



Effectiveness of Mindfulness Training on Ratings of Perceived Stress, Mindfulness and Well-being of Adolescents Enrolled in an International Baccalaureate Diploma Program

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EFFECTIVENESS OF MINDFULNESS TRAINING ON RATINGS OF PERCEIVED
STRESS, MINDFULNESS AND WELL-BEING OF ADOLESCENTS ENROLLED IN
AN INTERNATIONAL BACCALAUREATE DIPLOMA PROGRAM

By

Virginia Reiss

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ABSTRACT

The presence of stress is normative for individuals, and it is how one copes with stress that is important towards a person's well-being. In stressful situations, one's cognitive appraisal of and emotional reactions to a challenge are based on whether it is perceived as a threat to one's beliefs and goals. Mindfulness meditation training (MMT) is a set of coping strategies that has demonstrated beneficial effects for adults in reducing stress, enhancing wellbeing, and promoting cognitive efficiency. This procedure incorporates breathing techniques to regulate physiological responses and teaches the person to appraise moment to moment sensations, feelings and events as transitory, positive or neutral to assist in emotional regulation. In the past decade, research has suggested that MMT is appropriate and effective for children and adolescents, although most studies have been with clinical populations. The present study examined the relative effectiveness of MMT in stress reduction, and in promoting the mindfulness and well-being of adolescents enrolled in an International Baccalaureate (IB) program. Twelfth-grade students self-selected to participate in either an eight-week MMT course or to complete surveys as part of a no-treatment control group. Ratings for perceived stress, mindfulness, and well-being were collected from the MMT and the control groups at pre-intervention, post-intervention, and at one week prior to admission of high stakes IB exams. A repeated measures 2 X 2 ANOVA was conducted for each of the three scales. Within the repeated measures ANOVA, the interaction between the factor of treatment/no treatment and the within-subjects variable "point in time" (before training, after training, and prior to the exam) was found to be statistically significant. Subsequent *post hoc* testing showed that the significant interaction effects occurred only at pre-test for the three

measures of perceived stress, mindfulness and well-being, indicating that the groups were very different to begin with. These findings were discussed with respect to the current literature on MMT. Future directions for research in this area were also discussed, as were the limitations of the study.

CHAPTER 1

INTRODUCTION

Lazarus' (1993) stress, appraisal and coping theory provides a framework for the present study, focusing on differences in the ways individuals handle the same stressful events based on their unique cognitive appraisal in which perceived demands and limitations of an environment are balanced against the individual's goals and belief systems. In this transactional model, Lazarus (1993) defines psychological stress as a relationship between an individual and his or her environment with two central processes that can mediate within this relationship, namely, appraisal and coping. When the environment is appraised by an individual as taxing or exceeding his or her resources, psychological stress results which may threaten the person's well-being (Lazarus & Folkman, 1984). Both perception of the environmental demand and perceived capability to respond to the challenge have been suggested as determining the effect of the stressor. Cognitive appraisal of the challenge, based on whether it is perceived as a threat to one's beliefs and goals, also impacts the coping response selected to address stressful situations (Lazarus, 1993). Thus, "potential stressors" become "real stressors" when they are perceived as threatening. A positive state of appraisal can be an important component in combating stress and facilitating coping (Lazarus, 1993). Research on mindfulness meditation training (MMT) suggests it encourages a less avoidant, more agreeable exposure to threatening experiences which may, in turn, lower negative cognitive appraisal, resulting in lower levels of stress (Weinstein, Brown, & Ryan, 2009). Mindfulness practices have also been reported as providing a reductive effect on stress by

cultivating increased capacity to adaptively cope with circumstances perceived as threatening or harmful (Weinstein et al., 2009).

A growing body of neuroscience research suggests that MMT has applications for improving learning and performance under stressful conditions. For example, a number of research studies suggest that MMT enhances sustained attention and cognitive efficiency, improving the ability to monitor performance and ignore distractions under time pressure for adolescents (e.g., Bogels, Hoogstad, Dun, Schutteter, & Restifo, 2008; Zylowska et al., 2007) and adults (e.g., Jha, Kiyonaga, Wong, & Gelfand, 2010). Recently, studies using functional magnetic resonance imaging (fMRI) have also provided evidence that networks in a person's neural structure can be modified as the result of mindfulness meditation interventions (e.g., Goldin & Gross, 2010; Holzel et al., 2011). The cognitive effects of having practiced meditation are associated with gradual changes in brain physiology which accrue through neuroplastic response to task repetition (Chang, Hou, & Mattson, 2010). In this regard, activation in the hippocampus (associated with learning, memory and emotional control) and the right anterior insula (associated with attention, awareness, and cognitive control and performance monitoring) have been reported during meditative states, and group differences in gray matter concentration have been noted in each of these areas in individuals with frequent meditation practices (Holzel et al., 2011).

One of the most frequently studied applications of mindfulness as a therapeutic method is Mindfulness-Based Stress Reduction (MBSR), which provided the basis for the curriculum and protocol in the present study. MBSR was originally developed in the late 1970's by Kabat-Zinn at the University of Massachusetts Medical Center to assist cancer patients in managing chronic pain (Kabat-Zinn, 1994). The core practices address stress

management and emotional regulation by incorporating breathing techniques that assist in regulating physiological responses (Kabat-Zinn, 1990). It also provides a method of meditation involving the nonjudgmental appraisal and acceptance of an individual's moment-to-moment sensations, feelings and events that occur within his or her meditation sessions (Hayes & Feldman, 2004). For example, in research studies with both clinical and non-clinical adult populations, MBSR has been found effective in treating a variety of health and mental health issues including chronic pain (e.g., Kabat-Zinn, Lipworth, Burney & Sellers, 1986), psoriasis (e.g., Kabat-Zinn et al., 1998), fibromyalgia (e.g., Kaplan, Goldenberg, & Galvin-Nadeau, 1993), anxiety disorders (e.g., Miller, Fletcher, & Kabat-Zinn, 1995), depression (e.g., Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000), substance abuse (e.g., Bowen et al., 2006), eating disorders (e.g., Tapper, Shaw, Ilseley, Hill, Bond, & Moore, 2009), borderline personality disorder (e.g., Linehan, 1993), and attentional control (e.g., Chambers, Lo, & Allen, 2008), as well as enhancing well-being and healthy adaptive human functioning (e.g., Brown & Ryan, 2003; Shapiro, Brown, & Astin, 2011).

While MBSR has extensive empirical evidence to support its relative effectiveness in reducing a variety of physical and mental health problems and in improving well-being, it is only in the past 10 to 15 years that MBSR and related practices have been studied as an intervention for children and adolescents (Burke, 2009). In this regard, it is generally accepted that adolescence is a period of growth and development marked by significant and lasting change, with much of this period of change often associated with stress since many physical, psychological, and social challenges are encountered for the first time by these youths (e.g., Arnett, 1999; Compas, Connor-Smith, Saltzman, Thomsen, &

Wadsworth, 2001; Frydenberg, 1997; Lohman & Jarvis, 2000; Suldo, Shaunessy, Thalji, Michalowski, & Shaffer, 2009; Yousefi et al., 2009). Moreover, it is suggested by some researchers that adolescence is the most difficult developmental stage of the lifespan since conflicts with others, mood disruptions and risky behaviors are more likely to surface during this time than at any other developmental stage (e.g., Arnett, 1999; Suldo et al., 2009). Adolescence is also a time when the ability to successfully adapt to stress is developed, including methods employed to handle emotions, to reason productively, to regulate autonomic arousal and to direct behavior to modify the stress in their environment (Compas et al., 2001). The ways that children and adolescents learn to cognitively appraise their environment, as well as the ways they select coping strategies to deal with stress, has significant influence on their future adjustment and patterns of coping throughout their later stages of development (Compas et al., 2001).

Adolescents identify the daily routine of being faced with pressure at school as one of their most frequent stressors. In the American Psychological Association's 2009 *Stress in America Survey*, over 1,200 children ages 8-17 in a nationally represented sample were asked about the sources of their stress. School-related pressures were named as the primary source of stress for the majority of both the younger and older children (Munsey, 2010). In the California Bay Area, Conner, Pope and Galloway (2009) conducted a survey of 3,500 students attending high performing high schools and found more than 70% reported "often" or "always" feeling stressed because of their school work. Fifty-six percent of the adolescents surveyed said they "often" or "always" felt stressed about tests, grades, and college prospects.

The IB diploma program, the academic program utilized in the present study, is acknowledged as having academic and extracurricular requirements exceeding those for regular high school graduation from public schools in the United States (e.g. Suldo et al., 2009). In this regard, perhaps the most stressful aspect of the IB program is the high stakes examinations students must pass to earn the diploma, proving mastery of material covered over two years of course work (Hill, 2002). Failing even one IB exam has appreciable repercussions for the post secondary options of these latter students (Hill, 2002).

In the past 15 years, an increase in the use of academic test scores in the United States to evaluate educational levels of attainment has led to an escalation of test-related stress (Zeidner, 1998). Specifically, with the passage in 2002 of the *No Child Left Behind Act* (NCLB), there was a new requirement that all states intending to retain federal funding must develop and administer criterion reference tests in grades three through eight, and one additional time during grades 10 through 12 (U.S. Department of Education, 2011). To date, 26 states require students to pass high stakes graduation tests to earn a high school diploma (USDOE, 2011). In this regard, according to Ravitch (2010), the former U.S. Assistant Secretary of Education, test scores have become an obsession, to the point that test preparation takes precedence over knowledge.

Some research on the effects of high stakes testing under the mandate of NCLB suggests there are greater levels of test anxiety among elementary and secondary students in U.S. schools as an unintended consequence of this legislation (e.g., Jones & Egley, 2004). Test anxiety is a reaction in which fear is activated because of a threat (the test) to students' need to see themselves (and be perceived by others) as competent and intelligent (Cizek & Burg, 2006). When directed in a productive way by students, some level of

school related stress can be beneficial in furthering their education. For example, Lohman and Jarvis (2000) suggest that motivating students to work harder by raising their level of attentiveness and responsiveness to school-related demands for their time can have a positive impact on their education. However, when levels of stress and anxiety are too high, the ability to think clearly, concentrate and perform optimally in school can be compromised (Frydenberg, 1997). For example, the occurrence of emotional states like anxiety and depression can inhibit the ability to screen out extraneous stimuli, and in doing so increase distractibility, as well as contribute to weakening organizational skills, and making attentional focus on particular tasks for extended periods more challenging (Shapiro, Brown, & Astin, 2011). There is also evidence that excessive stress and negative affect can contribute to memory impairment, with clear implications for learning (Bremner & Narayan, 1998).

In recent years, increased attention has also focused on “sub-threshold anxiety” in students that is below the threshold of those clinical manifestations of anxiety that often come to the attention of mental health professionals (e.g., Massone, Ducci, Scoto, Passaniti, D’Arrigo, & Vitiello, 2007; Putwain, 2007). Researchers found that a wide spectrum of anxiety symptoms common in school-age youth, including those below the clinical threshold, are associated with memory and cognitive impairments that can result in diminished school performance (e.g., Massone et al., 2007; Musch & Broder, 1999; Putwain, 2007). For example, Massone et al. (2007) found that in all grades, highly anxious students were significantly more likely to obtain lower scores on measures of academic achievement. They also found that the prevalence of high self-reported levels of anxiety increased in frequency with increasing age and grade level. While testing and

stress related to academic demands are normative during adolescence, inadequate coping responses can be a factor in a variety of social-emotional difficulties that are evident in secondary schools including lack of academic achievement, truancy, behavioral and conduct problems, anxiety, depression, and eating disorders (e.g., Frydenberg et al., 2004; Kovacs, 1997).

According to Lazarus (1993), coping is a process whereby the individual makes “ongoing cognitive and behavioral effort to manage specific external and /or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 237). He further explains that coping involves executing a response and is defined by the purpose it serves: to change the identified cause (problem-focused) by acting on either the environment or oneself, or to impact the emotional reaction (emotion-focused). Emotion-based coping strategies can include venting to others, exercising to release tension or cognitively reframing the situation through reappraisal (Lazarus, 1993). Nonavoidant strategies resolve stressful situations, or overcome the stress associated with them in an adaptive manner through direct action, acceptance of the reality of the situation, or through the use of cognitive reinterpretation of the situation (Roth & Cohen, 1986). Avoidant coping strategies include distorting, ignoring or running away from threatening stimuli, resulting in short-term solutions that are ultimately ineffective in supporting well-being (Roth & Cohen, 1986). While these latter strategies may promote feelings of relief in individuals, such actions may also produce other behavioral or emotional problems such as alcohol abuse (Wills, Sandy, & Yaeger, 2001). In Lazarus’ conceptualization, neither problem-focused nor emotion-focused coping strategies are necessarily the better choice; rather, what appears to be important is whether the coping process is adaptive and results

in improving an individual's adaptive outcome, such as improving his or her morale, physical health, and social functioning (Lazarus, 1993). Adolescents can overcome stressful situations by selecting adaptive coping strategies that are either problem-focused or emotion-focused, provided they have been exposed to such strategies (e.g., Compas et al., 2001; Frydenberg, 1997). Studies have indicated that having a repertoire of adaptive coping skills to select from can mediate the effects of negative life stressors on the development of future psychological problems (Weissberg, Kumpfer, & Seligman, 2003). Research also suggests that the use of nonadaptive coping strategies increases rapidly during adolescence (Frydenberg et al., 2004); therefore suggesting that this developmental period is a potentially important time period to teach adaptive methods that will promote the likelihood of the well-being of these individuals in adulthood (Frydenberg, 1997).

Although most of the research on MMT has focused on clinical populations and adults over the past two decades, some empirical studies have suggested that MMT can be taught to children and adolescents using a developmentally appropriate curriculum (Burke, 2009; Kabat-Zinn, 2005). Mindfulness meditation is typically taught as a five to eight week long course, focusing on a set of mindfulness practices which are Buddhist in origin, but applied in a secular context (Kabat-Zinn, 1990). The techniques taught have attendant attitudes, such as focusing and practicing staying in the present moment while experiencing and accepting thoughts and bodily sensations without judgment or investment. Training activities include learning how to conduct a body scan, and performing sitting, movement and walking meditations. Focus on breathing during meditation is used to induce calm but also to bring attention back to the present moment when the mind wanders. However, there is no particular way that participants are required

to breath. The goal of mindfulness meditation is to have the client notice and attend to what is taking place in his or her mind and body without attempting to alter the experience (Shapiro, Brown, & Astin, 2011). As an example, one exercise involves eating a raisin as if for the first time, guided by the instructor. The participant's attention and concentration are focused from moment to moment: first examining the texture with the fingers, then smelling the raisin, feeling the sensation of it laying on the tongue, biting into the raisin, savoring the tastes that are released, chewing it, and finally experiencing the desire to finish the eating process by swallowing the raisin (Kabat-Zinn, 1994). Students are coached to disregard their judgments based on previous experience with raisins. They are also instructed to acknowledge distracting thoughts and stimuli if they present themselves, but quickly release them and return their attention to the raisin. This practice of self-monitoring during a focused activity, moment by moment, has been found to be successful in reducing emotional reactivity and impulsivity in adults (Hayes & Feldman, 2004) and to improving executive functions including self-regulation of cognition, attention and emotion in a group of 20 undergraduate and graduate students (Chambers, Lo, & Allen, 2008).

Relaxation meditation is the most frequent type of meditation used in research with children and adolescents (Breslin, Zack, & McMain, 2002). In a systematic review of electronic data bases from 1982 to 2008, Black, Milam, and Sussman (2009) found 16 empirical studies in school, clinical and community settings that demonstrated the relative effectiveness of meditation in improving various behavioral symptoms and physiological responses in youth between six and 18 years of age. The slow, deep breathing inherent in meditation helps to balance sympathetic and parasympathetic responses (Kabat-Zinn,

1994). Deep, rhythmic breathing has also been shown to decrease resting and ambulatory blood pressure and heart rate in middle school students (Barnes, Davis, Murzynowski, & Trieber, 2004), and to decrease systolic blood pressure, heart rate and cardiac output in children both while at rest and during acute stress conditions (Barnes, Trieber, & Davis, 2001).

In relaxation meditation, the goal is to reduce stress by ignoring distracting stimuli and thoughts (Breslin et al., 2002). In contrast, the aim of mindfulness meditation is to accept the inevitable thoughts and sensations, observing them without judgment before returning the attention back to the breath (Kabat-Zinn, 1990). The goal is not so much to reduce stress as for individuals to be highly observant in the present from moment-to-moment, becoming desensitized to aversive interpretations of distractions, and paying attention to the connections between their emotional state and the behaviors they typically select in response to their emotional state (Breslin et al., 2002).

Research on the efficacy of mindfulness meditation with adolescents is recent, particularly for non-clinical populations, with the first set of research studies being published since the late 1990's (Burke, 2009). In Burke's (2009) review of research on 15 mindfulness-based studies with children and adolescents, effect size calculations were not determined because of the variability in data reporting and methodology used across the studies. Eight of the studies involved adolescents from clinical populations, with only two studies having non-clinical samples. Sample sizes for adolescents ranged from one to 102, and ages ranged from 11 to 19 years. Burke reported that the studies provided support for the feasibility of using mindfulness-based practices with children and adolescents, but no generalized empirical support for the efficacy of such interventions (Burke, 2009). Most

of the studies reviewed presented methodological design and procedural issues including small sample sizes, lack of random assignment and the absence of control groups. Other limitations included dependence on self-report measures, including measures of mindfulness with no data presented on the reliability and validity of the measures, and not identifying the contribution that group support made to the outcome. One of the most methodologically promising studies in Burke's review was by Biegel, Brown, Shapiro, and Schubert (2009) which examined the effects of a mindfulness intervention on 102 current or recently discharged psychiatric outpatients who ranged in age from 14 to 18 years. When compared to the treatment as usual group, participants in the eight week MBSR class reported reduced symptoms of anxiety, depression and somatic distress, and increased quality of sleep and self-esteem. When compared to controls over the course of the five month study, the treatment group also demonstrated higher diagnostic improvement as rated by clinicians who were not aware of the treatment condition.

Research has also shown that MMT may be associated with enhancements in executive attention in situations requiring self-regulation. For example, in a study involving adolescents diagnosed with ADHD, a mindfulness-based intervention improved the executive attention of the youth while performing several laboratory tasks (Zylowska et al., 2007). Another study involved clinically referred adolescents who had been diagnosed with externalizing disorders, including ADHD, oppositional defiant disorder, conduct disorder, and autism spectrum disorder. Researchers found improvements in attention and impulsivity problems after eight weeks of parallel mindfulness training with the adolescents and their parents. These improvements were also maintained at an eight week follow-up period (Bogels et al., 2008).

In a school-based, randomized control study of 64 students, second and third grade students who started with lower levels of executive functioning showed greater gains in behavioral regulation, metacognition and overall global executive control after an eight week mindfulness course (Flook et al., 2010). However, positive findings were based only on teachers and parents subjective ratings on survey measures.

In a six week trial involving 7 and 8 year olds from a fifth grade classroom, Semple, Reid, and Miller (2005) found support for the acceptability of treating children with anxiety problems using group mindfulness techniques. Each of the five children met the criteria for generalized anxiety disorder. Clinical observations showed that the children experiencing more severe symptoms were the ones who showed the greatest beneficial effects from the training. In another study by Beauchemin, Hutchins and Patterson (2008) it was found after a five week mindfulness meditation intervention that there was decreased state and trait anxiety between pre-test and post-test, as well as decreased detrimental self-focus of attention with a group of 34 adolescents with learning disabilities.

Huppert and Johnson (2010) conducted a study of mindfulness training with 173 14 and 15 year olds who were attending two different boarding schools in the UK. The training program used a curriculum based on the MBSR program developed by Kabat-Zinn (1990) which was also used in the present study. The control condition involved having students attend religion classes, a standard part of the curriculum of both schools. Students in the mindfulness group were also encouraged to practice outside of class hours, using a CD developed to guide them in mindfulness exercises at home. Intervention and control groups results were compared using self-report measures of mindfulness (CAMS-R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007), resilience (ERS; Block &

Kremen, 1996), psychological well-being (WEMWBS; Tennant et al., 2007) and the Big-Five personality dimensions (McCrae & Costa, 1987). The results showed non-significant effects on mindfulness, ego-resilience or well-being. However, students who reported less emotional stability and also openness to experience at baseline showed significantly greater increases in well-being after training than did their peers who reported at baseline more robust emotional stability but less openness. This suggests that students who are less emotionally stable but more open to experience may have greater potential for improvement using MMT. The results also showed a significant positive association between the amount of individual mindfulness practice participants engaged in outside the classroom and improvements on measures of psychological well-being ($\beta=.23, p=.03$) and mindfulness ($\beta=.245, p=.05$). The treatment was well accepted by the students who responded in a positive manner when asked if they enjoyed the MMT (69% responded yes) and if they would continue with mindfulness practice (74% answered yes).

While the research involving the use of mindfulness practices with children and adolescents is very limited, studies with adults may be suggestive of what might happen with children and adolescents. Research studies with adults have found that MMT has been beneficial in facilitating working memory under stressful conditions (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010). At best, these findings may suggest the potential of benefits to adolescents under academic pressure; however, this is ultimately an empirical question. Jha et al. found that mindfulness training had a protective effect on working memory capacity during periods of high stress for a group of military service members preparing for deployment to Iraq. In this study, working memory was defined as the capacity to selectively maintain and manipulate goal relevant information without getting

distracted by irrelevant information over short intervals. Recent fMRI research has shown that working memory can be impaired by acute psychological stress as evidenced by reduced activation of the prefrontal cortex in patients suffering from acute stress (Alloway, 2009). Research has also shown that working memory span is typically reduced following high cognitive demands, including instances when individuals try to suppress the experience of anxiety (Alloway, 2009). In the Jha et al. study, 29 research participants volunteered for an eight week MMT course. Before and after the training, performance scores on the Ospan, an operation span task, were used to represent working memory span. As the deadline for deployment approached, the mindfulness subjects maintained better performance on the Ospan than their control group peers who did not participate in the training. The study's results suggest that working memory capacity can be bolstered by mindfulness meditation training even in times of high stress.

Weinstein, Brown and Ryan (2009) conducted a study involving 141 college students between 17 and 40 years of age, investigating the effects of MBSR on the appraisal of stress, coping with stress, and the consequences for emotional well-being. The researchers included the MAAS measure of mindfulness (Brown & Ryan, 2003), the COPE Inventory (Carver, Scheier, & Weintraub, 1989), and the sadness and anxiety subscales of the Profile of Mood States (McNair, Lorr, & Droppleman, 1971). Participants were also asked to complete a measure of challenge construal and threat construal (McGregor & Elliot, 2002) and a short measure of challenge affect and threat affect (Folkman & Lazarus, 1985). The latter two measures were worded to refer to upcoming tests the students would be taking. Test scores were also collected. Results showed that the students reporting higher levels of mindfulness after training were likely to view

stressful situations, including tests, as being less stressful or threatening. While some of the participants in this study were adults, these findings may be suggestive of similar benefits for adolescents facing high stakes tests, including the International Baccalaureate exams.

Rosenzweig, Reibel, Greeson and Brainard (2003) examined the effectiveness of a 10 week MBSR class designed to improve the coping skills and reduce the stress of 140 second year medical students. Medical students self-selected for the MBSR intervention and were compared to cohort controls ($n=162$) who elected to participate in other classes on complementary medicine. The weekly classes involved 90 minutes of contact time for each of the 10 sessions. Participants in the MBSR class were also expected to practice 20 minutes of meditation at home six days per week. Both control and experimental subjects were asked to complete the Profile of Mood States (POMS) at the beginning and ending of the 10 week class session. The results showed that while students who self-selected for the MBSR class indicated having more overall mood disturbances at baseline when compared to controls, by the end of the class, the MBSR participants reported significant improvements in mood and lower psychological stress than the controls. While the participants in this study were not adolescents, the results may be suggestive of potential benefits for adolescents under highly stressful academic conditions like the students in the International Baccalaureate diploma program.

Purpose of the Present Study

Although mindfulness training research has focused primarily on adults in clinical populations, some research has examined the effects of mindfulness training on children and adolescents. However, most of this latter research has also been in clinical settings.

Only a few studies have focused on students within typical school settings despite two key factors that make MMT well-suited for this particular population. Adolescents are developmentally prepared for the meta-cognitive skills taught in mindfulness (Nelson, de Haan, & Thomas, 2006), and research evidence supports that this method is an effective, low-cost way to control stress and anxiety (Baer, 2003; Kabat-Zinn, Massion, Kristeller, Peterson, & Fletcher, 1992; Shapiro, Schwartz, & Bonner, 1998) and possibly help to manage the emotional demands associated with adolescence. In this regard, the purpose of the present study was to evaluate the relative effectiveness of MMT in reducing perceived stress and improving the mindfulness and well-being of adolescents in a school-based program. To ascertain the effectiveness of the training, students in MMT groups and control groups were administered pre-intervention and post-intervention rating scale measurements. Participants also completed these surveys at follow-up one week prior to taking comprehensive graduation exams. The dependent measures used included the Perceived Stress Scale, PSS (Cohen & Williamson, 1988) to assess perceived stress, the Cognitive and Affective Mindfulness Scale- Revised, CAMS-R (Feldman, Hayes, Kumar, Greeson & Laurenceau, 2007) to assess mindfulness, and the Warwick-Edinburgh Mental Well-Being Scale, WEMWBS (Tenant et al., 2007) to assess well-being.

Based on the successful use of mindfulness meditation training in prior research with children and adolescents (e.g., Burke, 2009; Bogels et al., 2008; Flook et al., 2010; Zylowska et al., 2007), the following null hypotheses were made and tested at the .05 confidence level:

Null Hypothesis 1: There will not be a significant difference over time between the experimental and control group participants on the PSS at the completion of the eight week MMT.

Null Hypothesis 2: There will not be a significant difference between the experimental and control group participants on the PSS at follow-up one week prior to the International Baccalaureate (IB) exams.

Null Hypothesis 3: There will not be a significant difference over time between the experimental and control group participants on the mindfulness scale (CAMS-R) at the completion of the eight week MMT.

Null Hypothesis 4: There will not be a significant difference between the experimental and control group participants on the mindfulness scale (CAMS-R) at follow-up one week prior to the IB exams.

Null Hypothesis 5: There will not be a significant difference over time between the experimental and control group participants on the well-being scale (WEMWBS) at the completion of the eight week MMT.

Null Hypothesis 6: There will not be a significant difference between the experimental and control group participants on the well-being scale (WEMWBS) at follow-up one week prior to the IB exams.

Null Hypothesis 7: There will not be a significant correlation between participants' predicted International Baccalaureate (IB) examination scores and their actual respective IB scores in both the MMT and the Control groups.

CHAPTER 2

REVIEW OF RELEVANT LITERATURE

“Mindfulness,” or “consciousness,” which is the more traditional term employed in the literature, is the state of being attentive to and aware of what is happening in an individual’s present moment without being associated with judgment (Kabat-Zinn, 1994). The concept of mindfulness has roots in Buddhist and other contemplative traditions, but can also be found in Greek, Western European, and American-based philosophical and psychological thought (Brown, Ryan, & Creswell, 2007). In particular, Sigmund Freud’s terms “conscious” and “unconscious,” and his theories of the interplay between these forces within an individual’s psyche, had a tremendous influence on personality theories during the late 19th century and throughout the 20th century (Hergenhahn, 2005). In general, mindfulness is considered an attribute related to or predictive of mental health and well-being (Brown & Ryan, 2003). It is also understood as a set of skills which can be taught and learned as a method of responding to stress (Bishop, Lau, Shapiro, Carlson, Anderson, & Carmody, 2004). Rather than a basic technique for relaxation, mindfulness is a “form of mental training to reduce cognitive vulnerability to reactive modes of mind that might otherwise heighten stress and emotional distress, or may otherwise perpetuate psychopathology” (Bishop et al., p. 6).

Definitions

Meditation is difficult to separate from cultural or spiritual contexts and there appears to be no clear consensus on its secular definition. Manocha (2000) explained it as the specific and well-defined practice of a state of thoughtful awareness in which the activity of the mind is reduced without minimizing alertness. From a cognitive psychology

perspective, Walsh and Shapiro (2006) described it as “a family of self-regulation practices that aim to bring mental processes under voluntary control through focusing attention and awareness” (p. 227). Cardoso, De Souza and Camano (2004) constructed an operational definition of meditation as any practice that meets the following criteria:

1. It uses a specific and clearly defined technique.
2. It utilizes muscle relaxation in the process.
3. It involves relinquishing logical analysis and judgment of the process and outcomes.
4. It is a self-induced state.
5. It uses some type of self-focus technique or “anchor” for attention.

A secular form of *Vispassana*, the Buddhist version of insight meditation, is the primary set of techniques used in MMT, although there are also aspects of *Samadhi*, or concentration meditation, which prepares the individual’s mind to practice Vispassana techniques (Kabat-Zinn, 1994). In concentration meditation, the goal is to focus on a particular object, then maintain that focus subsequently throughout the meditation session (Cardoso et al., 2004). The focus could be a visualization, a word or a certain physical sensation, such as air passing through the nose as one breathes. By practicing to focus on one specific thing, increased levels of concentration can be developed, resulting in feelings of calm and tranquility (Cardoso et al., 2004). For insight meditation, the goal is to remain detached from any particular focus and to be nonjudgmental of ideas or sensations that may occur during the session (Kabat-Zinn, 1994). By not dwelling on a thought or sensation, insight can be achieved, moment to moment, on all things.

In 2004, a grant from the Canadian Institutes of Health Research funded a series of meetings among mindfulness researchers in North America to establish consensus and

create a measurable operational definition of *mindfulness* (Bishop et al., 2004). The resulting definition includes two major components: The first is self-regulation of attention, which is oriented to the immediate present in a manner that is open and accepting. The second is a method of responding that is reflective and measured, rather than reflexive, so that the individual is less likely to select unhealthy avoidance strategies to deal with stressful situations. This group's conceptualization of mindfulness borrowed from self-regulation models of cognition and mood (Carver & Scheier, 1990). According to this model, cognition happens in the service of goals, comparing "what is" with "what is desired" by the individual. Then, the individual behaves in ways that narrow the gap between those two positions. If the discrepancy is reduced, a feeling of well-being follows. If the goal cannot be achieved, then a negative affect such as fear or frustration results. The mind will continue to search for ways to reduce discrepancies which can lead to even higher levels of distress (Carver & Scheier, 1990). This rumination may continue until the individual finds a new solution, abandons the goal, or succumbs to a deeper level of dysphoria that may lead to depression or physiological evidence of prolonged stress (Nolen-Hoeksema, 1991). Mindfulness training teaches acceptance; to observe and accept thoughts and feelings as transient mental events rather than negative reflections on the self, or truly accurate reflections of reality. Disengaging from the process of reducing the discrepancy can free the individual from continued rumination, and reduce vulnerability to psychological and physiological pathology (Nolen-Hoeksema, 1991).

The University of Massachusetts School of Medicine's Center for Mindfulness provided a concise, comprehensive definition: "Mindfulness is a way of learning to relate directly to whatever is happening in your life, a way of taking charge of your life, a way of

doing something for yourself that no one else can do for you—consciously and systematically working with your own stress, pain, illness and the challenges and demands of everyday life.” (Kabat-Zinn, 2005, p. 13). To further develop the definition, Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) performed factor analyses on items from the five most commonly used mindfulness questionnaires. Their findings appear to support the conceptualization of mindfulness as a multifaceted construct. Specifically, they reported that the following five factors were found: (1) non-reactivity to inner experience; (2) observing sensations, perceptions, thoughts and feelings; (3) action with awareness and concentration; (4) labeling with words; and (5) non-judging of experience.

Perceived stress is a subjective measure of the degree to which life situations are appraised as stressful, and how unpredictable, uncontrollable and overloaded an individual finds his or her life (Cohen & Hamrick, 2003). Perceived stress occurs when an individual recognizes, usually through physiological symptoms, that a stressor in the environment exceeds his or her coping skills (Cohen, Kamarck, & Mermelstein, 1983). Cohen’s Perceived Stress scale (PSS), which is used in the present study, focuses on a cognitive appraisal of stress and on the respondent’s perceived control and coping ability (Cohen et al., 1983). In the PSS, stress is believed to result from experiencing overload, with emphasis on the unpredictability and uncontrollable nature of events.

Well-being is an individual’s subjective cognitive and affective assessment of the quality of his or her life (Diener, 2000; Park, 2004). More recently referred to as “subjective well-being”, the literature notes three major components: high positive affect, low negative affect and high life satisfaction (e.g., Gilman & Huebner, 2003; Park, 2004). Quality of life is one’s general cognitive judgment that life is satisfying overall, and that

specific domains like school, family, friends and self are also satisfying (Diener, Suh, Lucas, & Smith, 1999). Research suggests that positive life satisfaction may encourage adaptive coping responses by alleviating frequent negative evaluations of situations (Huebner, Suldo, Smith, & McKnight, 2004). The key to subjective well-being is that the individual formulates an evaluation of his or her own life, as opposed to relying on the opinions of psychologists, philosophers or other experts (Diener, 2000). Hence, in his or her self-report, the individual is the expert.

Stress in Adolescents

In 1904, G. Stanley Hall characterized adolescence as a period of elevated “storm and stress.” Underlying this view was the idea that the period of adolescence was more difficult in many ways than any other period of human development across the life span (Arnett, 1999). According to Lazarus and Folkman (1984), psychological stress is a dynamic relationship between an individual and his or her environment, and is an ordinary part of daily living. When the environment is evaluated as exceeding available resources, it can challenge the person’s well-being. In Lazarus’ view, both perception of the environmental demand and perceived ability to act in response to the threat will determine the effect of the stressor. Thus, if an academic task, for example a mathematics examination, is perceived as being stressful and difficult prior to being attempted, then there is a strong likelihood that the actual experience will be a stressful one.

Stress has physiological, behavioral, cognitive and emotional components that are important to consider, along with developmental levels, when determining appropriate coping strategies and intervention methods for children and adolescents (Frydenberg, 1997). The human body has been described as having an automatic reaction to perceived

threat, often referred to as the “flight or fight reaction” or the Acute Stress Response (Cannon, 1929). This is an adaptive response that has evolved to maximize survival in threatening circumstances. In reaction to perceived danger, the hypothalamus signals the adrenal glands to release adrenaline which, in turn, increases heart rate and blood pressure (Thase & Howland, 1995). Adrenocorticotropic hormone (ACTH) is released into the bloodstream from the pituitary gland which then prompts the secretion of cortisol, the major stress hormone. Cortisol increases the level of glucose in the bloodstream to keep the brain alert, to prepare the body to repair tissue, and to suppress non-essential functions. Physiological effects include heart palpitations, shortness of breath, and stomach aches or headaches (Thase & Howland, 1995). This physiological response is not always warranted or appropriate to meet the level of actual danger (Thase & Howland, 1995). When the perception of threat does not decrease in intensity, continued activation of the stress response or chronic stress can be detrimental, and can possibly result in physiological problems including high blood pressure, heart disease, respiratory ailments, ulcers and diabetes (Ohman, Bergdahl, Nyberg & Nilsson, 2007).

Behavioral indicators of stress during adolescence may include an increase in irritability, hostility and conflict in relationships, being forgetful and careless, and a change in eating or sleeping patterns (Lohman & Jarvis, 2000). Increased use of substances like cigarettes, alcohol and drugs as coping mechanisms, school avoidance, and psychosomatic illness are also common behavioral indications of elevated levels of stress in adolescents (Frydenberg, 1997).

Feelings of apprehension, moodiness, depression and anxiety are common symptoms of stress among adolescents. In a general sense, anxiety is an emotional mood

condition that can result from an impending perceived threat (Seligman, Walker, & Rosenhan, 2001). “Normal anxiety” is typically in proportion to the actual threat. It doesn't involve overwhelming emotions and it usually elicits an individual's problem solving ability and coping mechanisms (Lazarus & Folkman, 1984). However, elevated levels of anxiety are associated with impairment of memory and cognitive functions (Heilman & Valenstein, 1979), and when prolonged or chronic, can lead to increased emotional and/or behavioral problems (Grant, Compas, Stuhlmacher, Thurm, McMahon, & Halpert, 2003). In fact, anxiety disorders are one of the most frequently diagnosed mental disorders during adolescence (Costello, Eggers, & Angold, 2005).

External causes of stress for adolescents include normative sources (e.g., puberty), non-normative situations like death and divorce, and also daily chronic stressors, for example, parent-child conflicts and academic pressure (McNamara, 2000). While parents and teachers often recognize the non-normative occurrences, they may be less sensitive to daily stressors that adolescents experience, and their ability to cope with them (Suldo, Shaunessy, Michalowski, & Shaffer, 2008). Research studies have investigated coping mechanisms that are used by adolescents under extreme stress (e.g., Compas et al., 2001), but coping with normative, daily stress has received far less attention (Suldo et al., 2008).

Research in the area of *school stress* indicates that school experiences are the most common stressors that present challenges during adolescence (Crystal, Chen, Fuligni, Stevenson, Hsu, & Ko, 1994; Puskar, Lamb, & Bartolovic, 1993; Munsey, 2010). Since adolescents spend most of their days in the school environment, school stress contributes to a large portion of the overall stress that they experience (Crystal et al., 1994). In this regard, in a study conducted by Lohman and Jarvis (2000) in the United States, 100% of

the adolescent females who participated and 96% of the adolescent males identified school as the major cause of stress in their lives. In addition, according to two studies conducted in secondary schools in Switzerland and Norway, one-third of the students surveyed rated tests, grade reports and social interactions in school as being excessively stressful (Haugland & Wold, 2001; Sieber, Ruggia, Magaton, & Palla, 1999).

Academic performance testing is an appreciable source of school stress for many students (Byrne, Davenport, & Mazanov, 2007). The term “test anxiety” describes significant feelings of apprehension and discomfort, fear of failure, and nervous symptoms before, during and after a test (Zeidner, 1998). Test anxiety has been negatively associated with test performance, academic achievement and career outcomes (Ergene, 2003).

Although there are many definitions of the construct in the literature, test anxiety is generally agreed to have physiological, behavioral, cognitive and emotional dimensions (e.g., Benson, 1998; Nicaise, 1995). One study estimated that from 55 to 61% of students in the United States reported being negatively impacted by test anxiety (Bradley, McCraty, Atkinson, Arguelles, Rees, & Tomasino, 2007). When an individual with test anxiety prepares for or is administered a test, physiological hyper-arousal manifests in symptoms that can include sweating, rapid heart palpitations, shortness of breathing and muscle tension (Beidel, Turner, & Taylor-Ferreira, 1999). While these symptoms of emotionality can lead to cognitive interference, a meta-analysis of test anxiety studies suggests that the worry component may be more responsible for lower test performance than somatic complaints (Hembree, 1988). Negative thoughts regarding the potential for failure can trigger worry stored in the memory from previous negative testing experiences, compounding the dread of the current event (Cizek & Burg, 2006). A detailed

examination of test anxiety is beyond the scope of the current study; however, a comprehensive review of the research including treatment methods can be found in Zeidner's (1998) book on this topic.

The educational reform initiatives under the *No Child Left Behind Act* (NCLB) may have inadvertently contributed to an increase of test-related stress reported in recent years (Kruger, Wandle, & Struzziero, 2007). While high stakes graduation testing is a recent phenomenon in the US, comprehensive exit exams have been used in Europe for many years, primarily to determine eligibility for postsecondary education options (Bishop, 1999). Some examples include the German Arbitur established in 1788, the French Baccalaureat introduced in 1808, and the British General Certificate of Secondary Education (GCSE) with Advanced Levels initiated in 1951. The International Baccalaureate (IB) exams were introduced in 1987 by the International Baccalaureate Organization (IBO), an international educational foundation with headquarters in Geneva, Switzerland (IBO, 2011). The IBO was originally established to develop an internationally standardized college preparatory course for highly mobile students whose parents were diplomats or employed in international and multinational organizations (IBO, 2011). Currently, the IBO offers three educational programs through a worldwide community of schools in 141 countries. In the rigorous IB diploma program, students are challenged by varied demands including internal and external assessments of their performance, preparing research papers, and engaging in mandatory hours of creative, action and service work requiring completion outside regular school hours (IBO, 2011). The two year IB program culminates in comprehensive, externally evaluated, high stakes examinations.

While it has commonly been assumed that struggling students are the most likely to experience academic stress, some research suggests that, because of academic and extracurricular demands, high achieving students in demanding college preparatory programs may also be vulnerable and may experience more elevated levels of stress and anxiety than most students (Suldo, Shaunessy, Thalji, Michalowski & Shaffe, 2009). Three related studies compared high school students' experiences of stress in a general education program with students from the high achievement environment of an IB diploma program. In a pilot study, Shaunessy, Suldo, Hardesty and Shaffer (2006) found that IB students reported higher self-perceptions of academic ability and grade point average (GPA) than did students engaged in a general education curriculum, and that the two groups reported equal levels of social-emotional health. Shaunessey et al. concluded that students in the IB program were able to handle the stress of a more rigorous academic program without damaging their sense of well-being. In a subsequent study, Suldo, Shaunessy and Hardesty (2008) compared the levels of perceived stress and coping styles of general education and IB students, as well as investigating differences within the IB group. Interestingly, in this study, the IB students scored significantly higher on the *Perceived Stress Scale* than did students in the general education program. Within the IB sample, the researchers also found that students who reported higher levels of perceived stress also were more likely to report issues with mental health and a reduced sense of well-being. The coping strategies employed by the students were responsible for a significant amount of the variance in social emotional functioning. Moreover, communicating with parents and family members was found to be the most adaptive strategy, while substance abuse was linked to low levels of well-being. However, there

was no association found between academic functioning as represented by grade point average (GPA) and mental health or life satisfaction (Suldo et al. 2008).

While examining specific causes of stress identified by IB students and general education students, Suldo, Shaunessy, Thalji, Michalowski, and Shaffer (2009) found that stress related to academic functioning was the primary source for the former, and family conflict and peer relations were primary for the latter. Correlations between psychopathology and stressors were stronger for the IB students than the general education students. Thus, although high achievement and academic confidence are often associated with success and well-being (e.g. Daniels, Haynes, Stupnisky, Perry, Newall, & Pekrun, 2008; Kaplan & Maehr, 1999), prolonged stress from heavy academic workloads and elevated expectations can also be potentially damaging.

Lazarus' Transactional Theory of Stress and Coping

Most conceptualizations of stress and coping have been based on adult models; however, research has acknowledged the need to consider developmental factors that would better inform strategies for use with children and adolescents (e.g., Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). One of the most widely accepted perspectives, Lazarus' transactional model of stress and theory of appraisal, allows for active interaction between the individual and his or her stressor (Lazarus, 1993). According to this model, a stress response results only if the individual appraises the situation as stressful. Psychological stress is defined as “a relationship with the environment that the person appraises as significant for his or her well-being, and in which the demands tax or exceed available coping resources” (Lazarus & Folkman, 1984 , p. 63). Cognitive appraisal and coping are the two processes that act as mediators in the

transaction between the individual and the outside stressor (Lazarus, 1993). The concept of appraisal is established on the belief that emotional processes like stress rely on expectations that individuals manifest with regard to the significance and potential outcome of a particular encounter (Lazarus, 2006). The same stressors may be experienced very differently by different individuals because stimuli are habitually filtered through personal values, memories and beliefs (Weinstein, Brown, & Ryan, 2009). Lazarus (1993) identified two basic forms of appraisal: primary and secondary. Primary appraisal is the individual's judgment of the event's significance as being irrelevant, benign-positive, or stressful (Lazarus & Folkman, 1984). While appraisals can be complex and mixed, they generally break down into these three types according to Lazarus and Folkman. When appraised as irrelevant, the individual has no investment in the outcomes and there is "nothing to be lost or gained in the transaction" (Lazarus & Folkman, 1984, p. 32). If the situation is appraised as benign-positive, the individual believes that the situation "preserves or enhances well-being or promises to do so" (Lazarus & Folkman, 1984, p. 32). According to this theory, when the individual appraises the situation as stressful it can fall into three subcategories: harm/loss in which some damage to the individual's health, self-esteem or a valued person or possession has already taken place; threat, in which harm or loss haven't happened but are anticipated; and challenge, which requires coping efforts but also focuses on the "potential for gain or growth inherent in an encounter" (1984, p. 33). Secondary appraisal takes place when individuals evaluate what coping resources are available to them to address the situation. Both levels of appraisals are influenced by personal factors including motivational disposition, goals, ideals and general expectations (Lazarus, 1993). They are also affected by situational factors

including predictability, potential for control, and the imminence of a possible stressful event (Lazarus, 1993). It is important to note that Lazarus and Folkman did not imply that cognitive appraisal is always a completely conscious process since the agendas that shape one's appraisal may lie below awareness where they are not always easily accessible. In fact, a threat appraisal may surface without the individual being "clearly aware of the values and goals that are being endangered, the internal or environmental factors that contribute to the sense of danger, or event that the threat has been appraised" (Lazarus & Folkman, 1984, p. 52). They incorporated an element of psychoanalytic theory when they went on to explain that this lack of awareness could result from the operation of a defense mechanism, for example, denial or repression (1984).

Coping refers to affect regulation strategies that work by modifying physiological, experiential or behavioral responses to situations that are perceived as threatening (Larsen, 2000). However, there continues to be a lack of consensus in the literature concerning how to define and analyze coping strategies (Amirkham, & Auyeung, 2007). According to Lazarus (1993) coping behavior is a function of the individual, the situation, and most importantly the personal perception of the problematic situation. One of Lazarus' central premises is that stress and coping are reciprocals of each other. When coping is effectual, stress is generally controlled; when coping is ineffectual, stress increases and can spiral out of control resulting in subjective distress, physiological instability and weakened social functioning (Lazarus, 2006).

In the research, coping responses of adults have been broadly referred to as either problem or emotion focused (e.g., Suldo et al., 2008). In problem focused coping, the individual engages in activities to address the source of stress; where in emotion-focused

coping, the individual employs behaviors to soothe the emotional distress brought about by a stressor (Lazarus, 2006). It was in his later research that Lazarus incorporated the importance of emotions into his theoretical system, defining emotions as the feelings that are aroused when an individual pays attention to a stimulus and assesses it as helpful or not helpful to meet a current goal (2006). The particular meaning of the situation leads to subjective feelings, making it more or less likely that a physiological impulse to act a particular way will result in response. According to Lazarus, emotions are strongly influenced by an individual's primary appraisal, and then can potentially interfere with the attention and cognitive reasoning required by the second appraisal (Lazarus, 2006). However, research on mindfulness meditation has found that by recognizing the transient nature of emotions, it is possible to modify the appraisal process to allow for an opportunity to change an automatic emotional reaction to a more effective and appropriate coping response (Kabat-Zinn, 1994).

Using Lazarus' work as part of the conceptual background for their "modal model" of emotion regulation, Gross and Thompson (2006) defined emotion as the subjective experience, behavior and peripheral physiology that result when one pays attention to a situation and decides it is relevant to what one cares about. Emotion regulation theory suggests that individuals can influence which emotions they have, when they have them, and how they express them by learning intrinsic and extrinsic processes to recognize, monitor, evaluate, and modify emotional reactions (Thompson, 1994). Some of the coping processes include attentional deployment (e.g., shifting attention away from aversive stimuli) and cognitive reappraisal, which entails changing a situation's meaning to alter its emotional impact and response modulation (Gross & Thompson, 2006). In this instance,

the individual attempts to influence physiological or behavioral responding directly, for example, through exercise or drinking alcohol. Research evidence suggests that both avoidance and over-engagement with emotions are correlated with negative psychological and health outcomes (Gross & Thompson, 2006). The well documented relationship between stress and elevated levels of psychopathology in adolescents underlies the critical importance of educating youth on how to modulate their emotions and manage the stress in their lives with positive coping strategies (Grant, Compas, Stuhlmacher, Thurm, McMahon, & Halpert, 2004).

Mindfulness Training, Stress, and Coping

Research on mindfulness training with adult participants suggests that the techniques can promote desensitization and fear reduction to potentially threatening stimuli (e.g., Arch & Craske, 2006; Broderick, 2005). The approach coping strategy encouraged in MMT discourages avoidance by evoking a cognitive, emotional and behavioral “turning towards” the stressful stimulus (Weinstein, Brown, & Ryan, 2009). This attitude is adaptive in that the stressful situation can then be resolved, or the negative feelings associated can be reinterpreted as more benign. Participants are encouraged to notice all thoughts, feelings and sensations without judgment of whether they are good or bad, and to take note of the transient nature of these phenomena as they return their focus to the breath (Kabat-Zinn, 1994). In this way, MMT encourages a less threatening exposure to challenging situations, altering cognitive appraisal of events to become more objective and adaptive, so that situations can be perceived in a neutral context (Kabat-Zinn, 1994). Thus, in Lazarus’ terms, MMT can engender a capacity to cope in an adaptive way with situations typically viewed as harmful at either or both the primary and secondary

appraisal levels. In regard to school stress, a student practicing MMT's nonjudgmental appraisal of all phenomena on a regular basis may be able to view testing situations with a more balanced, less threatened perspective. By encouraging a present moment orientation, MMT discourages rumination about the past or future (Kabat-Zinn, 1994). Thus, cognitive energies are focused on the task at hand, for example, the exam, and not expended by thinking about previous experiences or what might happen later.

Buddhist Origins of Mindfulness Meditation Training

Theravada Buddhism is the tradition followed by many mindfulness meditation practices. Theravada is the oldest continuing tradition of Buddhism, and is based on the Pali Canon, considered the most authoritative record of the teachings of the historic Buddha, Siddhattha Gotama, born in 623 BC (Gunaratana, 1992). After the Buddha's death, his teachings were passed down orally within the monastic community he founded, until they were compiled into texts called the "Tipitaka" by Sri Lankan monks in approximately 100 BC (Robinson, Johnson, & Bhikkhu, 2005). In the Buddha's first sermon, he established the Four Noble Truths, the four principles of nature and the human condition (Robinson et al., 2005). The first of these acknowledges that life means suffering and refers to *dukkha* which is often defined as "suffering" or "stress" (Robinson, et al., 2005). There are three main types of dukkha, the first being *dukkha-dukkha*, which includes physical, emotional and mental pain. The second is *Viparinama-dukkha* which refers to impermanence or change. Anything that is subject to change is dukkha. For example, happiness because it is not permanent, and success, which may fade with time, are considered dukkha. It doesn't mean that these things are bad and should not be enjoyed, just that one should not become attached to them. The third is *Samkhara-dukkha*,

which is the situation of being conditioned to be dependent on or affected by something else (Robinson et al., 2005). According to the Buddhist concept of dependent origination, all things are conditioned, because everything affects everything else. The goal of Buddhist psychology is to become completely free of dukkha by understanding what causes the suffering or stress in the first place, which is often the desire to cling to that which is impermanent (Robinson et al., 2005). One of the tools to achieve this freedom is insight meditation, or Vipassana.

Vipassana is a meditation practice that was reputedly first introduced by the Buddha over 2500 years ago (Gunaratana, 1992). The origin of the word *vipassana* comes from the ancient Pali language of India and is translated as “clear seeing” (Gunaratana, 1992). The goal of Vipassana, or insight meditation, is to see reality as it actually is by developing insights, referred to as “the three marks of humankind”, which can be used to liberate the mind. The first is the knowledge of impermanence, understanding that all phenomena will not last forever (Gunaratana, 1992). The second insight of suffering is the understanding that suffering comes about when people try to hold on to things that are not permanent. The third insight of “non-self” is knowledge that any concept of a permanent self is an illusion (Gunaratana, 1992). However, knowledge of these insights is not adequate; the goal of Vipassana meditation is to directly experience these characteristics in a state of uninterrupted mindfulness. Bhante Gunaratana (1992), a Theravada Buddhist monk and teacher, described the experience:

When you first become aware of something, there is a fleeting instant of pure awareness just before you conceptualize the thing, before you identify it. That is Mindfulness. Ordinarily, this stage is very short. It is that flashing split second

just as you focus your eyes on the thing, just as you focus your mind on the thing, just before you objectify it, clamp down on it mentally and segregate it from the rest of existence. It takes place just before you start thinking about it - before your mind says, "Oh, it's a dog." That flowing, soft-focused moment of pure awareness is Mindfulness. In that brief flashing mind-moment you experience a thing as an un-thing. You experience a softly flowing moment of pure experience that is interlocked with the rest of reality, not separate from it. Mindfulness is very much like what you see with your peripheral vision as opposed to the hard focus of normal or central vision. Yet this moment of soft, unfocused, awareness contains a very deep sort of knowing that is lost as soon as you focus your mind and objectify the object into a thing. In the process of ordinary perception, the Mindfulness step is so fleeting as to be unobservable. We have developed the habit of squandering our attention on all the remaining steps, focusing on the perception, recognizing the perception, labeling it, and most of all, getting involved in a long string of symbolic thought about it. That original moment of Mindfulness is rapidly passed over. It is the purpose of Vipassana meditation to train us to prolong that moment of awareness (p. 208).

Mindfulness techniques, practiced over time, are reported to result in a profound change in how individuals perceive the world and handle themselves in various situations (Kabat-Zinn, 1994). In Buddhist psychology, the “normal” way of thinking inhibits people from seeing the reality of things; when the world is viewed without these mental filters, the truth can be discerned (Gunaratana, 1992). In Vipassana meditation, the meditator observes anything that attracts the mind by mentally acknowledging it, but makes no

attempt to analyze it further. Thai meditation master Ajahn Chah (2002) described Vispassana as gazing at a still forest pond: Many interesting animals may come to drink from the water, but the goal is to observe them without being caught up in discursive thinking. The meditator observes without judgment, and from this, insight can occur. Unlike other forms of meditation, in Vipassana no attempt is made to attach focus to any object; the “in” and “out” breath are employed only as an anchor to bring the attention back when it wanders (Gunaratana, 1992).

Comparing Aspects of Buddhist and Western Psychological Theories

Mindfulness practices, with underpinnings in Buddhism, also share concepts with a variety of psychological traditions in Western European and American thought. Buddhist psychology provides a process-based model of the human mind and body which has been remarkably consistent over the 2500 years since the Pali Cannon was written (Olendzki, 2003). Western psychology can also be traced back to ancient philosophical roots, but for the purposes of this study, the 17th century teachings of Rene Descartes provide a reasonable reference point. As one of the first philosophers acknowledged to have conceptualized the mind as a nonphysical entity involving consciousness and self awareness that was separate from the brain, Descartes considered the brain to be the seat of intelligence where the mind interacted with the body at the pineal gland (Smith, 2010). Mindfulness-based practices are grounded in activities of consciousness, and mindfulness-based interventions utilize two components of consciousness, namely, “awareness” and “attention” (Shapiro, Brown, & Astin, 2011). Awareness refers to the bare mental and physical registration of stimuli and is our immediate, most direct contact with reality (Schmidt, 1994). When a stimulus is

sufficiently strong, attention is engaged, which is manifest as an initial taking notice of, or “turning toward” the object (Weinstein, Brown, & Ryan, 2009, p. 379).

Theories of the mind continued to be of interest, debated by philosophers and theologians until the late 1800’s when psychology, the study of the mind and behavior, emerged as a scientific discipline in Germany and in the United States (Hergenhahn, 2005). In Germany, Wilhelm Wundt developed the first experimental laboratory to study the conscious human experience. He believed in the concept of psychophysical parallelism: that physical events, like measurable reactions to stimulus, have mental counterparts; and that mental events, like sensations, have corresponding physical counterparts (Blumenthal, 2001). In this way, the mental processes of consciousness, which were not material, were understood as an activities of the brain, which was material. Wundt also wrote one of the first textbooks for psychology, “Principles of Physiological Psychology” (Blumenthal, 2001). Around the same time in the United States, William James developed an experimental laboratory as well, and wrote “Principles of Psychology”, also recognized as one of the first text books for the emerging study of psychology (Hergenhahn, 2005). Although both Wundt and James were interested in the scientific study of the conscious human experience, differences in their approaches emerged when Titchner, a student of Wundt, brought his theory of structuralism to the United States (Hergenhahn, 2005). Proponents of structuralism studied consciousness through a procedure referred to as “introspection,” in which research participants described to researchers their respective sensations, images and feelings regarding particular topics being investigated. The method of careful, repeated observations of one’s perceptions is similar to the meditative practice of noticing when something, for example

a thought or sensation, pulls attention from the breath. Tichtner and the tenets of structuralism were challenged by James, John Dewey and others who argued that the functions of the mind were of primary importance, rather than its structure (Hergenhahn, 2005). Functionalism developed from the philosophy of pragmatism which was popular at the time, the idea that in order to understand the meaning of something, it was critical to examine its consequences in the environment. Similar to the ever changing nature of the mind in Buddhist psychology, James described the stream of consciousness, a mental life that flows and changes (Hergenhahn, 2005). This stream of consciousness is the field of investigation in Eastern thought. In the ancient tradition, practitioners would go alone to meditate and observe the effects of fasting, breathing and other yogic practices on their internal experiences (Olendzki, 2003). In a sense, they were also researchers. However, the functionalists focused on mental experiences and behavior in terms of predicting, controlling and adapting the individual's environment in ways that improved the human condition. In contrast, mindfulness meditation encourages individuals to observe and accept the environment as it is (Olendzki, 2003).

In the late 1800's and beyond, Sigmund Freud dramatically changed the concept of Western psychology by discussing the unconscious mind and putting aside the importance of consciousness (Hergenhahn, 2005). Freud's concept of the mind consisted of three parts: the "conscious" which included everything we are aware of; "preconscious" which included memories that can be brought to awareness at any time; and, the "unconscious" which made up 90% of the mind. The unconscious contained feelings, thoughts and drives that are mostly unacceptable or unpleasant, and appreciably influence our behavior, even though we are unaware of it. Psychological disorders, in this view, were the result of

unresolved unconscious conflicts. Freud developed psychoanalysis as a treatment procedure to uncover these conflicts, and have unconscious feelings and thoughts become conscious. In his later work, Freud indicated that the “psyche” was divided into three parts, the “id,” “ego,” and “super-ego” (Hergenhahn, 2005). The id operated on the pleasure principle, doing whatever it wanted regardless of the consequences. The superego, formed over time by the rules of parents and society in general, attempted to reign in the id, while the ego tried to find a reasonable balance between the two. The ego could be overburdened with this task, using defense mechanisms including denial, repression and displacement to cope with anxiety emerging into consciousness as a result of the unconscious conflict(s).

Although Freud’s “talking therapy” seems very different from the contemplative practice of mindfulness meditation, there are some similarities (Hergenhahn, 2005). Modern psychoanalysis and mindfulness practices both employ a relaxed atmosphere in which attention is focused on aspects of present moment experience, while minimizing any judgmental qualities of the observation (Olendzki, 2003). They differ, in that mindfulness is a one-person as opposed to a two-person framework. In psychoanalysis, a highly trained analyst is required to help an individual understand his or her pain and the defenses against it (Hergenhahn, 2005). While mindfulness meditation initially involves training with an experienced practitioner, personal insight comes as the result of regular, solitary practice.

Prior to and especially after his death, some of Freud’s followers and colleagues developed theories of their own, building the foundations of modern psychiatry and clinical psychology (Segall, 2003). One of the most important colleagues, Carl Jung, studied Eastern religions, including Buddhism, and explored cross cultural universal

symbols that led him to develop his theory of the collective unconscious. Yet he advised people against the use of Eastern meditation techniques, believing that psychotherapy was a more appropriate form of introversion for Westerners (Jung, 1936). Erich Fromm and Karen Horney were two other prominent psychoanalysts who explored Buddhism, and were successful in finding ways to bridge gaps between eastern and western psychology (Segall, 2003).

At the same time Freud was developing his theory of personality and the mind, behaviorism was becoming a major force in Western psychology. Influenced by Ivan Pavlov's experimental work on animal responses to conditioning in the early 1900's John B. Watson completely rejected the study of consciousness, focusing instead on the observable behavior of people and their reaction to their environment (Graham, 2010). While Watson focused on reflexes and conditioning as determinates of human behavior, several versions of behaviorism emerged. In particular, B.F. Skinner developed his philosophy of radical behaviorism and refined the theory of operant conditioning wherein people operate on their environment in ways that led in the past to reinforcement or punishment of their behavior (Schneider & Morris, 1987).

By the 1950s and 1960s, the influence of behaviorism was being challenged by two other theoretical perspectives, cognitive psychology and the humanistic movement in the United States. Early cognitive psychologists, inspired by a model of the mind based on the computer, studied the internal mental states whereby people acquire, process and store information, and the strategies they use to learn (Hergenhahn, 2005). Later, cognitive neuroscience became another major direction for cognitive psychology, with increasing consensus that the information processing analysis could be dramatically

informed by knowing how cognition takes place in the brain through neuroimaging techniques (Hergenhahn, 2005). In contrast, the humanistic movement that began in the 1940s was decidedly nonmechanistic, viewing each person's behavior as unique and to be understood through subjective experience. Humanistic psychology, led by Carl Rogers and Abraham Maslow, rejected the idea that individuals are driven only by unconscious conflicts or environmental conditioning; they are also motivated to strive towards personal growth and fulfillment (Hergenhahn, 2005). Similar to Eastern psychological concepts, Roger's client centered phenomenological therapy placed special emphasis on the critical nature of experiencing life in a way that is immediate, full and authentic (Hergenhahn, 2005; Olendzki, 2003). However, Rogers also stressed the importance of a therapist's understanding of their client's subjective experience, and the therapeutic relationship in helping the client to become aware of his or her motivations for his or her maladjusted behavior (Hergenhahn 2005). Eastern psychological thought shares the goal of increasing awareness, but limits the role of an intermediary in bringing about insight.

Despite their differences, today in Western psychology several different theoretical perspectives flourish alongside each other with the common goals of promoting personal growth and the alleviation of suffering. Cognitive behavioral therapies are successfully used with people of all ages to reframe distorted thoughts, to substitute positive affirmations for destructive schemas, and to divert attention from harmful thoughts (McLeod, 2008). Mindfulness practitioners advocate a different approach by shifting the individual's orientation to the whole context of thinking rather than toward specific content. In mindfulness meditation, practitioners are encouraged to accept that thoughts are just thoughts that don't require emotional and behavioral reactions. Without these

reactions, the thoughts lose their negative impact. In a mindfulness context, all aspects of an individual's inner and outer worlds are registered equally without judgment about whether they are good, bad or neutral. Because the mind is trained to be impartial, details that may have been overlooked may be perceived with more clarity (Brown, Ryan & Creswell, 2007). In turn, greater clarity allows for unobstructed access to all relevant knowledge that can be of assistance in understanding issues and making decisions (Tart, 1994). Thus, the individual is trained to be present in the authentic experience of the moment, rather than reacting in automatic ways in which the meaning of the event may get lost in subjective thinking.

A Review of Mindfulness-based Interventions and Therapies

Currently, the dominant mindfulness-based therapeutic practices include Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), Dialectic Behavior Therapy (DBT; Linehan, 1993), and Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990). Although the four therapies have roots in Eastern philosophy and psychology, they are secular in nature. The practices have three components in common: mindfulness practice exercises, didactic instruction, and social support; however, these components have not been clearly differentiated in published studies when assigning cause to positive outcomes (Bishop, 2002). A number of meta-analytic reviews have provided evidence of the benefits of meditation and mindfulness training with adult populations, however empirical research studies with adolescents are limited.

Mindfulness-based Cognitive Therapy (MBCT)

MBCT was initially developed as a depression-relapse prevention intervention to help clients avoid falling back into dysphoria after initial recovery from a depressive episode (Teasdale, Segal, Williams, Ridgeway, Soulsby & Lau, 2000). The intervention integrates aspects of cognitive therapy with mindfulness training patterned after the eight week MBSR course developed by Kabat-Zinn. The resulting therapeutic practice facilitates metacognitive insight in which thoughts are experienced simply as events in the mind, as opposed to exclusively cognitive models that attempt to change negative thinking patterns or substitute them with positive thought patterns (Teasdale et al., 2000). Some research suggests that children and adolescents can benefit from MBCT-C, an adaptation of the therapeutic version for adults, although the studies are mostly single case studies or nonrandom small samples studies, without control groups, thus providing no generalized empirical evidence of its efficacy (Burke, 2009). Adaptations in protocols have been made to address differences in attention capacities, with MBCT-C having shorter and more frequent sessions and exercises and using stories, games and activities in the protocol to increase engagement in the treatment (Semple, Reid, & Miller, 2005). Family involvement is also used to enhance treatment outcomes. Parents attend an introductory session and are encouraged to maintain close contact with the therapist throughout. At the end of treatment, parents review sessions with the therapist and discuss ways to continue the mindfulness practice at home (Semple et al., 2005).

Acceptance Commitment Therapy (ACT)

ACT is a therapeutic model based on research that shows the tendency to ignore or avoid difficult emotions, thoughts, and symptoms is associated with psychological

disorders and can lead to increased distress (Hayes et al., 1999). The other theoretical basis for ACT is the Relational Frame Theory of language and cognition in which language is viewed as “the primary root of human suffering” because of how it influences experience and behavior (Hayes et al., 1999, p. 1). Clinical studies suggest the efficacy of ACT in treatment of anxiety disorders (e.g., Block & Wulfert, 2000), smoking addiction (e.g., Gifford, Kohlenberg, Hayes, Antonuccio, Piasecki & Rasmussen-Hall, 2004), and chronic pain (e.g., Torch & Follette, 2006). The goal of ACT is to change the relationship between individuals and the ideas, emotions, memories and physiological sensations that they typically fear and avoid (Hayes et al., 1999). Mindfulness techniques are taught to help individuals become present-focused, to reduce avoidance, and to encourage them to accept rather than attempt to control their experience. The adult model of ACT has been adapted for adolescents, with the language made simpler and the inclusion of parents in the therapeutic process (Coyne, McHugh, & Martinez, 2011). ACT has mostly been used in clinical settings, but is beginning to be practiced in a few school settings. Recent studies have shown ACT has been successful in treating depression in adolescents (e.g. Hayes, Boyd & Sewell, 2011), in addressing high risk sexual behavior with teenage girls (Metzler, Biglan, Noell, Ary & Ochs, 2000) and in reducing the risk of drop out behavior in a group of high school students (Hayes, Luoma, Band, Masuda & Lillis, 2006). These are small or single sample, uncontrolled studies with generally consistent positive results; however, given the emerging state of the literature, inferences about the effectiveness of ACT with children and adolescents is premature (Coyne et al., 2011).

Dialectical Behavioral Therapy (DBT)

DBT is a long-term intensive clinical treatment program that was developed for use with individuals diagnosed with borderline personality disorder. Founder Marsha Linehan described DBT as a mixture of behaviorism, cognitive behavior therapy, and Zen Buddhism (1993). The word “dialectical” means that two opposite concepts can be true at the same time; in this context, that individuals need to accept themselves while recognizing that changing their destructive coping methods can result in a better life (Linehan, 1993). Recently, DBT has been adapted as a therapy for adolescents with suicidal behavior and those demonstrating deliberate self harm (e.g. James, Taylor, & Winmill, 2008; Salsman & Arthur, 2011). A fundamental principle of dialectical philosophy is that tension develops when an initial truth or belief is challenged by a contradictory truth, for example, the polarities in behavioral patterns in the family. Some of the dialectics that may be central to adolescents and their families include the balance between normalizing pathological behaviors and “pathologizing” normal behaviors; the balance between leniency and authoritarianism; and the balance between forcing autonomy and fostering dependence (Salsman & Arthur, 2011). The instruction and practice of mindfulness meditation techniques are key to becoming able to manage emotions that accompany the tension that develops. By observing and accepting feelings and experiences as they arise without judging or reacting to them, eventually the fear response and avoidance behavior triggered by particular stimuli are diminished (Linehan, 1993). DBT with adolescents also includes weekly skills training with parents and family members, and telephone coaching for the adolescents and their parents. DBT is a one year treatment model for adults; however, treatment with adolescents is shorter, typically 16

weeks, because studies have suggested that adolescents are not likely to complete longer therapeutic courses (Ougrin & Latif, 2011).

Mindfulness-Based Stress Reduction (MBSR)

In the late 1970's, Kabat-Zinn used mindfulness meditation techniques to construct his Stress Reduction Program for patients with chronic pain and illness (1990). MBSR was conceived as a cognitive-based intervention that trains participants to be aware of their moment-to-moment experiences so they can respond more knowledgeably to stressful or painful stimuli, thoughts and feelings. While the goal in most meditation practices is to relax and reduce stress, the goal of mindfulness is to be in the present moment, whatever that experience may be (Kabat-Zinn, 1990). MBSR trains individuals to stay with the bodily sensations, thoughts and feelings that exist in the present, observing them with kindness and curiosity, without judgment of whether they are good or bad (Huppert & Johnson, 2010). Being trained to accept, not avoid, unpleasant experiences helps prevent negative thought patterns that can contribute to distress (Kabat-Zinn, 1994). It also desensitizes individuals to aversive thoughts and sensations, decreasing their avoidance of them (e.g., Arch & Craske, 2006). By paying attention to thoughts, feelings and sensations in the present moment, the individual also becomes sensitized to recognize his or her affective states, automatic reactions and responses (Breslin et al., 2002). With more information about their automatic responses, MBSR practitioners are able to consider more adaptive behavioral responses (Orsillo, Roemer, Lerner, & Tull, 2004). Thus the MBSR practitioner employs a pro-active appraisal of stress and discomfort.

In the adult practice, MBSR is an eight week program consisting of two-and-one-half hour group sessions each week, a seven hour session during week six, and 45 minutes

of homework practice required six out of seven days per week (Kabat-Zinn, 1994). Distinctive features of MBSR include a core curriculum and the requirement that course instructors must have MBSR training and an extensive personal mindfulness practice. The MBSR curriculum includes specific instruction on sitting and movement-based meditative practices that improve attentional stability, sensory awareness, and metacognitive skills. It includes both formal meditation processes and informal meditation practice where participants take meaningful pauses throughout the day to observe their breathing and be in the present moment (Bishop, 2002). These mini-meditations are encouraged several times a day to develop meditation skills. While sitting, standing, laying down or walking, participants are trained to anchor their attention to the present moment by focusing on the breath, paying attention to the physical sensation of the breath coming through the nostrils, or to the rise and fall of the chest and belly. Each time attention wanders, participants are trained to briefly acknowledge and accept the sensation, thought or feeling that interrupted their focus, and then return their attention to the breath. The goal is to develop the capacity to sustain attention even when it is cognitively or emotionally engaging or challenging (Bishop et al., 2004). According to Kabat-Zinn (2005), the habit of ignoring our present moments leads directly to a persistent lack of awareness with consequences that extend into social and political realms. However, at the core of MBSR is the individual and the present moment.

Mindfulness Training in Schools

In the past 15 years, MBSR training has been adapted for children and adolescents in mainstream classroom settings (Garrison Institute Report, 2005). Having reviewed clinical and school based mindfulness programs in the USA, UK, Canada, and Israel,

Meiklejohn et al. (2012) suggest that employing a mindfulness curriculum can improve children's and adolescents' ability to self regulate attention and emotions, and can act as a buffer for the negative impact of stress on their developing brains. However, the authors also acknowledge that the quality and quantity of studies restrict conclusions that can be made (Meiklejohn et al., 2012). Only a few peer-reviewed studies focused on normal populations, including school-based programs for adolescents. In a pilot program of the Learning to BREATHE course at an all girl high school in the United States, Broderick and Metz (2009) compared 120 seniors who participated in 6 sessions of mindfulness training with 17 juniors who acted as controls. After completing the course, the seniors reported reductions in negative affect (mean gain score -2.51 vs. 1.63; $t=2.34$, $p<0.05$) and increases in emotional regulation, and feelings of calmness and self acceptance (mean gain score 0.90 vs. -0.65; $t=-2.06$, $p<0.05$) on the Positive and Negative Affect Schedule (PANAS). Each lesson in the Learning to BREATHE curriculum is approximately 45 minutes long, and covers one of six themes, including body awareness, understanding and working with thoughts, understanding and working with feelings, integrating awareness of thought, feelings and body sensations, reducing harmful judgments, and integrating mindfulness into daily life.

The Mindful Schools program in the United States provides a 15 session training over eight weeks to students in K-12 schools in the United States (Mindful School, 2012). Topics covered in the curriculum include mindfulness of sound, breath, body and emotions; units on test-taking; and units on the importance of generosity, appreciation, kindness and caring. Although the non-profit organization's website indicates that the curriculum has been successfully taught to over 30,000 children (Mindful Schools, 2012),

to date the only peer-reviewed research study was done on a small group of 18 students from an elementary school (Liehr & Diaz, 2010). The authors found a significant improvement on a measure of depression ($p=.03$), however, the intervention in this particular study took place every day for two weeks, a more intensive schedule than is normally offered.

In the UK, the Mindfulness in Schools Project (MiSP) has developed “.b” a curriculum designed for adolescents that has been used in the present study (Burnett, Cullen & O’Neill, 2011). A pilot study using an earlier version of the curriculum with 14 to 15 year old students produced non-significant effects on measures of mindfulness, ego-resilience and well-being (Huppert & Johnson, 2010). However, students who scored lower in emotional stability at baseline reported significantly higher gains in well-being after the intervention than did their more emotionally stable peers. Currently, the revised curriculum is being piloted in a controlled longitudinal study involving three secondary schools in Oxfordshire, England (S. Hennelly, personal communication, October 11, 2012). Preliminary findings suggest that participation in the .b course is associated with small but significant effects on measures of mindfulness, ego-resilience and well-being (S. Hennelly, personal communication, October 11, 2012).

There are several challenges facing the research on mindfulness programs in schools. Meiklejohn et al. (2012) acknowledge that the lack of an articulated theory of change model makes it difficult to conceptualize mindfulness processes and build a case for the efficacy of mindfulness interventions. Additionally, school-based interventions are usually of short duration and developing mindfulness skills requires repeated and sustained practice. The positive gains reported in research with adults are associated with

practice outside of the classes, and studies with adolescents indicate that, in general, few practice on their own (e.g., Broderick & Metz, 2009; Huppert & Johnson, 2010). Finding the space, the scheduling time, and the funds required to institute programs are other practical reasons why it can be difficult to integrate mindfulness training in schools (Meiklejohn et al., 2012).

Neuroscientific Evidence of the Efficacy of Mindfulness Meditation Training

One of the most compelling reasons for integrating mindfulness into K-12 schools comes from the neuroscience research with adults who meditate. In the 1990's, neuroimaging studies on meditation became the dominant vehicle for brain research with some studies demonstrating the possibility of recognizing structure-function central nervous system relationships of meditative states and traits (e.g., Travis & Wallace, 1999). Positron emission tomography (PET; Blake & Logothetis, 2002) and functional magnetic resonance imaging (fMRI) are two methods used in a number of studies. Early methods of brain imagining, for example using X-rays and computer tomography, were deemed unsafe for studying brain development in healthy infants, children and adolescents because of the use of ionizing radiation. However, improvements in the technology to prevent health risks has allowed for a longitudinal NIMH study of normally developing young brains that yielded extensive information on brain development in humans, and sheds some light on how the adolescent brain is similar to and different from the adult brain (Lenroot & Giedd, 2006). Results of brain scans have shown that gray matter volume is at its highest density at puberty and then continuously declines thereafter (Lenroot & Giedd, 2006). This large amount of gray matter facilitates processing and learning, which allows young children and adolescents to learn languages much more

quickly than adults. In contrast, increases in white matter, critical for creating neural connections, continue past puberty and they do not appear to decline until adults are in their forties (Bartzokis, Beckson, Lu, Nuechterlein, Edwards, & Mintz, 2001). Thus, while adolescent brains are developmentally different from adult brains, they share the commonality of neuroplasticity, the brain's continuing ability to develop and restructure.

Much of the research on mindfulness in the past decade focused on understanding how neuroplasticity allows for brain changes in response to experience throughout the life cycle (Davidson & Lutz, 2007). Some research suggests that the mental training of meditation is similar to other types of skill development that can create plastic changes in the brain (Davidson & Lutz, 2007). The following studies describe the effects of meditation on adult brains. They are included to suggest that positive results may also be possible with adolescents whose minds are highly plastic. These studies provide neurological evidence that mindfulness meditation can facilitate memory and learning and can improve performance under stressful conditions by helping individuals manage their attention and emotional reactivity. These outcomes would be of great benefit to children and adolescents in schools, particularly those facing stress associated with high stakes testing. Because brain imaging has not yet been used in research on mindfulness meditation with adolescent populations, the suggestion that adolescent brains might show comparable results is only speculative. However, neurological evidence of the beneficial effects of mindfulness is an exciting development and an impetus to employ similar research methods with younger populations in the future.

It has been generally accepted by the research community that individuals with a greater extent of activity in the left prefrontal cortex have a more positive affect, and that

those with more activity on the right side of the brain report thoughts and behavior that are more anxious and irritable (Harmon-Jones, 2003). In a randomized controlled study, researchers at the University of Wisconsin used fMRI to assess the electrical activity of 25 healthy individuals before and after training, and at a four month follow-up (Davidson et al., 2003). Participants in the study were employed by a high-pressure biotechnology business, and all reported an affective set point that was generally negative and stressed prior to the start of the course. There were no differences between the experimental and wait-list control groups at baseline on trait anxiety. Participants were asked to complete an eight week MBSR training and to meditate 30 minutes per day for three months. At the conclusion of the training, all participants engaged in vigilance tasks to examine sustained attention. Typically in these types of tasks, accuracy decreases over time because of fatigue or lack of alertness to the task (Carter & Beh, 1987). However, participants in the MBSR group were able to sustain their levels of accuracy and vigilance. Additionally, fMRI results showed the MBSR participants to have significant increases in left-sided anterior activation after training when compared to non-meditators. They also reported subjectively that their moods had improved, and that they felt more energized and less anxious. Positive gains were maintained at follow-up. To examine the effects of MBSR on the immune system, both the participants and the wait-list control group were administered influenza vaccines immediately after the end of the first eight week training. Compared to wait-list individuals, participants who had completed MBSR training showed significant increases in antibody titers to the influenza vaccine. Moreover, the magnitude of the increase in left-sided activation predicted the magnitude of the antibody response to

the vaccine. The results suggest that meditation may change both brain and immune systems functioning in beneficial ways (Davidson et al., 2003).

In a study of college students who received MBSR training, Creswell, Way, Eisenberger, and Lieberman (2007) found that those with higher scores in dispositional mindfulness showed less reactivity to emotionally threatening visual stimuli, as indexed by lower amygdala activation and stronger prefrontal cortical (PFC) activation. The researchers concluded that results suggested that the more mindful individuals had better executive control; in addition, results showed a stronger inhibitory association between the PFC and amygdala, suggesting better regulation of emotional reactions (Creswell et al., 2007).

The Dalai Lama was instrumental in recruiting 14 Buddhist monks, with an average of 19,000 hours of meditation experience each, to study long-term effects of meditation on the brain (Davidson & Lutz, 2007). The monks were matched with same age novices who had expressed a desire to learn to meditate. One week prior to the testing, the novices were given instructions in concentration meditation, and told to practice one hour per day for the week. In laboratory sessions, the monks were instructed to meditate on a state of compassion, or to adopt a neutral baseline and not meditate, while their reactions were measured with fMRI and a high density recording system with electrodes on the scalp surface. The novices' reactions were similarly recorded while they were told to focus their meditation on a small dot on a gray background, alternating meditation with periods of rest. During periods of meditation, compared to the novices, gamma activity of the experienced meditators increased significantly. In addition, activity was seen in the monks' left prefrontal cortex which is associated with positive emotion. In another session,

researchers introduced distracter sounds while subjects were told to meditate. When compared to the novices, the monks showed reduced activity in the amygdala, which is associated with fear and negative emotions. The researchers believe this suggests advanced levels of concentration are linked with significant reduction in emotionally reactive behaviors which are incompatible with stability of concentration (Davidson & Lutz, 2007).

A recent study conducted by Massachusetts General Hospital, Harvard Medical School and Massachusetts Institute of Technology suggests that beneficial effects of mindfulness meditation on working memory may result from an enhanced ability to regulate the alpha rhythm which is suggested to improve concentration, memory and learning by reducing the impact of potentially distracting information (Kerr et al., 2011). Alpha rhythm is thought to help suppress irrelevant or distracting sensory information from passing though a particular part of the brain, while decreases in alpha waves enhance the ability of a stimuli to be transmitted. Using magnetoencephalography (MEG), an imaging process that precisely shows the location of brain activity, researchers conducted brain scans on 12 healthy volunteers who had never meditated before, then randomly assigned them to MBSR training or wait-list control groups. Data was gathered on alpha rhythms flowing through cells in the somatosensory cortex where information about the left hand is processed. Subjects were instructed to focus on either their left hand or left foot while being given tactile stimulation. Data was gathered prior to training, at three weeks into training, and at the end of the training. Participants in the MBSR course were asked to attend an initial two and a half hour training session and meditate on their own for 45 minutes each day. They listened to a CD to guide them through subsequent

sessions. Results at the end of the study showed participants who completed the MBSR course made quicker and significantly larger attention-based adjustments to the alpha rhythm during testing than did individuals in the control group. According to Kerr et al., meditators had improved ability to turn the alpha rhythm up or down and more quickly adjust the brain wave that screens out distraction, which could explain their superior ability on working memory tasks that required them to rapidly remember and incorporate new facts. In a news release that further elaborated on the findings' significance, one of the researchers remarked that "these data suggest that mindfulness meditation practitioners can use the mind to enhance regulation of currents in targeted cortical cells. The implications extend far beyond meditation and give us clues about possible ways to help people better regulate a brain rhythm that is dysregulated in attention-deficit hyperactivity disorder and other conditions" (2011, para.5).

In a recent study conducted by Massachusetts General Hospital, Harvard Medical School, Universitat Giessen and University of Massachusetts' Medical School, the effects of MBSR training on changes in regional grey matter density in novice meditators were examined (Holzel et al., 2011). Previous studies determined that grey matter increases as the result of repeated activation of a brain region, for example, through training (e.g. Gage, 2002; May et al., 2007). This study focused on the hippocampus, which contributes to the regulation of emotions and is associated with learning and memory (e.g., Corcoran & Maren, 2001) and the insula, which is important in interoceptive/visceral awareness and empathic responses (e.g., Singer, Deymour, O'Doherty, Kaube, Dolan & Frith, 2004). MR images were taken of the brain structures of 16 healthy volunteers who had never meditated, along with a wait-list control group, two weeks before and after they

participated in an eight week MBSR training (Holzel et al., 2011). The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) was also administered at these time points. MBSR training consisted of eight weekly group sessions lasting two and a half hours each, and a six and a half hour training session held during week six. Participants were also given audio recordings to perform guided meditative practices at home, and were asked to keep track of the time spent meditating. The group averaged 27 minutes of homework per day. After training concluded, repeated measures ANOVAs confirmed that MBSR participants significantly increased their mindfulness scores on three out of five subscales. Researchers also found changes in brain regions associated with memory, sense of self, empathy and stress that could be responsible for the participants' subjectively reported changes. Comparing pre-assessment to post for MBSR participants, findings included significantly increased grey matter density in the left hippocampus which is associated with learning and memory, and with modulating cortical arousal and regulating emotion. Additional areas which showed significantly greater grey matter concentration included the posterior cingulate cortex, the left temporoparietal junction, and two clusters in the cerebellum. These structures are associated with self awareness, compassion and introspection (Holzel et al, 2011). The insula did not show significant gray matter increase; researchers speculate that more practice of the meditation techniques might be required for this to happen. No significant changes in gray matter density were observed in the wait-list control group. Because none of the participants in this study had any prior experience with meditation training, it represents one of the first studies to document that changes in brain structures associated with learning, memory and regulating attention and emotions were actually produced by mindfulness meditation.

CHAPTER 3

METHOD

This chapter is organized into four sections: (a) setting and participants, (b) dependent measures, (c) independent variables, (d) procedure, and (e) data analyses.

Setting and Participants

The school was a private K-12 international school in Western Europe with a population of approximately 1000 students. Eligible participants for the present study were male and female students enrolled in the 12th grade of the International Baccalaureate (IB) Diploma program during the 2010-2011 school year ($n= 98$). The MMT group was limited to 12 students by the instructor. Twenty-four students volunteered for the MMT group (Experimental Group) and were randomly assigned to participate in either the fall 2010 (S1) or spring 2011 (S2) sessions. Thirty-one students volunteered to be enrolled in of a pool of students who could be selected to complete surveys as control participants (Control Group). Each experimental participant was yoked to a control participant based on gender, grade and nationality as defined by primary passport country. Two students in the MMT fall training (S1) and two students in the MMT spring training (S2) did not complete the required minimum of seven out of eight sessions and dropped out of the training prior to the conclusion of the course. As a result, their pre-test data and the data of their matched controls were not included in the data analyses. The final sample consisted of 40 participants, 20 in the MMT Experimental group and 20 in the Control group (see Table 1). Participants ranged from 16 to 18 years-of-age (total sample: $M=17.25$, $SD=.54$; MMT group: $M= 17.15$, $SD=.58$; Control group: $M=17.35$, $SD=.48$). More males (65%) than females (35%) volunteered for and completed

the study. The nationality of participants was predominantly German (40%), with 17.5% from the United States (USA), 12.5% from the United Kingdom (UK), 10% from Netherlands, 5% from Japan, and one student each coming from Albania, Canada, Finland, Belgium, Ukraine and Turkey. Demographic information gathered from students' records including age, grade, sex and nationality is displayed in Table 1.

Table 1

Demographic Characteristics of Sample Population

Characteristic	MMT (n=20)		Control (n=20)		
Sex	Frequency	Percent	Frequency	Percent	
Age	Male	13	65	13	65
	Female	7	35	7	35
Nationality	16 years	2	10	1	5
	17 years	12	60	12	60
	18 years	6	30	7	35
	Germany	8	40	8	40
	USA	3	15	4	20
	UK	3	15	2	10
	Netherlands	2	10	2	10
	Japan	1	5	1	5
	Albania	1	5	0	-
	S. America	0	-	1	5
	Canada	1	5	0	-
	Finland	1	5	0	-
	Ukraine	0	-	1	5
	Turkey	0	-	1	5

Dependent Measures

The dependent measures in the study were the students' self-predictions of their IB examination scores at the beginning of the Grade 12 school year, their actual IB

examination scores received at the end of the school year, and scores from three self-rating scales that were completed by all participants. The scales used for the data analyses included the *Perceived Stress Scale* (PSS; Cohen & Williamson, 1988), the *Cognitive and Affective Mindfulness Scale Revised* (CAMS-R; Feldman, Hayes, Kumar, Greeson & Laurenceau, 2006), and the *Warwick-Edinburgh Mental Well-Being Scale* (WEMWBS; Tennant et al., 2007). These scales respectively measure the constructs of perceived stress, mindfulness and well-being, and were selected based on their brevity in order to maximize the likelihood of completion by the participants. The scales are described below.

The Perceived Stress Scale (PSS) is a global measure of the degree to which an individual appraises situations in his or her life as being stressful, unpredictable, uncontrollable, and overloaded (Cohen & Williamson, 1988). The PSS was normed on a community sample of individuals with at least junior high school education. It has been used in a wide range of clinical and non-clinical research settings. The PSS has demonstrated particular value in cross-cultural studies and has been translated into Japanese (Mimura & Griffiths, 2008), Spanish (Remor & Carrobles, 2001), Swedish (Eskin & Parr, 1996), Turkish (Celik, Orucu, & Demir, 2007) and Chinese (Lee & Crockett, 1994). Total scores range is from 0 to 56 with higher scores indicating higher stress levels. The 10 questions ask about feelings and thoughts. Respondents are asked to rate how often they have felt a certain way in the past month based on a five point Likert scale ranging from 0 (“Never”) to 4 (“Very Often”). The reliability coefficients in two separate samples of college students have been reported as alpha=.84 and alpha= .85 (Cohen & Williamson, 1988). With respect to validity, correlations between two symptomatology measures yielded scores of .76 and .52 in one sample, and .65 for both

measures in the second sample (Cohen & Williamson, 1988). Cohen et al. (1983) reported convergent validity with depressive ($r = .76, n=332$) and physical ($r = .70, n=64$) symptomatology scales. Internal consistency reliability was high with Cronbach's alpha coefficient ranging from .84 ($n=332$) to .86 ($n=64$). A copy of the Perceived Stress Scale can be found in Appendix J.

The Cognitive and Affective Mindfulness Scale Revised (CAMS-R) contains 12 items that are rated on a four point Likert scale ranging from 1 ("Rarely, Not at All") to 4 ("Almost Always"). The scale covers the four major parts of the mindfulness construct: an orientation to the present, ability to regulate attention, awareness of experience, and a non-judgmental acceptance of that experience. It has been shown to have acceptable reliability and validity with a large undergraduate student population ($n=548$) in a series of studies by Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007. In regard to convergent validity, CAMS-R was correlated with other measures of mindfulness including the Freiburg Mindfulness Inventory ($r = .69, p < .001, n = 179$) and the Mindfulness Attention Awareness Scale ($r = .46, p < .001, n = 144$). In regard to discriminant validity, the CAMS-R was inversely correlated with the Moods and Anxiety Symptoms Questionnaire on the both the General Distress Anxiety and the Anxious Arousal subscales (-.15, $p < .05, n = 209$). A copy of the CAMS-R can be found in Appendix H.

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) was constructed to investigate the affective-emotional and cognitive-evaluative aspects of well-being, and psychological functioning related to wellness (Tennant et al., 2007). It contains 14 items rated on a five point Likert scale ranging from 1 ("None of the Time") to 5 ("All of the Time"). The WEMWBS is designed to identify positive emotions, satisfying relationships

and only positive (as opposed to negative) functioning. Clarke et al. (2011) performed a validation study on the WEMWBS using a sample of 1,650 students ages 13-16 years old who were attending secondary schools in England and Scotland. The mean score for the group was 48.8 (SD 6.8; median 49; range 14-70). WEMWBS showed strong internal consistency and a high Cronbach' alpha of .87 (95% CI [.85-.88], $n=1517$.) Measures of construct validity rendered values as was predicted. The correlation coefficient for WEMWBS total score and psychological wellbeing section of the Kidscreen-27 was .59 (95% CI [.55; .62]); for the Mental Health Continuum Short Form (MHC-SF) was .65, (95% CI [.62; .69]); and for the World Health Organization (WHO-5) Well-being Index .57 (95% CI[-.53; .61]). Test-retest reliability was acceptable (Intraclass correlation coefficient (ICC) .66 (95% CI [.59; .72] $n=212$)) (Clarke et al., 2011). The authors concluded that WEMWBS is a psychometrically strong measure of well-being and is appropriate for use with teenagers ages 13-18 years. A copy of the WEMWBS can be found in Appendix I.

Independent Variables

The independent variables for the study were the two levels of Mindfulness Training in the first session (S1) and second session (S2) and the two levels of no treatment control group in S1 and S2.

Procedure

Recruitment of volunteers and data collection for the present study were conducted by this researcher, a school psychology doctoral student with nine years of experience working as a certified school psychologist. Approval for the study was granted by the University of Arizona's Human Subjects Protection Program (Appendix A) and the

school's Director and Principal (Appendix B). Students in grade 12 ($n = 98$) were informed about the study at a grade level assembly. Concurrent with the assembly, information about the study was sent to 12th grade parents via the school's online newsletter which is sent home at the end of each week. At the assembly, students were presented with two new options to accumulate the required 150 volunteer hours of creativity, action and service (CAS) hours as part of the International Baccalaureate Organization's graduation policy. At the beginning of the IB program, all students are presented with a menu of more than 30 different CAS activities. The first option presented at the assembly was to participate in an eight week mindfulness meditation training (MMT) and to fill out three surveys rating their feelings at three time points during the school year. They were informed that some research has suggested MMT may be helpful with stress management and in developing stronger skills of focus and concentration. The second option for CAS hours related to volunteering to be part of a pool of possible control participants that would be matched with the MMT participants. If selected, students could earn CAS hours by completing three surveys rating their feelings at three points during the school year. They were informed that because the surveys would be used in a research study, they (and their parents if under 18) would need to complete consent forms. Participants were given assurances that all information they provided would be kept strictly confidential. Interested students were invited to complete a brief follow-up form indicating the CAS option of choice (MMT or Control surveys) and asked to deposit the forms in boxes located in the school office and homerooms by the next week. Students interested in the mindfulness training but not wishing to participate in the research were given the option of working with the instructor after the study was

completed. Students indicating an interest in MMT were invited with their parents to attend evening or after-school introductory meetings facilitated by the researcher. They received packets containing information on MMT, consent forms (see Appendices) and some sample items representative of those found on the three surveys. The goals, expectations, potential risks and benefits of participating were explained in detail. Participants were informed they could withdraw from the research study at anytime without negative repercussions. They were also advised that due to the short duration of the training, their survey data would be excluded from the study if they missed more than one MMT class. After signing consent forms, participants for MMT were randomly assigned to one of two sections of MMT during fall 2010 (S1) or spring 2011(S2).

Afternoon and evening introductory sessions were held for students willing to participate in the research as part of the potential control pool. The requirements for participation were explained, along with the caveat that they could withdraw from the study at anytime without fear of penalty. They were also assured that they would receive assistance, if needed, in finding other activities for CAS hours if they were not selected from the pool of potential control participants. Written consent was obtained from students and parents of minor children. After collecting consent forms and examining demographic information, 24 students from the Control group were matched where possible with participants in the Experimental group based on grade, sex and nationality.

All participants were assigned identification numbers to preserve the confidentiality of personally identifiable information (i.e., name, sex, age, nationality and homeroom). The list of participants and identification numbers was kept in a locked file cabinet accessible only to the researcher. Participants in the control group completed the

surveys concurrently with their matched MMT participants in a large classroom monitored by the researcher who checked each survey to ensure all items were completed. Rating surveys were presented in a variety of different orders to counteract order effects. Participants completed the three rating surveys prior to the start of the MMT course (pre-test), at the end of the MMT course (posttest), and three weeks prior to the administration of their IB final exams in May (follow-up). The first MMT training session convened from November 19, 2010 to January 25, 2011, and the second training session ran from January 11, 2011 to March 12, 2011. Table 2 describes when the surveys were administered to each group at each time.

Table 2

PS, CAMS-R and WEBWBS Scales Administered to Each Group at Each Time

Dates of Administration

Pre-11/19/10	Post-01/25/11	Pre-01/11/11	Post-03/12/11	Follow-up 04/08/11
S1 MMT n=12	S1 MMT n=10			S1 MMT n=10
S1 Cntrl n=12	S1 Cntrl n=10			S1 Cntrl n=10
		S2 MMT n=12	S2 MMT n=10	S2 MMT n=10
		S2 Cntrl n=12	S2 Cntrl n=10	S2 Cntrl n=10
Total tested n=24	n=20	n=24	n=20	n=40

MMT Protocol

The MMT sessions were facilitated by an instructor employed by the school as a personal counselor who was trained in both MBSR and on the implementation of the curriculum selected for the study. The instructor has a Master's degree in Counseling and has practiced a personal meditation program for over 15 years. The sessions were also

attended by the researcher as a non-participating observer using a curriculum checklist to ensure the fidelity of instruction (see Appendix G for MMT Curriculum Checklist). The level of consistency ranged from 90 to 100% for the sessions.

The curriculum used for the study, “.b: An Introduction to Mindfulness”, was developed through a collaboration of the Well-being Institute at Cambridge University, the Oxford Mindfulness Group, and the Queensland University of Technology, along with two teachers at Tonbridge and Hampton schools in the UK (Mindfulness in Schools, 2010). The collaboration formed a nonprofit organization, the Mindfulness in Schools Project, with the goal of encouraging and supporting the teaching of secular mindfulness in schools. Based on the MBSR program developed by Kabat-Zinn (1990), adaptations in the curriculum were designed to match the interests and developmental level of an adolescent population (Mindfulness in Schools, 2010). First piloted in 2008, the curriculum used for the present study consisted of eight 45 minute long lessons. During each session, an average of 30 minutes was spent in lecture, viewing video clips and engaging in discussion focused on the principles of MBSR, and introducing participants to the concepts of awareness, acceptance and the transient nature of the human experience. The other 15 minutes was spent practicing MMT techniques, including the practices of the body scan, various types of mindful breathing, awareness of sounds and sensory experiences, and sitting and walking meditation. At the end of each session, participants were provided with 5-15 minute homework exercises. Home practice was not mandatory and no formal record was kept of homework completion.

The MMT sessions were held 15 minutes after the official end of the school day in a large classroom. At the beginning of the first session, participants were given an

overview of MMT, and ground rules were discussed, including the importance of confidentiality. Each session began with a transitional exercise to help participants transfer focus from their school day to MMT. While the informational part of the session was being presented, participants could ask questions and make comments. During the practice part of the session, they were asked to close their eyes and observe a “strong silence,” refraining from interacting with others (Mindfulness in Schools, 2010). Participants were encouraged to make use of meditation cushions and yoga mats so practicing techniques could be comfortable and safe. Chimes were used to indicate when a practice started and finished.

Each of the eight training sessions had a particular focus as noted in the .b protocol and as briefly described here.

Session 1. Learning to focus attention: A flashlight helped to illustrate the way attention can focus in, pan out or disappear. Participants practiced mindful breathing, learning that “attention is like a puppy, it isn’t very good at staying in one place very long” (Mindfulness in School, 2010). The task was to bring attention back to the breath when it wandered, and to note any physical sensations and thoughts occurring while breathing.

Session 2. Learning to establish calm and concentration: Participants watched a video clip of Sir David Attenborough observing a family of apes as an example of the curiosity, kindness and acceptance that they were encouraged to employ in their own introspection. They learned to calm the mind by anchoring to the body with a more structured breathing technique, “FOFBOC,” which stands for “feet on the floor butt on the chair” (Mindfulness in Schools, 2010).

Session 3. Recognizing problems with thinking and returning to focus: This session used video clips of “Kung-fu Panda” and Woody Allen to illustrate how minds create worry, for example, by interpreting the present based on negative past experiences, ruminating and catastrophizing. Participants learned “Beditation,” a technique helpful in preparing for restful sleep (Mindfulness in Schools, 2010).

Session 4. Developing present moment awareness: After discussing activities they typically do on “autopilot”, participants engaged in a mindfulness eating exercise, one pleasant (chocolate) and one less pleasant (a hot pepper) as an example of experiencing the present fully.

Session 5. Slowing and savoring activities including stretching and walking: Participants were introduced to moving mindfully using the “samurai walk” in which attention is focused totally on the physical experience of walking (Mindfulness in Schools, 2010).

Session 6. Stepping back from thoughts that overwhelm you: Participants discussed repetitious thoughts they experience that cause them stress and were encouraged to recognize these thoughts, and simply observe them “as they pass by like clouds or a flowing river” (Mindfulness in Schools, 2010).

Session 7. Allowing, accepting and being with difficult emotions: Participants focused on understanding the physiological, cognitive and behavioral aspects of stress. Participants were coached to accept the existence of difficult thoughts and feelings, and to use breathing techniques to relax and neutralize the experience.

Session 8. Developing a personal practice: In the final session, participants reviewed the techniques they learned and formulated plans to incorporate those they found helpful into their daily routines.

Data Analyses

The *Statistical Package for Social Sciences* (SPSS) was used for analysis of the data collected in the present study. The data for each participant consisted of their demographics, predicted and actual IB exam scores, and individual scores from the PSS, the CAMS-R, and the WEMWBS that were collected prior to the start of training, at the end of training, and at follow up at one week prior to the IB exams. Repeated measures 2 X 2 X 3 ANOVAs were conducted between all four groups on each measure. An advantage of the repeated measures ANOVA is that it is possible to partition out variability due to individual differences (Coolican, 2005). Statistical significance was set at the $p < .05$ level. Pearson product-moment correlations were used as measures of the strength and the direction of relationships between variables (Cohen, 1988).

CHAPTER 4

RESULTS

The descriptive statistics in Table 4 show the mean scores and standard deviations of the dependent measures of perceived stress (PSS), mindfulness (CAMS-R) and well-being (WEWBS) for the MMT and Control groups in each session at pre-test, post-test and follow-up.

Table 3

Means & Standard Deviations for PSS, CAMS-R & WEMWBS at Pre-Test, Posttest & Follow-Up

Scale	Experimental Groups <i>M(SD)</i>		Control Groups <i>M(SD)</i>	
	S1 (<i>n</i> =10)	S2 (<i>n</i> =10)	S1 (<i>n</i> =10)	S2 (<i>n</i> =10)
Perceived Stress* Lowered scores show improvement				
Pre-test	19.0 (3.50)	15.3 (7.76)	21.9 (4.82)	11.6 (4.72)
Posttest	21.0 (5.27)	19.5 (6.35)	18.6 (5.60)	15.1 (5.00)
Follow-up	19.7 (3.30)	19.2 (5.27)	18.4 (4.48)	16.6 (4.88)
Mindfulness				
Pre-test	29.8 (4.54)	30.6 (5.44)	29.0 (4.40)	32.8 (5.92)
Posttest	30.1 (4.41)	30.7 (3.80)	29.8 (4.40)	33.0 (5.98)
Follow-up	30.7 (3.80)	33.4 (5.15)	30.8 (3.77)	33.4 (6.40)
Well-being				
Pre-test	37.4 (5.70)	41.8 (7.48)	32.1 (6.64)	42.6 (3.37)
Posttest	39.2 (6.00)	39.6 (7.73)	36.0 (7.45)	41.7 (3.65)
Follow-up	39.8 (5.81)	40.2 (7.73)	37.2 (6.54)	41.5 (3.14)

A repeated measures 2 X 2 X 3 ANOVA was conducted between all four groups on each measure. The results are presented in the context of the predictive hypotheses.

Null Hypotheses 1 and 2: Perceived Stress

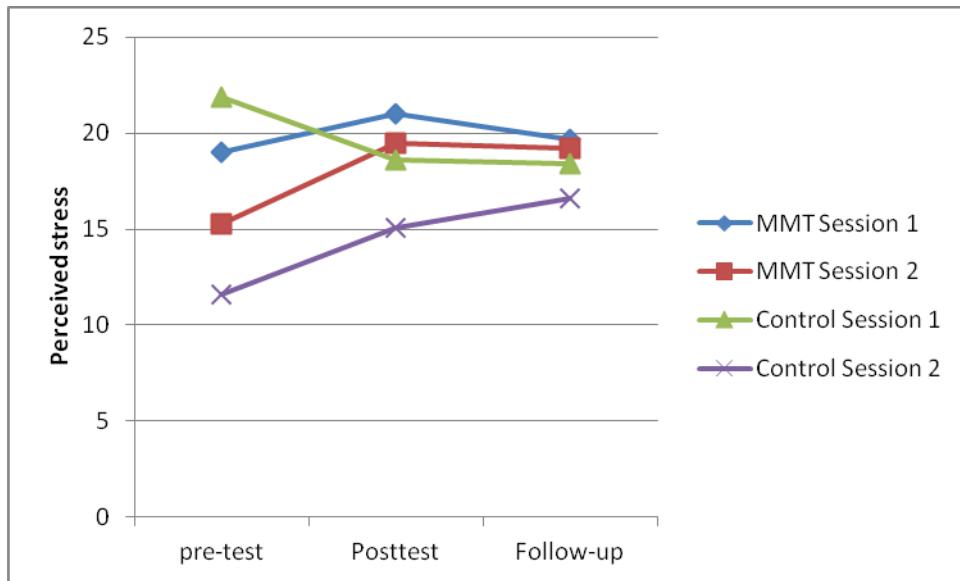
Hypotheses 1 and 2 stated that there would be no significant differences over time between the MMT and Control groups on the Perceived Stress scale at posttest and follow up. The assumption of sphericity was tested and was not significant. The results of a repeated measures 2 X 2 ANOVA showed the main effect of perceived stress was statistically significant, $F(2,72)=3.97, p=.02$. The effect size was moderate, partial eta squared=.09. While there were no significant interaction effects on perceived stress scores based on whether participants were in the MMT or Control groups, there was a significant interaction effect according to Session Assignment by Group, $F(2,72)=8.23, p=.00$, partial eta squared=.18. Tests of Between Subjects Effects confirmed this, $F(1,36)= 7.85, p=.00$, partial eta squared=.17. *Post hoc* pairwise comparisons indicated significant mean differences between perceived stress scores for participants in Session 1 and Session 2 ($M=4.11, p=.00$). Additionally, *post hoc* pairwise comparisons revealed significant mean differences on perceived stress scores between pre-test and post-test scores ($M=-1.60, p=.02$), and between pre-test and follow-up scores ($M=-1.52, p=.03$). Subsequent analysis also showed that the differences in pre-test scores for perceived stress were statistically significant, $F(1,36)=16.62, p=.00$, partial eta squared .31.

Figure 1 shows perceived stress scores over time for each of the assigned sessions for the MMT and Control groups. Differences in regard to groups mean levels of perceived stress are evident, particularly for participants in the Control group during Session 2. The perceived stress levels of the groups that received MMT did not improve

any more than those of participants in the Control group, and as a result, the null hypotheses cannot be rejected.

Figure 1.

Group Means for Perceived Stress Over Time for Each Session



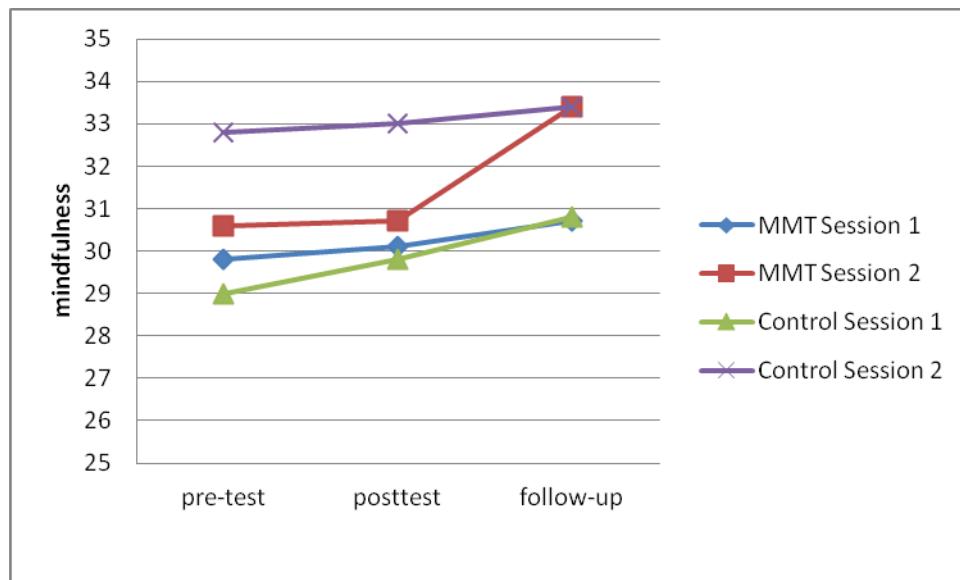
Null Hypotheses 3 and 4: Mindfulness

Null Hypotheses 3 and 4 predicted that there would be no significant difference over time between the MMT and Control groups on the CAMS-R scale at posttest and follow up. The assumption of sphericity was tested and was not significant. A repeated measures 2 X 2 X 3 ANOVA showed a moderate sized main effect for mindfulness across time with 3 levels, $F(2,72)=3.98, p=.00$, partial eta squared=.10. There was also a significant interaction effect for Session Assignment by Time with a moderate effect size, $F(2,38)=3.24, p=.03$, partial eta squared =.08. *Post hoc* testing for significant interaction effects using a Bonferroni correction showed that the means were not significantly different from each other ($p=.16$). The data indicates that the mindfulness level of

participants in the groups that did receive MMT did not improve any more than that of participants in the Control groups. As a result, the null hypotheses cannot be rejected.

Figure 2.

Group Means for Mindfulness Over Time for Each Session



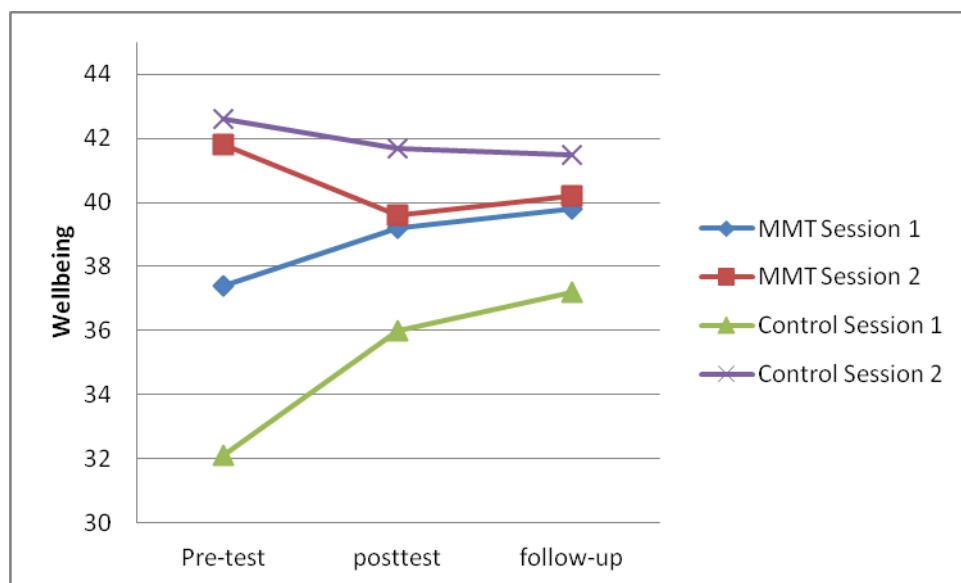
Null Hypotheses 5 and 6: Well-being

Null Hypotheses 5 and 6 predicted that there would be no significant differences over time between the MMT and Control groups on the WEBWEMS scale at posttest and follow-up. The assumption of sphericity was tested and was not significant. The results of a repeated measures 2 X 2 X 3 ANOVA showed the main effect of well-being was not significant, $F(2,72)=1.38, p= .83$. However there was a significant interaction for Session by Group with a large effect size, $F(2,72)=7.32, p<.05$, partial eta squared =.16. Pairwise comparisons indicated significant mean differences between well-being scores for the participants in Session 1 and Session 2 (*Mean difference* =-4.28, $p=.02$). Post hoc testing for significant interaction effects using a Bonferroni correction showed that differences

between the mean scores on well-being for the two sessions were statistically significant ($p=.000$). Figure 3 shows that the well-being scores of participants assigned to both the MMT and Control groups in Session 1 were lower at pretest than those of participants in both groups assigned to Session 2. In regard to the hypotheses predicted, the well-being levels of the groups that received MMT did not improve significantly more than those of participants in the Control groups, and as a result, the null hypotheses cannot be rejected.

Figure 3.

Group Means for Well-being Over Time for Each Session



Null Hypothesis 7: Exam Score Predictions

Null Hypothesis 7 indicated there would not be a significant correlation between MMT participants' predicted International Baccalaureate (IB) examination scores and their actual respective IB scores and between Control participants' predicted IB scores and their actual respective scores. A Pearson product-moment correlation coefficient was computed to assess these relationships. The results showed there was a significant and

high positive correlation for both the MMT ($r=.91$, $n=20$, $p=.00$) and Control ($r=.90$, $n=20$, $p=.00$) groups. As a result, the null hypothesis was rejected.

Secondary Analyses

Dropped Participants

In Table 4, the demographic characteristics and survey scores of students who pretested for the study but dropped-out before completing seven out of eight mindfulness sessions are presented. Three female and one male student dropped from the study. The stated reasons for leaving the study offered by the three females were that they could not continue due to time constraints and scheduling conflicts. The male student said he left the study because did not feel comfortable with the meditation techniques after two sessions.

Table 4

Descriptive Information, Survey Scores for Perceived Stress (PS), Mindfulness (CAMS-R) and Well-being (WEBWBS) and Predicted/Actual IB Scores for Dropped Participants

Training Session	Group	Gender/Age	Country	PS	CAMS-R	WEBWBS	IB Score P/A
Session 1							
11/19/10-01/25/11	MMT*	F/17	UK	27	26	39	24/22
*(Dropped after 5th session having missed 2 previous sessions)							
	Control	F/17	UK	21	30	34	30/31
	MMT*	F/18	Japan	26	32	33	32/33
*(Dropped after 2nd session due to schedule conflict)							
	Control	F/19	Japan	22	30	35	34/34
Session 2							
01/11/11-03/12/11	MMT*	M/17	NL	24	28	30	26/23
*(Dropped after 2nd session: "not comfortable w/meditation")							
	Control	M/17	Belgian	19	31	32	30/30
	MMT*	F/18	German	24	29	34	29/27
*(Dropped after attending 1 st session due to time constraints)							
	Control	F/18	German	20	28	33	28/28

Table 5 compares mean scores on the dependent variables for students who dropped from the MMT group with those of the students who completed mindfulness training. Compared to participants who completed MMT, students who dropped from the study rated themselves as having a higher level of perceived stress, and a slightly lower sense of mindfulness and well-being. The students who dropped also predicted lower IB scores for themselves and scored lower on the actual exams ($M=26.25$), almost four IB points lower than the mean for students who completed the study in the MMT ($M=30.2$) and Control ($M=31.95$) groups.

Table 5

Mean scores on Perceived Stress (PS), Mindfulness (CAMS-R) and Well-Being and Predicted/Actual Scores for 2 Experimental Groups and Dropped Participants

Groups	n	PS	CAMS-R	Well-Being	Predicted IB/Actual IB
Experimental	20	20.45	29.55	34.75	30.95
Dropped Exp.	4	25.25	28.75	34	27.75
<u>Difference</u>		+4.8	-0.8	-0.75	-3.2
					<u>-3.95</u>
Control	20	16.75	30.8	37.35	33
Dropped Cntl	4	20.5	29.75	33.5	30.5
<u>Difference</u>		+3.75	-1.05	-3.85	-2.5
					<u>-1.55</u>

Differences in MMT Groups on Dependent Measures in Each Session

A question that arose *post hoc* was whether the two MMT groups differed on any of the three surveys, indicating a potential advantage for the 1st session participants due to having more time to practice, or, possibly, being disadvantaged because their exposure to the treatment was not as recent as the other MMT group. In this regard, Session 1

participants completed MMT in January 2011, three months before the follow-up surveys were completed in April 2011. Participants in Session 2 completed MMT on March 12, approximately one month before the follow up surveys were completed, and less than one month before administration of the IB exams. Independent 2-tailed *t*-tests were conducted to compare follow-up scores of participants in Sessions 1 and 2 on the dependent measures of perceived stress, mindfulness, and well-being. Results showed that there were no significant differences in perceived stress, $t(18)=.73, p=.46$; mindfulness, $t(18)=.05, p=.95$; or well-being, $t(18)=.13, p=.89$. A 2-tailed *t*-test was also conducted to see if there were differences in actual IB examination scores for MMT participants in the first and second sessions. Results showed there was no statistically significant difference, $t(18)=.68, p=.50$. The mean IB score was 28.9 ($SD=4.75$) for Session 1 and 30.7 ($SD=6.83$) for Session 2.

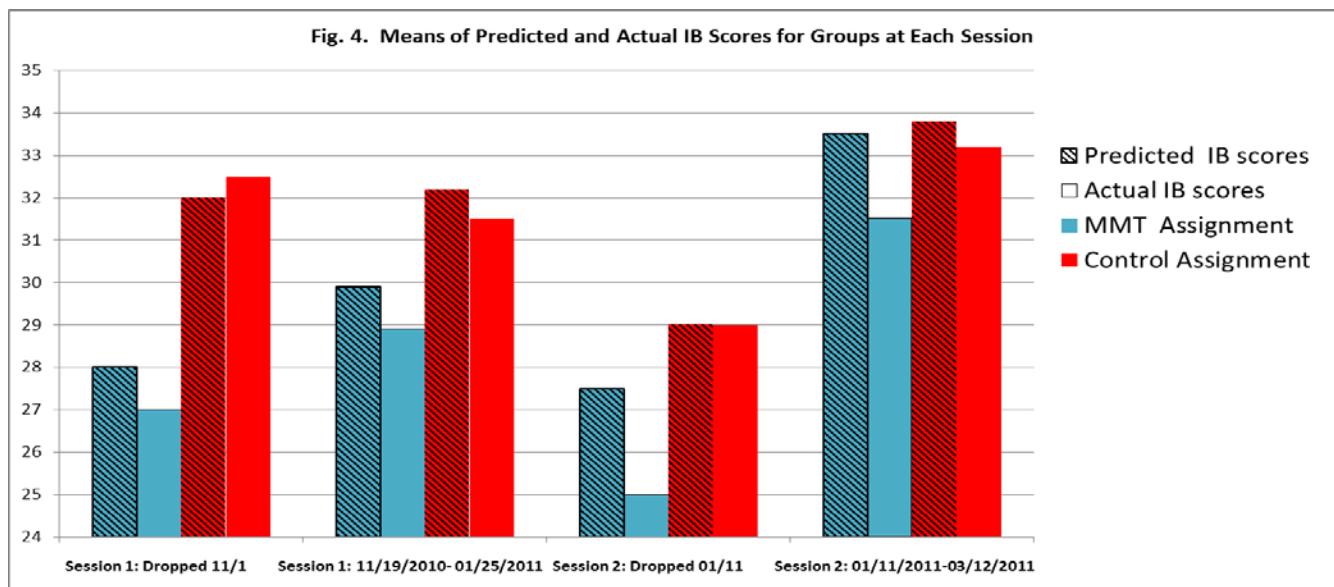
Differences in Performance Between MMT and Controls on the IB Exam

Another *post hoc* question was whether significant differences existed in the actual performance of the participants in the MMT and Control group on the IB examinations. First, a *t*-test was conducted to determine if there were significant differences in IB scores for Control group participants based on assignment to Session 1 or 2. The difference in mean IB scores between Control Session 1 ($M=31.5, SD=5.5$) and Control Session 2 ($M=33.2, SD=6.46$) was not significant, $t(18)=.63, p=.53$. Next, a 2 tailed *t*-test for matched pairs was conducted on IB scores for the combined MMT and Control groups. Results from the *t*-test indicated no significant differences between the two groups on actual IB scores, $t(19)=1.38, p=.18$. The mean IB score for participants who completed MMT was 29.8 ($SD=5.8$), and 32.4 ($SD=5.91$) for participants in the Control groups.

Figure 4 displays the means of predicted and actual IB scores for the individuals who dropped from the study, as well as those of participants in MMT and Control groups during each session. Participants in all groups predicted IB scores that were slightly higher than their actual scores. Figure 4 shows that participants assigned to Session 1 had predicted and actual IB scores that were lower than participants assigned to Session 2 in both the MMT and Control groups. While the difference between the MMT and Control groups on IB scores was not statistically significant, a difference of a few IB points can have important practical implications that will be pointed out in the Discussion section.

Figure 4

Means of Predicted and Actual IB Scores for Each Group at Each Session



Relationships between Actual IB Scores and the Dependent Variables

A final *post hoc* question concerned whether there were significant relationships between participants' scores on the perceived stress, mindfulness and well-being surveys, and their performance on the IB exam. Individual Pearson Product Correlation analyses were run to test the degree and direction of the association between each of the dependent variables

and IB exam scores. Results indicated a significant negative correlation between perceived stress and IB scores, $r(40) = -.375, p = .01$, where a lower perceived stress score indicates that the individual is reporting less perceived stress. On the mindfulness measure, the results showed a significant positive correlation with IB performance, $r(40) = .34, p = .02$. There was no significant correlation for the well-being measure and IB examination results, $r(40) = .02, p = .08$.

CHAPTER 5

DISCUSSION

The purpose of the present study was to evaluate the relative effectiveness of MMT in reducing the perceived stress and improving the mindfulness and well-being of a group of adolescents in a school-based program that culminates in high-stakes examinations. In addition, the present study examined whether there was a significant correlation between MMT versus control participants in their predicted IB examination scores and their respective actual IB scores. Seven hypotheses were proffered with regard to this study, and the results will be discussed based on these hypotheses.

In regard to Hypotheses 1 and 2, the analyses revealed significant differences in the perceived stress reported among the groups that participated in this study, particularly at pretest. To provide some perspective on perceived stress scores, a survey of the literature determined that an “average” score on the Perceived Stress Scale for adolescents is 19 (Augustine, Rao, Rao, Laxmaiah & Nair, 2011; Cohen, 1994; Lemon & Watson, 2011; Roberti, Harrington, & Storch, 2006). Lower scores indicate less perceived stress. In general, participants assigned to Session 2 reported feeling less stress than other participants in the study. A review of individual scores revealed that none of the participants in Session 1 reported pre-test scores lower than 10 on the Perceived Stress scale. The average pre-test score for MMT participants in Session 1 was 19 ($n = 10$), with an average score of 21.9 reported for their matched Controls ($n = 10$). In contrast, MMT participants in Session 2 reported an average pretest score of 15.3 on the Perceived Stress Scale ($n = 10$), with two participants rating themselves less than 10, one of those scores being 1. Control participants for Session 2 also reported being less stressed at pre-test;

their average score for perceived stress was 11.6 ($n = 10$), with four scores falling below 10. It may be relevant to note that pre-testing for Session 2 participants took place on January 11, a few days after students returned from a two week semester break, and at the halfway point in their final year of the IB program. These factors may have influenced the ratings participants reported. Sampling bias may have been a side effect of the small sample size, perhaps resulting in a group over-represented by students who were experiencing less stress (Coolican, 2009). While the Perceived Stress Scale has been used with adolescent populations, it has not been used in any published studies to detect the effectiveness of MMT on adolescent populations (Cohen & Hamrick, 2003). The PSS is based on the theoretical perspective of Lazarus who defined the impact of stressful events as being determined by the particular threat itself, as well as the resources that are available to offset that threat. Hence, the PSS seemed to be a good instrument to measure the degree to which academic and co-curricular demands were appraised to be stressful, as well as the degree to which coping mechanisms, including MMT for the Experimental group, were appraised to be effective in handling the demands.

Hypotheses 3 and 4 addressed the construct of mindfulness as measured by the CAMS-R. To put the scores in perspective, a survey of the research literature indicated that an average score for an adolescent on the CAMS-R is 36 (Feldman, Greeson, Renna, & Robbins-Montieth, 2011; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007; Huppert & Johnson, 2010; Schmertz, Anderson, & Robins, 2009). Participants who received MMT reported increases in levels of mindfulness between pre-test and follow-up; an increase of nearly 1 point for Session 1 participants, and of 2.8 points for Session 2 participants. However, both Control groups also reported increases over time. In fact, the

Control group in Session 2 reported higher mindfulness scores at each time point than all other groups. It is possible that this latter group of individuals were more accepting of their thoughts and feelings, and had better powers of focus and concentration than did other individuals in the study. Participants in the Control group for Session 2 also reported feeling less stressed at pre-test, perhaps in part because they were more confident in their ability to direct focus and concentration to the tasks required by the IB program.

A possible reason why students who completed the MMT course did not show significantly higher levels of mindfulness after training may be found in the nature of mindfulness itself. One of the first lessons in the .b curriculum is for students to recognize that they are not very mindful in everyday life (Burnett, Cullen, & O'Neill, 2011). In the course, they are trained to notice when they seem to be on “automatic pilot.”. Primed with this realization, their ratings of mindfulness may be lower than expected until they have reached a level of mastery in their daily lives. Similarly, Huppert and Johnson's (2010) study using the .b curriculum with adolescent boys at a British boarding school produced non-significant effects for mindfulness.

In regard to Hypotheses 5 and 6, a review of the literature indicates that 48.8 is an average score for an adolescent on the Warwick-Edinburgh Mental Well-Being Scale (Huppert & Johnson, 2010; Stewart-Brown & Janmohamed, 2008; Tennant et al., 2007). Both the MMT and Control groups in Session 2 reported significantly higher well-being scores than did both groups in Session 1. However, the participants in Session 1 showed subtle improvements in well-being scores over time, nearing the levels of the participants in the second session. The development of the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) was funded by the NHS Heath Scotland, and is the only one of the

three surveys used in this study that was normed on an adolescent population. It is possible that the WEMWBS is more aligned to the thoughts and feelings of adolescents than the other scales used in this study, and is more sensitive to change as a result. The 10.5 point difference in mean pre-test scores between Control group participants in Session 1 and Session 2 may be explained, in part, by the time of year that pre-tests were administered. Participants in Session 1 completed the pre-test in early November of their senior year. According to the IB calendar, the end of November hosts the highest number of deadlines for assignments and external assessments. External assessments are sent out to be evaluated by IB examiners around the world, eliminating potential for scores to be influenced by an instructor's perception of "good effort." The well-being scores of MMT participants in Session 1 were higher than the matched Controls, perhaps having been buffered by the understanding that they were enrolled in a training program purported to help them handle the demands of those academic challenges. In contrast, participants in Session 2 filled out pre-test surveys for well-being after returning from a two week semester break, having made it through one half of the most difficult year in the IB program. It is certainly possible that "academic calendar" may have influenced participants' dispositions while filling out the surveys, a variable that was not controlled for. In regard to the only published study involving an adolescent populations that used the WEMWBS, Hubbert and Johnson (2010) found significant results for well-being in the their study on MMT only for the students who did homework for the .b course.

Null Hypothesis 7 posited that MMT participants would not be accurate in predicting their IB examination scores. Results showed that all participants were equally adept at predicting their IB results. Participants in the Control group over-predicted their

IB results by an average of 1.7 points. MMT participants predicted lower IB scores in general, and missed their predictions by an average of less than 1 point. The average prediction of students who dropped MMT was 3.2 IB points lower than that of participants who completed MMT. Secondary analyses shed some light on these individuals. At pre-test, students who dropped MMT reported lower well-being scores, and higher perceived stress scores ($M = 25$) compared to MMT completers ($M=18$). At the onset, they may have felt too stressed and overwhelmed to commit to completing the entire mindfulness training. Most research supports that stress has an inverse and negative relationship with academic achievement (Malik & Balda, 2006). Students who dropped from MMT also produced scores on the IB examinations that were lower than any other group.

On a positive note, the present study's results seem to indicate that the MMT intervention attracted individuals who could especially benefit from the training program. Additionally, while not at a significant level, MMT participants improved their mindfulness scores to the level of their matched Controls who started at a higher place to begin with. Becoming more focused and aware of the impact of their thoughts and feelings, these individuals may be better able to assess challenging situations as they occur, and hopefully choose to respond based on the information gathered, rather than simply react.

Limitations of the Study

An inevitable consequence of conducting research on behavior in a real-life setting is that some critical variables cannot be controlled (Robson, 2002). Variance due to factors other than the independent variables decreases the likelihood of detecting differences or relationships that actually exist (Cohen, 1988). The researcher in this study could not

randomly assign students to MMT and control groups because that would, in essence, be requiring students to meditate. Additionally, although students at the school where the study was conducted were presented with the same opportunities to participate, they self-selected to be included in mindfulness meditation training or to fill out survey forms to earn volunteer service credit. Self-selection makes it impossible to determine causation, and has long been recognized as a problem for many research studies (Jackson, Procidano, & Cohen, 1989). In this study, differences in pre-test scores suggest that students who perceived they were under significant stress and felt less focused (not mindful) were more likely to volunteer for the eight week mindfulness meditation training designed to help students with these types of issues. This is not surprising since stress reduction and improved concentration were presented as potential benefits of MMT.

Another limitation was the small sample size ($n=40$) and the resulting low power to detect small changes. Small sample size increases the likelihood of sampling error, and restricts interpretation of results (Coolican, 2009). Larger sample sizes result in increased power and decreased estimation error (Van Voorhis & Morgan, 2007). Cohen (1988) recommends that given a medium to large effect size, 30 participants per cell should lead to approximately 80% power, the minimum suggested for a study using ANOVA statistics. Because MMT was offered as an after school activity, the academic and extracurricular pressures of the IB program restricted efforts to recruit a larger number of students for participation. Many IB students maintain full schedules at the end of each school day, with extracurricular activities expected of those applying to elite universities and colleges. In this study, MMT was in competition with homework, internal and external assessments,

SAT and ACT preparation, tutoring, and community service activities which IB students must complete outside of regular school hours.

In regard to the validity of the measures used in this study, student self-ratings have been found to be questionable in some of the research literature. For example, a study by Fan et al. (2006) found significant challenges to the validity of self-reporting surveys completed by adolescents who provided inaccurate data due to carelessness, confusion, or intentionally false responses. Other researchers have found problems associated with self-rating scales because of self-preservation bias and the tendency to report symptoms in a way that is socially desirable (e.g. Kendall & Flannery-Schroeder, 1998). Additionally, while both the Perceived Stress Scale and the CAMS-R have been used in research with adolescent populations, they were standardized primarily on adult populations. As a result, the surveys can only be used with confidence on adults (Coolican, 2009).

It was ambitious to expect that major effects of MMT would be evident after providing only eight hours of formal exposure to the adolescents in this study. Lack of any significant overall group differences between the experimental and control groups was also a finding in Huppert and Johnson's (2010) research using the .b curriculum with 14 and 15 year old boys. In the current study, contact time with MMT participants ranged from 7 to 8 hours of direct instruction. In studies with adult populations, MBSR trainings usually involve eight 2 hour sessions and 30-40 minutes per day of individual practice, more than twice the amount of time that participants received in this study. According to researchers connected with the Mindfulness in Schools Project (MiSP), "To make a measurable difference in the lives of adolescents with so little contact time is a huge

challenge, and it may be that to teach mindfulness effectively in a school context we need to rethink the entirely the issue of contact time” (Burnett, 2011, p. 12).

Mandating homework seems like a logical way to increase MMT exposure. Studies with adults have indicated that home practice of mindfulness techniques was significantly related to improvements in mindfulness and psychological well-being (e.g., Carmody & Baer, 2008; Carson, Carson, Gil, & Baucom, 2004). In the Huppert and Johnson (2010) study, small but significant effects were found when examining the survey results of the minority of participants who did mindfulness homework. However, participants in the study attended boarding schools where home practice was verified by the boarding school staff. The Mindfulness in Schools (MiSP) staff who provide teacher training for implementation of the .b curriculum discourage mandating homework, reasoning that in the interests of promoting MMT as a pleasant and positive long term practice, it is more important for young participants to enjoy the class sessions without worry of negative recrimination for not completing homework. Data were not collected on homework in the present study. Informal comments from the MMT participants indicated that home practice was rarely done because of time constraints. Home practice may be problematic, but providing MMT practice time during lunch periods and breaks might be one way to increase the amount of exposure to the treatment.

Future Directions for Research

In regard to the secondary analyses, some practical information was revealed about the students who dropped from MMT. It appeared that these students were academically weaker, based on their lower IB scores, and they reported experiencing a greater degree of perceived stress than any other group of participants. Some studies on MMT have found

that individuals who are more challenged by stress at baseline are the ones who benefit most from MMT (e.g., Huppert & Johnson, 2010). In the present study, time constraints were cited by three of the four participants as their reason for dropping MMT. In future efforts, it will be important to target students with similar profiles for MMT sessions by finding flexible ways to schedule training. For example, MMT sessions could be offered during part of the lunch period or during study periods instead of being scheduled at the end of the school day. Of additional interest in the secondary analyses were the correlations found between participants' IB examination scores and the dependent variables. Specifically, that perceived stress scores were negatively correlated with IB scores, and that mindfulness scores were positively correlated with IB scores. These results strengthen the argument that MMT may be an appropriate vehicle for helping students cope with the academic pressure and cognitive demands of the IB examinations.

The stated aim of the .b curriculum is to perform as “an awareness raising exercise to give all students a taste of mindfulness so that they know about it and can return to it later in life if they chose to do so” (What is .b?, 2012, p.2). Most mindfulness courses have been designed with adults in mind, and children and adolescents are very different audiences. The authors of the .b curriculum recognize that as children mature, their cognitive abilities and skills change and develop. Hence, a developmental perspective may need to be considered when implementing this intervention. The .b curriculum was originally designed to be used with younger adolescents. Adapting the curriculum for older adolescents may add to the effectiveness of this program, although this remains an empirical question. For example, using video clips and activities that are more appropriate for older adolescents may maintain student motivation and interest in the intervention and

therefore, contribute to the intervention in comparison to a control condition. Within the current course, opportunities for group discussion were also limited. Providing older adolescents time to discuss their specific vulnerabilities and concerns or anxieties within the program may also enhance the outcome versus presenting mindfulness to the participants in a more general way as was the case in the present study. Related to this latter point, in a study sponsored by the Mindfulness in School's Program in the UK, preliminary results show that students tend to deploy mindfulness techniques when challenging situations arise (Hennelly, 2013). Discussing how to use mindfulness techniques in potentially stressful situations, such as during conflict situations with parents and having anxiety issues regarding school, may make the mindfulness practice more relevant and satisfying to the older adolescents and, therefore motivate them to practice the techniques on their own time and/or at home. This remains, however, an empirical question needing to be addressed in a controlled experiment.

In addition, mindfulness research with children and adolescents has not yet taken advantage of technological advances that may permit increased accuracy in measuring the relative effectiveness of treatment. Objective measures would add additional value, such as using performance tests of attention or fMRI to examine neural activity. For example, brain imaging studies with adults show that mindfulness meditation can modify the structure of the brain to advance the quality of both thought and emotion (e.g., Holzel et al., 2011; Kerr et al., 2011). Similar changes may take place in children and adolescents, but again, it is an empirical question needing study.

Despite a significant increase in the volume and quality of research in the past several years, mindfulness meditation studies continue to be characterized by poor

methodology, with very few studies using randomized control trials (e.g. Burke, 2009; Ospina et al., 2008). In addition, critics have noted a lack of precision in the terminology used. For example, the terms “attention” and “awareness” are often used unchangeably, and explanations of the difference between “concentration” and “mindfulness” appear vague (Mind and Life Institute, 2012). Efforts, therefore, to develop a more precise and widely accepted vocabulary are needed, along with more rigorously designed studies to add to the research base.

Conclusions

In the United States, there is wide agreement among educators, policy makers and the general public that schools should graduate students who are competent in academic subjects, as well as those who work with others and have the social and emotional skills to behave responsibly and lead full and productive lives (Elias, 2003). High stakes tests are being employed to provide evidence of academic achievement, compounding the stress for young people already dealing with normal stressors and developmental processes known to make adolescence a particularly difficult period in the life cycle (Frydenberg & Lewis, 2000). Research studies show that school programs offering stress management and coping skills training are effective in reducing stress symptoms and enhancing coping ability (Kraag, Zeegers, Kok, Hosman, & Abu-Saad, 2006). However, most school districts that are limited in resources and feeling intense pressure to raise measures of academic performance are finding it increasingly difficult to fund programs beyond core academics (NEA, 2011). Not properly supporting children has its own costs. A UNICEF report determined that among the 23 wealthiest countries, children in the United States

and Great Britain fall in last place on 40 indicators of child well-being compared to the other countries involved in the analysis (UNICEF, 2007).

Research on mindfulness meditation is seeing growth in recent years, although research with children and adolescents still lags behind that of adults. MMT teaches participants to cope in an adaptive way with situations viewed as threatening at both the primary and secondary appraisal levels. Through practicing nonjudgmental appraisal of all phenomena on a regular basis, participants may view challenges with a more balanced, less intimidating perspective (Kabat-Zinn, 1994). Many studies provide evidence that adults can develop these skills and attitudes through MMT (Kabat-Zinn, 1994). Recent research shows adolescents are more likely to deploy mindfulness techniques in particular circumstances, as situation specific tools (Hennelly, 2013). A systematic review of studies of mindfulness practices with children and adolescents published in 2012 shows a growing body of evidence that MMT is generally acceptable and well-liked by young participants, and there are no reports that any of the practices caused harm (Harnett & Dawe, 2012).

Although it is difficult to control for extraneous variables in a high school environment, the advantage of conducting research in a real world setting is that it enhances understanding about how an intervention can actually work in a location to which adolescents have regular access. In this regard, Egon Brunswik (1955) proposed that “representative design” was a useful alternative to the systematic design conducted in laboratories by prominent psychological researchers of the time. He argued that results from research in artificial or analogue settings could not be easily generalized to larger populations outside the laboratory and therefore, advocated for the study of psychological processes at the level of in vivo research. His theory of the environment pointed out that it

is by nature unpredictable; therefore, it is challenging to isolate causality in research (Brunswik, 1955). Representative design necessitates that in the same way in which participants in an experiment must be representative of the population the study will be generalized to, the restrictions on the experimental task must also be similar to the environmental constraints to which they will be generalized.

The present study is one of the few that has examined school-related stress and mindfulness training in older adolescents in a secondary school setting (Huppert & Johnson, 2010). Although the null hypotheses were supported, the study nevertheless produced helpful information about the reality of providing MMT in a high school environment where students are confronted daily with some of the situations that they feel may contribute to their perceived stress and impact their well-being.

Mihaly Csikszentmihalyi, one of the founders of the Positive Psychology movements said that "people who learn to control inner experience will be able to determine the quality of their lives, which is as close as any of us can come to being happy" (Csikszentmihalyi, 1990, p. 2). He suggested that to overcome the anxieties and depressions of contemporary life, people must become independent of their social environment "so they no longer respond automatically to its rewards and punishments" (Csikszentmihalyi, 1990, p. 16). He proposed that "the most important step in emancipating oneself from social controls is the ability to find rewards in the events of each moment" (Csikszentmihalyi, 1990, p. 19). Although Csikszentmihalyi's comments are inspirational in nature, it remains an empirical question regarding whether the mindfulness meditation training is effective in reducing adolescent anxiety and perceived

stress, and increases their sense of wellbeing as well as their academic performance in school.

APPENDIX A: HUMAN SUBJECTS PROTECTION PLAN APPROVAL



Human Subjects
Protection Program

1618 E. Helen St.
P.O. Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
<http://orcr.vpr.arizona.edu/irb>

HSPP Correspondence Form

Date: 10/22/10

Investigator: Virginia Reiss, PhD Candidate

Department: School Psychology

Advisor: Shitala Mishra, PhD

Project No./Title: 10-0768-02 The Efficacy of Mindfulness-based Stress Reduction (MBSR) Training for Reducing Perceived Stress, and Increasing the Mindfulness and Wellbeing of Adolescents Pursuing the International Baccalaureate (IB) Diploma Program

Current Period of Approval: 10/22/10 – 10/21/10

Submit the "FORM: Continuing Review Progress Report" no later than 45 days prior to the end of the approval period listed above.

IRB Committee Information

IRB2 – IRB00001751

Expedited Review – New Project

FWA Number: FWA00004218

Documents Reviewed Concurrently	Status
Project Approval Form – Social/Behavioral (received 10/22/10)	Appr
Consenting Instruments:	
Parental Informed Consent (version 10/06/10))	Appr
Experimental Informed Consent (version 10/06/10)	Appr
Control Informed Consent (version 10/21/10)	Appr
VOTF (version 10/22/10)	Appr
Site Authorizations:	
International School of Dusseldorf (version 10/06/10)	Appr
Recruitment Materials:	
Mindfulness Meditation Project Information and Interested? Slip (version 10/06/10)	Appr
Informational Flyer (version 10/06/10)	Appr
Friday Notes for Parents (version 10/21/10)	Appr
CAS Point Options (version 10/06/10)	Appr
Data Collection Instruments:	
CAMS-R (version 10/21/10)	Appr
WEMWBS (version 10/21/10)	Appr
PSS (version 10/21/10)	Appr
Other (define):	
Mindfulness Curriculum (version 10/06/10)	Appr
Community Referral List (version 10/06/10)	Appr

Determination

Approved as submitted effective 10/22/10

Requirements

- **Research Site Authorization Requirement:** Clearance from official authorities for sites where research is to be conducted must be obtained prior to performance of this study at those sites. Evidence of this must be submitted to the HSPP office.
- **Recruitment Site Authorization Requirement:** Before posting any flyers/advertisements on private bulletin boards OR University of Arizona bulletin boards outside of the Principal Investigator's home department OR physically recruiting from any location, written site authorization must be obtained. Please retain this authorization in your research records.

Reminders: No changes to a project may be made prior to IRB approval except to eliminate apparent immediate hazard to subjects.

Arizona's First University – Since 1885

Form version: 10/01/2010

Virginia Reiss

10-0786-02

Page 2

Date

Regulatory Determination(s)**Criteria for Approval has been met (45 CFR 46.111):**

Expedite Approval (45 CFR 46.110 Category 7): Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Vulnerable Population – Children (45 CFR 46.404): Research involving not greater than minimal risk (**will by answering surveys or turning in written work**) and adequate provisions are made for soliciting the assent of the children and permission of their parents or guardians, as set forth in 45 CFR 46.408.

Waiver of One Parental Signature (45 CFR 46.408(b)): permission of one parent is sufficient as it is research involving not greater than minimal risk as defined in 45 CFR 46.404.

By signing this form, I attest that I do not have a conflict of interest with this project and do not need to recuse myself from review.



10/22/10

Elaine G. Jones, RN, PhD
Chair, IRB2 Committee
UA Institutional Review Board (IRB)

Date

EGJ:ae

cc: Departmental/College Review Committee

-
- No changes to a project may be made prior to IRB approval except to eliminate apparent immediate hazard to subjects.
-

APPENDIX B: SCHOOL PROPOSAL APPROVAL

**INTERNATIONAL SCHOOL
OF DÜSSELDORF E.V.**

ISD | Niederrheinstr. 336 | 40489 Düsseldorf | Germany

Institutional Review Board
c/o Office of Human Subjects Research
University of Arizona
Tucson, Arizona

21 August 2010

Dear IRB Members,

We have reviewed the proposed study "Mindfulness Meditation Project at the International School of Düsseldorf" presented by Virginia Reiss, a PhD candidate at the University of Arizona. We have granted authorization for Ms. Reiss, as Principal Investigator of the study to do the following activities at the International School of Düsseldorf:

1. To contact potential participants within ISD's 11th and 12th grade student populations;
2. To recruit potential participants within ISD's 11th and 12th grade student populations;
3. To collect survey data on ISD student participants including administering rating scales on Mindfulness, Wellness and Perceived Stress.
4. To collect the student and teacher IB predictions used for university applications in the fall 2010, along with the actual IB scores that student participants obtain in July 2011.
5. To allow the Principal Investigator to cull from school records information on students' date of birth, gender, grade level and ethnicity.
6. To co-facilitate a Mindfulness Meditation class at ISD for interested 11th and 12th grade students to be held on campus.
7. It is understood that this project will end no later than July 30, 2011.

We understand that student participants will be assigned research numbers to protect their anonymity and that all information connected to the study will be kept completely confidential. To ensure that students are protected, Ms. Reiss has agreed to provide us with a copy of the University of Arizona IRB approved, stamped consent documents.

Ms. Reiss has also agreed to provide a copy of her study results, in aggregate, to ISD administration when they are available.

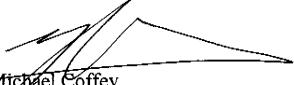
We have agreed to the following responsibilities:

- To provide space for the Mindfulness Meditation class
- To provide space for the safe storage of study records.

If the IRB has any concerns about the permission being granted by this letter, please contact either of us at the email listed below.

Sincerely,


 Neil McWilliam
 Director, International School of Dusseldorf
nmcw@isdedu.de


 Michael Coffey
 Principal, International School of Dusseldorf
coffeym@isdedu.de

APPENDIX C: EXPERIMENTAL SUBJECT CONSENT FORM

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THE UNIVERSITY OF ARIZONA HUMAN SUBJECTS PROTECTION PROGRAM
INFORMED CONSENT FORM

For IRB Office Use Only:
APPROVED BY UNIVERSITY OF AZ IRB.
THIS STAMP MUST APPEAR ON ALL
DOCUMENTS USED TO CONSENT SUBJECTS.
 DATE: 10/22/11 EXPIRATION: 10/23/11

Project Title: Mindfulness Meditation Project at the International School of Dusseldorf

You are being invited to take part in a research study being conducted by The University of Arizona and asked to read this form so that you know about this research study. The information in this form is provided to help you decide whether or not to take part. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefit you normally would have.

If you agree to participate in this study by signing this consent form, the following information will be accessed from your school records at ISD:

- Demographic data: your date of birth, grade level, gender and ethnicity
- IB test predictions submitted by you and your teachers
- If you are in 11th grade, IB test results for Grade 11 (June 2011)
- If you are in 12th grade, final IB test results (July 2011)

1. WHY IS THIS STUDY BEING DONE?

The purpose of this study is to find out if an 8 week mindfulness meditation course can lower stress levels and increase the focus, concentration and wellbeing of the students who participate in it. Mindfulness is a meditation practice that is a way of paying attention, on purpose and non-judgmentally, to what goes on in the present moment in your body, mind and the world around you. A common mindfulness practice is to sit quietly and concentrate on the breath as it passes in and out of the body. When thoughts are distracting, they are let go and attention is returned to the breath. There is substantial evidence that daily mindfulness practice, even for relatively short periods of time, leads to improvements in wellbeing from a number of perspectives. Mindfulness Based Stress Reduction (MBSR) is now a well proven therapeutic intervention for stress in the workplace and in the classroom. The non-religious class we will teach at ISD is based on MBSR and on studies done in other high schools and medical schools. For more information see <http://www.mbsr.co.uk/mindfulness.html>.

WHY AM I BEING ASKED TO BE IN THIS STUDY?

You are being asked to be in this study because you are an 11th or 12 grade student attending the International School of Dusseldorf. You have indicated an interest in participating in the 8 week Mindfulness Meditation class or indicated a willingness to fill out the rating scales as a part of a comparison group.

HOW MANY PEOPLE WILL BE ASKED TO BE IN THIS STUDY?

Approximately 35 students (participants) will be enrolled in this study. An additional 50 students will be enrolled in the comparison pool.

Version Date:

Page 1 of 4

Subject's Initials _____

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WHAT ARE THE ALTERNATIVES TO BEING IN THIS STUDY?

The alternative is not to participate. There are other ways to reduce stress, such as talking with your counselor at school. You can earn CAS points for the hours you participate, but you can also earn CAS points for many other activities, for example Fitness, Dance and service work. You can also earn points for activities you do in the community. Contact CAS coordinator Denise Grant (grantd@isdedu.de) if you need suggestions about alternative ways to earn CAS points.

WHAT WILL YOU BE ASKED TO DO IN THIS STUDY?

Participants in the Comparison Group Only

If you have agreed to be a member of the comparison group only, you will be asked to attend an informational meeting, and you will be asked to fill out 3 (three) brief survey forms on Mindfulness, Wellness and Perceived Stress in October 2010, December 2010 and May 2011. Total time to fill out all 3 surveys is estimated at 10-15 minutes. In addition, data will be gathered from your school records including your gender, ethnicity, date of birth, grade and your IB exam predictions and your teachers' predictions. Your actual IB results will also be culled from school records. You will have the opportunity to attend a debriefing session at the end of the project and read the final report.

Participants in the Mindfulness Meditation Class

If you agree to be in the Mindfulness Meditation class, your active participation in this study will last from the day you begin the class (first session starts October 21, 2010) until May 13, 2011, one week prior to the IB exams. Each of the 8 (eight) sessions lasts one hour and fifteen minutes. In addition, you will be asked to do at least 3 (three) ten minute homework meditation practice sessions during each of the 8 weeks that you are taking the class. The curriculum you will be asked to participate in is described below.

- Session 1: Learning to focus attention
- Session 2: Learning to establish calm and concentration
- Session 3: Recognizing problems with thinking and returning to focus
- Session 4: Developing present moment awareness
- Session 5: Slowing and savoring activities including stretching and walking
- Session 6: Stepping back from thoughts that overwhelm you
- Session 7: Allowing, accepting and being with difficult emotions
- Session 8: Developing a personal practice

Participants in the Mindfulness Meditation class will also be asked to fill out 3 (three) brief surveys on Mindfulness, Wellness and Perceived Stress at the beginning and ending of the 8 week session, and again one week before the IB exams are administered. In addition, data will be gathered from your school records including your gender, ethnicity, date of birth, grade and your IB exam predictions and your teachers' predictions. Your actual IB results will also be culled from school records. You will have the opportunity to attend a debriefing session at the end of the project and read the final report.

The following procedures are experimental: There will be a comparison group who will not complete the 8 week course.

If you quit the Mindfulness Class early, you may be asked to complete the following activities: Fill out the 3 surveys in October 2010, December 2010 and May 2011. If you decline, there will be no repercussions.

1.2.page 3/4

ARE THERE ANY RISKS TO ME?

The things that you will be doing have no more significant risk than you would come across in everyday life. You will be asked to fill out 3 (three) rating scales at the beginning and ending of the Mindfulness Meditation class and again one week prior to the IB exams. You do not have to answer anything you do not want to. Your identity will be protected by the assignment of a research number to you that will be used on all forms and data sheets. The forms will be kept in a locked file and the data sheets will be protected by a user name and password known only to the Principal Investigator of the study and ISD's data system manager.

ARE THERE ANY BENEFITS TO ME?

You may not benefit from being in this study. However, participating in the study may assist you in better managing stress.

WILL THERE BE ANY COSTS TO ME?

Aside from your time, there are no costs for taking part in the study.

WILL I BE PAID TO BE IN THIS STUDY?

You will not be paid for being in this study. However, if you are a participant in this study, you will be able to earn CAS points for the time you participate. A total of 100 points of CAS are required for graduation. Points are awarded in hourly increments.

Students who participate in the Mindfulness Meditation class can use their hours for either Action or Service points or a combination of both. If you decide to participate in the Mindfulness Meditation class, you have the potential to earn a total of 18.5 CAS points/hours: 8 hours for the class, 8 hours for homework (20 minutes, 3 times weekly), and 3.5 hours for completing the surveys, attending the consent/assent meeting, and attending a debriefing session at the end of the project.

If you decide to participate by filling out the surveys only, you can use hours for Service points and have the potential to earn a maximum of 3.5 CAS points/hours in total from the Mindfulness project: 3.5 hours for completing the surveys, attending the consent/assent meeting, and attending a debriefing session at the end of the project.

WILL INFORMATION FROM THIS STUDY BE KEPT CONFIDENTIAL?

Information about you will be stored under your research number in a computer file protected with a password. The rating scales that you fill out will be kept in a locked file with this consent form in the Principal Investigator's office. Information about you will be kept confidential to the extent permitted or required by law. The only person who will have access to your information is the Principal Investigator. Aside from the record of CAS points you earn, no evidence of your participation in this study will appear in your school records. Representatives from the University of Arizona Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly. However, the rating scales and any information about you will be coded with a number so that they cannot tell who you are. Representatives from the University of Arizona Human Subjects Protection Program can see information that has your name on it if they come to the study site (ISD) to view records. If there are any reports about this study, your name will not be in them.

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WHOM CAN I CONTACT FOR MORE INFORMATION?

You can call the Principal Investigator to tell her about a concern or complaint about this research study. The Principal Investigator Virginia Reiss, MSW and PhD candidate can be called at 211 46872917 or 211 9406771 or contacted by email reiss@isdedu.de. You may also contact the Principal Investigator's advisor, Dr. Shitala Mishra, PhD at +001 520-621-5817 or mishras@u.arizona.edu.

For questions about your rights as a research subject; or if you have questions, complaints, or concerns about the research and cannot reach the Principal Investigator or want to talk to someone other than the Investigator, you may call the University of Arizona Human Subjects Protection Program office.

- Telephone number: +001(520) 626-6721
- Website (this can be anonymous): <http://orcr.vpr.arizona.edu/irb/contact>.

MAY I CHANGE MY MIND ABOUT PARTICIPATING?

You have the choice whether or not to be in this research study. You may decide to not begin or to stop the study at any time. If you choose not to be in this study, there will be no effect on your student status. You can stop being in this study at any time with no effect on your student status. Any new information discovered about the research will be provided to you. This information could affect your willingness to continue your participation.

STATEMENT OF CONSENT

I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it is available. I can ask more questions if I want, and I maintain my student status with no penalty if I stop participating. A copy of this entire, signed consent form will be given to me.

Subject's Signature

Date**INVESTIGATOR'S AFFIDAVIT:**

Either I have or my agent has carefully explained to the subject the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

Signature of Presenter

Date

Signature of Investigator

Date

Version Date:

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Subject's Initials _____

APPENDIX D: CONTROL SUBJECT CONSENT FORM

<p style="text-align: center;">THE UNIVERSITY OF ARIZONA HUMAN SUBJECTS PROTECTION PROGRAM INFORMED CONSENT FORM</p>	<p><i>For IRB Office Use Only:</i></p> <p style="margin-top: -20px;">APPROVED BY UNIVERSITY OF AZ IRB THIS STAMP MUST APPEAR ON ALL DOCUMENTS USED TO CONSENT SUBJECTS. DATE: 10/22/10 EXPIRATION: 10/21/11</p>
--	--

Project Title: Mindfulness Meditation Project at the International School of Dusseldorf

You are being invited to take part in a research study being conducted by The University of Arizona and asked to read this form so that you know about this research study. The information in this form is provided to help you decide whether or not to take part. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefit you normally would have.

If you agree to participate in this study by signing this consent form, the following information will be accessed from your school records at ISD:

- Demographic data: your date of birth, grade level, gender and ethnicity
- IB test predictions submitted by you and your teachers
- If you are in 11th grade, IB test results for Grade 11 (June 2011)
- If you are in 12th grade, final IB test results (July 2011)

1. WHY IS THIS STUDY BEING DONE?

The purpose of this study is to find out if an 8 week mindfulness meditation course can lower stress levels and increase the focus, concentration and wellbeing of the students who participate in it. For more information see <http://www.mbsr.co.uk/mindfulness.html>. The purpose for the study is also to find out more about how students feel about their experience in the International Baccalaureate Diploma Program.

WHY AM I BEING ASKED TO BE IN THIS STUDY?

You are being asked to be in this study because you are an 11th or 12 grade student attending the International School of Dusseldorf. You have indicated an interest in earning CAS points by filling out 3 rating scales at 3 times during the school year as a part of a comparison group.

HOW MANY PEOPLE WILL BE ASKED TO BE IN THIS STUDY?

Approximately 50 students will be enrolled in the comparison pool.

WHAT ARE THE ALTERNATIVES TO BEING IN THIS STUDY?

The alternative is not to participate. You can earn CAS points for the hours you participate, but you can also earn CAS points for many other activities, for example Fitness, Dance and service work. You can also earn points for activities you do in the community. Contact CAS coordinator Mrs.Grant (grandt@isdedu.de) if you need suggestions about alternative ways to earn CAS.

WHAT WILL YOU BE ASKED TO DO IN THIS STUDY?

If you have agreed to be a member of the comparison group only, you will be asked to attend an informational meeting, and you will be asked to fill out 3 (three) brief survey forms on Mindfulness, Wellness and Perceived Stress in October 2010, December 2010 and May 2011. Total time to fill out all 3 surveys is estimated at 10-15 minutes. In addition, data will be gathered from your school records including your gender, ethnicity, date of birth, grade and your IB exam predictions and your teachers' predictions. Your IB exam results will also be culled

Version Date:

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Subject's Initials _____

from school records. You will have the opportunity to attend a debriefing session at the end of the project and read the final report. The following procedures are experimental: The comparison group will be compared with a group of students who complete an 8 week Mindfulness meditation course.

ARE THERE ANY RISKS TO ME?

The things that you will be doing have no more significant risk than you would come across in everyday life. You will be asked to fill out 3 (three) rating scales at the beginning and ending of the Mindfulness Meditation class and again one week prior to the IB exams. You do not have to answer anything you do not want to. Your identity will be protected by the assignment of a research number to you that will be used on all forms and data sheets. The forms will be kept in a locked file and the data sheets will be protected by a user name and password known only to the Principal Investigator of the study and ISD's data system manager.

ARE THERE ANY BENEFITS TO ME?

You may not benefit from being in this study, but can earn CAS points for the time involved.

WILL THERE BE ANY COSTS TO ME?

Aside from your time, there are no costs for taking part in the study.

WILL I BE PAID TO BE IN THIS STUDY?

You will not be paid for being in this study. However, if you are a participant in this study, you will be able to earn CAS points for the time you participate. A total of 100 points of CAS are required for graduation. Points are awarded in hourly increments. If you decide to participate by filling out the surveys, you can use hours for Service points and have the potential to earn a maximum of 3.5 CAS points/hours in total from the Mindfulness project: 3.5 hours for completing the surveys, attending the consent/assent meeting, and attending a debriefing session at the end of the project.

WILL INFORMATION FROM THIS STUDY BE KEPT CONFIDENTIAL?

Information about you will be stored under your research number in a computer file protected with a password. The rating scales that you fill out will be kept in a locked file with this consent form in the Principal Investigator's office. Information about you will be kept confidential to the extent permitted or required by law. The only person who will have access to your information is the Principal Investigator. Aside from the record of CAS points you earn, no evidence of your participation in this study will appear in your school records. Representatives from the University of Arizona Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly. However, the rating scales and any information about you will be coded with a number so that they cannot tell who you are. Representatives from the University of Arizona Human Subjects Protection Program can see information that has your name on it if they come to the study site (ISD) to view records. If there are any reports about this study, your name will not be in them.

WHOM CAN I CONTACT FOR MORE INFORMATION?

You can call the Principal Investigator to tell her about a concern or complaint about this research study. The Principal Investigator Virginia Reiss, MSW and PhD candidate can be called

Version Date:

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Subject's Initials _____

at 211 46872917 or 211 9406771 or contacted by email reiss@isdedu.de. You may also contact the Principal Investigator's advisor, Dr. Shitala Mishra, PhD at +001 520-621-5817 or mishras@u.arizona.edu.

For questions about your rights as a research subject; or if you have questions, complaints, or concerns about the research and cannot reach the Principal Investigator or want to talk to someone other than the Investigator, you may call the University of Arizona Human Subjects Protection Program office.

- Telephone number: +001(520) 626-6721
- Website (this can be anonymous): <http://orcr.vpr.arizona.edu/irb/contact>.

MAY I CHANGE MY MIND ABOUT PARTICIPATING?

You have the choice whether or not to be in this research study. You may decide to not begin or to stop the study at any time. If you choose not to be in this study, there will be no effect on your student status. You can stop being in this study at any time with no effect on your student status. Any new information discovered about the research will be provided to you. This information could affect your willingness to continue your participation.

STATEMENT OF CONSENT

I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it is available. I can ask more questions if I want, and I maintain my student status with no penalty if I stop participating. A copy of this entire, signed consent form will be given to me.

Subject's Signature

Date

INVESTIGATOR'S AFFIDAVIT:

Either I have or my agent has carefully explained to the subject the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

Signature of Presenter

Date

Signature of Investigator

Date

Version Date:

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Subject's Initials _____

APPENDIX E: PARENT CONSENT FORM

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THE UNIVERSITY OF ARIZONA HUMAN SUBJECTS PROTECTION PROGRAM
PARENTAL PERMISSION FORM

For IRB Office Use Only:
 APPROVED BY UNIVERSITY OF AZ IRB.
 THIS STAMP MUST APPEAR ON ALL
 DOCUMENTS USED TO CONSENT SUBJECTS.
 DATE: 10/22/10 EXPIRATION: 10/21/11

Project Title: Mindfulness Meditation Project at the International School of Dusseldorf

Your child is being invited to take part in a research study being conducted by The University of Arizona. You are being asked to read this form so that you know about this research study. The information in this form is provided to help you decide whether or not you want your child to take part. If you decide to let your child to take part in the study, you will be asked to sign this permission form. If you decide you do not want your child to participate, that is okay. There will be no penalty to you or your child and your child will not lose any benefit which he/she would normally have.

If you and your child agree to participate in this study by signing this consent form and the assent statement, the following information will be accessed from your child's school records at ISD:

- Demographic data: his/her date of birth, grade level, gender and ethnicity
- IB test predictions submitted by your and his/her teachers
- If your child is in 11th grade, IB test results for Grade 11 (June 2011)
- If your child is in 12th grade, final IB test results (July 2011)

WHY IS THIS STUDY BEING DONE?

The purpose of this study is to evaluate the effects of an 8 week mindfulness meditation course on stress levels and the focus, concentration and wellbeing of the students who participate in it. It is expected that participating in the course will help students manage the stress of the International Baccalaureate (IB) program and the IB exams.

Mindfulness is a meditation practice that is a way of paying attention, on purpose and non-judgmentally, to what goes on in the present moment in your body, mind and the world around you. A common mindfulness practice is to sit quietly and concentrate on the breath as it passes in and out of the body. When thoughts are distracting, they are released and attention is returned to the breath. There is substantial evidence that daily mindfulness practice, even for relatively short periods of time, leads to improvements in wellbeing and a reduction in stress. Mindfulness Based Stress Reduction (MBSR) is a well proven therapeutic intervention for stress in the workplace and in the classroom. The mindfulness meditation class offered at ISD is not religious in nature and is based on MBSR and on studies done in other high schools and medical schools. For more information see <http://www.mbsr.co.uk/mindfulness.html>.

WHY IS MY CHILD BEING ASKED TO BE IN THIS STUDY?

Your child is being asked to be in this study because he or she is an 11th or 12th grade student attending the International School of Dusseldorf. He/she has indicated interest to participate in the 8 week Mindfulness Meditation class or has indicated a willingness to fill out the rating scales as a nonparticipant and to be a part of a comparison pool.

HOW MANY PEOPLE WILL BE ASKED TO BE IN THIS STUDY?

Approximately 35 students (participants) will be enrolled in the class. Another 50 students will

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Parent's Initials _____

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be recruited to be in the comparison group.

WHAT ARE THE ALTERNATIVES TO BEING IN THIS STUDY?

The alternative is not to participate. There are other ways to reduce stress, such as talking with the counselor at school. Students can earn CAS points for the hours they participate, however they can also earn points for many other activities, including activities sponsored by the school like Fitness, Dance, and service projects, or by doing projects in the community. Contact CAS coordinator Denise Grant (grantd@isdedu.de) if your child needs suggestions about other ways to earn CAS points.

WHAT WILL MY CHILD BE ASKED TO DO IN THIS STUDY?

Participants in the Comparison group

If your child has agreed to be a member of the comparison group only, he or she will be asked to fill out 3 (three) brief survey forms on Mindfulness, Wellness and Perceived Stress in October 2010, December 2010 and May 2011. Total time to fill out all 3 surveys is estimated at 10-15 minutes. In addition, data will be gathered from your child's school records including gender, ethnicity, date of birth, grade and IB exam predictions. Actual IB results will also be culled from school records. You and your child will have the opportunity to attend a debriefing session at the end of the project and read the final report.

If your child agrees to be in the Mindfulness Meditation class, his or her participation in this study will last from the day he or she begins the class (first session starts ? 2010) until May 13, 2011, one week prior to the IB exams. Each of the 8 (eight) sessions lasts one hour. In addition, he or she will be asked to do at least 3 (three) 20 minute homework meditation practice sessions during each of the 8 weeks that he/she is taking the class. The curriculum your child will be asked to participate in is described below.

Session 1: Learning to focus attention

Session 2: Learning to establish calm and concentration

Session 3: Recognizing problems with thinking and returning to focus

Session 4: Developing present moment awareness

Session 5: Slowing and savoring activities including stretching and walking

Session 6: Stepping back from thoughts that overwhelm you

Session 7: Allowing, accepting and being with difficult emotions

Session 8: Developing a personal practice

Participants in the Mindfulness Meditation class will be asked to fill out 3 (three) brief surveys on Mindfulness, Wellness and Perceived Stress at the beginning and ending of the 8 week session, and again one week before the IB exams are administered. In addition, data will be gathered from your child's school records including gender, ethnicity, date of birth, grade and IB exam predictions. Actual IB results will also be culled from school records. You and your child will have the opportunity to attend a debriefing session at the end of the project and read the final report.

The following procedures are experimental: There will be a comparison group who will not complete the 8 week course.

If your child quits the intervention early, he/she may be asked to complete the following activities: Fill out the 3 surveys in October 2010, December 2010 and May 2011. However, no

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pressure or repercussions will happen if he/she declines.

ARE THERE ANY RISKS TO MY CHILD?

The things that your child will be doing have no more significant risk than he/she would come across in everyday life. If your child is participating in the Mindfulness Meditation class, he/she can decline to do any activity he/she does not want to do. Your child will be asked to fill out 3 rating scales at the beginning and ending of the Mindfulness Meditation class and again one week prior to the IB exams, however your child does not have to answer anything he/she does not want to.

His/her confidentiality will be protected by the assignment of a research number to him/her that will be used on all forms and data sheets. The forms will be kept in a locked file in the Principal Investigator's office. Data sheets will be protected by a user name and password known only to the Principal Investigator of the study and ISD's data system manager.

ARE THERE ANY BENEFITS TO MY CHILD?

Your child may not benefit from being in this study, however being in the study may help him/her better handle stress.

WILL THERE BE ANY COSTS TO ME/MY CHILD?

Aside from your child's time, there are no costs for taking part in the study.

WILL MY CHILD BE PAID TO BE IN THIS STUDY?

Your child will not be paid for being in this study. However, if your child is a participant in this study, he/she will be able to earn CAS points for the time they participate. A total of 100 points of CAS are required for graduation. Points are awarded in hourly increments.

Students who participate in the Mindfulness Meditation class can use their hours for either Action or Service points or a combination of both. If your child decides to participate in the Mindfulness Meditation class, he/she has the potential to earn a total of 18.5 CAS points/hours: 8 hours for the class, 8 hours for homework (20 minutes, 3 times weekly), and 3.5 hours for completing the surveys, attending the consent/assent meeting, and attending a debriefing session at the end of the project.

If your child decides to participate by filling out the surveys only, he/she can use hours for Service points and has the potential to earn a maximum of 3.5 CAS points/hours in total from the Mindfulness project: 3.5 hours for completing the surveys, attending the consent/assent meeting, and attending a debriefing session at the end of the project.

WILL INFORMATION FROM THIS STUDY BE KEPT CONFIDENTIAL?

Information about your child will be stored in a computer file protected with a password. The rating scales that your child fills out will be kept in a locked file box with this consent form in the Principal Investigator's office. Information about your child will be kept confidential to the extent permitted or required by law. The only person who will have access to your child's information is the Principal Investigator. Besides recording CAS hours/points earned, no record of his or her participation in this project will be included in any school records. Representatives from the University of Arizona Human Subjects Protection Program may access your child's records to make sure the study is being run correctly and that information is collected properly.

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Parent's Initials _____

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However, the rating scales and any information about your child will be coded with a number so that they cannot tell who your child is. Representatives from the University of Arizona Human Subjects Protection Program can see information that has your child's name on it if they come to the study site (ISD) to view records. If there are any reports about this study, your child's name will not be in them.

WHOM CAN MY CHILD OR I CONTACT FOR MORE INFORMATION?

You or your child can call the Principal Investigator to tell him/her about a concern or complaint about this research study. The Principal Investigator Virginia Reiss, MSW and PhD candidate can be called at 211 46872917 or 211 9406771 or contacted by email reiss@isdedu.de. You or your child may also contact the Principal Investigator's advisor, Dr. Shitala Mishra, PhD at +001 520-621-5817 or mishras@u.arizona.edu.

For questions about your child's rights as a research subject; or if you or your child have questions, complaints, or concerns about the research and cannot reach the Principal Investigator or want to talk to someone other than the Investigator, you or your child may call the University of Arizona Human Subjects Protection Program office.

- Local phone number: +001(520) 626-6721
- Website (this can be anonymous): <http://orcr.vpr.arizona.edu/irb/contact>.

MAY I/WE CHANGE OUR MINDS ABOUT PARTICIPATING?

You and your child have the choice whether or not to be in this research study. You or your child may decide to not begin or to stop the study at any time. If you or your child chooses not to be in this study, there will be no effect on your child's student status. Your child can stop being in this study at any time with no effect on his/her student status. Any new information discovered about the research will be provided to you. This information could affect your willingness to continue your child's participation.

STATEMENT OF CONSENT

The procedures, risks, and benefits of this study have been told to me and I agree to allow my child to be in this study and sign this form. My questions have been answered. I may ask more questions whenever I want. I do not give up any of my/my child's or my legal rights by signing this form. A copy of this signed consent form will be given to me.

Subject's Signature _____ Date _____

Parent/Legal Guardian _____ Date _____

Parent/Legal Guardian _____ Date _____

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.1 page 2/5

STATEMENT OF ASSENT:

I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it is available. I can ask more questions if I want, and I can still keep my present student status with no penalty if I stop participating in this study. A copy of this entire, signed consent form will be given to me.

Minor's Name

Minor's Signature

Date

Presenter's Signature

Date

Investigator's Signature

Date

INVESTIGATOR'S AFFIDAVIT:

Either I have or my agent has carefully explained to the subject the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

Signature of Presenter

Date

Signature of Investigator

Date

APPENDIX F: MINDFULNESS TRAINING PROTOCOL

.b

An introduction to mindfulness

Mindfulness in Schools Project, 2010



.b

*This is an excellent way of
learning how to use the
most precious instrument
that you have: your mind*

Professor X,
Cambridge
University

*This course distils many of
the key teachings of
mindfulness into a format
that is accessible and
engaging.*

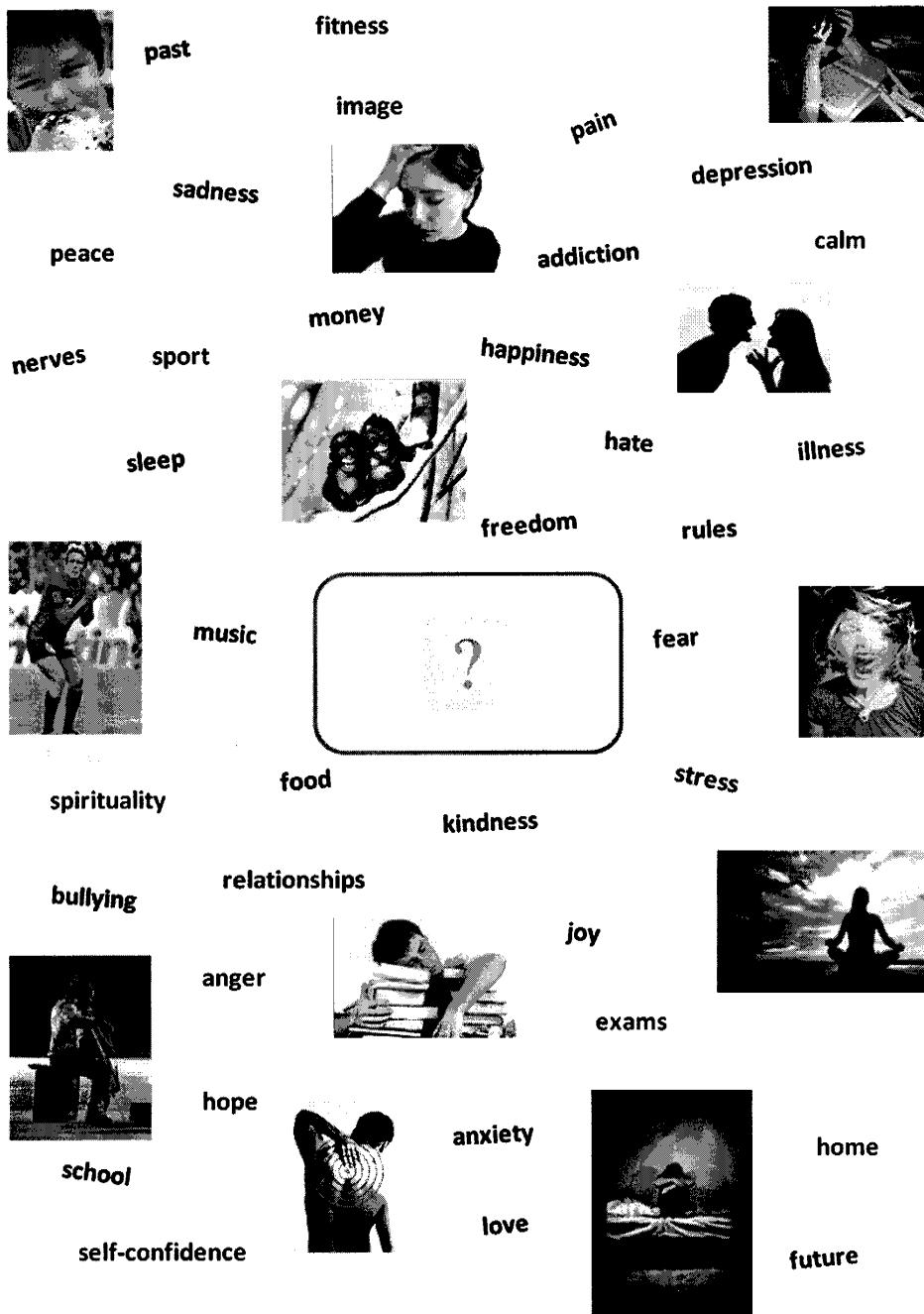
Professor Y,
Oxford University

*It's the relaxing
lesson in between
the more stressful
ones*

Student, 14

*i learnt something
totally different to
what you expect to
learn and i probably
wouldn't have learnt it
any where else*

Student, 15

.b

.b

For best results...

① Choose strong silence

'Weak silence' is when you're quiet because you're made to be. Strong silence is when you're quiet because you want to be... because you understand that it will benefit you. Sometimes it feels strange to begin with, but once you get used to it, it is tremendously nourishing.

② Be in your own bubble

Come into the class as usual... banter, laughter, whatever. But so that the right vibe in each lesson can be created quickly, there will be a kind of transition exercise. This is a signal that says "relax, take it easy" but also cues you to get into the zone. Think of it as turning up for a training session for the mind, as if you're entering a mind-lab. On the one hand you're sharing an experience, but to get the most out of it you want to be in your own virtual bubble for the lesson.

③ Give space to others

In discussions everyone needs to feel safe that they can say what they like, without fear of banter or laughter flying back at them because of what they've said. Please respect each other's views, whatever they may be.



④ Be there!

Every lesson is important so try not to miss one if at all possible. Please be on time too. If you are late then slide into the lesson as quietly as you can as we might be in the middle of an exercise.

⑤ Try this at home

I can't force you to do the Home Practice, but it's crucial if you really want to learn. Find a time every day when you can do the exercises... the most you will be asked to do in any one session is 15 minutes. It is not very demanding so please do it. Just try.

⑥ Ask for help

This is a gentle introduction to mindfulness. You won't be exploring the depths of your unconscious and are unlikely to experience altered states! However, occasionally mindfulness practices will throw up a question in the mind or stir an emotion which you'd like to discuss with someone. If you don't want to discuss it in the class, then just stay behind or email me. Even if you have a question about technique, then just ask or email. We're here to teach you for your benefit, not because we want you to pass an exam.

LESSON ONE**.b**

Puppy Training

In this lesson you will learn to...

1

Direct your attention

2

Explore what you find there

Attention is like a puppy



- We ask the mind to "sit" or "stay" in a certain place
- But it isn't very good at staying for long
- It wanders off
- It keeps fetching things we didn't ask for
- Sometimes it makes a real mess
- **Every time it wanders off we bring it back**
- It wanders off; we bring it back

If you do manage to get your attention to settle then try to **investigate** and explore the physical sensations that you find with real **curiosity**.

There is no 'right' or 'wrong' sensation. What we're doing is **noticing whatever is there**, be it comfortable or uncomfortable, familiar or 'weird'

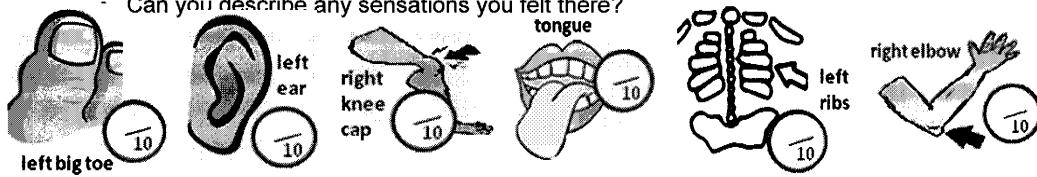
LESSON ONE**.b****Home Practice****Breath Counting**

- Count how many breaths you do in 1 minute, before and after your homework.
- Sit as still as you can and count the breaths as they come in and out of your body.
- The 'in' and the 'out' count as 1 breath.
- Use your fingers to keep track of where you are in case your mind wanders

Day	Breaths per min. BEFOR	Comments	Breaths per min. AFTER	Comments

Experimenting with the Searchlight of Attention

- Immediately after the second '1 minute', choose one of the list below (e.g. right big toe, left knee, right little finger)
- Close your eyes and focus your mind on that part of the body, as best you can
- On a scale of 0-10, how easy was it to feel anything (0 = "impossible", 10 = "really easy")
- Can you describe any sensations you felt there?



LESSON TWO**.b****Turning Towards Calm**

In this lesson you will learn to...

1 Calm your mind
by 'anchoring' it in
the body

2 Relax *into*
experiences,
even difficult ones

Our minds are often compared to animals (and not just puppies)!

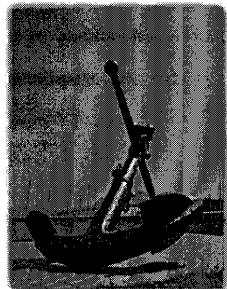
Which others would you compare it with, and why?

What's David Attenborough's attitude to the animals?



Dealing with stress and anxiety can be a bit like sinking in sand

- The harder you struggle, the more stuck you get



FOFBOC

- 'Anchors' the mind in the body
- Calms and steadies it
- Teaches you to 'accept' whatever is there

LESSON TWO**.b****Home Practice****Practice “Anchoring” attention to bodily sensations once every day.**

- Choose a regular time each day (e.g before bed or first thing in the morning).
- Use the sound file to guide you through the routine.
- Note your experiences in the table below

Practical Tips:

- Choose a time and a place where you will not be disturbed.
- Remember how posture can help your practice:-
 - Grounded and stable; feet on floor and bum on chair.
 - Relaxed but alert, sitting upright, head balanced on the top of the spine.
 - Open and ready; shoulders relaxed and chest widening.
- Focusing within; allowing eyes to close or look downwards.
- Observe sensations within the body and accept them as they are.

Whenever your mind wanders (which it will!) simply notice where it went, and then patiently bring it back to the sensations in the part of the body you're currently exploring. Be curious.

Day	What did you notice?

LESSON THREE**.b**

Recognising Worry

In this lesson you will learn to..

- 1 Recognise what our minds do that make us worry: we *interpret*, we *rumeinate*, we *catastrophise*
- 2 'Un-worry' via a 7/11
- 3 Use Meditation to help you get to sleep

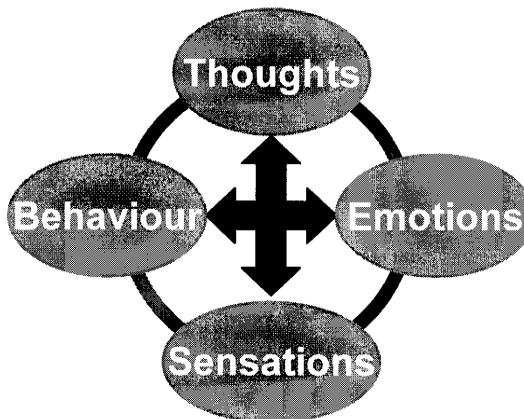
Listen to the scenario described by your teacher

How do you think your mind would respond?

What have you been ruminating about recently?



Thoughts, emotions, body sensations and actions are all linked together in a feedback loop



LESSON THREE**.b****Home Practice****Practice “Beditation” before you go to sleep at night**

- Like last week's FOFBOC you are giving attention to bodily sensations, but this time doing the exercise lying down before bed.
- Use the sound file to guide you through the routine.
- Notice the effects. How does the exercise change your normal bedtime ‘mandscape’?

Practical Tips:

- As normal, whenever your mind wanders (which it will!) simply notice where it went, then gently bring it back.
- Bring a spirit of exploration and acceptance to your experience - whatever it is!



LESSON FOUR**.b**

Being Here Now

In this lesson you will learn to..

1 Step out of
'autopilot' mode

2 Fully experience
the present
moment

3 Notice your
reactions to it

Since waking up this morning, what have you done on 'autopilot'?

After each 'taste' exercise, jot down the responses you had:

What was it?

What did you notice? What reactions did you notice?

1

What was it?

What did you notice? What reactions did you notice?

2

What was it?

What did you notice? What reactions did you notice?

3

Like

Yum!

Dislike

Yuck!

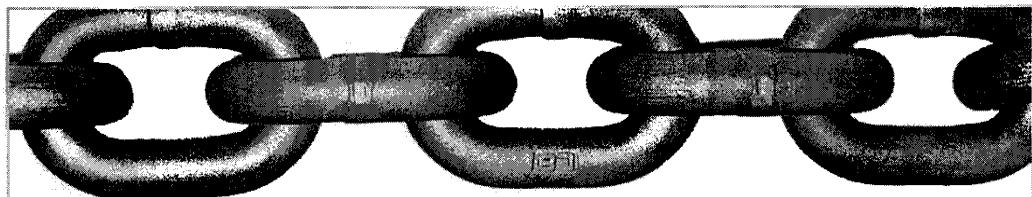
Neither

Hmm...

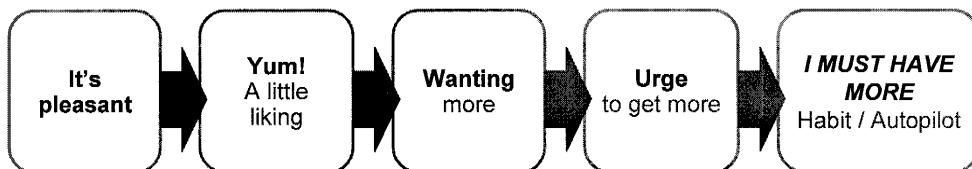
LESSON FOUR

.b

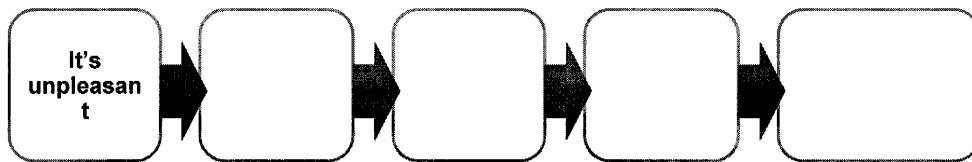
Being Here Now



The Pleasant Chain



The Unpleasant Chain



These reactions become hardwired and we are often swept away by them. We may not actually be **aware** of a lot of what we do. Instead, we can become a bit like a series of chain reactions. This is autopilot

A great part of every day is not lived consciously.

Virginia Woolf

Whenever you want to wake up/change gear out of automatic pilot you can:

- 1 Slow the activity down and savour every detail – and reactions to it.
- 2 Stop, breathe and ‘wake up’ to what is happening at that particular moment

.b

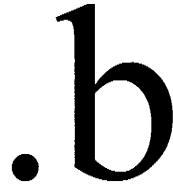
LESSON FOUR

Home Practice

.b

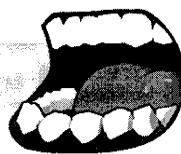
There are three parts to this week's home practice...

1



- First, pick a partner that you don't mind getting random texts from. Once a day, you text your partner simply with .b
- Whenever you get the text, wherever you are and whatever you are doing: STOP and BREATHE
- In other words, come out of autopilot. *Feel your feet on the floor, become aware of the whole of the next breath... both in and out... and notice 'where you are at'.*

2



The Mindful Mouthful

Try to eat ONE mouthful mindfully for every meal and one snack. If you forget all of the meals (easily done) then have a snack and eat it mindfully so that you can tick at least one box! Write the card in to see whether you managed it

Monday				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

B	L	T	S	

B	L	T	S	

B	L	T	S	

B	L	T	S	

B	L	T	S	

B	L	T	S	

.b

LESSON FOUR

Home Practice

3



Sit like a Statue

- Try to sit completely still for 15 minutes every day
- Set an alarm to go off in 15 mins so that you don't have to keep peeking at the time
- Find a posture that is comfortable. Sitting on a chair is fine. Don't lie down for this one, though.
- As best you can, move your attention from your toes up to the top of your head, part by part, just as we did with the FOFBOC.
- There is no audio-file for this one, and it is longer, so you'll almost certainly find your attention wandering. Don't worry. That is what minds do. Just return your attention to whichever part of the body you left it at.
- If you get an itch, try not to scratch... observe the urge to itch!
- If you feel like moving, try not to (unless gently straightening back)... just observe the urge to move!
- Note in the chart below how many times you moved, and make any comments about how it felt and what you noticed.

Day	Times moved	What did you notice?

LESSON FIVE**.b****Moving Mindfully**

In this lesson you will learn to...

1 Move mindfully

2 Aspire to 'flow' or
be 'in the zone'

What characterises sportsmen and women who manage to get
'into the zone'?



In clip 1, what do you think the young man means when he says
'no mind'?

What does Cruise do at the start of clip 2 that gets him 'into the zone'?

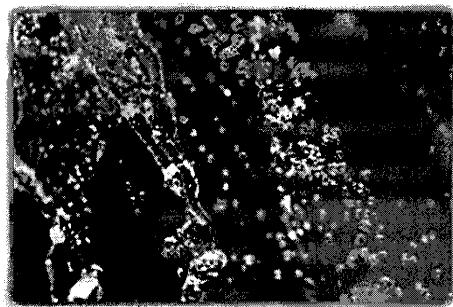


LESSON FIVE**Home Practice****.b****Samurai walking**

- Identify a 20m stretch that you walk every day and walk it mindfully
- Which stretch of road / pavement / path do you walk every day? Choose one which is about 20m long.
- Walk it mindfully. Try to walk all 20m with your attention wholly absorbed in the movement of your body... e.g. the weight on your feet

**Routine revisited**

- Choose one routine activity that you do every day and do it mindfully e.g...
 - Brushing your teeth?
 - Washing your face?
 - Having a shower?
 - Making a cup of tea?



Try to concentrate and absorb yourself in all the tiny details of the activity

LESSON SIX**.b**

Stepping Back

In this lesson you will learn to...

1 Listen to thoughts as 'sound'

2 Observe thoughts passing by like clouds or a flowing river

3 Learn how not to be swept away by the thought-stream

3 Recognise which of your thoughts tend to do this



Think of your thoughts as a stream or a river

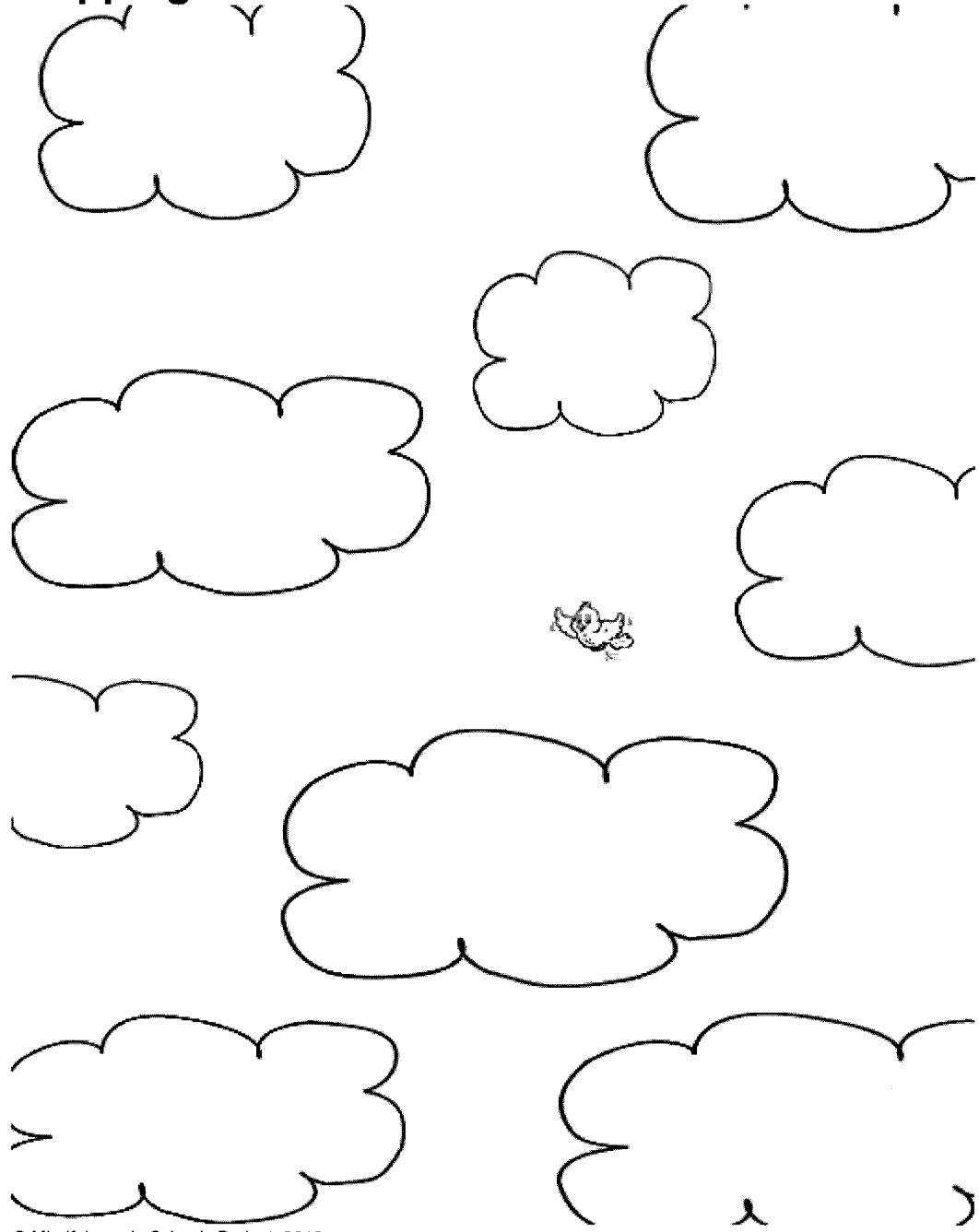
Certain thoughts trickle quietly by

Some have a stronger current and carry you away

What **thoughts** tend to carry you away and cause you stress?

We can learn to approach these thoughts differently by 'stepping back' from them and simply watching them happen. You might observe your thoughts as if they were:

- Clouds passing through the sky of your mind
- Trains going back and forth along a busy railway line
- Passengers getting on and off a bus that you're driving
- A waterfall that you can stand behind and just watch
- A stream or river that you can observe safely from the bank

LESSON SIX**.b****Stepping Back**

LESSON SIX**.b****Stepping Back**

LESSON SIX**Home Practice****.b****1. Observing thoughts**

- Every day, for five minutes before you begin your homework or at another time

*Closing your eyes**Feeling your feet on the floor and body in the chair**Settling your attention on your breath and then...*

- Just watching whatever thoughts are flowing past...
- Observing and allowing them as if from the river bank...
- Focusing on breath or body to regain your balance as some thoughts tug and pull

What did you observe your thought stream to be like? Use the words below or your own.

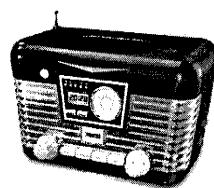
a waterfall a vast ocean a steady flowing stream stormy
 a raging torrent a trickle a calm pond lots of little droplets still, deep water

Monday	Tuesday	Wednesday	Thursday	Friday

2. Radiohead

Listen to the voice and sounds in your head as if it is a radio. What tracks are played most frequently? Not musical tracks so much as repetitive thoughts that you hear again and again and again...

1	
2	
3	



LESSON SEVEN

Befriend the difficult



- Understanding stress
- Recognising your stress signature
- Turning towards stress and difficult emotions instead of away

Breathing with stress and letting it be....



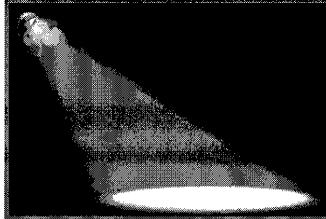
.b

LESSON EIGHT**Pulling It All Together**

What have you found most useful?

Where in your own life could mindfulness be applied?

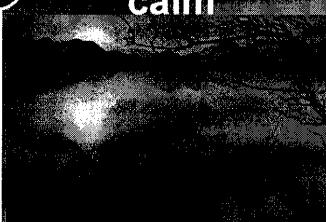
What advice would you give yourself to make the most of what you have learned

1 Direct Attention*Skills:*

- Focusing the spotlight of attention wherever you choose
- Exploring what you find there with curiosity

Practices

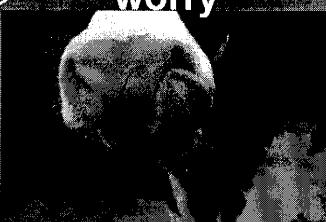
- ‘Aim and sustain’ attention at the breath for 2 minutes
- Counting the number of **breaths in a minute**

2 Accept and calm*Skills:*

- Calming the mind by directing attention into the body
- Accepting what you find there

Practices

- **FOFBOC:**
A body scan with Feet on Floor, Bum on Chair
- Anchoring your mind in the sensations of the body

3 Recognise worry*Skills:*

- Recognising tricks the mind plays which often lead to worry such as rumination and catastrophising.
- Accepting this rather than struggling with it, which only makes things worse

Practices

- **7-11**
- **Beditation** (lying down body scan)

.b

LESSON EIGHT

Pulling It All Together

4

Be here now



Skills:

- Waking up to the present moment
- Noticing and savouring even the smallest details – the juice and the pips of life
- Noticing also your reactions to these experiences

Practices

- .b
- Mindful **mouthful**
- Sitting like a statue for 15 minutes

5

Move mindfully



Skills:

- Mindful movement in the every day
- Being absolutely focused and absorbed in the performance of sport, music or any other activity

Practices

- Mindful **walking**
- Mindful toothbrushing, **showering**, **eating** etc.

6

Step back



Skills:

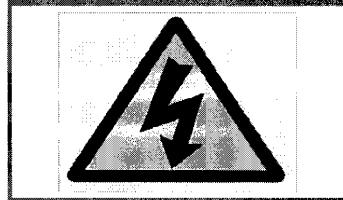
- Listening to thoughts as 'sound'
- Observing thoughts passing by like clouds or a flowing river
- Not being swept away by them

Practices

- Cloud spotting
- Listening to thoughts like a radio in your head

7

Befriend the difficult



Skills:

- Understanding stress
- Recognising your stress signature
- Turning towards to stress or difficult emotions by turning towards them rather than away.

Practices

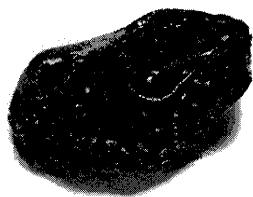
- Breathing with stress / letting it be

.b
1

LESSON EIGHT

Pulling It All Together

4 Be here now



Skills:

- Waking up to the present moment
- Noticing and savouring even the smallest details – the juice and the pips of life
- Noticing also your reactions to these experiences

Practices

- .b
- Mindful **mouthful**
- Sitting like a statue for 15 minutes

5 Move mindfully



Skills:

- Mindful movement in the every day
- Being absolutely focused and absorbed in the performance of sport, music or any other activity

Practices

- Mindful **walking**
- Mindful toothbrushing, **showering**, **eating** etc.

6 Step back



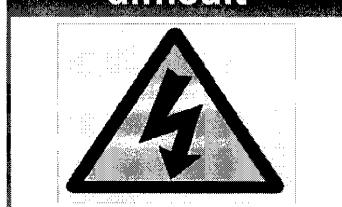
Skills:

- Listening to thoughts as 'sound'
- Observing thoughts passing by like clouds or a flowing river
- Not being swept away by them

Practices

- Cloud spotting
- Listening to thoughts like a radio in your head

7 Befriend the difficult



Skills:

- Understanding stress
- Recognising your stress signature
- Turning towards to stress or difficult emotions by turning towards them rather than away.

Few

Practices

- Breathing with stress / letting it be

APPENDIX G: MINDFULNESS TRAINING CURRICULUM CHECKLIST

.b. AN INTRODUCTION TO MINDFULNESS CURRICULUM CHECKLIST

Key for Activities scoring:

TM=totally met

PM=partially met

NM=not met

<u>Lesson</u>	<u>Skill Focus</u>	<u>Activities</u>	<u>Date/Comments</u>
(1) Puppy Training	Directing and investigating attention	Review ground rules Puppy video clip Breath Counting Home work	
(2) Turn to calm	Anchoring mind in body Relax into experiences	Transition Animal video clip Attentborough clip FOFBOC practice Homework	
(3) Recognize worry	Identify interpreting, ruminating and catastrophising	Transition Worry scenario Feedback loop 7-11 Beditation Homework	
(4) Here and Now	Stop autopilot/notice the moment	Transition Discuss autopilot Taste exercises 15 min meditation Homework	

<u>Lesson</u>	<u>Skill Focus</u>	<u>Activities</u>	<u>Date/Comments</u>
(5)Move Mindfully	meditative movement	Transition Sports video clip Last Samurai clip Samurai walk practice Homework	_____
(6)Stepping Back	understanding thoughts	Transition Identify stress thoughts 20 min. meditation Homework	_____
(7)Befriend difficulty	Turn towards stress	Transition Understand stress Guided visualization 20 min meditation Homework	_____
(8)Pull it Together	review of concepts and practices	Transition What helped? (discuss) What next?(plan) 15 min meditation	_____

APPENDIX H: COGNITIVE & AFFECTIVE MINDFULNESS SCALE-R

CAMS-R

: _____

This questionnaire contains questions that may relate to your thoughts, feelings, experiences and preferences. There are no right or wrong answers or trick questions so please be as honest as possible. Please don't discuss the questionnaire with others or compare answers. Please select the option that best describes your experience using the following scale:

Not at all= 0 Rarely=1 Sometimes=2 Often=3 Almost Always=4

1. It is **easy** for me to **concentrate** on what I am doing. _____
2. I am preoccupied by the future. _____
3. I tolerate emotional pain. _____
4. I can accept things I can't change. _____
5. I can usually describe how I feel at in lots of detail. _____
6. I am easily distracted. _____
7. I am preoccupied by the past. _____
8. It is **easy** for me to keep track of my thoughts & feelings. _____
9. I try to notice my thoughts without judging them. _____
10. I am able to accept the thoughts and feelings I have. _____
11. I am able to focus on the present moment. _____
12. I can pay close attention to 1 thing for a long period of time. _____

APPENDIX I: : WARWICK-EDINBURGH MENTAL WELLBEING SCALE

WEMWBS

: _____

People have a variety of ways of relating to their thoughts and feelings. For each of the items below, rate how much each of these ways apply to you.

Not at all=0 Rarely=1 Sometimes=2 Often=3 All of the time=4

1. I have been feeling optimistic about the future. _____
2. I have been feeling useful. _____
3. I have been feeling relaxed. _____
4. I have been feeling interested in other people. _____
5. I have energy to spare. _____
6. I have been dealing with problems well. _____
7. I have been thinking clearly. _____
8. I have been feeling good about myself. _____
9. I have been feeling close to other people. _____
10. I have been feeling confident. _____
11. I have been able to make up my own mind about things. _____
12. I have been feeling loved. _____
13. I have been interested in new things. _____
14. I have been feeling cheerful. _____

APPENDIX J: PERCEIVED STRESS SCALE

PSS

The questions in this scale ask you about your feelings and thought during the last month. In each case, you will be asked to indicate how often you felt or thought in a certain way by using the following scale.

Never=0 Almost Never=1 Sometimes=2 Fairly Often=3 Very Often=4

1. In the last month, how often have you been **upset** because of something that happened unexpectedly? _____
2. In the last month, how often have you felt that you were **unable to control** the important things in your life? _____
3. In the last month, how often have you felt nervous and "stressed"? _____
4. In the last month, how often have you felt confident about your ability to handle your personal problems? _____
5. In the last month, how often have you felt things **were going your way**? _____
6. In the last month, how often have you found that you **could not** cope with all the things that you have to do? _____
7. In the last month, how often have you been **able to control** irritations in your life? _____
8. In the last month, how often have you felt that you were on top of things? _____

9. In the last month, how often have you been **angered** because of things that were outside of your control? _____
10. In the past month, how often have you felt difficulties were piling up so high that you **could not** overcome them? _____

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