



AN ABSTRACT OF THE DISSERTATION OF

April Dominguez, for the degree of Doctor of Philosophy in Counseling, presented on May 29, 2014.

Title: School Counselor's Role with Emotive Factors: A Quantitative Investigation of School Counseling Program Use of Mindfulness-Based Cognitive Therapy for Children

Abstract approved: \_\_\_\_\_  
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Fennema and Sherman (1976) defined math anxiety as “feelings of anxiety, dread, nervousness, and associated bodily symptoms related to doing mathematics” (p. 326). The longitudinal impact that math anxiety has on adolescent students can include their experiencing reduced math achievement, avoiding majors that involve large amounts of math, and choosing career paths that require less mathematics (Ashcroft & Moore, 2009; Hembree, 1990; Ma, 1999). These potential outcomes are problematic given that the push for supporting science, technology, engineering, and math (STEM) throughout our educational system is growing (Furner & Duffy, 2002). School counselors should focus on decreasing math anxiety as a path to addressing the academic needs of the student. Mindfulness-Based Cognitive Therapy for children, although still in its emerging stages of research, demonstrates efficacy as a promising intervention for students who suffer from mild to severe psychological and behavioral disorders such as anxiety (Semple et al., 2010). The purpose of this study is to determine the impact of a 12-session Mindfulness-Based Cognitive Therapy protocol on math anxiety in adolescents.

The design for this study was a non-concurrent, multiple baseline, experimental research design. Three high school students who were determined to presently experience math anxiety were asked to participate in the intervention. Following an established baseline for each participant, the first author administered Mindfulness-Based Cognitive Therapy for Children (Semple & Lee, 2011) to each of the students for the duration of 12 sessions. A weekly administration of an anxiety measurement tool, the Fennema-Sherman Mathematics Anxiety Scale Revised (Fennema & Sherman, 1976), provided data on the students' respective levels of anxiety.

The data collected showed a decrease in the anxiety levels in all three participants during the time in which the intervention was administered. In addition, two out of the three participants' academic grades specific to their mathematics courses increased as a result of their participation in the intervention.

*Keywords:* Mindfulness-Based Cognitive Therapy, math anxiety, STEM, school counselor, emotion regulation

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School Counselor's Role with Emotive Factors: A Quantitative Investigation of  
School Counseling Program Use of Mindfulness-Based Cognitive Therapy for  
Children

by  
April Dominguez

A DISSERTATION

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APPROVED:

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Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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April Dominguez, Author

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## CONTRIBUTION OF AUTHORS

Dr. Cass Dykeman assisted in the review of literature as well as the ongoing formatting and editing of the dissertation. Dr. Gene Eakin assisted with the analysis and interpretation of data as well as the ongoing formatting and editing of the dissertation.



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## **Chapter 1: General Introduction**

### **Dissertation Overview**

The purpose of this research study is to demonstrate scholarly work by using the *manuscript style dissertation format* as outlined by the Oregon State University Graduate School. In adhering to this format, Chapter One provides an overview of how the two journal-formatted manuscripts found in Chapters Two and Three are thematically tied and point toward research conclusions applicable and important to the area of school counseling, specifically social-emotional concerns in the adolescent student. Chapter Two is entitled “School Counselors’ Program Use of Mindfulness-Based Cognitive Therapy for Children to Increase Emotion Regulation among Adolescent Students.” Chapter Three presents quantitative research in a manuscript style entitled “School Counselors Use of Mindfulness Based Cognitive Therapy for Children in Addressing Math Anxiety in Adolescents.” Chapter Four is a thematic summary of the manuscripts, including the results, limitations, and possible future research directions.

The manuscripts thematically unite in emphasizing the importance of applying psycho-educational interventions to adolescent students in the form of Mindfulness-Based Cognitive Therapy for Children (MBCT-C) (Semple & Lee, 2011). This intervention is a well-established and published treatment protocol. In the first manuscript, I discuss the academic and behavioral concerns of the adolescent student, how emotion regulation is correlated to academic achievement, the need

for interventions that improve emotion regulation for students, information regarding the role of the professional school counselor, and reasons that MBCT-C may be a promising intervention for the student population. In the second manuscript, I present a multiple-baseline study of Mindfulness-Based Cognitive Therapy and the effects of its application as an intervention for students who experience math anxiety.

### **Thematic Introduction**

Schools are faced with addressing multiple challenges that can influence a student's academic success (Schmidt, 2007). These challenges can vary among a multitude of academic and behavioral concerns (Wentzel, 1993). Consequently, if these concerns are not adequately addressed, the outcomes can be detrimental to the student, the school, and society; students may disengage from academic activity and/or become disruptive in the school setting (Link, Costello, & Angold, 2003). Eventually, without intervention, they may become truant or drop out of school entirely (Prevatt & Kelly, 2003). The financial and social ramifications of school dropouts, such as poverty and unemployment, create a negative impact on society (Eckstein & Wolpin, 1999). Therefore, it is imperative that we identify the social, emotional, and psychological indicators that create these barriers so that academic success can be an option for all students.

One common psychological matter present in K-12 settings is math anxiety (Vukovic, Kieffer, Bailey, & Harari, 2013). Fennema and Sherman (1976) defined math anxiety as "feelings of anxiety, dread, nervousness, and associated bodily

symptoms related to doing mathematics” (p. 326). The research suggests that math anxiety in students can be externally influenced by attitudes toward math presented by teachers and parents. However, internal factors play a large role in the development of anxiety as well. These internal influences include students’ low self-esteem, learning styles, and ability to regulate emotions (Fotoples, 2000; Harper & Dane, 1998; Steele, 1998; Trujillo & Hadfield, 1999). The longitudinal impact that math anxiety has on students can include their experiencing reduced math achievement, avoiding majors that involve large amounts of math, and choosing career paths that require less mathematics (Ashcroft & Moore, 2009; Hembree, 1990; Ma, 1999). These potential outcomes are problematic given that society highlights the importance of mathematics in the professional society as a foundation for increased economic opportunity (Khadaroo, 2011; Peterson, Woessmann, Hansushek, & Lastra-Anadon, 2011). Additionally, the push for supporting science, technology, engineering, and math (STEM) throughout our educational system is growing, thereby increasing the need for intervention strategies with our youth who experience math anxiety (Furner & Duffy, 2002).

### **The Role of the Professional School Counselor**

The past several decades have shown a notable shift in the role of the professional school counselor (Baker, 2001; Borders, 2002; Burnham, 2000; Eschenauer & Chen-Hayes, 2005). Societal and political changes in school counseling have shifted the emphasis to be more academically focused (Baker, 2001). The general consensus among professional school counselors is that they should no

longer rely on the passive, non-directive approach when working with students but rather utilize a more proactive and directive educational counseling approach (Eschenauer & Chen-Hayes, 2005; Green, 2001; Gysbers, 2001). This paradigm shift has grown out of the recognition and prevalence of the various immediate needs of students struggling socially and emotionally as well as academically (Schmidt, 2007).

The role transformation of professional school counselors has pushed for an emphasis on well-defined responsibilities for the school counselor (Burnham, 2000). As a response to this need for role specificity, the American School Counseling Association (ASCA) has adopted a national model of school counseling that is aimed at facilitating student learning through three domains: (1) personal and social, (2) career, and (3) academic (American School Counselor Association, 2008). As a result of the current model, several state education departments are further defining the role of the school counselor to be one of increased importance on the school campus. Given the adoption of national and state standards as well as the shift in the role for school counselors, it is essential to find interventions that can allow school counselors to effectively address the broad demographics and social, emotional, and academic needs of our modern student population.

Research shows that adolescent students who struggle in emotion regulation may also have a more difficult time with their academic achievement as well as adjustment in school compared with students who have adequate emotion regulation (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg

& Klonsky, 2009; Wentzel, 1993). Therefore, school counselors should focus on increasing emotion regulation as a path to addressing the academic needs of the student.

### **Mindfulness-Based Cognitive Therapy for Children**

Mindfulness-Based Cognitive Therapy for Children (MBCT-C) is an approach that may be a successful intervention for school counselors to use when working with students who are experiencing a low level of academic success due to experiencing anxiety (Semple et al., 2010). The concept of a mindfulness approach encourages participants to objectively view their own thoughts, emotions, and bodily sensations without the fear of being judged (Thompson & Gauntlett-Gilbert, 2008). Approaches that include mindfulness show promising results in decreasing negative externalizing and internalizing behaviors in adults and children in a number of published articles (Fox, Hong, & Sinha, 2008; Sim & Zeman, 2006; Weinberg & Klonsky, 2009; Yap, Allen, & Sheeber, 2007). Moreover, research indicates a promising future for MBCT-C as schools are increasingly becoming more open to the idea of mindfulness-based interventions (Lee et al., 2008; Schoeberlein & Koffler, 2005; Thompson & Gauntlett-Gilbert, 2008). MBCT-C, although still in its emerging stages of research, demonstrates efficacy as a promising intervention for students who suffer from mild to severe psychological and behavioral disorders (Semple et al., 2010).

### **Rationale**

Schools are charged with mitigating the various academic and behavioral



challenges faced by adolescents (Schmidt, 2007). The goal for a school is to support students academically, socially, and emotionally in order to teach them how to function as positive contributors to society (Eckstein & Wolpin, 1999). However, physiological, environmental, and cultural factors influence students in the academic setting and create challenges for schools to meet these goals (Dahl, 2008; Eccles et al., 1993; Steinberg, 2008).

Math anxiety affects students regardless of their culture, age, or grade level (Hembree, 1990; Ma, 1999; Vukovic et al., 2013). Hembree (1990) conducted a meta-analysis in which he found that math anxiety peaks in the 9th and 10th grades for students. Further research indicates that mathematics performance is adversely affected when high levels of math anxiety are present in students.

The process of regulating emotions is a widely researched topic in the field of psychology (Fox, Hong, & Sinha, 2008; Sim & Zeman, 2006; Yap, Allen, & Sheeber, 2007; Weinberg & Klonsky, 2009). The direct influence of emotion regulation on psychological dilemmas such as anxiety and depression show promising development in this area (Mullin & Hinshaw, 2007; Yap et al., 2007). Furthermore, the history of solid research in the realm of emotion regulation has led to more recent interest in the connection between regulating emotions and successful academic development in students (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993). This research aligns with the ASCA National Model that suggests that the focus of professional school counselors should be their support of students in the areas of personal, social,

career, and academic domains. Researchers encourage school counselors to utilize evidence-based practices to demonstrate the efficacy of their interventions and to establish that school counselors make a difference in impacting students' academic achievement, personal-social-emotional development, and college/career readiness (Eschenauer & Chen-Hayes, 2005; Green & Keys, 2001; Gysbers, 2001). Researchers have established MBCT-C as an effective, evidence-based practice in addressing the social-emotional development in children (Semple & Lee, 2011).

Although Mindfulness-Based Cognitive Therapy has been highly used as an intervention with adults, the use of the intervention with children in school settings is an emerging field (Burke, 2010). The literature asserts the need for additional quantitative research that focuses on the impact of MBCT-C in educational settings (Burke, 2010; Elliott et al., 2001; Lee et al., 2008).

### **Research Question**

The specific research question is: What is the impact of a 12-session Mindfulness-Based Cognitive Therapy protocol on math anxiety in adolescents?

### **Hypothesis**

H<sub>1</sub>- Mindfulness-Based Cognitive Therapy for Children decreases feelings of mathematics anxiety in adolescent students.

H<sub>0</sub>- Mindfulness-Based Cognitive Therapy for Children has no impact on the feelings of mathematics anxiety in adolescent students.

Research on the effects of Mindfulness-Based Cognitive Therapy on adolescent students experiencing feelings of mathematics anxiety has not been

conducted. The second manuscript adds to the current body of literature in asserting the need for the use of mindfulness-based interventions with the adolescent population. The results of this study add to the research that contributes to the field of school counseling, specifically in intervention delivery.

### **Glossary of Terms**

- *Mindfulness-Based Cognitive Therapy (Semple & Lee, 2011)*: This is an established therapeutic protocol that utilizes traditional cognitive behavioral therapy methods and adds in newer mindfulness meditation strategies.
- *Emotion regulation*: Emotion regulation refers to a person's ability to understand and accept his or her emotional experience and to manage uncomfortable emotions when necessary.
- *Adolescence*: Adolescence is the period of life from puberty to adulthood.
- *Internalizing behaviors*: Internalizing behaviors are actions that are directed inward, such as feeling depressed or anxious.
- *Mathematics anxiety*: "Feelings of anxiety, dread, nervousness, and associated bodily symptoms related to doing mathematics" (Fennema & Sherman, 1976, p. 326).
- *STEM*: Science, technology, mathematics, and engineering.

## CHAPTER 2

### School Counseling Program Use of Mindfulness-Based Cognitive Therapy for Children to Increase Emotion Regulation Among Adolescent Students

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### Abstract

School counselors are tasked with addressing programs in three developmental domains: personal/social, career, and academic, with the increasing pressures of collecting data to support the contribution their programs have on positive academic outcomes for students. The literature reports that there are a number of adolescent students who lack the ability to regulate their emotions. A student's academic achievement can be directly tied to this struggle. Referrals from teachers and parents suggest a high need for school counselors to have effective strategies that aid in teaching a diverse student population to increase their emotion regulation. Utilizing emotion regulation strategies is likely to have a positive impact on students' emotional and cognitive development as well as their school completion rates, which in turn provides support for the importance of school counselors. MBCT was developed to assist the client to recognize and identify thoughts and feelings by fostering awareness of breath and sensations of the five senses. The vast majority of the studies with youth lie in the use of Mindfulness-Based Cognitive Therapy for Children (MBCT-C) to decrease anxiety and depression levels in clinical settings. The literature suggests that MBCT-C may be useful in an array of counseling settings. In this article, I discuss the academic and behavioral concerns of the adolescent student, how emotion regulation is correlated to academic achievement, the need for interventions that improve emotion regulation for students, information regarding the role of the professional school counselor,

and reasons that MBCT-C may be a promising intervention with the student population.

*Keywords:* emotion regulation, Mindfulness-Based Cognitive Therapy, school counselor

### **School Counseling Program Use of Mindfulness-Based Cognitive Therapy for Children to Increase Emotion Regulation among Adolescent Students**

The adolescent period of human development brings with it an array of unexpected psychological and physiological changes (Spear, 2009). These changes can often interfere with the development and regulation of emotions (Lewis, Zinbarg, & Durbin, 2010; Spear, 2009). Research shows that adolescent students who struggle in regulating their emotions may also have a more difficult time with their academic achievement and social and emotional adjustment in school than do students who can adequately regulate their emotions (Blair, 2002; Eisenberg, Sadovsky, & Spinrad, 2005; Rapp-Paglicci, Stewart, & Rowe, 2011; Weinberg & Klonsky, 2009; Wentzel, 1993).

The term “emotion regulation” can be defined as the ways that individuals can maintain, inhibit, and enhance their emotional reaction to an experience (Robertson, Daffern, & Bucks, 2012). An example of emotion regulation being practiced in an educational setting would be a child getting upset over a received grade and communicating respectfully with the teacher regarding his or her concerns. Conversely, if that same child was not practicing adequate emotion regulation, he or she might yell at the teacher, storm out of the room, or throw a textbook as a response to the same experience. An emotional experience that is not regulated can often have a negative impact on a child’s social behavior that can then lead to detrimental academic and developmental consequences (Cole, Michel, & Teti, 1994).

Improving student academic and behavioral success is an ongoing challenge that school counselors face on a daily basis. It can be a struggle for counselors to find effective approaches to address emotion regulation in students. One intervention that is promising is MBCT-C (Semple & Lee, 2011), which has an established history of assisting in the decrease of a variety of internalizing and externalizing emotion regulation behaviors with children in clinical settings (Semple, Lee, Rosa, & Miller, 2010). The literature suggests the need for additional quantitative research that focuses on the impact of MBCT-C in educational settings (Burke, 2010; Elliott, Malecki, & Demaray, 2001; Lee et al., 2008).

This article addresses the following five interrelated topics: (a) a summary of present academic and behavioral concerns among adolescents, (b) the influence that emotion regulation plays in academic success, (c) the application of interventions during the adolescent years, (d) the shift in focus for school counseling programs, and (e) Mindfulness-Based Cognitive Therapy for Children as a promising intervention.

### **Summary of Academic and Behavioral Concerns Among the Adolescent Population**

Schools are faced with addressing the several challenges that can influence a student's academic success; these challenges can vary among a multitude of academic and behavioral concerns (Prevatt & Kelly, 2003). Consequently, if these concerns are not adequately addressed, the outcomes can be detrimental to the student, to the school, and to society (Eckstein & Wolpin, 1999). Students may



disengage in academic activities and/or become disruptive in the school setting (Link, Costello, & Angold, 2003). Eventually, without intervention, they may become truant or drop out of school entirely (Bjerk, 2012).

The national dropout rate during the 2006–2007 school year was 4.4% (Aud et al., 2012). Although this is an improvement over the past several decades, this number continues to be alarming with almost 450,000 students who discontinued their education before grade 12 in the 2008–2009 school year (Aud et al., 2012). The effects of school dropouts pose challenges that ripple throughout society. The financial and social ramifications of school dropouts, such as poverty and unemployment, create a negative impact on society (Eckstein & Wolpin, 1999). Furthermore, Bjerk (2012) found that students who were “pushed out” of school or left because of behavioral or academic issues experience the impact of these financial and social effects much longer than those who were “pulled out” or left for family and work obligations.

Educators are not only concerned with the dropout rate of students but also with the alarming rates of truancy, school disengagement, and students who create a disruptive school environment (Eccles & Roeser, 2011). These concerns are interrelated and largely dependent on one another (Prevatt & Kelly, 2003). Therefore, it is imperative that we identify the social, emotional, and psychological indicators that create these barriers so that academic success can be an option for all students.

Research shows that a high percentage of students who experience truant behavior or create disruptive school environments do so because of their inability to regulate certain externalizing (e.g., fighting, yelling at teachers) and internalizing (e.g., being depressed, experiencing anxiety) behaviors in the school setting (Link et al., 2003). In addition, research demonstrates that the ability to regulate emotions has a positive impact on student behavior and academic outcomes (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993). Based on the implications of the previous research, addressing the emotion regulation of students should be an essential focus of educators.

### **Emotion Regulation as a Key Element of Academic Success**

There is a proliferation of research correlating the importance of emotion regulation and the healthy social, emotional, and psychological development of children and adolescents (Cole et al., 1994; Gullone & Taffe, 2012). The term “emotion regulation” has been theorized as a foundational element to the structure of psychological health and development (Gullone & Taffe, 2012; Spinrad et al., 2007; Thompson, 1994). Although there is a general agreement regarding the loose definition of emotion regulation, the diversity of perspectives regarding what emotion regulation specifically encompasses is abundant and continuously evolving (Gullone & Taffe, 2012; Spinrad et al., 2007; Thompson, 1994). The literature promotes several common themes regarding the broad definition of emotion regulation. Thompson (1994) defined emotion regulation as the “extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional

reactions, especially their intensive and temporal features, to achieve one's goals" (pp. 27–28). In addition to the focus on the involvement of extrinsic and intrinsic properties, researchers are progressively aligning with a definition of emotion regulation that includes reducing negative emotions and sustaining positive emotions (Calkins & Hill, 2007; Gross & Thompson, 2007; Cole et al., 1994). Gratz and Roemer (2008) integrated several of the theorized components that researchers have posited to create the definition of emotion regulation in the following:

[Emotion regulation is] involving the (a) awareness and understanding of emotions, (b) acceptance of emotions, (c) ability to control impulsive behaviors and behave in accordance with desired goals when experiencing negative emotions, and (d) ability to use situational appropriate strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands. (p. 42)

The continuum of emotion regulation includes a broad spectrum that spans from under-regulation to over-regulation of emotions (Thompson, 1994). Under-regulation refers to a process by which an individual is unable to separate an experience from an emotion (Gratz & Tull, 2010). An example of this would be an individual who experiences extreme anger shouting at someone with whom he or she typically would have an amicable relationship. Under-regulation of emotions can inhibit the achievement of goals and break valuable relationships. However, over-regulation of emotions can have negative effects as well. Emotion over-

regulation occurs when an individual consistently suppresses the necessary emotions that he or she may encounter in any given situation (Greenberg & Bolger, 2001). This may include avoidance or suppression of specific emotions. An example of this would include an individual who feels extreme anger toward another person and attempts to avoid all social interaction with that person in the expectation that his or her anger will subside. This regulation of emotions in the aforementioned examples may have several benefits (Butler et al., 2003). However, over-regulation or under-regulation of these emotions impedes the necessary physiological and psychological development that needs to occur in order for an emotional experience to process fully (Whelton, 2004).

Emotion regulation is correlated with several adolescent internalizing and externalizing psychological disorders, including depression (Yap, Allen, & Sheeber, 2007), suicide, eating disorders (Sim & Zeman, 2006), risky sexual behavior, substance use (Crockett, Raffaelli, & Shen, 2006; Fox, Hong, & Sinha, 2008), adolescent adjustment, aggression (Robertson et al., 2012; Weinberg & Klonsky, 2009), and non-suicidal self injury (Klonsky, 2009).

In an educational setting, emotion regulation is theorized to be a large predictor of student success, which includes pro-social behavior, school adjustment, positive peer interactions, and increased academic outcomes (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993). Bakracevic and Licardo (2010) examined a multitude of assessments with students and determined that emotion regulation was found to be the best predictor of

academic performance. Wentzel (1993) found that students who exhibited emotion regulation also had higher grade point averages and standardized test scores than those who did not. Moreover, students who portrayed emotion dysregulation, such as inappropriate externalizing behaviors, were found to have negative peer interactions, problems with cooperative learning groups, decreased grade point averages, and negative preferences from their teachers. Furthermore, researchers discovered that students who did not possess the skills to regulate their emotions adequately may also have experienced long-term academic and developmental concerns (Cole et al., 1994; Link et al., 2003).

### **The Application of Interventions During the Adolescent Years**

Students in their adolescence can encounter a wide variety of physical, emotional, and environmental changes that can have an influential impact on their ability to process and regulate emotions (Blakemore, Burnett, & Dahl, 2010; Eccles & Roeser, 2011). In addition, these changes may contribute to a wide variety of internal and external psychological issues, such as anxiety, depression, aggression, and social difficulty that can be exacerbated in the adolescent (Eisenberg & Sulik, 2012; Kessler, Chiu, Demler, & Walters, 2005). As previously discussed, the inability to process and regulate emotions adequately can lead to serious academic concerns such as decreased levels of academic engagement, achievement, and motivation (Eccles & Roeser, 2011; Reinke, Eddy, Dishion, & Reid, 2012). Furthermore, research indicates that adolescents who report having problems regulating emotions during their adolescent years have a trajectory that is more likely to involve long-term

academic and social maladjustment (Eisenberg, Spinrad, & Eggum, 2010; Reinke et al., 2012).

Students' experiences in the middle school years can have an influential impact on their academic and social adjustment (Spear, 2000). Consistent evidence reports that students who transition into middle school can experience a decrease in school attachment, academic engagement, and motivation throughout their adolescent development. This change can lead to school failure and eventually may lead to dropping out of school (Juvonen, 2007; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). Researchers stated that the reasons for these changes may be associated with biological factors like brain and hormone development or social and contextual factors such as peer influences and school transitions (Dahl, 2008; Eccles et al., 1993; Steinberg, 2008). As a result of the aforementioned contributories, emotions that children are unable to regulate adequately become obvious in the adolescent years as they present more signs of uncontrolled externalizing behaviors in the classroom (Causadias, Salvatore, & Sroufe, 2012).

Given that research has indicated that emotion regulation in adolescence can be a predictor of student academic achievement and positive social adjustment (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993), an intervention is needed to address the increase of emotion regulation in adolescent students.

### **The Shift in Focus for Professional School Counselors**

The past several decades have shown a notable shift in the role of the

professional school counselor (Baker, 2001; Borders, 2002; Burnham, 2000; Eschenauer & Chen-Hayes, 2005). According to Dahir (2004), "The history of school counseling has depicted a profession in search of an identity" (p. 345). This shift is in response to several societal and political factors, including the growing diversity of students and the variety of needs that must be addressed among these students as well as legislative and policy-driven decisions regarding increased accountability for school counselors. Historically, Carl Rogers (1977), who advocated for the student-centered approach in schools (Baker, 2001), heavily influenced the foundation of the practice of school counselors. However, because of the aforementioned changes in society, school counseling has shifted the emphasis to be more academically focused (Baker, 2001). In addition, the general consensus among professional school counselors is that they should no longer rely on the passive, non-directive approach when working with students but rather create a more proactive and directive educational counseling stance (Eschenauer & Chen-Hayes, 2005; Green & Keys, 2001; Gysbers, 2001). This paradigm shift has grown out of the recognition and prevalence of the various, immediate needs of students struggling socially and emotionally as well as academically (Schmidt, 2007).

Research indicates that most school counselors are not adequately providing merit to their practices through the use of data and suggests school counselors utilize data-driven outcomes in order for their professional school counseling programs to be sustained (ASCA, 2008; Baker, 2001). The National Center for Transforming School Counseling and the Center for School Counseling Research and

Evaluation align with ASCA by embracing a vision that is consistent with the ASCA emphasis on data-driven practices (Borders, 2002).

The role transformation for professional school counselors has pushed for an emphasis on well-defined roles for the school counselor (Burnham & Jackson, 2000). The duties of a school counselor can range from providing individual or group counseling for students with social and emotional needs to signing tardy slips and performing clerical tasks in the office. As a response to this need for role specificity, ASCA has adopted a national model of school counseling standards that are aimed at facilitating student learning through three domains: (a) personal and social, (b) career, and (c) academic (ASCA, 2008). As a result of the current model standards, several state education departments are further defining the role of the school counselor to be one of increased importance on the school campus. Given the adoption of national and state standards as well as the shift in the role for school counselors, interventions are needed that can effectively address the broad demographics and social, emotional, and academic needs of our modern student population. Research shows that adolescent students who struggle in emotion regulation may also have a more difficult time with their academic achievement as well as social and emotional adjustment in school than may students who have adequate emotion regulation (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993). School counselors should focus on increasing emotion regulation as a path to addressing the needs of the



student; however, there is still a need to determine the most effective intervention for students.

### **The Need for Intervention Strategies for School Counselors**

The school counselor typically uses interventions with a student after receiving a referral by a concerned teacher or parent (Bleuer & Walz, 2002). The counselor then may do a brief assessment or interview with the student as well as gather information from parents and teachers regarding the behavior of concern. As a result of the identified issues, an intervention is put into place. School counselors must utilize interventions that meet a variety of student behaviors while maintaining the focus on their academics (Bleuer & Walz, 2002; Hanson, 2002). The credibility of the school counseling profession is largely dependent on the successful outcomes of these interventions (Borders, 2002; Whiston, 2002).

A large number of students are referred to school counselors due to disruptive classroom behavior. In an effort to stay consistent with the ASCA national standards, school counselors need to use interventions that will address the personal/social component of the students while at the same time focusing on the academic concerns (ASCA, 2008).

Matching the appropriate intervention to the behavior can be challenging to a school counselor. As the student population continues to be more diverse, so do the issues that need to be addressed (Baker, 2001; Gysbers, 2001). Baker (2001) posited, "School counselors are challenged to find ways to help a broad array of clients who are at risk of one or more of a variety of difficulties" (p. 80). The school

counselor needs an intervention that can address a wide range of behaviors.

Furthermore, as the role of the school counselor has shifted into one that is focused on academic success and sustained by successful data-driven interventions, it is imperative that school counselors use interventions that show an impact on academic achievement.

Given that an increase in emotion regulation has been shown to increase academic performance (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993), school counselors should be equipped with the right interventions to address this behavior. Mindfulness-based interventions have a consistent and solid efficacy in increasing emotion regulation in both the adult and adolescent population (Biegel, Brown, Shapiro, & Schubert, 2009; Miller, Fletcher, & Kabat-Zinn, 1995; Witkiewitz, Marlatt, & Walker, 2005). In addition, the use of mindfulness-based interventions is an emerging and promising concept as a tool for use in school settings (Lee, Semple, Rosa, & Miller, 2008; Schoeberlein & Koffler, 2005; Thompson & Gauntlett-Gilbert, 2008).

### **Mindfulness-Based Cognitive Therapy as a Promising Intervention**

Mindfulness-Based Cognitive Therapy is an innovative therapeutic approach that may be a successful intervention for school counselors to use when working with students who are experiencing low levels of academic success (Semple & Lee, 2011). Mindfulness-Based Cognitive Therapy is a method that involves a decentering of one's self to observe and evaluate cognitions, emotions, and physical sensations through a nonjudgmental lens in which events are described rather than

changed (Lee et al., 2008; Semple et al., 2010). Several empirically driven studies have shown mindfulness-based interventions to be effective with a variety of psychological, biological, and physical disorders (Biegel et al., 2009; Miller et al., 1995; Witkiewitz et al., 2005). In a meta-analysis, Baer (2003) examined 21 adult mindfulness studies that focused on psychological or physical conditions. The analysis revealed that mindfulness-based interventions show strong signs of efficacy among the adult population.

Mindfulness-based interventions have been in place for over 20 years. The concept and original practitioners of mindfulness can be dated back centuries with application through Buddhist practices (Hill & Updegraff, 2012). However, it is only recently that mindfulness has been utilized as an operational construct through a psychological lens (Bishop et al., 2004). The skills in mindfulness are now taught without reference to their religious roots (Thompson & Gauntlett-Gilbert, 2008). Current research identifies three central components to mindfulness: attitude, attention, and intention (Bishop et al., 2004; Kabat-Zinn, 1990; Shapiro, Carlson, Astin, & Freedman, 2006). A non-judgmental attitude, along with trust and patience, is an emphasized part of any mindfulness meditative practice. Second, the attention component includes being focused with the capability to switch focus when needed, which is the last component of intention. Intention is also known as self-regulation (Bishop et al., 2004). The goal in mindfulness practices is for an individual to be able to decenter non-judgmentally the perspective so as to take an objective view of the experience and eventually recognize and shift the relationship with negative

behaviors and mind states (Hill & Updegraff, 2012; Shapiro et al., 2006; Teasdale et al., 2002). These foundational concepts of mindfulness-based meditations allow for an individual to observe independently his or her own thoughts, emotions, and body sensations without the feeling of being evaluated (Lee et al., 2008). These concepts make mindfulness-based practices ideal for the adolescent population (Thompson & Gauntlett-Gilbert, 2008).

Mindfulness-Based Cognitive Therapy uses the foundation of mindfulness-based theory and integrates cognitive strategies to “help patients achieve affective self-regulation through the development of mindful attention” (Semple et al., 2010, p. 222). Sustaining a “mindful” perspective can result in more flexible and adaptive behavior (Thompson & Gauntlett-Gilbert, 2008). Research indicates that Mindfulness-Based Cognitive Therapy with the adult population is a promising intervention (Kuyken et al., 2008; Teasdale et al., 2002). The approach has been published in numerous journals as an efficacious intervention for depression and has shown some emerging evidence as an intervention for insomnia (Heidenreich, Tuin, Pflug, Michal, & Michalak, 2006), Parkinson’s disease (Fitzpatrick, Simpson, & Smith, 2010), generalized anxiety disorder (Evans et al., 2008), and mixed mood disorders (Ree & Craigie, 2007).

Recently, Mindfulness-Based Cognitive Therapy for Children was developed to address the adolescent population, and it has shown to be a successful treatment to address depression and anxiety as well as to enhance overall social-emotional resiliency in children ages 7-13 (Semple et al., 2010). Therefore, MBCT-C is an

appropriate intervention with the adolescent population (Semple & Lee, 2011), given that it has been used with adolescents in clinical settings. Emerging research in educational settings addresses MBCT-C as an intervention for anxiety, depression, and attention as well as shows promise as an intervention to a variety of internalizing and externalizing behaviors (Burke, 2010). In a study with students ages 9-13, Semple et al. (2010) showed a decrease in behavior problems and anxiety with the use of MBCT-C. Mindfulness-Based Cognitive Therapy for Children may have a positive impact on academic success for children because the core of mindfulness is to increase awareness and regulation, specifically in emotions (Erisman & Roemer, 2010; Gratz & Roemer, 2008). Hill and Updegraff (2012) revealed that mindfulness increases emotion awareness and is linked to improved emotion regulation. Furthermore, emotion regulation is shown to affect grade point average, standardized test scores, school adjustment, and pro-social skills in students (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993).

Mindfulness-Based Cognitive Therapy for Children is designed as a manualized, 12-session approach that integrates a variety of activities focused on guiding students through the process of recognizing their mental and physical states without any evaluation (Semple & Lee, 2011). Mindfulness teaches students how to be present and engaged in every emotion and bodily sensation that may transpire. Furthermore, creating this non-judgmental awareness and acceptance of emotions gives students more opportunities to take responsibility for their own behaviors

(Semple & Lee, 2011). Sessions one through three include cultivating mindfulness of the breath and body. The middle phase (sessions four to 10) creates and deepens mindful awareness with sensory-based practices. Children may start to understand their own thoughts, feelings, and body sensations that can contribute to increasing or decreasing emotions and behaviors. They may see more clearly what response choices are available to them now looking through a non-judgmental lens. The termination phase (sessions 11 to 12) addresses the integration of mindful awareness across the senses and the maintenance of mindfulness practices in daily life (Semple & Lee, 2011).

Mindfulness-Based Cognitive Therapy for Children contains several adaptations from the original adult-based model that appear to make it an appropriate intervention to apply to the adolescent population (Semple et al., 2010). First, experiential mindfulness exercises reflect students' limited abstract conceptualization and their need to engage in concrete cognitive activities (Piaget, 1962). Additionally, physical movement is included as part of the therapy. Last, because the child typically encounters the family environment daily, MBCT-C enlists the involvement of family members as an integral part of the process (Semple & Lee, 2011). Furthermore, in modifying MBCT-C, Semple and Lee (2011) altered the intervention to fit the educational setting for children. They adapted the approach in a variety of ways, including targeting a broader, potentially non-clinical population, shortening the session length, and validating the expectation that the mindfulness approach would more than likely be facilitated by educators who have no

background in mindfulness meditation.

Mindfulness-Based Cognitive Therapy for Children is an intervention that may be appropriate for school counselors to utilize as an approach for increasing the academic success of students. Although there is limited research on using the MBCT-C intervention with students in a school setting (Burke, 2010; Elliott et al., 2001; Lee et al., 2008), research asserts the positive outcomes of MBCT-C use in the adult population as well as with children in clinical settings (Semple et al., 2010). This intervention is shown to be effective with students who exhibit a wide range of behaviors, including anxiety, depression, anger, and self-injury (Semple et al., 2010). School campuses are populated with students who experience the aforementioned psychological dilemmas as well as students who have less severe behavioral issues. School counselors need to be equipped with research-based interventions that address the broad populations that they serve (Carrell & Carrell, 2006). Moreover, research indicates a promising future for MBCT-C, as schools are increasingly becoming more open to the idea of mindfulness-based interventions (Lee et al., 2008; Schoeberlein & Koffler, 2005; Thompson & Gauntlett-Gilbert, 2008). Mindfulness-Based Cognitive Therapy for Children, although still in its emerging stages of research, demonstrates efficacy as a promising intervention for students who suffer from mild to severe psychological and behavioral disorders. Furthermore, as the school student-to-counselor ratio increases, it is imperative to find ways to reach more students in a shorter period of time (Carrell & Carrell, 2006). Mindfulness-Based Cognitive Therapy for Children can be used with students

in individual as well as group settings, allowing for larger numbers of students to be involved in the intervention (Semple et al., 2010).

## **Conclusion**

Schools are charged with mitigating the various academic and behavioral challenges faced by adolescents in society (Eckstein & Wolpin, 1999). The goal for a school is to support students academically, socially, and emotionally so as to teach them how to function as positive contributors to society (Eckstein & Wolpin, 1999). However, physiological, environmental, and cultural factors influence students' behavior in the academic setting and create challenges for schools to meet these goals (Dahl, 2008; Eccles et al., 1993; Steinberg, 2008). Students can become disengaged and unmotivated to learn in a school setting (Eccles & Roeser, 2011). This increases the chance of dropping out of school, which leads to a number of negative personal and societal impacts. Although students may disengage and drop out of school for numerous reasons, many of them leave because of unresolved behavioral issues in school (Bjerk, 2012). Educators typically see these behaviors as a disruption to the learning environment, and they can negatively impact the relationships with students and teachers in a school setting (Wentzel, 1993). This can ultimately result in school disengagement and dropping out (Eccles & Roeser, 2011).

During the adolescent period of a student's life, several psychological and physiological changes are taking place that can influence his or her academic and social path in life (Dahl, 2008; Eccles et al., 1993; Steinberg, 2008). If emotions are



not adequately regulated, these changes may contribute negatively toward a student's development. A number of internalizing and externalizing behaviors can surface during this period in a student's development. These behaviors can range from anxiety to depression to uncontrolled anger. The research indicates direct correlations between these negative internalizing and externalizing behaviors and long-term societal impacts (Eccles & Roeser, 2011).

The process of regulating emotions is a widely researched topic in the field of psychology. The large emphasis on regulating emotions and the direct influence on a variety of psychological dilemmas, such as anxiety and depression (Mullin & Hinshaw, 2007; Yap et al., 2007), show promising development in this area. Furthermore, the history of solid research in the realm of emotion regulation has led to a more recent interest in the connection between regulating emotions and successful academic development in students (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993). This research aligns with the ASCA national model that suggests that the focus of professional school counselors should be their support of students in the areas of personal, social, career, and academic domains. In addition, empirically driven practices are highly encouraged to support the importance of the school counseling profession.

Mindfulness-Based Cognitive Therapy for Children is an approach that may be a successful intervention for school counselors to use when working with students who are experiencing a low level of academic success due to an inability to regulate emotions adequately (Semple et al., 2010). The concepts of a mindfulness

approach encourage participants to objectively view their own thoughts, emotions, and bodily sensations without the fear of being judged. Approaches that include mindfulness show promising results in decreasing externalizing and internalizing behavior with adults and children (Mullin & Hinshaw, 2007; Yap et al., 2007).

Research demonstrating that school counselors have an impact on academic achievement is limited. There is a need for an increase in research that contributes to the field of school counseling, specifically in intervention delivery (Carrell & Carrell, 2006). Although Mindfulness-Based Cognitive Therapy has been highly used as an intervention with adults, the use of the intervention with children is an emerging field (Burke, 2010). The literature asserts the need for additional quantitative research that focuses on the impact of Mindfulness-Based Cognitive Therapy for Children in educational settings (Burke, 2010; Elliott et al., 2001; Lee et al., 2008).

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## CHAPTER 3

The Impact of Mindfulness-Based Cognitive

Therapy on Math Anxiety in Adolescents

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### Abstract

Math anxiety affects students throughout a variety of grade levels and among several cultures. Consequently, research indicates that math anxiety contributes to the drop in the overall mathematics performance of many students. Math anxiety depletes the resources of the working memory, thus making mathematical processing a challenging task. A number of studies show the effectiveness of using emotion regulation to control anxiety. Moreover, several empirically driven studies have shown mindfulness-based interventions to be effective with a variety of psychological, biological, and physical disorders. Mindfulness-Based Cognitive Therapy (MBCT) is a method that involves a decentering of one's self to observe and evaluate cognitions, emotions, and physical sensations through a nonjudgmental lens. The purpose of this non-concurrent, multiple baseline study is to conduct a preliminary exploration on whether MBCT can be expanded to the treatment of math anxiety. Three high school students who were determined to presently experience math anxiety were asked to participate in an intervention that involved participating in a manualized treatment for anxiety, Mindfulness-Based Cognitive Therapy for Children (Semple & Lee, 2011). A weekly administration of an anxiety measurement tool, the Fennema-Sherman Mathematics Anxiety Scale Revised (Fennema & Sherman, 1976), provided data on the students' levels of anxiety. The results supported the initial hypothesis. The data collected showed a decrease in the anxiety level in all three participants.

*Keywords:* Mindfulness-Based Cognitive Therapy, math anxiety, STEM, school counselor, emotion regulation

## The Impact of Mindfulness Based Cognitive Therapy on Math Anxiety in Adolescents

One common debilitating psychological issue present in K–12 settings is math anxiety (Vukovic, Kieffer, Bailey, & Harari, 2013). Math anxiety is defined as “feelings of anxiety, dread, nervousness, and associated bodily symptoms related to doing mathematics” (Fennema & Sherman, 1976, p. 326). The discussion of math anxiety was first introduced by Dreger and Aiken (1957), as they brought attention to this emotionally driven response to mathematics. Math anxiety develops out of a variety of environmental, personality, or cognitive elements. Research suggests that math anxiety in students can originate from external influences such as attitudes toward math that teachers and parents present. Additionally, internal factors play a large role in the development of anxiety as well. These may include students’ low self-esteem, various learning styles, or ability to regulate emotions (Fotoples, 2000; Hadfield & Trujillo, 1999; Harper & Daane, 1998; Steele & Arth, 1998).

This impairment affects students across a variety of grade levels and throughout several cultures (Hembree, 1990; Ma, 1999; Vukovic et al., 2013). A meta-analysis that Hembree (1990) conducted suggests that math anxiety levels peak in grades 9 and 10. The timing of this peak in anxiety levels prevents students from taking the necessary college preparatory math courses in grades 11 and 12. Further research indicates that math anxiety contributes to the drop in overall mathematics performance among students across elementary, middle, and high school grades (Ashcraft & Moore, 2009; Ashcraft & Krause, 2007; Hembree, 1990). The current state of mathematics achievement among students in

the mathematics subject area of the California Standards Tests indicates that, on average, 50 to 60 percent of students score below basic, which indicates little or no understanding of the content (California Department of Education, 2012). The high school in which the principal researcher is employed reflects these rates, with 53% of students scoring below basic or far below basic (0-258) on the aforementioned state assessment and 95 of 300 ninth-grade students failing their algebra class.

The impact of high math anxiety on students can have longitudinal outcomes, including experiencing reduced math achievement, avoiding majors that involve large amounts of math, and being less likely to choose career paths that require math (Ashcraft & Moore, 2009; Hembree, 1990; Ma, 1999). These potential outcomes are problematic given the fact that society emphasizes the importance of mathematics as a foundation for increased economic opportunity (Khadaroo, 2011; Peterson, Woessmann, Hansushek, & Lastra-Anadon, 2011). Further, there is a push for supporting science, technology, engineering, and math (STEM) throughout our educational system, thus increasing the need for intervention strategies with our youth who experience math anxiety (Furner & Duffy, 2002).

Research shows that math anxiety impacts mathematic performance by compromising the resources of the student's working memory (Ashcraft & Krause, 2007; Daneshamooz, Alamolhodaie, & Darvishian, 2012). The cognitive impact that math anxiety has on working memory is problematic because working memory plays a large role in the successful development of math ability and performance and is an essential component in mathematical processing (Ashcraft & Krause, 2007; Daneshamooz et al., 2012; Engle, 2002). Working memory workspace allows a person to work mentally on problem solving,

reasoning, and other cognitive tasks that require information to be stored for a short period of time in the memory so information can be pieced together and processed (Engle, 2012). Math anxiety seems to compromise resources of working memory by replacing cognitive mathematical processing abilities with internal worry and anxiety over math (Ashcraft & Krause, 2007).

Several assessments and treatments have been utilized to identify or reduce levels of math anxiety in students. The Mathematics Anxiety Rating Scale (MARS) (Richardson & Suinn, 1972) and the Fennema-Sherman Mathematics Anxiety Scale (FSMAS) (Fennema & Sherman, 1976) are widely used tools that measure the constructs of mathematics anxiety due to their high validity and reliability. Treatments used to reduce math anxiety in students include cognitive behavior therapy (Genshaft, 1982), tai chi (Field, Diego, & Hernandez-Reif, 2010), bibliotherapy (Hebert & Furner, 1997), and a variety of classroom interventions (Hembree, 1990). However, these studies are limited in number and depth, indicating a need for further research in this area (Ashcraft & Krause, 2007).

Given the strong relationship between math anxiety and math achievement, the construct of math anxiety is an area of concern among researchers (Ashcraft & Krause, 2007). Regulating negative emotions seems to act as a protective factor in moderating the effects of anxiety (Busari, 2013; Thompson, 1994). The term “emotion regulation” has been theorized as a foundational element to the structure of psychological health and development (Gullone & Taffe, 2012; Spinrad et al., 2007; Thompson, 1994). Interventions that focus on this construct seem to show promising results in reducing math anxiety and freeing up working memory resources (Keogh, Bond, & Flaxman, 2006; Wood, 2006). Mindfulness-Based Cognitive Therapy (MBCT) was designed as an intervention to decrease



general anxiety in children (Lee, Semple, Rosa, & Miller, 2008; Semple, Lee, Rosa, & Miller, 2010).

Mindfulness-Based Cognitive Therapy is a method involving a decentering of one's self to observe and evaluate cognitions, emotions, and physical sensations through a nonjudgmental lens in which events are described rather than changed (Lee et al., 2008; Semple et al., 2010). Several empirical studies have shown mindfulness-based interventions to be effective with a variety of psychological, biological, and physical disorders (Biegel, Brown, Shapiro, & Shubert, 2009; Miller, Fletcher & Kabat-Zinn, 1995; Witkiewitz, Marlett, & Walker 2005).

Recently, MBCT-C was modified to address the adolescent population and has been shown to treat depression and anxiety successfully as well as to enhance overall social-emotional resiliency in children ages 7–13 (Semple et al., 2010). Mindfulness-Based Cognitive Therapy for Children contains several adaptations from the original adult-based model that appear to make it an appropriate intervention to apply to adolescents (Semple et al., 2010). These adaptations include: (a) experiential mindfulness exercises that account for adolescents' limited abstract conceptualization and their need to engage in concrete cognitive activities, (b) physical movement as part of the therapy, and (c) the involvement of family members as an integral part of the process (Semple & Lee, 2011). MBCT-C has been adapted in a variety of ways to be appropriate for the educational setting, including targeting a broader, potentially non-clinical population; shortening the session length; and validating expectations so that mindfulness approaches would often be facilitated by educators who have no background in mindfulness meditation (Semple & Lee, 2011).

Mindfulness-Based Cognitive Therapy uses the foundation of mindfulness-based

theory and integrates cognitive strategies to “help patients achieve affective self-regulation through the development of mindful attention” (Semple et al., 2010, p. 222). MBCT-C is designed as a manualized, 12-session approach that integrates a variety of activities focused on guiding students through the process of recognizing their mental and physical states without any evaluation (Semple & Lee, 2011). In an effort to facilitate Mindfulness-Based Cognitive Therapy for Children effectively, Semple and Lee (2011) outline specific principles of the approach. There are three phases to this approach:

- The opening phase (sessions 1–3). The therapeutic goal is cultivating mindfulness of the breath and body.
- The middle phase (sessions 4–10). The therapeutic goal is creating and deepening a mindful awareness with sensory-based practices. Children may start to understand that their own thoughts, feelings, and body sensations can contribute to increasing or decreasing emotions and behaviors. They may see more clearly what response choices are available to them now looking through a nonjudgmental lens.
- The termination phase (sessions 11–12). The therapeutic goal is the integration of mindful awareness across the senses and the maintenance of mindfulness practices in daily life.

Mindfulness-Based Cognitive Therapy for Children may have a positive impact on the academic success for children, as the core of mindfulness is to increase awareness and regulation specific to emotions (Erisman & Roemer, 2010; Gratz & Roemer, 2008). Hill and Updegraff (2012) found that mindfulness increased emotional awareness and linked to improved emotion regulation in young adults. Furthermore, emotion regulation has been shown to positively impact grade point averages, standardized test scores, school

adjustment, and pro-social skills in students (Blair, 2002; Eisenberg, Sadovsky, & Spinrad, 2005; Rapp-Paglicci, Stewart, & Rowe, 2011; Weinberg & Klonsky, 2009; Wentzel, 1993).

The purpose of this study is to conduct a preliminary exploration on whether or not MBCT can be expanded to the treatment of math anxiety. The specific research question is as follows: What is the impact of a 12-session Mindfulness-Based Cognitive Therapy protocol on math anxiety in adolescents?

## **Methodology**

### **Research Design**

The design for this study was a non-concurrent, multiple baseline experimental research design across three subjects (Gast & Ledford, 2010; Watson & Workman, 1981). This research design is encouraged in the field of school counseling and other professions where applied research is needed to prove results empirically (Foster, Watson, Meeks, & Young, 2002). The principle researcher used [www.random.org](http://www.random.org) to assign the students randomly to their baseline orders of 5 days for Participant A, 8 days for Participant B, and 11 days for Participant C.

### **Participants**

The first author requested from teachers in her school referrals of students who suffer from “high math anxiety.” The participants in this study were the first three students referred to the counselor who met the following criteria: (a) a pre-experimental screening score of 229 or above, which is the recommendation by the author of the Math Anxiety Rating Scale for Adolescents (MARS-A), (b) enrollment in the 9th or 10th grade, (c) not currently receiving medication and/or psychotherapy for an anxiety disorder, (d) absences no more than once in the previous 30 calendar days, (e) willingness to consent to be part of

the study, (f) a signed consent form from a parent for the child to participate in the study, and (g) not being on an Individualized Education Plan.

**Participant A.** Participant A was a 9th grade student, age 15. He self-identified as a Caucasian male. His algebra teacher referred him to the first author, who is also his school counselor. After discussions with the student's family and pre-screening, his grades revealed that other than his mathematics courses, he has maintained an average or above grade point average in his middle school and high school courses. He scored a 252 on the Math Anxiety Rating Scale for Adolescents (MARS-A).

**Participant B.** Participant B was a 9th grade student, age 15. He self-identified as a Caucasian male. His algebra teacher referred him to the first author, who is also his school counselor. After discussions with the student's family and pre-screening, like Participant A, his grades revealed that other than his mathematics courses, he has maintained an average grade point average in his middle school and high school courses. He scored a 245 on the Math Anxiety Rating Scale for Adolescents (MARS-A).

**Participant C.** Participant A was a 10th grade student, age 16. She self-identified as a Caucasian female. Her algebra teacher referred her to her counselor, who then referred her to the first author for possible screening for math anxiety. After discussions with the student's family and pre-screening, her grades revealed that as of the current academic year, her grades in her mathematics course are failing. Prior to the current school year, she has maintained an average or above grade point average in all of her middle school and high school courses. She scored a 328 on the Math Anxiety Rating Scale for Adolescents (MARS-A).

## Measures

**High Math Anxiety Screening Measure: Math Anxiety Ratings Scale for Adolescents (MARS-A).** This is a scale designed to measure anxiety specifically associated to math (Suinn & Edwards, 1982). It is a self-administered, 98-item scale that lists circumstances in which a student may deal with numbers. These circumstances include “deciding how much tip to leave” or “doing a word problem in Algebra.” The level of anxiety that the participant feels from the noted circumstance is indicated on a 5-point Likert-scale format. The range is from “not at all” to “very much.” The lowest score possible is 98, which would indicate that the student is possessing a low anxiety level. The highest score would be 490 and would indicate extreme anxiety in the student. It has an internal consistency coefficient alpha of .96. The author of the scale recommends a score of 229 as a qualifier for math anxiety.

**Baseline and Intervention Phase Measure: Fennema-Sherman Mathematics Anxiety Scale Revised FSMAS-R: FS-ANX subscale.** This scale is designed to measure negative feelings, attitudes, or beliefs toward mathematics in the high school setting (Fennema & Sherman, 1976). It consists of 5-item statements in which a student agrees or disagrees. The 5-point, Likert-scale format ranges from “strongly agree” to “strongly disagree.” Examples of the statements include the following: “Mathematics makes me feel uncomfortable and nervous,” and “My mind goes blank when I am unable to think clearly when working mathematics.” It has an internal consistency of .91, and the research suggests that it may be a useful tool in the evaluation of interventions specifically intended to reduce mathematics anxiety in students (Lim & Chapman, 2013). In the representation of data, the lower scores indicate a higher level of math anxiety, and the higher scores

indicate a lower level of math anxiety. The baseline was established by rating the student's anxiety once a day for 5 days for Participant A, 8 days for Participant B, and 11 days for Participant C.

### **Treatment Protocol**

Following the baseline period, each participant individually attended sessions of MBCT-C twice a week over the course of 6 weeks for a total of 12 sessions. Each session was approximately 45 minutes in length. The content for each session was Semple and Lee (2011)'s MBCT-C manual. The manual outlines a specific curriculum and criteria that is used in each session. It included materials needed and a rationale for each lesson. Once each week, the FS-ANX subscale was administered to measure the anxiety level in the student. These data were collected after each assessment and compiled to measure the reduction of math anxiety in each student.

### **Treatment Fidelity**

The first author is a professional school counselor and doctoral candidate with formal training in quantitative research. The researcher has completed a graduate-level teaching practicum and a master's degree in Educational Counseling, which prepared her to provide quality instruction with the Mindfulness-Based Cognitive Therapy for Children curriculum. In addition, the school counselor was the only provider of the behavioral intervention, thus increasing internal validity. The researcher taped the MBCT-C sessions each week. Two students receiving their Ph.D. in Counselor Education and Supervision at Oregon State University reviewed these tapes. Inter-rater reliability using ReCal to calculate Krippendorff's Alpha was achieved through the use of a content checklist that the principal researcher created directly from each step in the MBCT-C intervention manual.

The researcher conducted a mock therapy session that the students rated for fidelity. The researcher compared those checklists, and a discussion resolved any discrepancies in rating the fidelity of the sessions. This process continued until the percentage rate of agreement was > 80% and Krippendorff's Alpha was calculated at < .65, as calculated by ReCal ([www.dfreelon.org](http://www.dfreelon.org)). Throughout the sessions, the students gave ongoing feedback regarding fidelity of the intervention to the researcher.

### **Data Analysis**

The researcher conducted data analysis using visual analysis (Gast & Ledford, 2010) and the percentage of non-overlapping data (Parker, Hagan-Burke, & Vannest, 2007).

### **Results**

Visual analysis for the data reported by all participants showed a consistent, improving trend. The percentage of non-overlapping data, the data that are above the baseline measurement, supported the visual analysis trend. In the representation of data, the lower scores indicate a higher level of math anxiety, and the higher scores indicate a lower level of math anxiety. The lowest level of anxiety would be represented by a score of 25 with the highest level of anxiety represented by a score of 5.

### **Participant A**

Data gathered from Participant A reported a mean baseline score of 10.8 on the FS-ANX subscale. In addition, 67% of the weekly data scores gathered were above all of the baseline measurements. A follow-up score of 22 that the researcher obtained two weeks post-intervention indicated that Participant A was continuing to experience a lower level of math anxiety than levels present pre-intervention.

**Participant B**

Data gathered from Participant B reported a mean baseline score of 9.6 on the FS-ANX subscale. In addition, 67% of the weekly data scores that the researcher gathered were above all of the baseline measurements. A follow-up score of 17 obtained two weeks post-intervention indicated that Participant B was continuing to experience a lower level of math anxiety than levels present pre-intervention. This participant's math grade also improved during the course of the intervention.

**Participant C**

Data gathered from Participant C reported a mean score of 7 on the FS-ANX subscale. In addition, 100% of the weekly data scores gathered were above all of the baseline measurements. A follow-up score of 18 obtained two weeks post-intervention indicated that Participant C was continuing to experience a lower level of math anxiety than levels present pre-intervention. This participant's math grade also improved during the course of the intervention.

**Discussion**

The hypothesis, which was that Mindfulness-Based Cognitive Therapy for Children decreases feelings of mathematics anxiety in adolescent students, was supported by the data. These findings seem to suggest a need for interventions that can be used by school counselors to treat math anxiety in adolescents. Based on their last reflection activity, it is suggested that the students genuinely understood and appreciated the intervention. The students were asked to write a future letter to themselves based on a variety of questions from their mindfulness-based activities.



**Participant A:**

“How far have I come? Did I pass math? I know I passed because I am you and you are me and I’m confident that I will pass. On another note, did the tennis team go on to an all win streak? Hopefully you (I) got way better. When you look back and see where you are (no matter good or bad), thank those who helped you.”

**Participant B:**

“The past 8 weeks or so I have learned how to be mindful, in other words, to become aware of my surroundings. Mindfulness has helped me with math and my scores have been going up consistently. But this skill has helped me with my life in general. I am definitely more aware of my surroundings and more observant. Being mindful of my surroundings has helped me both at home and at school. At home I have remembered to not forget anything and at school I have gotten most of my assignments in on their proper due date.”

**Participant C:**

“When you get anxious, take a breath, count to 10 if you have to. Always remember a test will always just be a test. Never give up on what you dream about.”

**Limitations**

A threat to internal validity was the involvement of parents. This knowledge of their student participating in the study could have led to an increased involvement, thus skewing the results of the study. Another threat to validity was that the participants were all Caucasian, and the results must be interpreted accordingly. Whether this intervention would be perceived or experienced the same way by a group portraying different demographics is a question for future research. According to Christ (2007), the methodology of a multiple baseline study addresses for potential threats to internal validity, such as testing and instrumentation effects that create an improved performance

by the participant due to multiple administrations of the same assessment. In this study, the FS-ANX subscale was used weekly to measure the current math anxiety level that the participants were experiencing. Perhaps a study that utilizes a multiple probe design might reduce this threat to internal validity.

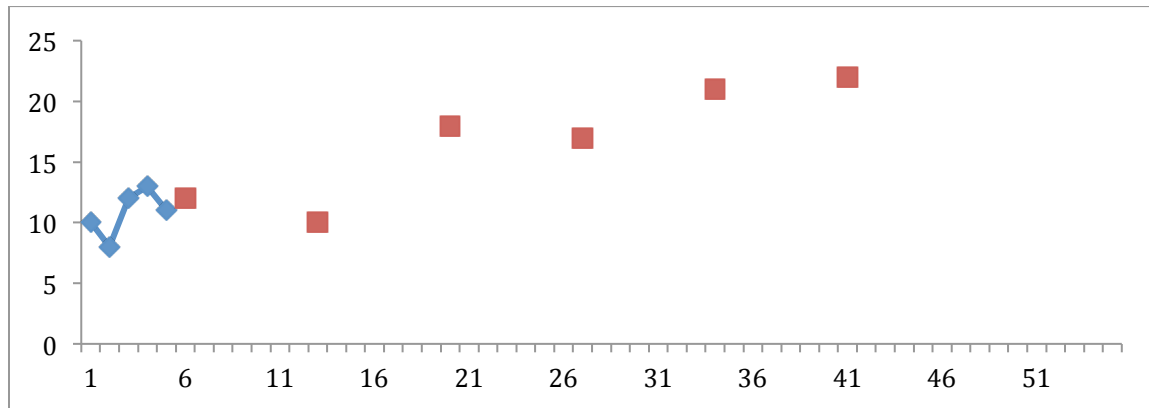
### **Implications for Future Research**

Further research is needed to expand the results of the current study, particularly given the increasingly more defined role of the school counselor's responsibility for utilizing evidence-based interventions with students. Opportunities for future research with larger sample sizes or different methodologies may be able to give more validity for the impact of MBCT-C on adolescents who experience math anxiety. More research is needed to understand the usefulness and acceptance of using mindfulness-based interventions in school settings. Finally, a study that involved more ways of measuring academic success, such as grades and work production, could provide more information on the effectiveness of MBCT-C.

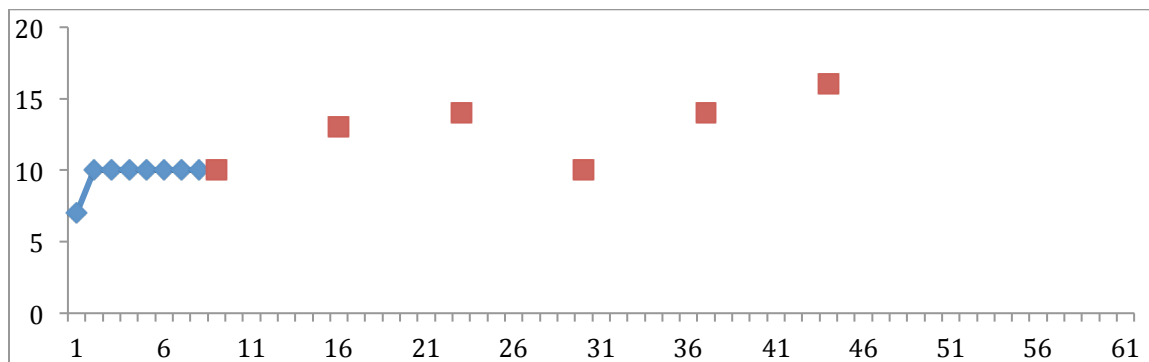
The potential impact of this study and future studies that produce similar results could be profound, given the increasing emphasis our society has put on the importance of math and math-related careers. The magnitude of the problem of math anxiety at the research site and other schools could be dramatically reduced with future studies that can duplicate the present research with similar findings. Given the adoption of national and state standards as well as the shift in the role for school counselors, successful interventions, such as the one presented in this study, should be adopted. These and other interventions that produce promising results should also be infused into pre-service

counselor education programs so that new counselors may be educated and equipped with these methods prior to going into their profession as school counselors.

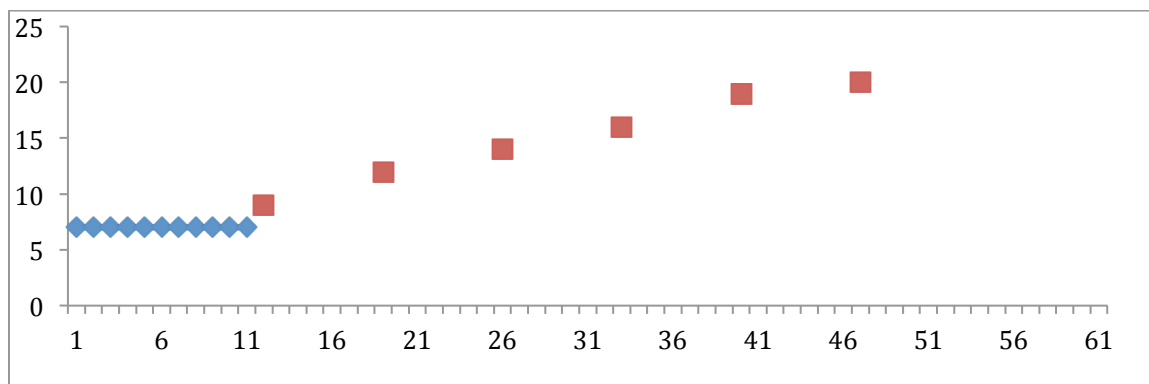
Participant A: Responses on the FSMAS-R: FS-ANX subscale



Participant B: Responses on the FSMAS-R: FS-ANX subscale



Participant C: Responses on the FSMAS-R: FS-ANX subscale



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## CHAPTER 4

### GENERAL CONCLUSION

This dissertation included two linked manuscripts thematically examining the impact of Mindfulness-Based Cognitive Therapy for Children on math anxiety in adolescent students. The review of literature showed that the process of regulating emotions, such as anxiety, is a widely researched topic in the field of psychology (Fox, Hong, & Sinha, 2008; Sim & Zeman, 2006; Yap, Allen, & Sheeber, 2007; Weinberg & Klonsky, 2009). The history of solid research in the realm of emotion regulation has led to more recent interest in the connection between regulating emotions and successful academic development in students (Blair, 2002; Eisenberg et al., 2005; Rapp-Paglicci et al., 2011; Weinberg & Klonsky, 2009; Wentzel, 1993). Specifically, the review on literature for math anxiety supported the idea that math anxiety affects students academically, regardless of their culture, age, or grade level (Hembree, 1990; Ma, 1999; Vukovic et al., 2013). The impact of high math anxiety on students can have longitudinal outcomes, including experiencing reduced student math achievement, avoiding majors that involve large amounts of math, and being less likely to choose career paths that require math (Ashcroft & Moore, 2009; Hembree, 1990; Ma, 1999). These potential outcomes are problematic, given society's emphasis on the importance of mathematics as a foundation for increased economic opportunity (Khadaroo, 2011; Peterson, Woessmann, Hansushek, & Lastra-Anadon, 2011).

Treatments used to reduce math anxiety in students include cognitive behavior therapy (Genshaft, 1982), tai chi (Field, Diego, & Hernandez-Reif, 2010), bibliotherapy (Hebert & Furner, 1997), and a variety of classroom interventions (Hembree, 1990). However, these studies are limited in number and depth, indicating a need for further



research in this area (Ashcraft & Krause, 2007). The review of the literature asserted that given the strong relationship between math anxiety and math achievement, the construct of math anxiety is an area of concern among researchers (Ashcraft & Krause, 2007).

Mindfulness-Based Cognitive Therapy (MBCT) was designed as an intervention to decrease general anxiety in children (Lee, Semple, Rosa, & Miller, 2008; Semple Lee, Rosa, & Miller, 2010).

Mindfulness-Based Cognitive Therapy for Children (MBCT-C) is an approach that may be a successful intervention for school counselors to use when working with students who are experiencing a low level of academic success due to experiencing anxiety (Semple et al., 2010). The concept of a mindfulness approach encourages participants to view objectively their own thoughts, emotions, and bodily sensations without the fear of being judged (Thompson & Gauntlett-Gilbert, 2008).

This research aligns with the ASCA national model that suggests the focus of professional school counselors should be their support of students in the areas of personal, social, career, and academic domains. School counselors are being encouraged to utilize evidence-based practices to demonstrate the efficacy of their interventions and establish that school counselors make a difference in impacting students' academic achievement, personal-social-emotional development, and college/career readiness (Eschenauer & Chen-Hayes, 2005; Green, 2001; Gysbers, 2001). Researchers have confirmed that Mindfulness-Based Cognitive Therapy for Children is an evidence-based practice that addresses the social-emotional development in children (Semple & Lee, 2011).

This study utilized a non-concurrent multiple baseline research design across three subjects. The three participants were screened and determined to have math anxiety. Each

of the participants individually attended 12 sessions of Mindfulness-Based Cognitive Therapy. Each session consisted of activities that promoted mindfulness while helping to mitigate any irrational thoughts that may have been contributing their math anxiety. Baseline measures were taken using the Math Anxiety Rating Scale for Adolescents. The participants were assessed weekly during the intervention phase using the Fennema-Sherman Mathematics Anxiety Scale Revised FSMAS-R: FS-ANX subscale. A 2-week follow-up was also measured following the intervention phase.

Using visual analysis and the percentage of non-overlapping data, the results showed an improving trend in the data reported and a percentage of non-overlapping data for all three participants that would suggest that Mindfulness-Based Cognitive Therapy for Children does have a positive impact on adolescents who experience math anxiety.

The literature and implications presented in these manuscripts are relevant for school counseling, but they also extend beyond this area of focus. This study may show implications for counselor education, psychology, social work, and teacher education as well as any other work that involves students who experience math anxiety. If the role of school counselors is to be continually refined and supported, there must be empirically based interventions that contribute to the efficacy of their work.

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## APPENDICES

## APPENDIX A

### PARTICIPANT RECRUITMENT EMAIL

To the parent/guardian of ???:

You are receiving this email because your student was referred by their math teacher to the school counselor for possibly having math anxiety. Our school counselor, April Dominguez is working with Dr. Gene Eakin from Oregon State University to conduct research on the Tehachapi High School Campus that your child could possibly qualify to take part. Please see the details of the research study below:

- 1) Research Study Title: The Impact of Mindfulness Based Cognitive Therapy (MBCT) on Math Anxiety in Adolescents
- 2) Principal Investigator: Dr. Gene Eakin, Professor, Oregon State University
- 3) Student Researcher: April Dominguez, PhD student in Counselor Education and Supervision, Oregon State University and School Counselor, Tehachapi High School
- 4) Explanation of Research: The purpose of the current study is to research if using the Mindfulness Based Cognitive therapy curriculum as an intervention with adolescents who experience math anxiety is helpful in decreasing their math anxiety. Participants will be given an intervention of MBCT twice a week for 45 minutes each session. This intervention will last for 6 weeks and take place at Tehachapi High School.
- 5) Contact Information for individuals interested in consenting for their child to participate in the study or to find out further information
  - a. April Dominguez  
School counselor, Tehachapi High School  
661-822-2253  
[adominguez@teh.k12.ca.us](mailto:adominguez@teh.k12.ca.us)  
  
or
  - b. Gene Eakin, PhD  
Professor, Oregon State University  
541-737-8551  
[Gene.eakin@oregonstate.edu](mailto:Gene.eakin@oregonstate.edu)

## APPENDIX B

### PARENT CONSENT FOR CHILD PARTICIPATION IN STUDY

**Project Title:** The Impact of Mindfulness Based Cognitive Therapy on Math Anxiety  
**Principal Investigator:** Gene Eakin, PhD  
**Student Researcher:** April Dominguez  
**Co-Investigator(s):** N/A  
**Sponsor:** N/A  
**Version Date:** 10/31/13

#### **WHAT IS THE PURPOSE OF THIS FORM?**

You are being asked to give permission for your child to participate in a study. This form contains information you will need to help you decide whether to be in this research study or not. Please read the form carefully and ask the study team member(s) questions about anything that is not clear.

#### **WHY IS THIS RESEARCH STUDY BEING DONE?**

The purpose of this study is to explore whether Mindfulness Based Cognitive Therapy can be expanded to treatment of math anxiety. The specific research question is as follows: What is the impact of a 12- session Mindfulness Based Cognitive Therapy protocol on math anxiety in adolescents?

Up to 3 participants may be invited to take part in this study.

#### **WHY AM I BEING INVITED TO TAKE PART IN THIS STUDY?**

You are being asked to allow your child to participate in this study because your child meets the criteria for him/her to participate in this study.

#### **WHAT WILL HAPPEN IF I TAKE PART IN THIS RESEARCH STUDY?**

Participants are required to attend 2 sessions each week of the intervention of Lee and Simple's (2011) Mindfulness Based Cognitive Therapy for Children curriculum. The sessions take approximately 45 minutes and will be conducted twice per week for the duration of 6 weeks. **The sessions will take place during class time in your child's physical education class period. Your child will be expected to make up any educational time that you miss per their teacher's request.**

In addition, the study activities include the weekly administration of the Fennema – Sherman math anxiety rating scale to measure any change in math anxiety exhibited by the student.

**Recordings and photographs:** To ensure that the intervention is facilitated accurately, weekly tapings of the sessions may be recorded for peer review. These tapes will be focused solely on April Dominguez and will be destroyed immediately after their purposed is fulfilled.

\_\_\_\_ I agree for my child to be video recorded  
*Initials*

\_\_\_\_ I do not agree for my child to be video recorded  
*Initials*

### **WHAT ARE THE RISKS AND POSSIBLE DISCOMFORTS OF THE STUDY?**

The risks to participating in this study are low and may include a breach of confidentiality of the student's information. Data will be stored in a secured, locked file case. Three years after the completion of the research study all documentation will be destroyed.

### **WHAT ARE THE BENEFITS OF THIS STUDY?**

We do not know if you will benefit from being in this study. However, your child may experience a decrease in anxiety towards mathematics.

### **WILL I BE PAID FOR BEING IN THIS STUDY?**

No. The participants **will not** be paid to participate in this study

### **HOW WILL THE RESULTS BE SHARED?**

Results will be reported in the dissertation of the co-investigator. Results might also be shared through articles and professional presentations. All identifiable information will be kept secure and not made public.

### **WHO WILL SEE THE INFORMATION I GIVE?**

The information you provide during this research study will be kept confidential to the extent permitted by law. Research records will be stored securely and only researchers will have access to the records. Federal regulatory agencies and the Oregon State University Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research. Some of these records could contain

information that personally identifies you. The ending results of the study will be shared with the school district in which the study took place, however, all information given to the district will be unidentifiable.

To help ensure confidentiality, all of your child's information will be stored in a locked cabinet only accessible by April Dominguez and Dr. Gene Eakin.

#### WHAT IF I CHOOSE NOT TO PARTICIPATE IN THE STUDY?

Choosing not to participate in the study will not affect the student's relationship with their counselor. If at any time you choose to have your child stop participating in the study, this will not affect their relationship with their counselor.

#### **WHO DO I CONTACT IF I HAVE QUESTIONS?**

If you have any questions about this research project, please contact: April Dominguez at [adominguez@teh.k12.ca.us](mailto:adominguez@teh.k12.ca.us) or 661.822.2253 or Dr. Gene Eakin at [gene.eakin@oregonstate.edu](mailto:gene.eakin@oregonstate.edu) or 541.737.8551.

If you have questions about your rights or welfare as a participant, please contact the Oregon State University Institutional Review Board (IRB) Office, at (541) 737-8008 or by email at [IRB@oregonstate.edu](mailto:IRB@oregonstate.edu)

#### **ASSENT STATEMENT**

This research study has been explained to my child in my presence in language my child can understand. He/she has been encouraged to ask questions about the study now and at any time in the future.

---

Your signature indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a copy of this form.

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Participant's Name (printed)

---

Participant's Signature

---

Date



Researcher signatures indicate that the study was explained to the subject, comprehension was assessed and found to be sufficient, and the subject provided consent to participate in the study.

---

Researcher's Name (printed)

---

Researcher's Signature

---

Date

## APPENDIX C

### ASSENT FORM

**Project Title:** The Impact of Mindfulness Based Cognitive Therapy on Math Anxiety in Adolescents  
**Principal Investigator:** Dr. Gene Eakin  
**Student Researcher(s):** April Dominguez, M.S., P.P.S.

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We are asking you whether you want to be in a research study. Research is a way to test new ideas and learn new things. You do not have to be in the study if you do not want to. You can say Yes or No. If you say yes now, you can change your mind later.

Ask questions if there is something that you do not understand. After all of your questions have been answered, you can decide if you want to be in this study or not.

This study is about providing a type of help for students who experience anxiety towards math.

We are asking you if you want to be in this study because your teacher has referred you to your counselor for math anxiety.

If you take part in this study, we will ask you to agree to be audio or video recorded with the focus on your school counselor, not you.

**If you take part in this study, we will be meeting 2 times per week over a 6-week period. You will be missing class time in your physical education class during this period. You will be expected to make up any educational time that you miss per your teacher's request.**

Some things that might happen to you if you are in this study are other college students will listen to or watch the recording submitted by your school counselor. This is to make sure the intervention is being done the right way. The videos will be destroyed as soon as college students have seen the tapes.

The final results of the study will be shared with the school district in which the study took place, however, all information given to the district will be unidentifiable.

Some good things that might happen to you if you are in this study are that your math anxiety may decrease and other students who experience math anxiety may benefit from your participation. We are not sure that these things will happen. We will write a report when the study is over, but we will not use your name in the report.

Please note: You will first take a math anxiety rating scale to see if you are eligible for the study. If you are not eligible for the study, you still may receive help from the counselor.

If you want to be in the study, sign your name on the line below.

\_\_\_\_\_  
Participant's Name (printed):

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Person Obtaining Assent/Student Researcher

\_\_\_\_\_  
Date

## APPENDIX C

### Fennema-Sherman Mathematics Anxiety Subscale

Participant Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_

**Please respond to the following statements to the best of your ability. Please circle:**

1-Strongly agree    2-Agree    3- Neither disagree or agree    4-Disagree    5-  
Strongly disagree

#### Question 1:

Mathematics makes me feel uncomfortable and nervous.

1      2      3      4      5

#### Question 2:

Mathematics makes me feel uncomfortable, restless, irritable, and impatient.

1      2      3      4      5

#### Question 3:

I get a sinking feeling when I think of trying hard mathematics problems.

1      2      3      4      5

#### Question 4:

My mind goes blank and I am unable to think clearly when working mathematics.

1      2      3      4      5

#### Question 5:

Mathematics makes me feel uneasy and confused.

1      2      3      4      5