated by neural responses to external stimuli. People with higher resting heart rate variability have been shown to have greater executive functioning, including working memory and emotional response, and it has even been linked to greater 'wisdom'-related judgement (Grossmann et al., 2016). Therefore, while the Stoic quote below is true to a degree in terms of the affectiveness of secondary emotional responses, humans *are* also physiologically

disturbed or influenced by things which happen, especially when they are similar to things that have happened.

> "*Men are disturbed not by the things which happen, but by their opinions about the things*." (Epictetus, 1991, in Murguia & Díaz, 2015)

Transcendental Meditation

Transcendental meditation (TM) is a form of mindfulness meditation that involves practitioners silently repeating mantras in their minds during their practice as thoughts pass, compared to more traditional practices that focus more on mindful breathing. Sessions typically take place twice a day, for 20 minutes each, and past studies of this practice have shown a decrease in stress and anxiety (Avvenuti et al., 2020). A recent study by Avvenuti and colleagues examined the effects of TM on perceived stress, anxiety, depression, resilience, interpersonal abilities and sleep disturbances, using psychometric questionnaires, as well as on neural activity using structural and resting-state functional magnetic resonance imaging (RS-fMRI). Participants were divided into a meditation group (n = 19; 11 female; mean age 29), and a control group who carried on with their regular daily activities (n = 15; 7 female; mean age 32). A certified TM trainer taught the TM technique to the meditation group, who then practiced TM twice a day for 20-minute sessions, once in the morning and once in the evening, and used journals to log the start and end times of their sessions for three-months.

Compared to the control group, the anxiety and stress levels of the meditation group significantly reduced after three months. The fMRI scans of the meditation group but not the control group also showed marked difference in neural connectivity between different cerebral areas, such as the precuneus, left parietal lobe and insula, which play a role in the modulation of emotional states and the balance between internal and external awareness. However, when comparing the RS-fMRI results to the psychometric scores, the meditation group's reduction in perceived depression, anxiety and stress was found to be associated but not significantly correlated with increased connectivity of the posterior cingulate cortex with the precuneus and the left parietal lobule, showing more research is needed in this area.

Public Speaking/ Stage Fright Interventions

Mindfulness interventions have proven effective in overcoming public speaking anxiety. Kumar et al. (2017) looked at the relation to self-esteem (measured using the 10-item RSES) and public speaking anxiety (PSA)—one of the most common forms of anxiety—and the effects of mindfulness-based interventions. The study was conducted on 227 individuals (151 male; age range 24-28 years) in a two-year management education program, where public speaking was an essential component. Participants completed the following measures: the Rosenberg Self-Esteem Scale, the Personal Report of Public Speaking Anxiety, and the Mindful Attention Awareness Scale (MAAS). Respondents were contacted and requested to fill the questionnaires only if they had the opportunity of public speaking at least three times in the last 12 months. Mindfulness was found to be positively correlated with self-esteem and negatively correlated

with public speaking anxiety. Increased focus on the present may keep individuals from being distracted by any disruptions and being overcome by negative "what if" thoughts and help encourage individuals with low self-esteem that their negative thoughts are merely mental process.

Partner-based Cognitive Reappraisals

One form of mindful self-regulation is cognitive reappraisal or reframing. This strategy involves shifting one's thought patterns by reinterpreting or reappraising a situation and one's emotional connection and response to it (Brockman et al., 2017). For example, for cases of road rage, rather than getting mad at the person speeding by, instead consider they may be rushing to the hospital. Using such reappraisals in everyday life has been associated with increased positive emotional responses, including feelings of happiness, satisfaction, enthusiasm, excitement, and increased everyday mindfulness (Brockman et al., 2017). One study that focused on partners' involvement in the cognitive reappraisal process for individuals with breast cancer showed a reduction in stress levels by adopting a more consistent positive outlook (Robbins et al., 2017).

Fifty-two couples coping with breast cancer wore Electronically Activated Recorder (EAR) devices through the day to track their natural use of positive and negatively framed word use using the Linguistic Inquiry and Word Count (LIWC) software, and completed self-reports for positive reframing and stress before and two months after the study. The study found that the patients' spouses' cancer-related positive emotion words (used in reframing, e.g., happy, calm, fine) were significantly positively associated with the patients' reported positive reframing, and the spouses' cancer-related cognitive processing words (used in reframing, e.g., think, know, because) were marginally associated with patients' greater positive reframing. While patients' cancer-related cognitive processing words were marginally associated with their own lower T1 stress (showing an actor effect), the spouses' non-cancer cognitive processing words were also unexpectedly marginally associated with patients' lower reported positive reframing (showing partner effect). The authors write that in general, positive reframing words predicted lower levels of stress.

Mindful Eating

There are other ways to practice mindfulness besides meditation. Another technique to improve mindfulness is not on paying attention to the breath but on the act of eating, including the texture of the food, the taste, the bodily mechanisms involved in eating and digesting. Stanszus et al. (2019) showed that mindful eating can help to combat mindless eating, and cites past studies that have shown that mindfulness therapies are effective in addressing eating disorders, such as obesity and binge eating, as it helps to reconnect the individual with internal hunger and satiety cues, rather than giving into external cues (e.g., fast food advertisements, or the feeling of needing to eat out of comfort foods to combat anxiety). Their own participants in the mindfulness group (n=76; 37 in intervention and 39 in control; 73.4% female, mean age =

31) took part in exercises from sustainable consumption education programs in the framework of the Mindfulness-based-stress-reduction (MBSR) program. This involved eight weekly group sessions 90-minutes each, one additional half-day session after week six ("day of mindfulness") and individual daily practice (20 min). The training sessions included group discussions and different meditation techniques, including body scans, breathing meditation, loving-kindness or "metta" practice, and yoga. Topics of consumption, nutrition and grocery shopping were also discussed and practiced, and the MBSR focus on mindfully eating a raisin was also practiced. Mixed methods data showed positive results for MBIs having positive effects on mindful eating, and qualitative data showed that mindfulness practices increased sustainable food consumption practices.

Digital Media – Use of apps

With the advancement of digital technology, mindfulness-improving exercises are available in computer games and smart phones (Roquet & Sas, 2018; Sliwinski et al., 2015). Apps can be used to improve accuracy of reporting meditation and participation in other MBIs, especially with such tools as the "Muse™ Headband". Such technology may prove beneficial to practitioners for maintaining consistency by tracking their progress, and for researchers attempting to study the effects of meditation on mindfulness, and the frequency and duration of those practices. For example, Kabat-Zinn et al. (1987) found that while 75% of their former patients of a pain intervention study reported continued meditation practices, only 43% of these reported meditating regularly (more than three times a week, for more than 15 minutes per session), 19% meditated sporadically, and 38% meditated marginally (less than once a week for any length of time, or less than three times a week for less than 15 minutes each time; Baer, 2003; Kabat-Zinn et al., 1987; Lau et al., 2006).

A search of "mindfulness" on iTunes and Google Apps Marketplace identified 560 accessible English-language mindfulness apps, with 23 offering training and education (Mani et al., 2015). Of these 23, most were guided meditation apps, timers, or reminders, and the Headspace app had the highest Mobile Application Rating Scale (MARS) score. Another recent study by Economides et al. (2018) found that participants (n = 69; 39 female, 30 male; ages 18-50) who used the Headspace app, compared to those in a group using an introductory mindfulness audiobook, were able to lower stress, negative affect, and irritability within 10 days of using the app.

Self-Control Training

One theoretical approach to self-regulation interventions are that, like a muscle, self-regulation and self-control can be strengthened and improved through repeated practice (Baumeister et al., 2018; Beames et al., 2018). In a meta-analysis of 29 experiments of practicing cognitive and behavioural self-control training (SCT), Beames and colleagues found significant, small-to-medium effects on a variety of outcomes, including health and well-being. These interventions tend to occur over two-week periods, and focus on replacing unhealthy

habits with healthy habits, such as smoking with physical activity. Further, several experiments showed effects of "far transfer", i.e., practicing self-control in one area (e.g., improving posture, eating habits, physical activity, and using a non-dominant hand for tasks) showed improvement elsewhere (e.g., improved study habits and academic outcomes). However, worth noting, another metanalytical study on SCT's far transfer effects, based on 33 studies and 158 effect sizes, found a small to medium effect, and called for more research (Friese et al., 2017).

Assessment

Measures of Trait-like Mindfulness

Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003)

- 15-item measure of daily mindfulness, or "the general tendency to be attentive to and aware of present-moment experience in daily life" (Baer et al., 2006, p. 28).
    - "respondents rate how often they have experiences of acting on automatic pilot, being preoccupied, and not paying attention to the present moment. Items include, "I find myself doing things without paying attention," and "I break or spill things because of carelessness, not paying attention, or thinking of something else.""
- 6-point Likert scale from 1 (almost always) to 6 (almost never). Higher scores reflect greater mindfulness.
- Cronbach's alpha (α = .82).
    - MAAS was significantly positively correlated with openness to experience, emotional intelligence, and well-being; negatively correlated with rumination and social anxiety; and unrelated to self-monitoring. MAAS scores have been shown to be significantly higher in mindfulness practitioners. (Baer et al., 2006)
- "The MAAS was constructed to be free from attitudinal, motivational, and other psychological phenomena that might have contents directly connoting well-being or outcomes closely connected to it (e.g., patience, acceptance)." (Brown & Ryan, 2003; p. 844).

Cognitive and Affective Mindfulness Scale—Revised (CAMS-R; Feldman et al, 2007)

- 12-item scale
- Measures everyday mindfulness in terms of attention, awareness, present-focus, acceptance and non-judgemental attitudes towards thoughts and feelings in daily life. Measures all in a single score.
    - Example items: "I try to notice my thoughts without judging them," "It is easy for me to concentrate on what I am doing," and "I am able to accept the thoughts and feelings I have"
- 4-point Likert scale ('rarely/not at all' to 'almost always'). Higher scores reflect greater mindfulness.
- Cronbach alpha (α = .74–.80).

- The CAMS-R has exhibited acceptable convergent and discriminant validity with other measures of mindfulness, emotional clarity, avoidance, and over-engagement.
- The authors reported "negative correlations with experiential avoidance, thought suppression, rumination, worry, depression, and anxiety; and positive correlations with clarity of feelings, mood repair, cognitive flexibility, and well-being" (Baer et al., 2006).

The Mindfulness Questionnaire (MQ; Chadwick, et al., 2005, in Baer et al., 2006)

- Unidimensional, 16-item scale, representing four aspects of mindfulness: mindful observation, letting go, non-aversion and non-judgement.
- Assessing a mindful approach to distressing thoughts and images
- 7-point Likert scale ('totally agree' to 'disagree totally')
- Internal consistency alpha = .89.

Freiburg Mindfulness Inventory (FMI; Buchheld et al, 2001)

- 30-item
- Designed for use with experienced meditators
- Measuring non-judgmental, present-moment observation, and openness to negative experience
    - E.g., "I watch my feelings without becoming lost in them," and "I am open to the experience of the present moment."
- 4-point Likert scale ('rarely' to 'almost always')
- Internal consistencies of .93 and .94
    - "The authors reported internal consistencies of .93 and .94 in individuals who completed the inventory at the beginning and end of intensive meditation retreats lasting from 3 to 14 days." (Baer et al., 2006, p. 29)

Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004)

- 39-item self-report, measuring four elements of mindfulness: observing, describing, acting with awareness, and accepting without judgement
    - E.g., "I notice when my moods begin to change" (observe); "I'm good at finding words to describe my feelings" (describe); "When I do things, my mind wanders off and I'm easily distracted" (act with awareness); and "I tell myself that I shouldn't be feeling the way I'm feeling" (accept without judgment)." (Baer et al., 2006, p. 29)
- 5-point Likert-type scale ('never or very rarely true' to 'always or almost always true').
- Based heavily on Dialectical Behaviour Therapy (DBT; Linehan, 1999), measuring a general tendency to be mindful in everyday life, not requiring experience with meditation.
- Internal consistencies range from .76 to .91 for the four subscales

Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006; Appendix A)

- 39-item questionnaire, and short 15-item

- based on a factor analysis of five independently developed mindfulness questionnaires (listed above), the FFMQ is a measure of mindfulness commonly used to assess change before and after MBIs. It is used to measure 'trait-like' cognitive dispositions that might be a result of meditative and other mindful practices
- The five facets are (i) observing, (ii) describing, (iii) acting with awareness, (iv) non-judging of inner experience, and (v) non-reactivity to inner experience
- 5-point Likert scale: (1 = never or very rarely true; 2 = rarely true; 3 = sometimes true; 4 = often true; 5 = very often or always true)
- Cronbach alphas for facets from the 39-item measure ranged from .78 to .88, and for the 15-item from .64 to .80 (Gu et al., 2016).
- Full measure and scoring available here: https://goamra.org/wp-content/uploads/2014/06/FFMQ_full.pdf

Measures of State-mindfulness

State Mindfulness Scale (SMS; Tanay & Bernstein, 2013)

- 5-item
- measures mindfulness as a state-like phenomenon, that is evoked and maintained by regular practice
- Focuses on the objects of mindful attention ("what" a person attends to), and the qualities of mindfulness as a meta-cognitive state ("how" a person attends).
- Tanay and Bernstein (2013) found inconsistent relationships between trait mindfulness facets (measured using the FFMQ) and state mindfulness facets (i.e., state mindfulness of mind and body) of the SMS. Specifically, the researchers found that the SMS total and subscale scores were significantly positively related to FFMQ observing subscale scores (rs = .39–.47) and FFMQ non-reactivity subscale scores (rs = .18–.20), but significantly negatively related with FFMQ non-judging subscale scores (rs = −.20).
- Full measure and scoring available here: https://ggsc.berkeley.edu/images/uploads/The_Mindful_Attention_Awareness_Scale_-_State.pdf

Toronto Mindfulness Scale (TMS; Lau et al., 2006; Appendix B)

- 13 item scale
- 5-point Likert scale
- Measures overall state mindfulness and is based on two factors: "Curiosity" and "Decentering".
  - Curiosity items include, for example: "I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations."
  - Decentering items include, for example: "I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things really are."

- Unlike the FFMQ, the TMS is used *during* meditation to measure state-mindfulness experiences
  - "The TMS assesses the level of mindfulness during a single point in time and thus may not reflect a respondent's true or average capacity to evoke a state of mindfulness. Multiple testing periods should yield an indication of the ability to evoke a mindfulness state. In terms of using the TMS in evaluation research, we recommend multiple assessments of mindfulness at pre-, mid- and posttreatment to ensure reliable estimates of the respondent's ability to cultivate a state of mindfulness. This is because participants in meditation-based treatments may develop the capacity to evoke mindfulness generally, but may fail to do so effectively on a given testing session (e.g., at post-test for idiosyncratic reasons such as fatigue or extreme stress), resulting in misleading TMS scores" (Lau et al., 2006, p. 1462).
- Internal consistency: coefficient alpha = .84 - .88
- Full measure, scoring, and norms available here: https://www.ocf.berkeley.edu/~jfkihlstrom/ConsciousnessWeb/Meditation/TMS.htm

The State-MAAS (Brown & Ryan, 2003)

- 5-item scale adapted from the dispositional MAAS
- Designed to measure the recent or current expression of mindful attention and awareness of daily activities
  - Items include "I was doing something automatically, without being aware of what I was doing"; "I was rushing through something without being really attentive to it."
- 7-point Likert Scale
- Cronbach's alpha = .92

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003; described in Brockman et al., 2017)

- 10-item scale
- 7-point Likert scale (1 = Strongly Disagree; 7 = Strongly Agree)
- Assesses individual differences in the routine use of emotion regulation strategies of cognitive reappraisal and expressive suppression (4-item)
  - cognitive reappraisal (6-item) internal consistency = .79 and test–retest reliability = .69 in undergraduate student samples
  - expressive suppression (4-item) internal consistency = .73 and test–retest reliability = .69
- Full measure and scoring available here: https://fetzer.org/sites/default/files/images/stories/pdf/selfmeasures/Self_Measures_for_Personal_Growth_and_Positive_Emotions_EMOTION_REGULATION.pdf

Difficulties in Emotion Regulation Scale – Brief Version (DERS-16; Bjureberg et al., 2016)

- The full version of the DERS is widely used and psychometrically-sound, however, at 36-items, it can be cumbersome to administer. Bjureberg and colleagues developed the 16-item version of the DERS.
- Measures individuals' typical levels of difficulties in emotion regulation. "The conceptual definition of emotion regulation which the DERS is based on emphasizes the functionality of emotions and focuses on adaptive ways of responding to emotional distress, including the (a) awareness, understanding, and acceptance of emotions; (b) ability to control behaviours when experiencing negative emotions; (c) flexible use of situationally-appropriate strategies to modulate the intensity and/or duration of emotional responses, rather than to eliminate emotions entirely; and (d) willingness to experience negative emotions as part of pursuing meaningful activities in life" (Bjureberg et al., 2016, p. 285).
- The DERS-16 was validated in a clinical sample (n = 96) and two large community samples (Ns = 102 and 482).
- Internal consistency = .92
- The DERS-16 shows similar convergent and discriminant validity with relevant measures compared to the original DERS.

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Appendix A: Five Facet Mindfulness Scale

Baer et al. (2006)

In the space to the left of each item, please indicate whether each of the following statements is **generally true** or **generally false** of you, employing the following scale:

1	2	3	4	5
Never or Very Rarely True				**Very Often or Always True**

Rate 1-5	**Item #**	**Item**
	1	When I'm walking, I deliberately notice the sensations of my body moving.
	2	I'm good at finding words to describe my feelings.
	3	I criticize myself for having irrational or inappropriate emotions.
	4	I perceive my feelings and emotions without having to react to them.
	5	When I do things, my mind wanders off and I'm easily distracted.
	6	When I take a shower or bath, I stay alert to the sensations of water on my body.
	7	I can easily put my beliefs, opinions, and expectations into words.
	8	I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
	9	I watch my feelings without getting lost in them.
	10	I tell myself I shouldn't be feeling the way I'm feeling.
	11	I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
	12	It's hard for me to find the words to describe what I'm thinking.

	13	I am easily distracted.
	14	I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
	15	I pay attention to sensations, such as the wind in my hair or sun on my face.
	16	I have trouble thinking of the right words to express how I feel about things
	17	I make judgments about whether my thoughts are good or bad.
	18	I find it difficult to stay focused on what's happening in the present.
	19	When I have distressing thoughts or images, I 'step back' and am aware of the thought or image without getting taken over by it.
	20	I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
	21	In difficult situations, I can pause without immediately reacting.
	22	When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
	23	It seems I am 'running on automatic' without much awareness of what I'm doing.
	24	When I have distressing thoughts or images, I feel calm soon after.
	25	I tell myself that I shouldn't be thinking the way I'm thinking.
	26	I notice the smells and aromas of things.
	27	Even when I'm feeling terribly upset, I can find a way to put it into words.
	28	I rush through activities without being really attentive to them.
	29	When I have distressing thoughts or images I am able just to notice them without reacting.
	30	I think some of my emotions are bad or inappropriate and I shouldn't feel them.

	31	I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
	32	My natural tendency is to put my experiences into words.
	33	When I have distressing thoughts or images, I just notice them and let them go.
	34	I do jobs or tasks automatically without being aware of what I'm doing.
	35	When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
	36	I pay attention to how my emotions affect my thoughts and behavior.
	37	I can usually describe how I feel at the moment in considerable detail.
	38	I find myself doing things without paying attention.
	39	I disapprove of myself when I have irrational ideas.

As its name implies, the FFMS measures five different aspects of mindfulness. In order to determine your score, calculate the following subtotals:

Facet	Sum of Item #s (In Parentheses)
Nonreactivity to Inner Experience	**= (4 + 9 + 19 + 21 + 24 + 29 + 33)**
Observing / Noticing / Attending to Sensations / Perceptions / Thoughts / Feelings	**= (1 + 6 + 11 + 15 + 20 + 26 + 31 + 36)**
Acting with Awareness / Automatic Pilot/Concentration / Nondistraction*	**= 48.0 - (5 + 8 + 13 + 18 + 23 + 28 + 34 + 38)**
Describing / Labeling with Words*	**= 18.0 + (2 + 7 + 27 + 32 + 37) - (12 + 16 + 22)**
Nonjudging of Experience*	**= 48.0 - (3 + 10 + 14 + 17 + 25 + 30 + 35 + 39)**

> **Note:** Some items of these scales (in *italics*) are reverse-scored, such that a score of 5 indicates *less* mindfulness. This key takes account of the reverse-scored items.

**For scoring and more info:

https://www.ocf.berkeley.edu/~jfkihlstrom/ConsciousnessWeb/Meditation/FFMS_Score.htm

Appendix B: The Toronto Mindfulness Scale

Lau et al. (2006)

"We are interested in what you just experienced. Below is a list of things that people sometimes experience. Please read each statement. Please indicate the extent to which you agree with each statement. In other words, how well does the statement describe what you just experienced, just now?"

Rate 0-4	Item #	**Item**
	1	I experienced myself as separate from my changing thoughts and feelings.
	2	I was more concerned with being open to my experiences than controlling or changing them.
	3	I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings, or sensations.
	4	I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things 'really' are.
	5	I was curious to see what my mind was up to from moment to moment.
	6	I was curious about each of the thoughts and feelings that I was having.
	7	I was receptive to observing unpleasant thoughts and feelings without interfering with them.
	8	I was more invested in just watching my experiences as they arose, than in figuring out what they could mean.
	9	I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant.
	10	I remained curious about the nature of each experience as it arose.
	11	I was aware of my thoughts and feelings without overidentifying with them.
	12	I was curious about my reactions to things.
	13	I was curious about what I might learn about myself by just taking notice of what my attention gets drawn to.

0	1	2	3	4
Not at All	A Little	Moderately	Quite a Bit	Very much

The TMS measures two different aspects of mindfulness. In order to determine your score, calculate the following subtotals:

	Sum of Item #s
Curiosity	= (3 + 5 + 6 + 10 + 12 + 13)
De-Centering	= (1 + 2 + 4 + 7 + 8 + 9 + 11)
*All items are positively keyed.	

R2

For more information about R2 or to discover how you can bring the program to your organization, business or educational setting, please contact us.

Paul McGuinness

Operations Manager

✉ rrc@dal.ca
📞 (902) 494-8482

Michael Ungar, PhD

Director

✉ michael.ungar@dal.ca
📞 (902) 229-0434

RRC - Evaluation
and Training Institute