MINDFULNESS AND ADOLESCENT ANXIETY

by

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Abstract

The aim of this study was to determine if a mindfulness program would reduce anxiety, stress and depression in a grade 10 planning class (n = 12). The Depression Anxiety and Stress Scale was administered pre and post the implementation of the mindfulness program. Employing an action-research methodology, a 12-week mindfulness curriculum was implemented to see if students could learn and implement the mindfulness tools to build resilience against their anxiety, stress and depression. Both qualitative and quantitative data was gathered. While the quantitative data was inconclusive due to small participant numbers, there were nonetheless interesting trends towards significance if used with a larger group of participants. Qualitative data did provide interesting thematic comparisons between research literature and anxiety levels. It is recommended to rerun this program with a larger group of student participants, possibly including their teachers, parents and caregivers so that the program is implemented wholly and consistently.

Keywords: Mindfulness, anxiety, adolescence, curriculum, school, mental health.

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Chapter 1

The Problem

Introduction

Anxiety is a normal reaction to stress and danger (Bolton, 1972). The body releases chemicals into the blood to help us to react quickly to protect us from this perceived danger (Massey, 2014) . Anxiety reactions are seen as abnormal when the stress continues to cause distress after the perceived danger has passed (Bolton, 1972). Interestingly, anxiety and depression were once considered adult illnesses but we see them more and more in children and adolescents (Cross National Collaborative Group, 1992; Kovacs & Gatsonis, 1994; Broderick & Metz, 2009). In 2012, 17% of Canadians aged 15 or older reported a need for mental health care (Statistics Canada, 2013).

Anxiety can present in many ways at school that are not always obviously attributed to mental health. Students failing grades, avoiding school or have poor attendance rates or completely dropping classes are other signs that anxiety may be a factor at play and not just a refusal to cooperate within the system. Discipline referrals to administration and sudden or increased discipline issues in the classroom can be a sign that a student's emotional instability and anxiety have begun to manifest externally. (Child Mind Institute, 2016)(Child Mind Institute, 2016) Student violence is also on the rise and has been linked to adolescent anxiety.(Garbarino, 2001) Students are increasingly self-presenting to the school administrators and school counsellors with

anxiety, citing peer and other pressures, social media and family issues as their main causes of stress (Dwyer, 2014).

The aim of this thesis is to therefore determine if the implementation of a mindfulness-based program might be effective in reducing anxiety, stress and depression in a group of grade 10 students. The underlying research problem will be addressed, followed by a literature review addressing the trends in school-based interventions adolescent stress, depression and anxiety. A research methodology based on an action research investigation will be presented with the results and discussion in subsequent chapters.

Background to the Problem

At school we often only become aware of these anxious students when they start causing problems in and out of the classroom (Bolton, 1972). In schools, a number of initiatives have been introduced to alleviate anxiety, all of which have had limited success (Abel, 2014) and student anxiety levels did not change (Jones, 2013) However, some school districts have begun implementing mindfulness programs to help both the students and the adults that support them within the educational environment. (Lantieri, 2008; Davidson et al., 2012)

The Negative Effects of Anxiety, Depression and Stress in High School Students

Adolescents will typically pay attention to what is going around them until some level of cognitive and emotional reaction is made (Feldman Barrett, Gross, Chistensen, & Benvenuto, 2001; Ryan, 2005; Brown et al., 2007). Adolescents relate to the reality of an experience, object or situation as good, neutral or bad. The teenager's awareness of self is their direct link to this reality and the thought patterns that they have developed

through repetitive experiences of certain environments or emotions, gives them that reference to their own, personal reality (Brown et al., 2007; Tapert & Wetherill, 2013).

This has a direct impact on their behaviour and the intensity and urgency of their emotional reactions as these parts that are responsible for emotional reactivity. This is why teen behaviors appear to be inconsistent and unpredictable, and their risk-taking behaviors, impulsivity and cognitive development are also linked to their awareness of self and perception of their external environment or reality. While studies show that emotional response is very active during adolescence, more research is needed to see what true effect the developing brain has on these responses regarding impulse and emotional behaviour regulation (National Institute of Mental Health, 2011).

The Negative Effects of Anxiety in the School Setting

In adolescents in the school setting, we are seeing increasingly high rates of stress and anxiety disorders (Foa et al, 2005; Broderick & Metz, 2009) and the effects of these intense stressors and on young people in general (Caspi et al, 2000; Broderick & Metz, 2009). When adolescents are very stressed and have heightened emotions, they have a hard time making appropriate decisions; yet when they are calm, adolescents in particular demonstrate decision-making skills that are at par with those of adults (Steinberg, 2005; Davidson et al., 2012).

Teenage students who have difficulties in controlling their emotions and behaviour may partake in very risky behaviour while their prefrontal cortex is developing (Broderick & Metz, 2009; Davidson et al., 2012). This may extend beyond the usual immediate rewards and motivational cues that are associated with the development of this region. In highly stressed adolescents, the propensity to attach to the immediate

gratification associated with substance use, or self harm, may create an imbalance within the prefrontal cortex region which motivates the adolescent to go beyond the usual exploratory parameters of typical teen risk taking, to develop a need for this immediate gratification, potentially leaving them at risk of developing addictions to the stimuli in question. This may result in the teenager feeling even less inhibited, and the usual cause and effect in emotional, behavioural and cognitive cortex development which helps teach teens to learn their limits, are increasingly reduced (Tapert & Wetherill, 2013). This leaves them at greater risk of anxiety, depression and even suicide (Steinberg, 2009; Davidson et al., 2012).

In adolescents, we are seeing increasingly high rates of stress and anxiety disorders at school (Foa et al, 2005; Broderick & Metz, 2009). Young people with phobias, for example, may exhibit “panic in the face of minor environmental change, persistent concern over attendance at school, or fear of a non- threatening animal,” (Bolton, 1972, p. 690) if they feel it is linked to their phobia.

Adolescents with an anxiety disorder are more likely to report higher levels of anxiety, lower levels of self-esteem, lower levels of achievement as well as more difficulty with peer relationships and social behaviors than non-anxious youth. Learning difficulties, school refusal, phobic disorders and pain, particularly abdominal pain, are other common signs of anxiety in adolescents with anxiety disorder (Bolton, 1972; Hansen, Last, Massaro, & Sanders, 1998).

Anxiety and School Pressure

School itself is another cause for anxiety in our students. The competition and pressure our adolescents are facing is higher than ever on a school level as they

struggle to pick the best courses and get the necessary grades to gain admittance into the university program of choice (Weare, 2012).

Adolescents are coming to school so preoccupied by their internal problems, they do not have the emotional or cognitive capacities to learn (Lantieri, 2008; Bolton, 1972). We are also seeing anxious solitude in our schools now, characterized by very reticent and inhibited behaviours such as inability to verbalise needs, excessive shyness that is not typical when amongst peers that they are very familiar with (Faldowski, Gazelle, & Spangler Avant, 2011; Gazelle & Ladd, 2003; Gazelle & Rudolph, 2004). Left untreated, as already noted, anxiety can cause serious problems (Benjamin et al., 2011).

Statement of the problem

The existence of anxiety is very prevalent and our districts continually look at ways to manage it but so far has not been very successful (Jones, 2013).

Purpose of the study

The main aim of the mindfulness program is to allow the students to achieve similar success to the programs implemented in other school districts (Dadds et al., 2001). It is predicted that this program will help reduce anxiety levels in the participants.

Statement of Research Hypothesis

Can a mindfulness program be taught to Planning 10 students help reduce the scores on a Depression, Anxiety and Stress Scale?

Importance of the Study

It is imperative that we focus on helping our children learn the necessary coping skills to be able to cope in an ever-changing world (Chaillé, 2002). Mindfulness is a proven tool to help combat anxiety in schools (Suttie, 2007). Learning to take the time to

be still and be in silence are practical mindfulness and stress-management skills that can help our students (Lantieri, 2008).

It is proposed that a mindfulness program can be implemented to teach these coping skills and "cultivate a stable and non-reactive present moment awareness" (Miller, Fletcher, & Kabat-Zinn, 1995, p. 193) teaching formal and informal methods of mindfulness (Miller et al., 1995). This would be through guided meditation, physical activities (e.g.: yoga) or by drawing intentional focus on a particular element of our environment, body or our mind and daily homework for the participants (Davidson et al., 2012).

Definition of Terms

The following research is based in a school environment. The students that were a part of this research are known as participants in this paper. The scale used for the scoring is the depression, anxiety and stress scale, also known as the DASS scale (Lovibond & Lovibond, 1995) in this paper. The ranges are referring to the ranges within the DASS scale, scoring guide. The scores are referring to the total within each of the categories in the DASS scale, i.e.: the depression score total, the anxiety score total and the stress score total, per student in the study. Finally, the term 'teen' is used for adolescents, aged 13-18.

Scope of the Study

This study was based on 12 participants in a Planning 10 class. The program was run for 12 weeks and there were pre tests and post-tests. It will attempt to show if the implementation of the mindfulness course can reduce the scores in the DASS scales in the post-tests.

Chapter Summary

With increasing anxiety being observed in adolescents in schools, it is important to look at the causes of this increase in anxiety in our adolescents, and teach them the tools that can help them alleviate their anxiety in and out of the classroom. As mindfulness has already been noted as a tool that may provide such skills, a program will be implemented to see if it can help our students to learn resilience in their ever increasingly anxious world.

Outline of the Remainder of the Paper

This research paper will look at the possible reasons behind adolescent anxiety with a literature review. It will then explore the methodology used to implement the mindfulness program and test the scores. The results will then be presented and discussed, including limitations and scope for future research, based on the findings of the research. Finally, a summary section will be included to consider the implications and possible recommendations that may have arisen as a result of this research topic.

Chapter 2

Review of Literature

Introduction

In this chapter, the origins of adolescent behaviour and emotional response will be explored. By looking at how adolescents develop emotionally, neurologically, psychologically and intellectually, the effects of stress and anxiety can then be explored. As adolescents are in a stage of immense growth and development on so many levels, the effects of anxiety are not finite. This multi-faceted result on the adolescent is so diverse. This is what is being explored in this chapter in an attempt to create a broader spectrum of understanding when looking at the issues related to anxiety that are presented in outward behaviour in classrooms and schools.

Adolescence and Attachment

Adolescence is a time when they learn the skills that they will use throughout the rest of their lives (John, 2002). Young people depend on their parents/caregivers to teach them these important skills and provide for all of their needs (Cheng, 2011). In order to effective learn how to develop these skills, adolescents require secure attachments, which are created when parents provide consistent nurturing and meet a child's emotional needs. These skills, coupled with the reassurance and predictability that secure attachments provide, help encourage the adolescent to be proactive in trying to resolve challenges, rather than avoid them (Bowlby, 1969; Ali Mirzadeh & Rice, 2000). This bond can also affect future interpersonal relationships and emotional regulation in later life (Bowlby; Ali Mirzadeh & Rice). A father or mother's ability to provide for these needs will be patterns they have learned through their own parents or

primary caregivers and they will in turn pass these learned behaviors on to their children (Rabstejnek, 2011).

If these needs are not met through secure attachments, this can create anxiety as the adolescent worries about being incapable of achieving these unattainable expectations and demands that they have placed upon themselves (Chase, 1999; Castro, Jones, & Mirsalimi, 2004). This may physically wear the adolescent out and potentially result in other physical ailments as they strive to achieve self-imposed standards of perceived perfection and excellence (Chalder & Deary, 2010, p. 466). Moilanen et al (2010) note that “parenting behaviours that inspire guilt, fear or resentment may deprive children of the chance to practice self regulation skills in a supportive environment, and may also shift attention from the immediate issue (the child’s behaviour) to the child’s feelings” (McEntee & Thornton, 2001, p. 1054).

Adolescents who are not in a supportive environment, and receive dismissive, punitive or derogatory responses when they express their fear, anger or sadness, may not learn to label their emotions as important or appropriate, and may even label them as shameful. This unsupportive environment does not emotionally coach these adolescents with ways to effectively respond to stimuli by looking at their response and their emotions as separate elements in the environment and learning to label their emotions and develop problem-solving tools to deal with them. Instead, the teen feels shame each time they feel emotions and learns to equate an emotional response and an external behavioural response, as both being negative and not separate (Rosenthal et al. 2006).

Other negative experiences can also be witnessed in the case of parental separation or divorce as often the oldest child in a family will take on the burden of caring for the younger children when parents are no longer emotionally or physically available to provide for the needs of these younger siblings. Relational conflicts that should not be the responsibility nor the burden of an older sibling may result, putting the teen in the difficult position of caregiver and older sibling simultaneously (Bryant, 1982; Cheng, 2011). This can create severe anxiety in these adolescents who expect caregivers to provide for their needs, not the other way around. Insecure attachments developed with parents or caregivers that are neglectful and cold or overly intrusive potentially result in an adolescent's inability to develop close relationships with others or leave the teen with a constant concern that they will be abandoned again, at any time. This can prevent the adolescent from understanding how to form healthy secure attachments with others. (Lopez, Melendez, & Rice, 2000). Wallerstein and Blakeslee (1989) reported that adolescents from divorced families showed notable psychosocial impairments including greater anxiety and fear of rejection (Lopez et al., 2000).

As a result of these negative parental experiences adolescents may have difficulty developing a sense of their own capabilities, coupled with a healthy developed self-understanding and self-awareness (Castro et al., 2004) and they can place more importance and value on externalised factors such as luck and fate, rather than the strength in their own cognitive abilities and relational skills (Clance & Imes, 1978; Sightler & Wilson, 2001; Sonnak & Towell, 2001; Castro et al., 2004). Whitfield (1987) related the co-dependency directly to internalised shame. Co-dependency is described as the development of a false self, which is over-conforming and shame-based. This

false self seeks outer gratification in order to validate the person and their actions, which in turn causes immense anxiety in the adolescent (Glickauf-Hughes, Jones, & Wells, 1999).

The Effects of Everyday Negative Experiences and Traumatic Experiences on Adolescents

In order to explore the effects of attachment on adolescents, it is important to look at their resulting effect on adolescents and the everyday events in their lives.

Internet activity is an everyday event in the life of an adolescent. Internet addiction is a serious element that needs consideration and its subsequent sleep deprivation from spending too much time online, during supposed sleep time (O'Keeffe & Clarke-Pearson, 2011). Also, not all sites are healthy environments for adolescents and this is important for schools, educators and families to be aware of (O'Keeffe & Clarke-Pearson, 2011). The constant pressure to stay up to date with every new piece of information keeps our adolescents stressed as they spend too much time on the Internet, worrying about what they are missing. There is an increasing expectation that teenagers will constantly be accessible online and available to respond to peers, apps, emails, etc., and this pressure is creating a lot of anxiety in our students (Dwyer, 2014). It has also been found by some researchers that there is a link between the magazine dieting articles that many adolescents read online, in paper copy or otherwise, and body image anxiety, body shape concerns and a desire to change their overall appearance, shape and weight (Huon & Monro, 2005; Field et al., 1999; Utter, Neumark-Sztainer, Wall, & Story, 2003). These cognitive factors may play an important role in exacerbating

childhood anxiety disorders such as body phobia, body dysmorphia, etc. (Damsma, Mercklebach, & Muris, 2000).

Traumatic experiences are experiences that are typically less usual than everyday negative experiences, but can leave adolescents grappling with serious anxiety and stress. Events can be long or short term and can range from a variety of ongoing or seriously life changing events such as immigration and cyber bullying (Johnston & Short, 1997; O'Keeffe & Clarke-Pearson, 2011), physical or mental handicaps, an unsupportive family environment, a build up of internalised, unprocessed emotions or as a result of an immediate family member withdrawing from the child due to depression or other mental illnesses (Bolton, 1972).

The Adolescent Brain

Adolescent brain structure, connectivity, and behaviour are all intertwined. The brain and adolescent develop simultaneously as the teen's emotions and though processes develop and their brain develops to reflect these changes and support further development directly linked to these regulatory and cognitive changes (Bergland, 2013). Adolescents do not develop in a linear manner and the brain is no different. The brain is reshaped at the onset of and throughout puberty (Eating & Memory, 2011). The adolescent brain does not resemble the adult brain until the early 20s. Neuromaturation occurs in brain structure and function based on the adolescents maturity and development levels (Casey, Jones, & Hare, 2008; Clark, Thatcher, & Tapert, 2008; Somerville, Jones, & Casey, 2010; Tapert & Wetherill, 2013). Scans show that the grey matter in the brain is at its highest during adolescence (National Institute of Mental Health, 2011).

Brain circuitry is also changing and the teenager's responses to experiences, situations and emotionally charged images have shown to be heightened during adolescence. "During healthy teenage brain development, the prefrontal cortex communicates more fully and effectively with other parts of the brain" (Bergland, 2013, p. 1) and "Its functioning is important for learning, motivation, and cognitive processes (Bergland, 2013, p. 5)." Among the last connections to be fully established are the links between the prefrontal cortex, seat of judgment and problem solving, and the emotional centers in the limbic system, especially the amygdala. These links are critical for emotional learning and high-level self-regulation (Bergland, 2013).

It is also important to consider the impact that hormones and the reproductive hormones will have on the developing adolescent brain. The teenage brain produces adrenal stress hormones, growth hormones and sex hormones, which will influence its overall development. Sex hormones in particular, are linked to the development of the limbic system and raphe nucleus. This is where serotonin is sourced, which is important for mood regulation and sexual and emotional arousal. In male adolescents, testosterone production, is increased tenfold (Eating & Memory, 2011). These hormones are responsible for developing the adolescent sexually and also socially as they are directly linked to growth, behaviour and sexual development (National Institute of Mental Health, 2011).

Healthy Brain Development in Teens

The environment in which an adolescent is immersed, whether nurturing or stressful, has a direct effect on the developing brain that can persist a lifetime (Davidson & McEwen, 2012). The brain structure, behavior and connectivity of the adolescent

brain are all intertwined. Teenagers are working their way through their environment by developing their perception, emotional regulation and decision making processes, while their brains are working with these adolescents to support these changes and enable them to respond to all stimuli and experiences accordingly (Bergland, 2013).

The healthy adolescent brain is a combination of reinforced synaptic development and the pruning of neurons that are not needed, in order to learn to develop the connections required for effective cognitive and emotional development. This brain plasticity allows for signals to become either fortified or pruned in order to transmit signals as effectively as possible (Bergland, 2013). The synapses in the healthy brain will be strengthened through the experiences a teen has and those that are not exercised will be pruned off to this effect (National Institute of Mental Health, 2011). As the brain develops, a large portion of the synapses in the frontal lobes may be pruned off and the myelin coating responsible for carrying signals between the nerve cells will continue to accumulate and improve neuronal communication in the corpus callosum. 40% or more of these synapses may be pruned during this developmental period (Eating & Memory, 2011).

The Adolescent Brain and Self- Regulation

In a healthy adolescent brain, different parts of the cortex will develop at different rates. The more basic functions are typically the ones to mature first. For example, sensory information processing and movement control are usually developed before the ability to control impulses or plan ahead (National Institute of Mental Health, 2011) “Among the last connections to be fully established are the links between the prefrontal cortex, seat of judgment and problem-solving, and the emotional centers in the limbic

system, especially the amygdala. These links are critical for emotional learning and high-level self-regulation" (Eating & Memory, 2011, p. 2).

How the mind is used to focus creates thought patterns from these neural connections. Neuroplasticity is therefore this change in neural connection and function which reinforces these connections (Gogtay & Rapoport, 2008). If these thoughts are repeated, the neural connections serve to create patterns of thought that not only reinforce them but strengthen them, and those that are not reinforced or repeated will weaken and be eventually pruned off (Siegel, 2007; Rybak, 2013). Adolphs (2001) suggests that thoughts patterns and stimuli are then followed by the neuronal processing that is a part of a larger emotional and cognitive framework (Leibenluft, McLure, Nelson, & Pine, 2005). Adolescents will take notice of any stimuli that is engaging or strong enough to capture their attention. In turn, the adolescent then notices and will engage with this stimuli, beginning the creation of the thought process (Nyaniponika, 1973; Brown, Creswell, & Ryan, 2007).

Each time thought patterns are repeated; they are strengthened and reinforced, so that the response to a stressful situation will continue to be the same. The resulting behavioral patterns will become an automatic response if repeated enough times (Rybak, 2013). This may affect the development of the brain regions that make up the affective and cognitive nodes (Brown et al., 2007). These include the prefrontal cortex regions (cognitive) and the amygdala and the hypothalamus (limbic or affective regions) (Leibenluft et al., 2005). Continually engaging with these thoughts can interfere with completing a task or responding in a balanced manner, as the adolescent is preoccupied with their concerns and can no longer focus on responding appropriately.

Interestingly, Spear (2000) also notes that female adolescents may perceive these stressors as more serious than their corresponding male classmates.

To be preoccupied by thoughts depletes an adolescent of their emotional energy and self-regulatory resources which stops them viewing the situation clearly and responding appropriately (Brown et al., 2007). This may result in emotional volatility, anxiety and self-consciousness (Spear, 2000).

As this is through the sense of immediate self, this can create an incomplete or distorted picture of the reality that the adolescent is actually experiencing (Feldman Barrett, Gross, Chistensen, & Benvenuto, 2001; Ryan, 2005; Brown et al., 2007).

Neuromaturation coupled with the skill development of awareness of true reality can assist adolescents to regulate negative emotional states more efficiently, which is particularly relevant to teen mental health and their learned responses to anxiety (Brown et al., 2007). It also helps them to stop repetitive thought patterns that result in fearful and angry behavior (Blair & Cipolotti, 2000; Leibenluft et al., 2005). In order to gain control over one's responses, the adolescent develop self-control, or learn to alter how they respond (Baumeister & Masicampo, 2007).

It is important to recognize that some young people are more vulnerable than others and will react excessively to their environment and its negative stimuli. Repeated negative experiences can affect brain development and may result in behavioral response patterns that reinforce certain thought patterns (Bolton, 1972). The resulting behavioral patterns will become an automatic response if repeated enough times (Rybak, 2013). This may affect the development of the brain regions that make up the

affective and cognitive nodes (Brown et al., 2007), including the prefrontal cortex regions (cognitive) and the amygdala and the hypothalamus (limbic or affective regions) (Leibenluft et al., 2005).

The Effects of Stress on the Adolescent Brain

Chronic exposure to stress hormones during the adolescent period of development has an impact on the brain structures involved in cognition (Gunnar, Heim, Lupien, & McEwen, 2009). Mental health, stress and negative experiences also trigger "the activation of the hypothalamus- pituitary-adrenal (HPA) axis, culminating in the production of glucocorticoids by the adrenals" (Gunnar, Heim, Lupien, & McEwen, 2009, p. 434). As these steroids are then dispersed throughout the brain, they can have an effect on the long term functioning of the brain. How specifically the brain, behavior and thought patterns are affected will also be influenced by the timing, duration and number of times the adolescent has already been exposed to the negative experiences and stress (Gunnar et al., 2009).

Studies have shown that portions of the prefrontal cortex do not fully mature and are still very malleable until the late teens or early twenties (Sowell et al. 1999; Casey et al. 2000; Gogtay et al. 2004; Leibenluft et al., 2005). Stress, anxiety and life's other experiences shape how this region develops as it is very susceptible to these particular stimuli (Bergland, 2013).

Chronic stress and anxiety can cause the neurons in the prefrontal cortex to shrink and become defective, and has been associated with an overactive amygdala and impaired hippocampus. This can result in impulsivity, aggression and poor

executive function (McEwen, 2007; Chatterji et al, 2002; Liston et al, 2006; McEwen, Gianaros, 2011; Davidson & McEwen, 2012). There can be long-term consequences to the pre-frontal cortex's development as a result (Bergland, 2013). Stress can also affect the development and growth of the hippocampus which is where memories are collected and integrated (Gunnar et al., 2009).

School-Based Interventions to Address Anxiety in Adolescents

Mindfulness in Schools

For years, schools have been labelled as mindless institutions that stifle our children's creativity in favour of superficial learning. Philosophers and policy makers alike consider it a place where a child's natural curiosity and enthusiasm are discouraged and prevented in order to encourage passive learning (Perkins & Ritchart, 2000). Mindfulness is an intervention involving meditation with youth that has been reported to reduce distress, anxiety, emotional and behavioural reactivity and improves self-awareness and sleep among youth in schools (Bootzin and Stevens 2005; Napoli et al. 2005; Semple et al. 2005; Wall 2005; Suttie, 2006).

There is an increasingly convincing amount of evidence from around the world supporting the implementation of mindfulness techniques, courses and strategies in our schools to equip our students with the necessary toolkit to build resilience against the everyday stresses they experience from negative experiences, the traumatic events they live through and the pressures our adolescents are facing in this increasingly fast-paced world that they now find themselves navigating their lives in (Weare, 2012).

These mindfulness programs have been shown in reports and worldwide studies, to “improve their wellbeing, reduce worries, anxiety, distress, reactivity and bad behaviour, improve sleep, self esteem, and bring about greater calmness, relaxation, and self-regulation and awareness” (Weare, 2012, p. 5). By implementing a mindfulness program into schools, we can teach these coping skills and “cultivate a stable and non-reactive present moment awareness” (Miller et al., 1995, p. 193) teaching formal and informal methods of mindfulness (Miller et al., 1995) or by drawing intentional focus on a particular element of our environment, body or our mind and daily homework for our adolescents (Davidson et al., 2012).

The main goal of the mindfulness program is to help students develop greater emotional balance (emotional regulation). Learning to take the time to be still and be in silence are practical stress management skills that can help our students (Lantieri, 2008). Phalen (2001), as cited by Lantieri, notes Kabatt-Zinn’s research saw significant decreases in physical, psychological and stress-related symptoms (Lantieri, 2008). School districts have begun implementing mindfulness programs to help both the students and the adults that support them within the educational environment (Lantieri, 2008; Davidson et al., 2012). The positive effects of mindfulness are grounded not only in spiritual tradition, but also in scientific fact (School, 2014). Mindfulness techniques have already been successfully used to treat adult depression and anxiety (Carter, Wells, & White, 1997).

Studies show that it is also a very effective way to manage chronic pain, (Thompson and Gauntlett-Gilbert 2008; Burke, 2010) anxiety, and depression in adolescents (Arias, Steinberg, Banga, & Trestman, 2006; Davidson et al., 2012).

Programs such as the MindUp Curriculum, Mindful Schools, the Palouse MBSR courses, Jon Kabat-Zinn's Mindfulness courses and training can all be used to learn and teach mindfulness to our students (School, 2014).

The more they practice, the more it becomes an automatic habit (Fischer & Bidell, 1998; Urry et al., 2006; Davidson et al., 2012). Children in particular "feel an inner balance and flow" (Lantieri, 2008, p. 45) when they practice calming techniques which is very useful for those who are over stimulated and stressed (Lantieri, 2008).

A mindfulness program can allow students to achieve similar success to the programs implemented in other school districts (Dadds et al., 2001) Our children are our future and "we need to equip them to meet any possible challenges that they may face in the future by fostering their autonomy, creativity and resourcefulness" (Chaillé, 2002, p. 234). These mindfulness programs alone or combined can help reduce anxiety levels in the participants (Dadds et al., 2001).

Mindfulness and the Adolescent Brain

Research has shown that certain methods are likely to have these effects because they alter organization and action of neural circuitry, which is associated with alterations in stress reactivity and immune function (Greenberg & Harris, 2012).

Mindfulness interventions can help strengthen the cortex muscles responsible for self-regulation (Baumeister & Masicampo, 2007) by helping an adolescent to consciously learn to control their motor behaviors (Baumeister & Masicampo, 2007). When faced with emotionally challenging situations, teens can learn "a greater willingness to tolerate or remain experientially present to unpleasant stimuli without cognitive reactivity" (Eifert & Heffner, 2003; Levitt, Brown, Orsillo, & Barlow, 2004; Brown et al., 2007, p. 221).

The neural connections are then rewired to create new patterns of thought and new behavioral responses to the same stressful stimuli as they are no longer being seen in the old way that created the negative perception and corresponding negative, automatic behavior patterns (Rybak, 2013).

Regular mindfulness practice can teach students to regulate their emotions (Lantieri, 2008; Higgins, 1996; Davidson et al., 2012), activating the pre-frontal cortex (Blakemore & Choudhury, 2006; Davidson et al., 2012) so they can learn to step back from stressful situations without blindly reacting in a mindless manner, in their heightened emotional state (School, 2014).

Mindfulness and Adolescent Self-Regulation

Mindfulness exercises are considered a strategy that an adolescent can adopt in order to learn and develop greater self-control (Baumeister & Masicampo, 2007). Studies show adolescents can learn to regulate specific behaviors in specific settings, using mindfulness strategies (Lancioni et al., 2007). If an adolescent can learn to respond in new ways to stress or uncertainty, the situation can be observed in a new ways and managed with new responses that assist in more positive outcomes. Emotional states such as anxiety and stress can be then dealt with greater clarity and adolescents can learn to release themselves from the automatic behavior patterns that they had originally wired into their brains (Astin, Carlson, Freedman, & Shapiro, 2006). They can then develop the ability to stand back become a witness to their emotions, rather than responding automatically to them (Brown et al., 2007).

This helps the adolescent to be less occupied by the situation and their automatic

emotional responses and teaches them to develop greater self-control, rather than depleting their energy resources in less demanding situations. This helps them to also develop goal attainment as they learn to prioritize when to use their self-regulatory energies and when not to respond (Brown et al., 2007).

While many mindfulness programs have an expectation of focused awareness for periods of time greater than 30 minutes, it is has been shown that mindfulness activities “that require individuals to focus their visual attention for as brief a period as 7 min are sufficient for inducing self-regulatory fatigue” (DeWall, Baumeister, Stillman, & Gailliot, 2007; Baumeister & Masicampo, 2007, p. 256). By doing these mindfulness activities on a daily basis, teens can increase their ability to regulate emotions and automatic behavioral responses when in stressful or challenging situations (Baumeister & Masicampo, 2007).

Chapter Summary

The literature reviewed in this section highlight the need to explore anxiety in adolescence, its sources, its effects on the developing brain and how it presents in schools. The importance of attachment and healthy attachment in adolescence and the effects of poor attachment, were expanded in tool development to learn to respond effective to negative experiences and perceived reality were explored. The development of the healthy adolescent brain in homeostasis and its connection to self-regulation and school were discussed, as were the effects of stress and chronic anxiety on its development. The positive effects of introducing a mindfulness program for adolescents is introduced and the benefits of mindfulness on attachment, self-regulation and the

developing brain are indicated, to explain why the research is being conducted. The research paper is exploring if mindfulness will have a positive effect in reducing the scores in a DASS scale in a school setting, with adolescents. The research indicates positive results in all of the areas aforementioned, and the data collected from the research will be explored to compare the literature studied and our research results.

The next chapter presents the research methodology used to implement the mindfulness program in the selected population.

Chapter Three

Methodology

Introduction

This chapter will discuss the methods used to implement the mindfulness program to the participants. It will describe the research methodology and approaches and explain the research design. The selection of participants will be discussed as well as the ethical considerations that were required. It will also indicate the tests and measures that were used to conduct the research and data collection, and how the data was analyzed. The methodological assumptions will be considered, the limitations to the research a summary will be included at the end of the chapter.

Description of Research Methodology

The research approach was quasi-experimental and descriptive, using pre and post-testing following the implementation of a prescribed program so that the results could be analyzed based on the research question; can a mindfulness program improve the scoring results in a Depression, Anxiety and Stress Scale with adolescents. The methodology began with individual, informal interviews, a pre-test and ongoing classroom discussion. Quantitative pre-testing and post-testing were conducted using Likert scales within the following scale:

Depression Anxiety and Stress Scales (DASS) (Lovibond & Lovibond, 1995).

(see appendix 1)

This test is currently available online in the public domain.

The DASS is a 42-item questionnaire, which includes three self-report scales designed

to measure the negative emotional states of depression, anxiety and stress. Each of the three scales contains 14 items, divided into subscales of 2-5 items with similar content. The Depression scale assesses dysphoria, hopelessness, and devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. The Anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The Stress scale (items) is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient. Respondents are asked to use 4-point severity/frequency scales to rate the extent to which they have experienced each state over the past week (DASS appendix 1; Lovibond & Lovibond, 1995, p. 1).

Participants:

The sample size was a class of approximately 25 students as “students in smaller groups are much more willing to share” (Cook-Deegan, 2014, para. 1). All students were invited to participate, and included male, female and transgender students. Gender orientation data was not collected. All students that were interested in participating in the research plan were invited to receive an information letter from the Administration office that included the program that was followed, the assessment tools being used, the manner in which privacy of participants would be respected and upheld, and my direct contact details to allow for further questions that parents may have had. An information session, presenting the main goals and objectives of the program, was held 6 weeks before the start of the program. Students from my own teaching classes were not permitted to join the research project to avoid any potential bias in the testing. To prevent any overlap, a Planning 10 class was selected within which to conduct the

research. I actively chose to only teach grade 8 students for the academic year 2015-2016, and therefore no students of mine were able to cross over into the research project.

Design and Method

The program was run over a 12-week period. It began with an information session during class time, as per prearranged agreement with Administration and the cooperating teacher. The information session was a part of the Health and Wellness unit within the Planning 10 curriculum. This was with the cooperation of the teacher in charge. The intention was to teach the Stress and Anxiety units within the overall Health unit, initially. The program was then introduced as a means to combat stress. Students were introduced to various means of combatting stress and anxiety, as per the Planning 10 curriculum but participation in the academic research on mindfulness was then proposed.

Mindfulness sessions were taught twice-three times weekly, depending on the rotating timetable at the school, for 40-50 minutes and resources were provided free of charge to all students in the class, for home practice. The teacher in charge was invited to participate in the program, but was not included in the research data collection. Students were asked to a fill in the course-provided worksheets each time they practiced mindfulness, in school and at home. This provided qualitative information to the various extraneous factors that may not have been considered within this program and testing. This course was available for free use and reproduction at the website www.palousemindfulness.com. (The exact coursework provided to the students can be found in appendix 2)

Analysis and Statistical Testing

All analysis was conducted by myself and entered into an SPSS v. 22 program, to create visual aids that were beneficial in presenting the results of the research. Only data from students that completed the entire program was used. Statistical data was parametric (pre and post testing using specific scales and journal logs). I used previously published, free online tests. The reliability of these four scales was tested in a Planning 10 class, as anxiety and its different forms is directly linked to the Planning 10 curriculum (Greene et al., 2007, p. 40).

Ethical Considerations

There was no control group to compare results with and all students were invited to participate in the program. Consent was requested from the parents of the potential participants, following approval of the research plan proposal and all privacy and consent procedures by City University's Institutional Review Board. Once parental consent was received a second presentation was made to discuss the goals and objectives of the program to all those who had opted to participate. Before any testing began, students were informed that they could opt out of the research program at any time without any consequence whatsoever. All materials were provided to participants, free of charge. Our counselors were asked to present themselves to the students, and one counselor came to the information sessions to introduce herself again and reiterate this information. Both counselors at our school ensured the students that they would be available for any student that may have felt distressed during the pre and post testing session and at any stage during the research program. All data remained strictly confidential; no data identifying any participant was presented or discussed privately or

publicly. All research data is stored in a locked filing cabinet, off site, for the minimum period of 7 years.

The next chapter will present the statistical results of this study.

Chapter 4

Results and Discussion

Introduction

The results are broken into three areas, histographic analysis of the three sections within the DASS scale; depression, anxiety and stress. Parametric and non-parametric measures were used, as well as quantitative and qualitative measures. The histogram charts illustrate the pre-testing and separate charts are created for the post-testing of each of the three categories in the DASS scale so that they may be compared and evaluated for significance. In the second section an investigation into the certain survey items that would potentially be found to be statistically significantly different between the pre and post-tests. Finally, non-parametric measures were used for analysis with the Mann Whitney test to assess the median and explore the effects of gender in the results. Qualitative observations were also compared to the statistical analysis to see if the behaviors observed could be compared, contrasted and correlated with the data collected in this analysis.

Table 1.

DASS Scoring Ranges for Depression, Anxiety and Stress

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Note*: Scale is also included with the full DASS in appendix 1*

In Table 1, the scores and the ranges within which the different values of depression, anxiety and stress are presented. Each range is categorized a main heading and then the ranges are explained per heading. In order to understand the results of the data presented in the DASS scores, it is imperative to understand the results chart for the DASS Scale (see appendix 1) as it categorizes the depression, anxiety and stress scores into Normal, Mild, Moderate and Severe categories for each of the items evaluated, using the statement responses. Once the statement results scores are collected, categorized and added up, the total per depression, anxiety and stress, per participant, is calculated to see what range their pre and post-test results fall in. these ranges then help explain the changes pre and post the scale testing and evaluate what changes can be observed.

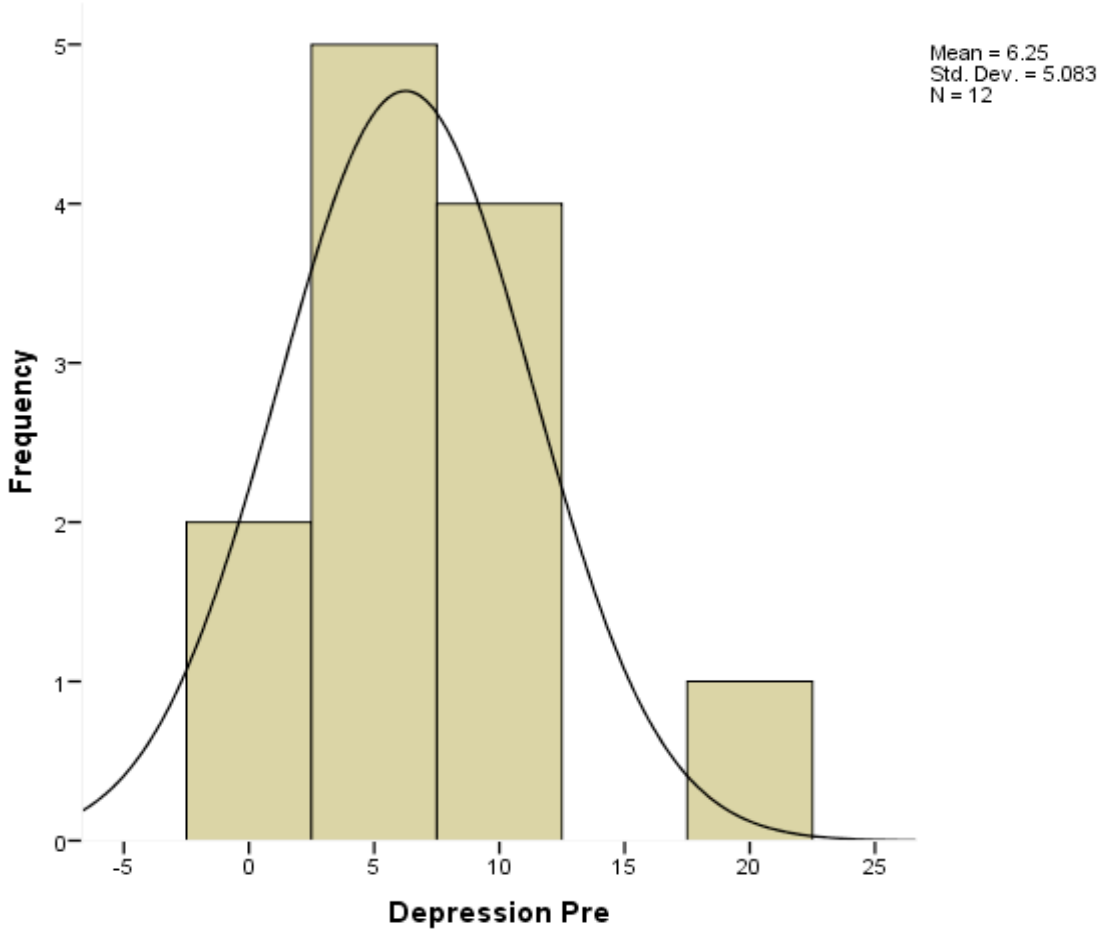

Figure 1. Depression pre-test scale histogram displaying normal curve.

In Figure 1, the depression pre-test, a total of 12 participants responded to the statements. As indicated in the scales in figure 1, the mean of 6.25, falls in the DASS scoring category 3-7, which is considered within the DASS normal ranges of depression. The majority of the participants are within the normal to mild ranges of

depression. There are no participants in the lower end of the moderate range of depression, but there is one participant in the moderate to severe range. As this was a small sample size, this outlier in the 18-22 range of depression appears to be an anomaly but the low sample may not reflect the entire population accurately.

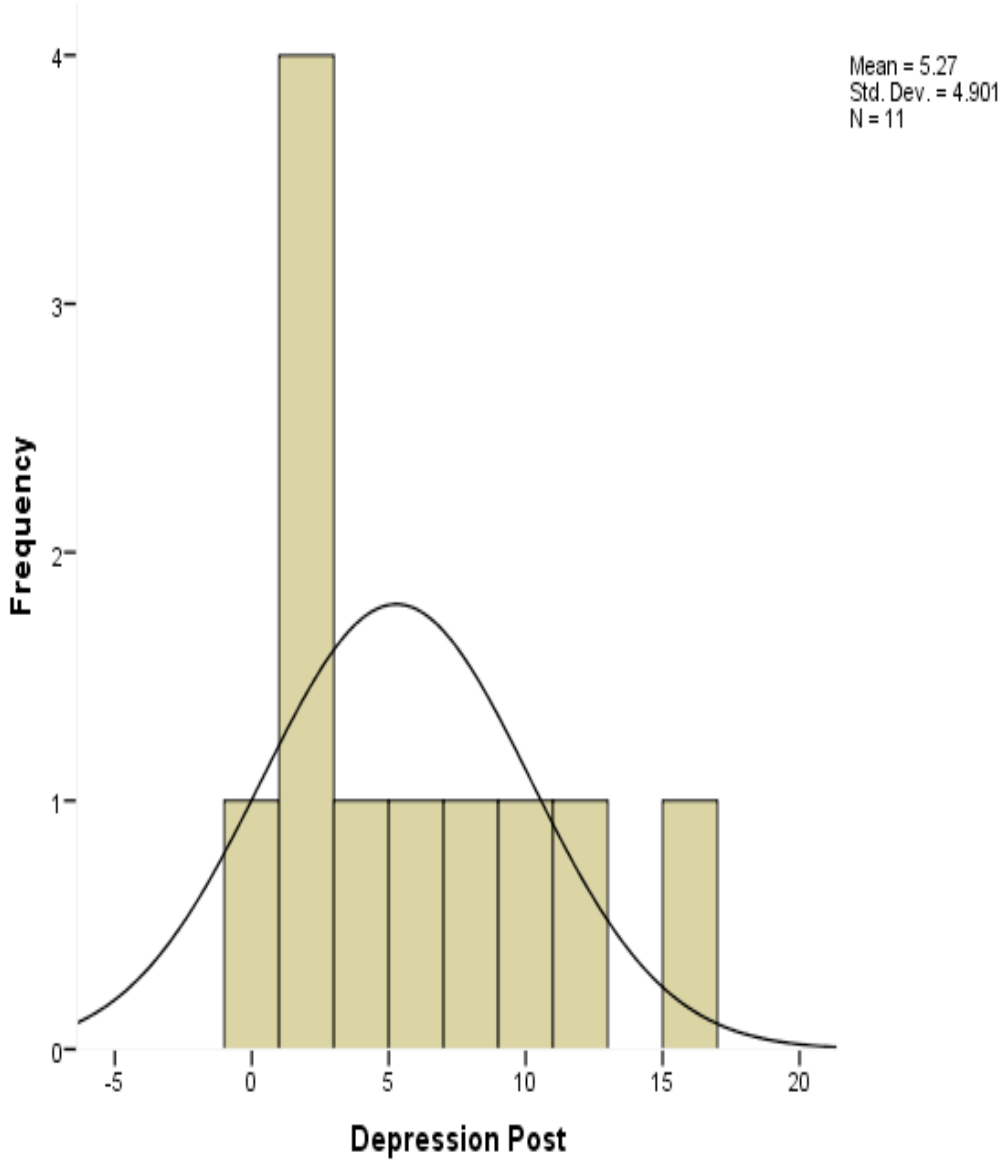

Figure 2. Depression post-test scale histogram displaying normal curve.

In Figure 2, the depression post-test histogram, the participants are distributed across a broader range of results. While two participants reported normal to no depression in the pre-test, this reduced to one participant in the post test and the rest of the participants were more spread out across the ranges of normal to mild depression. There is a reduction in the number of participants that reported mild depression and

there are four participants that report mild to normal depression. The mean has reduced from 6.25 in the pre-test to 5.27 and the standard deviation has also reduced from 5.08 in the pre-test, to 4.90 in the post-test. There is still an outlier in the post-test reporting, although the results indicate that their scoring in the post test is lower and therefore they are now in the 15-16 range for the DASS scale which is the lower end of the moderate range; this is still a reduction from their original scores in the pre-test.

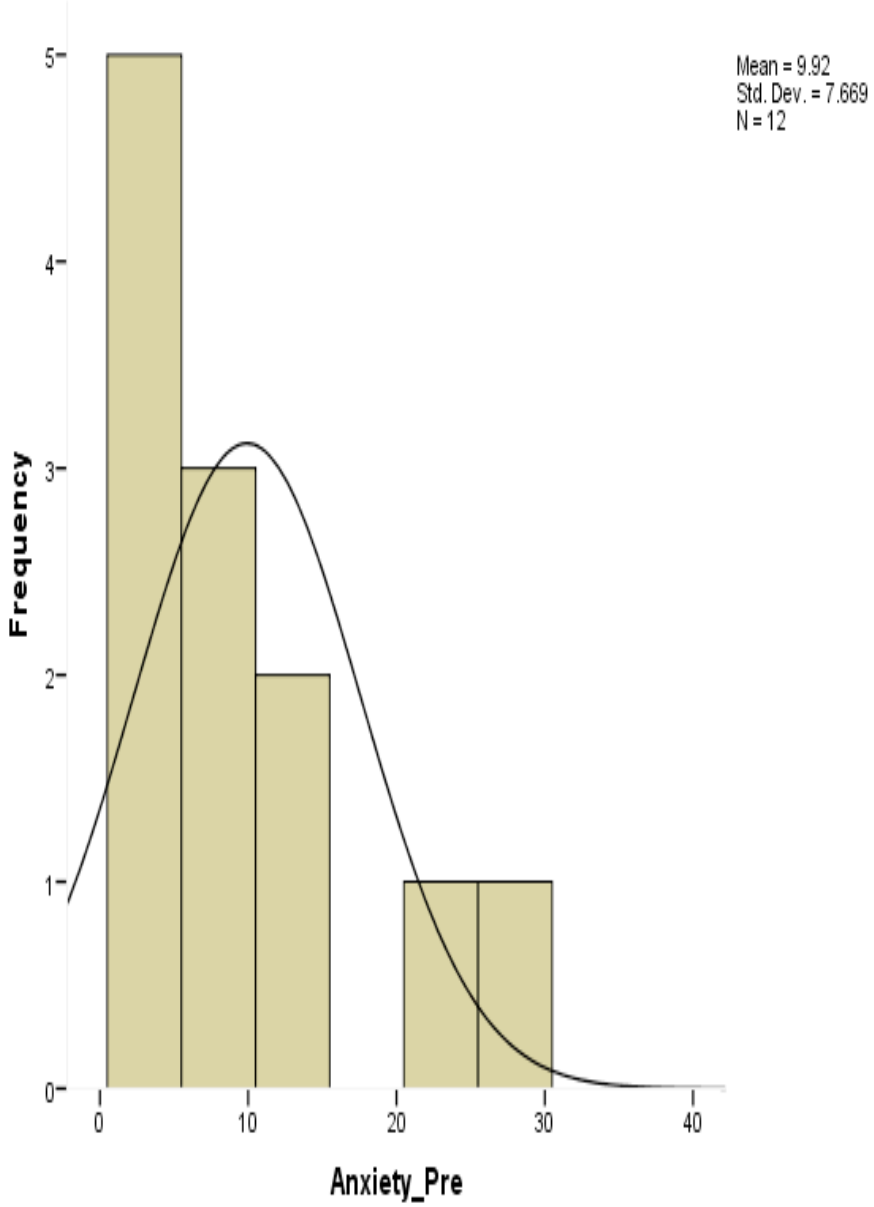

Figure 3. Anxiety Pre-test scale histogram displaying normal curve.

The anxiety pre-test in Figure 3 shows a mean of 9.2 and standard deviation of 7.67 for 12 participants. The anxiety pre-test shows that the majority of the participants fall in the lower ranges of anxiety. 5 participants low to no anxiety and 3 participants scored within the mild anxiety range (lower than a score of 9 on the DASS scale). While participants reported moderate anxiety, other participants reported severe to extremely

severe anxiety in the pre-test. Participants reported high pressure from home. Participants noted that their parents were already discussing university and grades, despite their feeling it unnecessary as they are only in grade 10. Others felt very anxious due to strict family norms and participants felt they were not allowed to just be a teenager and hang out with their friends. Students had a difficult time initially settling into the program, but once they practiced at home, they reported that they felt their anxiety reducing.

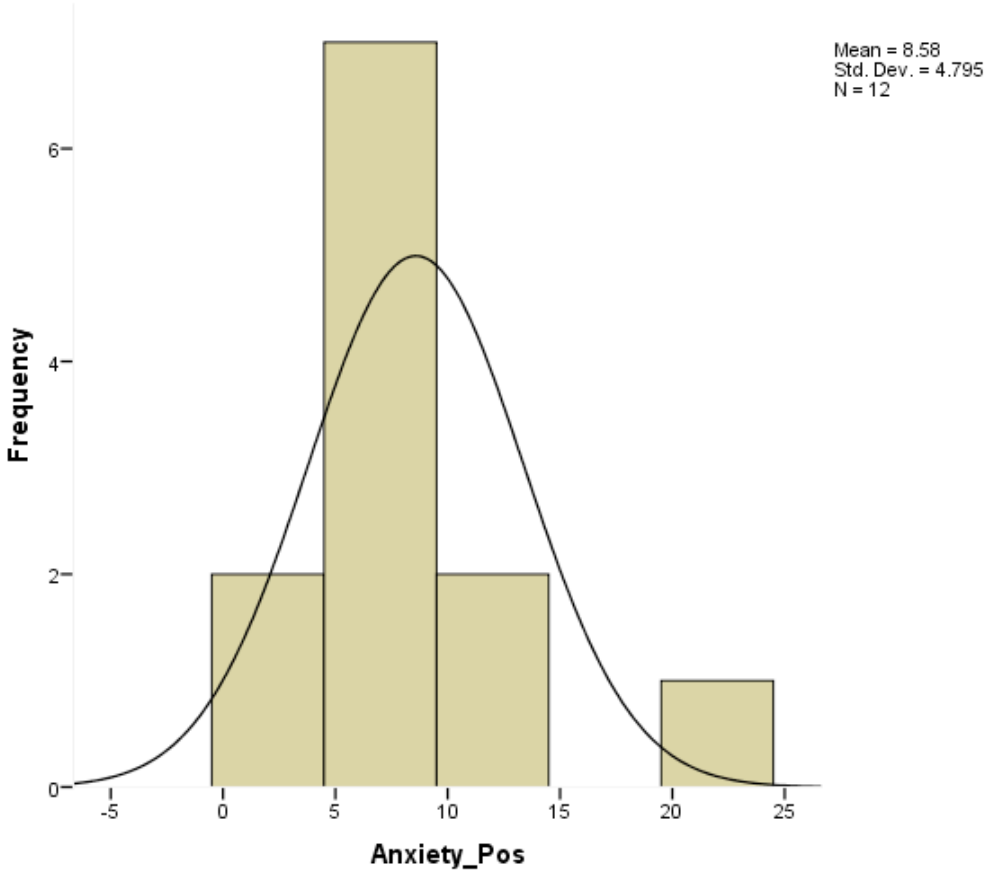

Figure 4. Anxiety post-test scale histogram displaying normal curve.

The anxiety post-test bar chart in Figure 4, shows a mean of 8.58 and a standard deviation of 4.795 for the 12 participants. There were fewer participants reporting lower levels of anxiety in the post-test but the difference in the pre-test mean and post-test mean are not significantly different at 9.92 and 8.58, respectively. Some participants felt that they were feeling more stress just before the final testing due to the impending report cards and the end of term two. Others reported opposite results and a reduction in their anxiety. The students had also become accustomed to the vocabulary in the mindfulness program and could identify better with the terminology and environmental stressors that can trigger anxiety. While the overall number of those within the normal to mild ranges of anxiety pre-test was 8 participants, the number of those participants that

were in the normal (DASS anxiety scale 0-7) range reduced and more participants identified with the mild and moderate (DASS anxiety scale 5-14) ranges. The outliers were reduced from two students in the pre-test to one student in the post-test, and the overall range of that post-test score for the outlier reduced to the 20-24 range, where they had reported within the 25-30 range previously. While this still represented a score within the extremely severe range of anxiety, they reported that their understanding of triggers and perception of reality as helping them to observe situations rather than reacting blindly to them, and this was helping them to reduce their anxiety the more they practiced it.

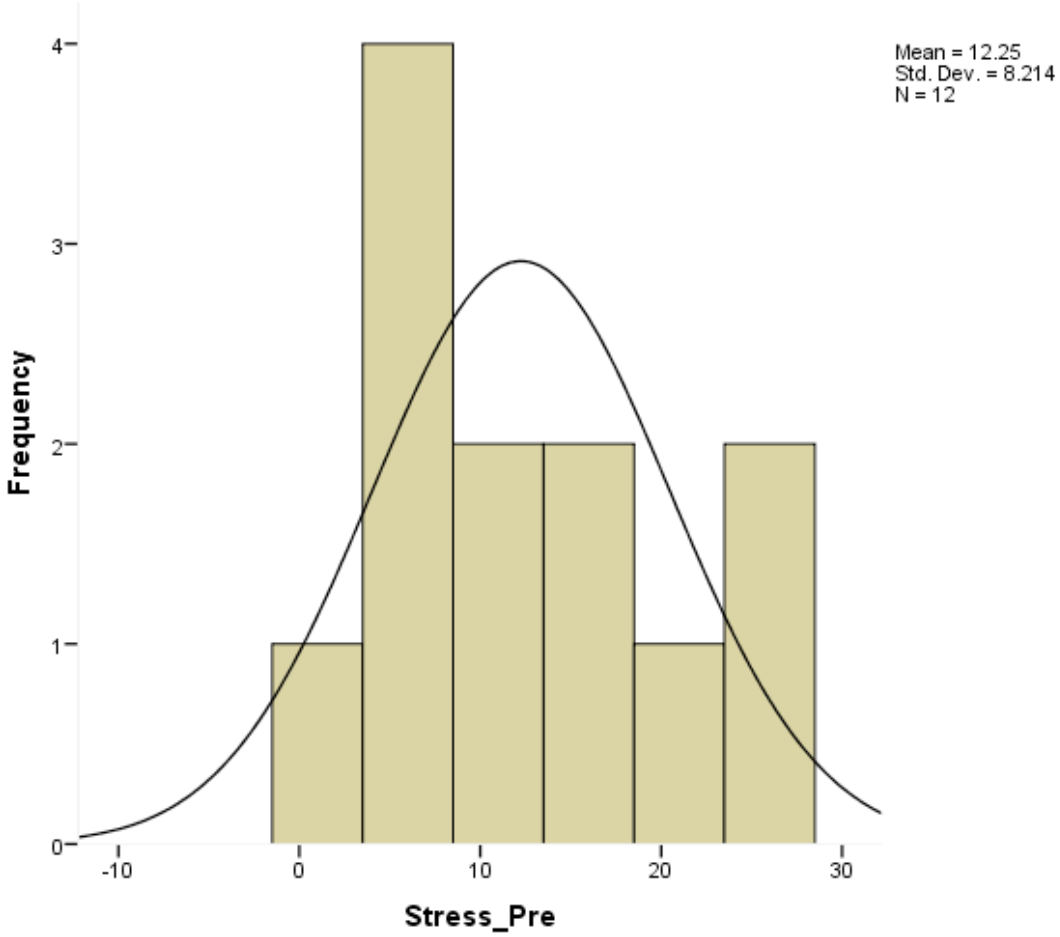

Figure 5. Stress-pre-test scale histogram displaying normal curve.

In Figure 5, the stress pre-test, there is a mean of 12.25 and a standard deviation of 8.21 for the participants n=12. The participants were represented in the normal, mild, moderate, and severe and extremely severe ranges in the stress pre-test. While more participants reported mild to normal levels of stress, one reported moderate stress and two participants reported extreme stress in the pre-tests. There were no outliers in the stress pre-testing, although the high number of participants in the 4-8 range, of the DASS stress scale range (normal range) did skew the histogram to the left of the scale.

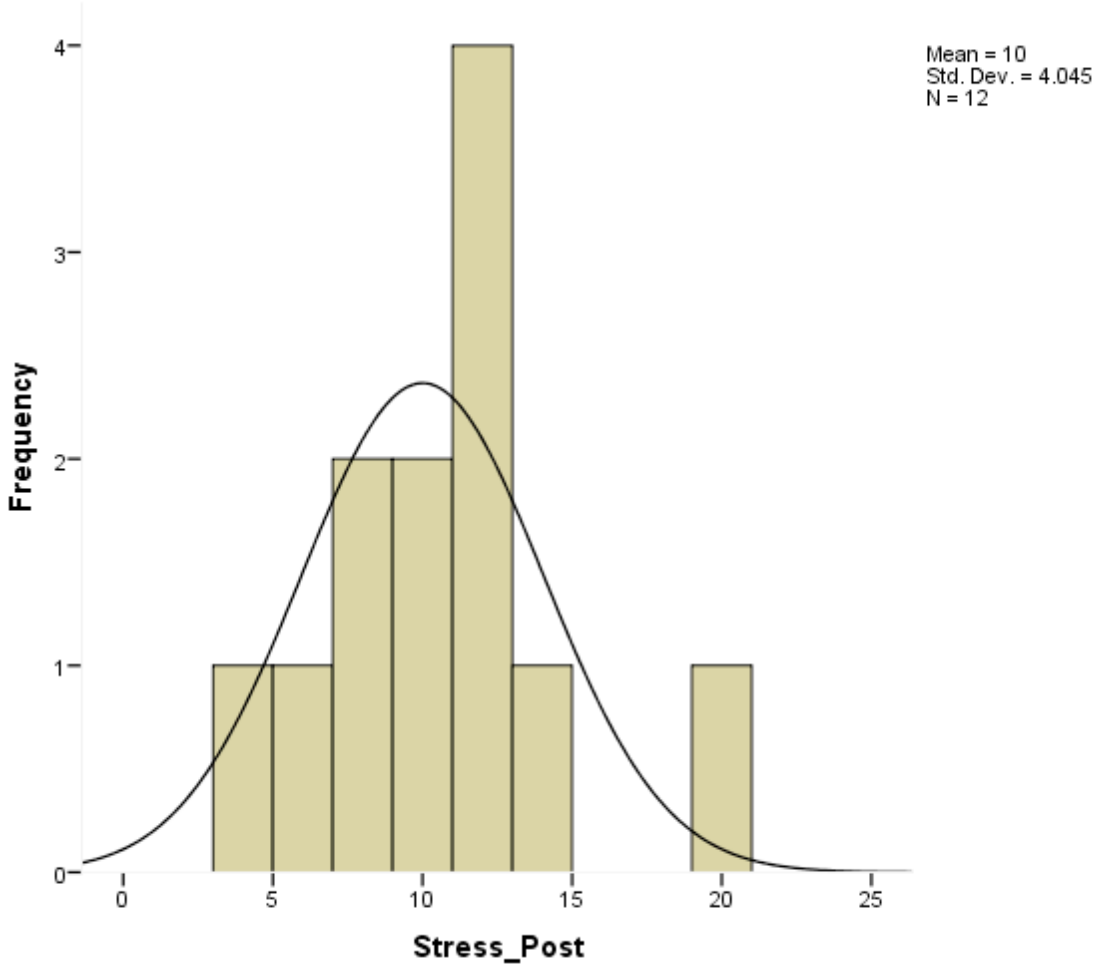

Figure 6. Stress post-test scale histogram displaying normal curve.

The post-test for stress in Figure 6, reveals a reduction in the standard deviation and mean, although there is still an extreme value, it is no longer in the 4-8 range (DASS scale for stress in the normal-mild ranges) but in the 11-12 range which is considered the mild stress range in the DASS stress scale scoring. There is a shift from the broader ranges in the pre-test to the majority of the participants now within the mild ranges. There is, however, still an outlier in the moderate range and no one reporting severe stress.

Paired Samples t-test Analysis

Table 2*. Comparison of the pre-test means (standard deviations), median, participant numbers and statistical significant results in a paired samples t-test.*

Variable	Pre M (SD)	Post M (SD)	Median	N	Sig
Depression	6.25 (5.08)	5.27 (4.90)	4.50	11	n/s
Anxiety	9.92 (7.67)	8.68 (4.80)	6.50	12	n/s
Stress	12.15 (8.21)	10.00 (4.05)	10.50	12	n/s

In Table 2, the comparison of the pre and post-test means shows the ranges within which the participant medians. Depression has a pre-test score of 6.25 with a lower score in the post-test of 9.27. The standard deviation in this test in the pre-test is 5.08 with a reduced standard deviation of 4.90 in the post-testing. Anxiety shows pre and post-testing mean scores of 9.92 and 8.68 respectively, with standard deviations of 7.67 and 4.80 for the pre and post-test. The stress also shows a reduction from 12.15 in the pre-test to 10.00 in the post-test with standard deviations of 8.21 and 4.05 for the pre and pot-tests. The differences in the scores pre and post-testing in table 2 show that the results are not considered significant, although there is evidence of a reduction in scores in the pre and post-testing for depression, anxiety and stress. A larger sample size might have indicated trends towards significance.

Table 3. *Paired-Sample Analysis Table*

Item	Pre M (SD)	Post M (SD)	N	Sig
I tended to over-react to situations	1.17(1.115)	1.08(.793)	12	n/s
I had a feeling of shakiness (e.g. legs going to give way)	.67(.985)	.67(.888)	12	n/s
I found it difficult to relax	.83(1.030)	.83(.835)	12	n/s
I found myself in situations that made me so anxious I was most relieved when they ended	.83(.900)	1.58(1.084)	12	n/s
I found myself getting impatient when I was delayed in any way (e.g. lifts, traffic lights, being kept waiting)	1.08(1.311)	.75(.866)	12	n/s

Table 3 was then explored, to look at paired sample analysis. Certain survey items were found to be statistically significantly different between the pre and post - tests.

Table 3 depicts differences between scores for 5 key statements:

1-I tend to over-react to situations

2-I had a feeling of shakiness (e.g. legs going to give way)

3-I found it difficult to relax

4-I found myself in situations that made me so anxious I was most relieved when they ended

5-I found myself getting impatient when I was delayed in any way (e.g. lifts, traffic lights, being kept waiting)

While Table 3 indicated that there was a small reduction in the pre and post means and a lower standard deviation for each statement post-test, the only one that showed potential to trend toward significance was the difference in the post-test standard deviation for the statement “I found myself in situations that made me so anxious I was most relieved when they ended” which showed potentially the closest trend ($p = .21$) but that was still far above $p < 0.05$.

In a case-by-case analysis, individual participants showed interesting trends in their scores. Of those participants that showed extreme values in the histogram scales, they also reported reduced scores on these particular questions. The small sample size skews the relevance of these results, as it is not reflective of the entire population, but the results certainly show interesting trends towards significance.

Effects of Gender

In the third section, gender is explored as a potentially significant result.

Table 4. *Group Statistics Divided by Gender*

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Depression-Pre	Female	8	6.38	5.731	2.026
	Male	4	6.00	4.243	2.121
Depression-Post	Female	7	6.14	5.047	1.908
	Male	4	3.75	4.924	2.462
Anxiety-Pre	Female	8	9.75	7.479	2.644
	Male	4	10.25	9.215	4.608
Anxiety-Post	Female	8	10.25*	4.683	1.656
	Male	4	5.25*	3.304	1.652
Stress-Pre	Female	8	12.88	7.396	2.615
	Male	4	11.00	10.801	5.401
Stress-Post	Female	8	10.88	4.390	1.552
	Male	4	8.25	2.986	1.493

* $p = .09$

In Table 4, an independent samples t-test for gender showed a trend on the variable “anxiety post scores” between males (M = 5.25, SD = 3.30) and females (M = 10.25, SD = 4.68; $t_{(10,\ 8.41)} = 1.89$, $p = .09$) indicating that girls retained higher anxiety scores at the end of the study than boys.

Table 5. *Descriptive Statistics of Pre, Post and Gender Analysis*.

	N	Mean	Std. Deviation	Minimum	Maximum
Depression-Pre	12	6.25	5.083	0	19
Depression-Post	11	5.27	4.901	0	15
Anxiety-Pre	12	9.92	7.669	3	26
Anxiety-Post	12	8.58	4.795	2	21
Stress-Pre	12	12.25	8.214	1	26
Stress-Post	12	10.00	4.045	4	19
gender	12	1.33	.492	1	2

In the Mann Whitney descriptive statistics of pre, post and gender analysis, seen in Table 5, the depression, anxiety and stress were tested. Descriptive statistics testing the depression pre-test, the mean was 6.25 with a standard deviation of 5.08. In the depression post-test, the mean was 5.27 with a standard deviation of 4.90. With respect to the anxiety pre and post-tests, the pre-test showed a mean of 9.92 with a standard deviation of 7.67 while the post-tests showed a mean of 8.58 with a standard deviation of 4.79. The stress pre-test revealed a mean of 12.25 and a standard deviation of 8.214 and the post-test indicated a mean of 10 and a standard deviation of 4.05.

Table 6. *Mann Whitney U testing and other non-parametric pre and post test analysis.*

	Depression Pre	Depression Post	Anxiety-Pre	Anxiety-Post	Stress-Pre	Stress-Post
Mann-Whitney U	14.00	10.00	16.00	5.50	13.00	10.00
Sig. (2-tailed)	.73	.45	1.00	.07	.60	.31

Table 6. Illustrates the trends towards significance using the non-parametric Mann Whitney test, which assesses significance between medians. While it does not reveal significance at the $p = 0.05$ level, the trend towards significance in Anxiety-Post ($p = 0.07$) is interesting and could be explored further in a larger sample. Qualitatively speaking, participants could be observed with varying speeds to which they can relax into the mindfulness class and settle into the activities. Participants chose to follow the guided meditations or visualizations or listen to music. Other observations indicate that participants that showed initial high ranges in the DASS scales and a very notable reduction in the post-tests for each category. The participants indicated that they had never been taught how to cope with stress, as it was not discussed in their family. Stress and anxiety were not considered suitable conversations to have at home. Participants practiced regularly at home, too, and reported an increased ease with the techniques as the program continued.

Table 7. *Pre and post-testing ranks with gender grouping variables.*

	Gender	N	Mean Rank	Sum of Ranks
Depression-Pre	Female	8	6.25	50.00
	Male	4	7.00	28.00
	Total	12		
Depression-Post	Female	7	6.57	46.00
	Male	4	5.00	20.00
	Total	11		
Anxiety-Pre	Female	8	6.50	52.00
	Male	4	6.50	26.00
	Total	12		
Anxiety-Post	Female	8	7.81	62.50
	Male	4	3.88	15.50
	Total	12		
Stress-Pre	Female	8	6.88	55.00
	Male	4	5.75	23.00
	Total	12		
Stress-Post	Female	8	7.25	58.00
	Male	4	5.00	20.00
	Total	12		

Table 7 shows the sum of ranks for each of the testing areas, depression, anxiety and stress, divided by gender. The anxiety pre test shows a mean rank of 6.57 for the female participants (n=8) and a mean rank of 5 for the male participants (n=4). The sum of ranks for female and males are 52 and 26, respectively. With regards to the Mann Whitney Ranks, the depression pre-test displayed results for 8 females and 4 males. The mean rank for the depression pre-test female participants was 6.25 and for Male participants the mean rank was 7. The post-test showed that the male rank had lowered to 5 whereas the female rank actually increased. This trend is repeated in the anxiety and stress pre and post-testing ranks for males. The anxiety pre-test shows a mean rank of 6.50 and the post-test shows a reduction to 3.88. The stress pre and post-tests show similar reductions with the male pre-test rank at 5.75 and 5 for the post-test. These results indicate, again, that the male participants have shown a reduction in their depression, anxiety and stress levels, whereas the female participants indicate increased levels of each area in their post-testing. This is an interesting trend that could certainly be explored further.

Qualitative Observations Following the Pre-testing of the DASS Scale:

Initially, participants reported never having learned about stress, anxiety and depression. They also reported not having learned any mindfulness tools. When asked what the sources of stress, depress and anxiety might be in a person's life, or how it might affect an adolescent, they were at a loss of what to respond. They could not see the link between their environment and the resulting biological and emotional responses of their bodies to stress, anxiety and depression. Language learning was a

consideration that was explored as the vocabulary in the test scales was difficult to understand without the prior instruction or introduction to some of the concepts included in the DASS scale tests. It is also important to note that the mindfulness course began in November, as the winter festivities were beginning; it was only term one and the participants were not in an exam period. Participants reported feeling excited for the winter break and the upcoming winter events happening around the school. Participants were not concerned about their report cards or results, as they felt the report was only term one and did not matter in the overall year-end grades.

Qualitative Observations During the Mindfulness Program:

The participants found it difficult initially to embrace the program and reported not being able to relax and cam their minds. As we progressed through the program, their understanding of non-judgment and acceptance became easier to understand and as soon as I would walk into the room, books were hurriedly put away and they settled very quickly into the mindfulness activity. Participants reported that they were actively doing the mindfulness activities at home everyday and that they were finding the exercises much easier to do.

As participants began to understand the effects of stress, and what types of situations may cause stress and anxiety, they began to become much more articulate about the sources of their anxiety and how they were responding to it on a daily basis. They could explain the effects on their body, thoughts and how they were behaving as a result. The triggers for their anxiety became more apparent and they could link certain situations with certain triggered responses. As we explored how triggers can create automatic responses, participants reported that they noticed their behavioral responses

when faced with family issues. Participants listed ways they became stressed and they cited family and family pressure as sources of their anxiety. Participant reported family stress and pressure to get good grades, overbearing and controlling family members as having an effect on their anxiety and stress levels. Family dynamics and structure were considered to be sources of stress and anxiety for the participants.

Participants noted excessive computer use and the resulting lack of exercise and poor sleep as being linked to how tired and stressed they felt.

Chapter 5

Discussion, Summary and Conclusions

The purpose of this study was to explore whether or not there would be an improvement in the scores in a Depression Anxiety and Stress Scale after implementing a mindfulness course during a Planning 10 class. With regard to this hypothesis, there was no conclusive data to support the hypothesis that mindfulness would decrease scores on the DASS scale. However, there were interesting trends that are potentially relevant for further exploration and evaluation.

Mindfulness as a Regular Practice

Participants did self-report an improvement in their coping skills on a day-to-day basis and those who did practice daily reported much better results than those who practiced less. Participants found that even doing short mindfulness activities during the day improved their sense of wellbeing. Statistical analysis of the histograms did show a trend towards improvement of the depression, stress and anxiety scores, but the small sample size may not reflect the overall population and did not show any statistical significance. When comparing the pre and post testing for depression, anxiety and stress, the greatest trends towards these findings being significant were with the outliers who were in the high to extreme ranges on the DASS scoring categories and then reduced their ranges from either a few points within the one category to moving to a new category. While this is not statistically significant due to the sample size, it raises the question of the potential of the larger population being potentially capable of reducing their ranges within a DASS scale, if they were to also use mindfulness as a regular tool in the classroom.

Mindfulness and the Brain

As said earlier, participants did not have much knowledge of the working and effects of anxiety on the developing adolescent brain. Using certain vocabulary to describe the effects of negative events on the brain and hormones was a new domain and the link to behavior, thought and emotions was also new territory. Looking at the statistical results, it can be argued that participants may not have had a full understanding of how they were feeling or how their brains were responding when they took the pre tests. Rosenthal (2006) relates this inability to label emotions as being the result of being immersed in an unsupportive environment, one where the adolescent may have learned that their emotions were not considered appropriate (as cited in Ciarrochi, Heaven, & Williams, 2012). While some results indicated reductions for the DASS scoring, others actually increased. One suggestion may be that being able to understand the statements in the DASS scale allowed participants to scale themselves accordingly and their newfound understanding may have caused a rise in range scoring. Participants may have realized that they were more stressed and anxious than they themselves had previously thought. In Chapter 2, the literature noted that Weare (2012) reports that mindfulness does indeed improve self-awareness and self-regulation this gives adolescents the opportunity to practice their new skills in a more supportive environment and learn to shift their attention from their stress or immediate issue that they are becoming more aware of (McEntee & Thornton, 2001).

Interestingly, participants reported noticing their stress and anxiety more after having learned the neurological effects and felt that acknowledging their distorted perception of reality as a distressing situation enabled them to begin the process of

observing rather and responding with automatic behaviors. Again, there is a trend towards improvement in the histogram and Mann Whitney results, but it is not statistically significant enough to produce conclusive results. During discussion and qualitative analysis, participants acknowledged that it is good to face everyday negative experiences and deal with them, they acknowledged that knowing when one is not seeing things as they are and reacting to triggers unconsciously seemed easier than having to face the reality of situations and then learn to undo that triggered and habitual response. The participants came to this understanding at different rates, throughout the program. Bergland (2013) highlights this interconnectivity between brain structure, connectivity and behavior and the importance for emotional learning and high-level self-regulation. His research relates these same newer levels of awareness and sophisticated thinking to the brain developing to meet the adolescents growing needs in emotional awareness and regulation. He also notes, that the prefrontal cortex development is not linear and not all adolescents will develop their emotional awareness and problem solving skills at the same time. This supports the participant self-awareness rates as they were not linear and were still developing at the end of the program.

Mindfulness, Stress and Parental Pressure

There was a correlation between participants that reported parental pressure to succeed academically in the pre and post testing. In the literature, Rabstejnek (2011) supports this, discussing that parents who make their children feel guilt and resentment about their perceived failures can create insecure attachments with their children. The children, in turn, feel the need to achieve to a particular standard in order to receive

emotional support or acknowledgment. In the literature, Castro et al (2004) highlight that these insecure attachments can make adolescents feel like their achievements are never good enough. It can be seen that some of the ranges continued to have similar mean scores, although the distribution of the scores was in higher ranges. The participants self-reported that the pressure did not reduce post testing and that it had increased with the time of year (second term coming to an end). Participants acknowledged the pressure and that having a mindfulness class everyday would help them develop the habit of being still, focusing breath and being in the moment. Weare (2012) indicates that schools are becoming increasing pressurized places as students struggle to get the necessary grades to get into the universities of their choice. Bolton (1972) as cited by Lantieri (2008) notes that this is causing our students to be overly preoccupied by internal issues that are preventing them from being able to learn effectively.

Participants expressed a desire to retrain their brains to observe rather than react to triggers in their environment. As found in the literature, adolescents who are very stressed have a hard time making appropriate decisions (Davidson et al., 2012). Mindfulness is a proven technique that is reported to reduce stress and anxiety in our youth (Suttie, 2007). Rybak (2013) also supports the findings, indicating that the behavioral patterns (triggers) can indeed change if repeated often enough. While arguably the participants considered the course to be helpful, the scores do not indicate such positive significance. This might be due to the sample size, their desire to remain positive and that the mindful classroom allowed them to articulate their family pressures

in a safe environment in comfort and security; this environment may not have extended beyond the mindful classroom.

Mindfulness, Attachment and Anxiety

Parental and family dysfunction were also reported to be triggers for stress as some of those who reported increases in their stress, depression and anxiety post-testing reported that their family situations or external environment was increasingly stressful. Participants reported that parental conflict caused them to respond stressfully to other situations that triggered them in a similar manner. In the literature, Wallerstein and Blakeslee (1989) reported that adolescents from divorced families may continue to show psychosocial impairments and form insecure attachments with others, displaying a fear of rejection. Lopez, Melendez and Rice (2000) also support these participant findings that adolescents can display anxiety about other situations by developing insecure adult attachment orientation, for example showing a chronic fear of separateness and abandonment or both, even if the adult is not their parent.

Mindfulness in the School Setting

Participants reported that although the mindfulness program was perceived as successful and very helpful, the end of term two was also considered very stress-inducing as educators also began emphasizing the importance of high grades, academic success and making the right choices as term three approached.

Participants acknowledged that their afternoon was much more relaxing and calm after the mindfulness session and that they felt they had clearer decision making skills after the program. It was predicted that this result would be found as noted by Rybak (2013) who explains that neural connections are rewired as a result of regular

mindfulness practice. School (2014) supports this, noting that students can learn to step back from stressful situations and not react in the heat of the moment. For some participants, this is not reflected in the statistical data collected and further research might indicate what other factors are influencing the responses on the DASS scale, or that possibly participants are attributing the scales to other situations and environments that are not connected to the calm they feel during the mindfulness sessions. In the paired sample analysis, two of the mean scores remained the same in the pre and post testing. While the standard deviation reduced slightly and this may indicate more students within the mean ranges, the significance that outside environments that cause stress and anxiety were improving, cannot be conclusively be recorded.

Participants were observed noting that before the mindfulness session, if the school day had been particularly stressful and challenging, they enjoyed the brain break to observe and allow their mind to focus only on their breath rather than the busyness of the regular day. As found in the literature research, adolescents can learn to release themselves from the behavioral patterns that they have wired into the brain, to allow the adolescent to observe, rather than respond, and this gives them the space to deal with situations with greater clarity (Astin et al., 2006). During days that they had had particularly difficult days, participants began voting on what mindfulness activity would work best for them, and they chose between listening to music and focusing on breathing, hand and foot reflexing with focused breath or visual imagery and tactile props with mindfulness. As the research indicates, this allows the adolescents to develop greater “behavioral self-control and more effective goal attainment” (Brown, Cresswell, & Ryan, 2007, p. 214). Thus, individuals began using the tools that worked

best for them and the room became completely silent as each individual began using the activity with which they identified best.

Phones were not turned off initially during the mindfulness sessions and were disruptive during the sessions. Participants often referred back to their phones initially, and kept their phones on their desks. Participants opened their eyes often and shifted in their seats, played with their clothing and could not relax. Interestingly, the more the sessions progressed from days to weeks to months; participants were actively turning off their phones before the session or checking that their phone was turned off so that they could focus only on the session. Fischer & Bidell (1998) note (as cited by Davidson et al., 2012), the more adolescents practice mindfulness techniques, the more they become automatic habits. Lantieri (2008) also supports this saying that students feel a greater inner-balance when they practice these calming techniques.

By the end of the mindfulness program the only sounds that could be heard were outside of the room. Although the outside sounds did break the concentration and relaxed focus of some participants momentarily, this was relatively short-lived and individuals returned back to focusing on their breath very quickly. As we debriefed those disturbances, participants noted that with practice, the interruptions become less notable and the brain returns back to its calm state very quickly.

Mindfulness, the Brain and Self-Regulation

Initially, it has been noted that the participants reported not understanding what a mindfulness activity really is and how to be mindful in their everyday lives. They reported that they found the same thoughts invaded their mindfulness activities and that self-talk or a conversation that may have happened earlier in the day was over thought.

Both Bolton (1972) and Rybak (2013) support these findings, discussing the link between negative experiences and automatic thought patterns. They also note that these patterns, if reinforced often enough, become automatic thought patterns. Brown et al., (2007) supports the participants' observations, explaining that these learned responses can reinforce anxiety and are particularly relevant to teen mental health as these thoughts can interfere with a teen's ability to develop emotional awareness of true reality, not the reinforced negative thoughts. During the positive affirmation activities, participants reported that they had difficulty saying nice things to themselves and this made them even more anxious. Participant responses in the paired sample analysis indicated that felt they were over reacting to situations and that it improved after the program had ended, although not conclusively, as the sample size is too small. There was also a noted trend in the pre and post item analysis describing being in anxious situations and wishing them to be over. It did reduce and in a larger sample, it might be interesting to see if this trend continued and showed greater significance.

Participants reported that at first in the silence of the room during the activities, they did feel they had a mind full of thoughts. Participants reported that this silence made their heads spin at first and gave them headaches, as they tried to calm their thoughts down. They felt that this in turn made them fidgety and disruptive in the room. In the literature, Lantieri (2008) and Bolton (1972) both highlight the problem that adolescents are coming to school too preoccupied by their internal issues and that they are not emotionally or cognitively capable of learning. The participants spoke about how the tactile activities helped them to keep their behavior in check and keep their bodies focused so that they could concentrate better.

We discussed how to see thoughts and allow them to exist as if not a part of us, only as a floating image. Participants reported feeling reassured that it is ok to still have a mind full of thoughts and ideas while during the mindfulness program and incorrectly reported that they thought it was wrong to think while focusing on one's breath. As the sessions progressed, participants noticed that the thoughts came and went a lot faster and that they could bring their focus back to their breath and their engagement much easier.

It can also be noted within this section that the participants were initially slow to arrive to class and settle down as they chatted and shuffled with their work at their desks. Once the first few sessions were over, a transition to calm and focus became the immediate norm at the bell and students were quick to get into the room and get settled so they had more time to focus on their breath, do the mindfulness activities and there was less and less fidgeting in the their seats. Weare (2012) supports these findings, noting that reports and studies worldwide show that mindfulness activities are improving student well being, reducing their stress and anxiety. These reports also show that mindfulness programs help students develop greater calmness, self-regulation, relaxation and self-awareness. Lancioni (2007) also reports that students can use specific mindfulness activities to regulate specific behaviors within a specific setting.

The observations made in self-regulation are positive and there is an interesting trend towards positive significance for the use of such a program in other areas of school and in other grade levels which cannot be reflected based on the results of this testing. While the DASS does not address these trends adequately, they are nonetheless interesting and worth exploring further.

Summary

This research has acknowledged that anxiety is seen increasingly in adolescents and that the developing brain, hormones, heightened responses to emotions and an increase in the intensity one feels their emotions, makes this time of development a more sensitive and delicate time to be exposed to unpleasant stimuli without the skills to regulate, perceive and function in these different environments. Parental pressure, internet addiction, chronic stress and anxiety all have devastating effects on the developing brain and its executive function. Negative experiences, when perceived incorrectly, can create neuronal responses that become ingrained if reinforced through repetitive behavioral responses to similar environments and stimuli and can these responses may become the norm even when the environment is no longer perceived as unpleasant or negative. The advantages of introducing a mindfulness program in a Planning 10 class were explored, the skills that can be taught and their potential to empower adolescents with the tools to face all environments with detached observation and calm to develop greater emotional balance and well being, were discussed.

The mindfulness program looked at how it might reduce the scoring in a depression, anxiety and stress scale. The 42-item questionnaire was distributed to the participants before introducing any coursework or skill building, to ensure validity and prevent bias. The mindfulness course was then taught and applied consistently and regularly for 12 weeks bridging two academic terms. Participants were selected based solely on their mandatory subscription to their grade 10 Planning course and the mindfulness program incorporated the healthy living and wellness unit within the Planning 10 curriculum. There was no control group, as it was not considered to be

ethical to include one and all data was recorded using the SPSS program, to allow for the creation of visual aids that could assist in the statistical analysis of the collected data.

Implications and Recommendations

The data does not support the thesis question to a significant level but that does not mean that it is an impossible task. It has the potential to show greater significance with a larger sample and with a different approach. It can be contemplated that such a program, when taught to an entire program, department or school, could show a greater change in not only the scoring on a scale, but in the development of tools required to gain resiliency when facing adversity, negative environments and the challenges that adolescents face in our changing world. Situational changes may indicate different results and might be included as a consideration. The implementation of the program as a home tool that could be expanded beyond grade 10 students to all grades and families might be explored. Limiting the program to one grade level or even a few classes cannot address the problem fully as adolescence is from such a larger age spectrum and the neuronal development continues beyond high school. As there were trends indicating potential improvements in depression, stress and anxiety within the class, perhaps a mindfulness course could be integrated to more than a planning 10 class, to address the implications of stress and anxiety on our teenagers and community.

It is shown that attachments extend beyond the parent and child so it might be worth looking at training teachers in mindfulness and breathing techniques to enable all

classes to have the same advantage that these grade 10 students gained through the introduction of this mindfulness course.

As seen in the literature, adolescents with secure attachments can cope better with the challenges they face on a daily basis. It might be argued that including the families to mindfulness programs to address anxiety from all of the angles might enable families to alleviate their family stresses, be more in the moment, and see the positive effects such a program might have on their entire well being.

Limitations

As the group of participants in the research is small, the results may not be very reflective of the school or school district. Language comprehension issues reduced the comprehension of the vocabulary that was included in the DASS scale testing. The mindfulness course was only taught during one class, the Planning 10 class, every second day as per the school's rotating timetable. It was not then taught or provided in all of the other classes that the participants attended during the same day or the alternate day when the research class was being taught. This reduces the potential of habit-forming thought patterns and neuronal development as the class is only every second day for forty minutes and may not have the same affect as a shorter course taught in every class, every day to reinforce neuronal strengthening and new positive, habit-forming behaviors. Participant illness, personal vacation absences during school times and other extraneous circumstances were also limitations to the implementation and collection of data with attendance being at times sporadic. This also accounted for the low number of participants that consented to being a part of the program.

Final Summary and Conclusion

While the quantitative analysis of this research project is considered inconclusive, it does present interesting trends towards improvement that could be explored further. Implementing this program on a larger scale and for a longer duration could provide the consistency and reinforcement that students need in order to strengthen the neurons they are forming through conscious mindfulness activities. Participants did acknowledge that using the techniques in more classes and over a longer period of time might be of greater, long-term benefits to them. The sample size of the participants posed a problem, as it was too small to be able to draw any conclusions from the data. Qualitatively there are interesting trends based on researcher observation of participants and group discussions. These could be explored further. As school districts look at ways to improve student resilience and self-awareness, trends such as these teach educators that students may respond positively to such a program, and the results indicate that if we can have such interesting results from such a small sample of the student population, the potential for further exploration and future learning to addressing our students' anxiety needs.

It is important to acknowledge that the qualitative results for such a small sample size can only indicate trends towards significance as such a small group size may lean participants towards giving the answers they feel are correct and providing the feedback that they feel reflect that they have been successful with the program, which the numerical results is not corroborating at such a conclusive or significant level. In the moment of classroom mindfulness, participants may have also been feeling the calm and reduced anxiety that was not maintained outside the room or school environment.

Increasing the size and scope of the mindfulness program could provide these students with the opportunity to reinforce the benefits garnered from taking a mindful moment, if there are more moments such as these, in other classrooms and situations around our school. As the quantitative data does not support the qualitative results to significance levels, it begs the question of what can one do next, to gain greater significance with such a program.

It has to start somewhere, and no better place than the security of the school environment where a team of highly-trained, dedicated educators are looking for ways to support the collective next generation from the throes of anxiety. “Healing is a matter of time, but it is sometimes also a matter of opportunity” (Hippocrates, as cited by Stander, 2013, sec. 2).

It is time for us to provide our students with this opportunity.

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Appendix A

Depression, Anxiety and Stress Scale

DASS

Name: *Date:*

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1	I found myself getting upset by quite trivial things	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I just couldn't seem to get going	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I had a feeling of shakiness (eg, legs going to give way)	0	1	2	3
8	I found it difficult to relax	0	1	2	3
9	I found myself in situations that made me so anxious I was most relieved when they ended	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting upset rather easily	0	1	2	3
12	I felt that I was using a lot of nervous energy	0	1	2	3
13	I felt sad and depressed	0	1	2	3
14	I found myself getting impatient when I was delayed in any way (eg, lifts, traffic lights, being kept waiting)	0	1	2	3
15	I had a feeling of faintness	0	1	2	3
16	I felt that I had lost interest in just about everything	0	1	2	3

17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life wasn't worthwhile	0	1	2	3

The maximum score of the DASS-42 is 42 in each of the depression, anxiety and stress scales. Lower scores are better. These results are intended as a guide to your health and are presented for educational purposes only. They are not intended to be a clinical diagnosis. If you are concerned in any way about your health, please consult with a qualified health professional.

Reminder of rating scale:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

22	I found it hard to wind down	0	1	2	3
23	I had difficulty in swallowing	0	1	2	3
24	I couldn't seem to get any enjoyment out of the things I did	0	1	2	3
25	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
26	I felt down-hearted and blue	0	1	2	3
27	I found that I was very irritable	0	1	2	3
28	I felt I was close to panic	0	1	2	3
29	I found it hard to calm down after something upset me	0	1	2	3
30	I feared that I would be "thrown" by some trivial but unfamiliar task	0	1	2	3
31	I was unable to become enthusiastic about anything	0	1	2	3

32	I found it difficult to tolerate interruptions to what I was doing	0	1	2	3
33	I was in a state of nervous tension	0	1	2	3
34	I felt I was pretty worthless	0	1	2	3
35	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
36	I felt terrified	0	1	2	3
37	I could see nothing in the future to be hopeful about	0	1	2	3
38	I felt that life was meaningless	0	1	2	3
39	I found myself getting agitated	0	1	2	3
40	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
41	I experienced trembling (eg, in the hands)	0	1	2	3
42	I found it difficult to work up the initiative to do things	0	1	2	3