

THE EFFICACY OF MINDFULNESS-BASED INTERVENTION IN  
AMELIORATING EXTERNALIZING BEHAVIORS AND  
ATTENTIONAL CONCERNS AMONG  
COLLEGE STUDENTS

A DISSERTATION

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## ABSTRACT

SHAILJA T. SHARMA, M.A., S.S.P.

### THE EFFICACY OF MINDFULNESS-BASED INTERVENTION IN AMELIORATING EXTERNALIZING BEHAVIORS AND ATTENTIONAL CONCERNS AMONG COLLEGE STUDENTS

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The purpose of this study was to investigate the efficacy of a mindfulness-based intervention among college students with externalizing behaviors and attentional problems. Three students attending their first year in college received the mindfulness intervention, Mindfulness Based Stress Reduction (MBSR) and data were collected pre-intervention (baseline), during the intervention, post-intervention, and follow-up (maintenance) as part of this study. The study utilized a single case design across the four phases. Baseline, post-intervention, and maintenance data were collected by administering the Conners Continuous Performance Test, Third Edition (CPT-3), the Conners Continuous Auditory Test of Attention (CATA), the Behavioral Assessment Scale for Children, Flex Monitor, Third Edition (BASC-3 FM), and the Mindfulness Attention Awareness Scale (MAAS). Additionally, each participant completed the BASC-3 FM eight times during the course of the intervention across four weeks. Primary analyses of the data included a visual analysis of level, variability, trend, immediacy, and latency as well as statistical analysis using two nonparametric techniques (i.e., NAP and Tau-U). Analysis of clinical and nominally significant changes on the

BASC-3 FM and the MAAS were also conducted by analyzing standard error of the difference and reliable change index.

The results of this study strongly suggest that mindfulness may be an effective intervention for addressing externalizing behaviors and attentional problems among first year college students. Improvements in externalizing behaviors were reported for all three participants. Improvements in attentional problems were reported among the participants who reported attentional problems at baseline. These findings demonstrate that psychologists can effectively use mindfulness as an intervention when working with students who report externalizing behaviors and attentional problems.

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## CHAPTER I

### INTRODUCTION

The topic of human cognition has intrigued ancient philosophers and contemporary researchers alike. Cognition is understood as a highly complex and an inter-connected process, with mindfulness as one component of cognition that is getting more attention today. Human cognitive processes involve a combination of conceptually-driven and data-driven processes (Radvansky & Ashcraft, 2014). Even the simplest cognitive processes of sensing and perceiving involve an interplay of the external characteristics of the stimuli such as color, shape, and size with the internal processes of memory, reasoning, and thinking. This interaction usually serves an adaptive function in facilitating a better understanding of our environments. With constant interaction of top-down and bottom-up processes, however, it becomes difficult to regulate emotions and thoughts (Zelazo & Lyons, 2012).

“Mindfulness” may be viewed as a mental characteristic that potentially develops self-regulation by optimizing top-down processes such as memory, while addressing bottom-up influences such as anxiety (Zelazo & Lyons, 2012). A variety of interventions has been developed that have used mindfulness as a key component such as Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 1982). Mindfulness has been explained in a variety of ways, with the underlying key component as developing an awareness to the present without distorting emotionally, cognitively, and physiologically reactive ways

(Semple, Lee, Rosa, & Miller, 2010). A question then arises as to whether individuals can be trained to pay attention to the present in a non-judgmental way. Furthermore, it is important to explore if this trainable quality could help individuals in ameliorating attention concerns and externalizing behaviors.

The focus of this study was to examine the effects of a mindfulness-based intervention (MBSR) on college students with attention and behavioral problems. The U.S. Department of Education (USDOE, 2018) reports there are about twenty million students attending degree-granting post-secondary institutions in the United States. Approximately half of the college population meets criteria for at least one psychological disorder, indicating a high need to develop and apply treatment approaches for college students (Rizvi & Steffel, 2014). The college environment brings additional stressors to the life of students and exacerbates psychological and behavioral concerns (Howard et al., 2016). The transition to college life brings new types of contexts with increased academic workloads and reduced institutional support (Heiligenstein, Guenther, Levy, Savino, & Fulwiler, 1999). The college environment typically reflects a lack of structure with access to immediate gratification, which puts additional demands on self-regulation (Fleming & McMahon, 2012). Moreover, young adults are still developing their neurological system, which supports self-regulation as well as adjustment to the varying academic and social demands of the new setting (Fleming & McMahon, 2012). Therefore, a combination of developmental characteristics of college students and the college environmental factors may exacerbate psychological and behavioral concerns in young adults.

## Externalizing Behaviors

Historically, externalizing behaviors have been viewed and addressed from a punitive standpoint (Connor, 2002). The knowledge within behavioral sciences, however, proposes that behavioral problems can have several underlying organic, emotional, and psychopathological causes, or they could be a result of maladaptive decision-making (Jiron, 2009). The term *externalizing behaviors* describes chronically impulsive, oppositional, aggressive, destructive, or delinquent behavior (Jiron, 2009). Externalization is understood as the tendency to express distress outwards, contrary to internalization or the predilection to express distress inward (Krueger, McGue, & Iacono, 2001). Externalizing behaviors are a broad category presenting across several diagnoses such as conduct disorder (CD) and oppositional defiant disorder (ODD), and are accompanied by other concerns (Kolar et al., 2008). For instance, they may be concurrently observed in attention-related disorders such as attention deficit hyperactivity disorder (ADHD). Singh (2008) reported 30–50% of individuals meeting the criteria for ADHD also meet the criteria for CD or ODD.

Attention disorders are characterized by behavioral and cognitive symptoms of inattention, lack of organizational skills, and hyperactive and impulsive behavior (Kolar et al., 2008). Because attention problems are more directly quantifiable and concomitantly present with externalizing problems, these variables were selected for the current study. Attention problems allow for a direct assessment via available instruments (e.g., computerized assessments) while the measurement of internalizing problems is limited to the use of indirect assessment (e.g., self-report scales of anxiety and

depression). Inattention is defined as having difficulty maintaining necessary levels of attention that may disrupt academic performance and functioning in other areas (Reynold & Kamphaus, 2015). Hyperactivity refers to disruptive, impulsive, and uncontrolled behaviors (Reynold & Kamphaus, 2015). Anger control may be understood as a tendency to become irritable quickly and difficulty maintaining self-control (Reynold & Kamphaus, 2015). Due to the high comorbidity observed in externalizing behaviors and attention concerns, the current study collectively targeted inattentiveness, hyperactivity, and anger control.

From a research perspective, due to a co-occurrence of externalizing and attention disorders, it is imperative to study multiple variables simultaneously for a comprehensive understanding (Meyers, Gamst, & Guarino, 2013). For the purposes of this study, college students reporting attention concerns and externalizing behaviors, specifically, difficulty paying attention, staying still, and controlling anger were eligible to participate. While externalizing behaviors have been broadly conceptualized in the literature, the scope of the study was limited to inattention, hyperactivity, and anger control problems regardless of the clinical diagnosis the participants may or may not have had. Practitioners and researchers are continuously involved in pursuits to develop effective intervention approaches to address attentional and behavioral concerns. This study was designed to add to the scientific knowledge base, demonstrating the potential impact of a mindfulness intervention to alleviate externalizing behaviors and attention concerns.

## **Mindfulness**

Mindfulness involves attending and focusing on the present experience and an attitudinal shift toward acceptance (Quaglia, Brown, Lindsay, Creswell, & Goodman, 2014). The research developments on mindfulness-based interventions have emerged from two different philosophies. The mindfulness philosophy, led by Kabat-Zinn and his colleagues in the 1970s, is primarily based on Eastern Buddhist religious practices (Hart, Ivztan, & Hart, 2013). The other mindfulness philosophy is influenced by Western and scientific principles and has been primarily led by Langer and her colleagues in the 1970s (Hart et al., 2013). It is important to note that mindfulness has been conceptualized in two different ways (Giluk, 2009). The first conceptualization of mindfulness is as a trainable quality developed through instruction, while the second view of mindfulness is as a trait or a disposition such that some individuals are innately more mindful compared to others (Giluk, 2009). Mindfulness-based interventions are based on the premise that mindfulness is an attribute that can be taught, and the long-term effects of mindfulness instruction are dependent upon maintained practice of techniques unless an individual has dispositional mindfulness (Giluk, 2009).

Many mindfulness interventions have been developed and popularized such as the MBSR developed by Kabat-Zinn in 1982 and mindfulness based cognitive behavioral therapy (MBCT) developed by Teasdale et al. in the 1990's. MBSR develops psychological well-being by gradually acquiring skills that develop mindfulness such as sitting and moving meditation exercises to develop self-reflection and self-awareness (Bergen-Cico, Possemato, & Cheon, 2013). MBSR involves psychoeducational

components, cognitive-behavioral therapy techniques, and physical practice of meditation. The cognitive-behavioral elements teach participants to appraise their maladaptive cognitions and coping strategies as well as internal and environmental triggers (Bergen-Cico et al., 2013). MBCT combines mindfulness training developed by Kabat-Zinn in 1990 and adds components of cognitive behavioral therapy (CBT) for depression developed by Beck, Rush, Shaw, and Emery in 1979 (as cited in Williams, Russel, & Russel, 2008).

### **Selecting an Effective Intervention**

Evidence-based practice is the standard expectation for providing interventions within the field of psychology (Shaw & D'Intino, 2017). Evidence-based practice in psychology represents integrating research with clinical expertise with respect to patient-related factors. Ethical guidelines listed by various organizations such as the American Psychological Association (APA), American Academy of Pediatricians, and National Association of School Psychologists (NASP) indicate evidence-based interventions as the best practice for psychologists (Shaw & D'Intino, 2017). Behavioral and pharmacological interventions have proven to be useful for treating attention disorders, but they have several limitations such as short-term benefits, a lack of generalizability, treatment fidelity issues, and side-effects of medications (Van de Weijer-Bergsma, Formsa, Bruin, & Bogels, 2012). Moreover, adolescents with attention issues have a higher risk of suicide, which indicates a need to explore alternative effective interventions to address attentional and associated behavioral issues (Van de Weijer-Bergsma et al., 2012).



## **Mindfulness-based Interventions**

The uses of mindfulness as an intervention in contemporary psychiatry and psychology have been well documented (Felver, Doermer, Jones, Kaye, & Merrel, 2013). Chiesa, Calati, and Serretti (2011) reported evidence concerning reduced cognitive reactivity and a decreased avoidance and rumination in response to mindfulness-based interventions. Bogels, Hoogstad, van Dun, de Schutter, and Restifo (2008) utilized an adapted version of group MBCT with adolescents in the age group of 11 to 18 years with externalizing disorders. Externalizing behaviors were measured through self-report as well as parent report before and after intervention, and the results indicated a significant decrease in externalizing behaviors on the rating scales after the completion of intervention (Bogels et al., 2008).

O'Driscoll, Byrne, Gillicuddy, Lambert, and Sahm (2017) conducted a meta-analytic review to examine the evidence on mindfulness-based interventions on health and social care undergraduate students. The purpose of this review was to critically evaluate mindfulness-based interventions among studies that delivered MBSR, MBCT, or similar mindfulness-based interventions. Eleven studies, representing medicine, nursing, and psychology students were selected. In 10 out of 11 studies, short-term benefits of mindfulness-based intervention regarding stress and mood were reported. Additionally, mindfulness-based interventions were efficacious in improving well-being, coping strategies, and self-compassion. Furthermore, the effectiveness of brief mindfulness-based interventions indicated there was no significant relationship between the number of hours required in mindfulness classes and the measured effect on psychological problems

(Carmody & Baer, 2009). These findings present the mindfulness approach as a viable venue in effectively addressing behavioral and emotional concerns. Research evidence on mindfulness-based interventions is instrumental to the creation of this study.

### **Significance of the Study**

The significance of this study is paramount because it adds to the knowledge of effective interventions and the discipline of psychology, providing insight and operation of a successful intervention for college students. As previously noted, about half of the college population meets criteria for at least one psychological disorder, indicating a high need to develop and apply effective, evidenced-based treatment approaches for college students (Rizvi & Steffel, 2014). Furthermore, increased rates of aggression in college students have been reported over the past few decades (Toppin & Pullen, 2015) and an effective mindfulness intervention can help ameliorate increased aggression.

Therefore, it is critical to find effective and efficient interventions that can be applied to the college population. Attempting to determine if an intervention is effective with college students with behavioral and attention problems will help contribute to empirically based research. Consequently, this may encourage other researchers to continue to make efforts to apply evidence-based interventions with college students. This study also provided a significant contribution to the current research base to determine if college students are able to maintain the benefits of a mindfulness intervention for an extended period of time after the intervention has been completed. This provided evidence for long-term benefits of the intervention.

Based on the results of this intervention with college students, it opens venues to test the utility of teaching mindfulness to younger ages, such as adolescents. Mindfulness interventions are a potential answer to helping students who experience attentional and behavioral problems in the educational environment. Overall, the results of this study contribute critical insight into the use of MBSR as an intervention for students attending post-secondary institutions with attentional and behavioral problems. In regards to future research implications, the applications of the study may be further extended downwards to individuals of other age groups, such as adolescents and perhaps even pre-adolescents.

### **Research Questions**

Four broad research questions were examined in this study; specific hypotheses were presented in the method chapter.

1. After implementation of a mindfulness intervention, will the externalizing behavior decline post-intervention?
2. After implementation of a mindfulness intervention, will the attention concerns decline post-intervention?
3. What effects will mindfulness intervention have on improving dispositional mindfulness?
4. Will the positive effects on externalizing behavior and attention issues be maintained at one month following post mindfulness intervention?

## **Definitions**

The terms in this section directly relate to the relevant topics within this research study and include, but are not limited to, topics pertaining to externalizing behaviors, attention concerns, and mindfulness intervention.

### **Externalizing behaviors**

Externalization is understood as the tendency to express distress outwards, contrary to internalization or the predilection to express distress inward (Krueger et al., 2001). Externalizing behaviors are a broad category presenting across several diagnoses and are accompanied by other concerns (Kolar et al., 2008). For the purposes of this study, externalizing behaviors are defined as behaviors related to inattention, hyperactivity, and anger control.

### **Inattention**

Inattention refers to a difficulty maintaining necessary levels of attention that may disrupt academic performance and functioning in other areas (Reynold & Kamphaus, 2015).

### **Hyperactivity**

Hyperactivity refers to disruptive, impulsive, and uncontrolled behaviors (Reynold & Kamphaus, 2015).

### **Anger control**

Anger control may be understood as a tendency to become irritable quickly and difficulty maintaining self-control (Reynold & Kamphaus, 2015).

## **Co-morbidity**

Co-morbidity is the presence or co-occurrence of two or more disorders in the same individual. For example, individuals frequently present with externalizing behaviors as well as attention problems warranting a dual diagnosis of CD and ADHD.

## **Mindfulness**

Mindfulness involves attending and focusing on the present experience and an attitudinal shift toward acceptance (Quaglia et al., 2014).

## **Cognitive Behavioral Therapy**

A major tenet of CBT is that maladaptive thoughts and cognitive processes lead to psychopathology, which may be addressed by re-structuring faulty cognitive processes (Benjamin et al., 2011). CBT combines behavioral, cognitive, as well as developmental and social learning theories of human behavior (Benjamin et al., 2011) to understand problem behavior.

## **Mindfulness Based Stress Reduction**

The MBSR is a psychotherapeutic intervention, which develops psychological wellbeing by the progressive acquisition of mindfulness skills through a variety of sensory exercises, meditation, mindful body scan and movements, psycho-education, and didactic training with elements from CBT (Bergen-Cico et al., 2013).

## **Body scan**

The body scan is done while the individual lies in a comfortable posture and the instructor guides them to pay attention to their bodies from the toes, moving upwards, and ending at the head (Do, 2011). This exercise requires both sustaining attention to

specific body parts as well as shifting attention from one location to another and forms a foundation to other meditative practices (Do, 2011).

## **Yoga**

Yoga sequences are a structured way of developing greater body awareness (Santorelli, Meleo-Meyer, & Koerbel, 2017). Within the MBSR curriculum, yoga is understood as a combination of gentle stretches, where each posture is done slowly with present-moment awareness of breathing (Do, 2011).

## **Sitting meditation**

Sitting meditation involves focus on breath, body sensations, and the whole body while sitting (Santorelli et al., 2017). Participants are guided to acknowledge the transient nature of bodily sensations and shifting attention to the breath if sensations are overwhelming. Additionally, participants are encouraged to explore the possibility of bringing awareness to their emotions or thoughts and shifting attention to the breath if emotions become overwhelmingly difficult (Santorelli et al., 2017).

## **Walking meditation**

Walking meditation is another type of meditation technique included in the MBSR curriculum. Kabat-Zinn (1990) described walking meditation as walking while being aware that one is walking. While doing walking meditation, participants focus in front of them without distracting themselves by other sights including their feet. The goal of walking in this case is not to reach anywhere, but to be where they are (Kabat-Zinn, 1990).

### **Single case design**

Single case refers to the participant or a group of participants being studied. In contrast to an experimental group design, in which one group is compared with another, participants in a single case design serve as their own control group for comparison (Smith, 2012).

## CHAPTER II

### LITERATURE REVIEW

This chapter addresses several topics related to externalizing behaviors, attentional concerns, aspects of mindfulness, and mindfulness as an intervention. First, the concept of externalizing behaviors will be discussed in depth, including the cognitive, environmental, and developmental contributors. Included in this is a specific focus on attention problems because of high comorbidity reported between attention disorders and externalizing behaviors (Jacob et al., 2014; Kolar et al., 2008). With relevance to the current study, the next section of the chapter will include a discussion of attentional and behavioral issues within the college population. This will include a brief discussion of research pertaining to interventions with the college population to address attentional and behavioral issues. Research with mindfulness-based interventions will be presented, with an emphasis on behavioral and attentional problems. The final section will cover the concept of mindfulness including its philosophical roots and socio-cultural aspects. The chapter will conclude by presenting research evidence regarding the positive benefits of mindfulness interventions.

#### **Externalizing Behaviors**

Psychologists traditionally utilize standardized, nosologically determined systems to classify mental disorders such as the DSM-V (APA, 2013) and the *International Classification of Diseases*, 10th Edition (ICD-10; World Health Organization, 2010).



While such empirically derived diagnostic systems continue to be valuable to the fields of mental and physical health, their use brings some challenges. Carragher, Krueger, Eaton, and Slade (2015) suggested that psychiatric diagnostic categories are not well supported by research evidence, which is evidenced by a frequently observed co-occurrence of psychiatric disorders in the same individual. This comorbidity characteristic cautions both researchers and practitioners to reflect deeply upon the nature and boundaries of the mental health nomenclature when conducting assessments, interventions, and/or research. This is especially applicable when identifying and defining dependent variables (e.g., psychiatric disorders or clinical presentation of symptoms) being studied in research.

Over the past decade, research has suggested two distinctive categories under which most mental disorders are organized: internalizing and externalizing disorders (Carragher et al., 2015). Carragher et al. (2015) discussed a dimension-based model that arranges mental disorders based on empirical evidence which is the internalizing–externalizing model of psychopathology. This is especially relevant because it has become extremely difficult to address a single disorder alone, considering the overwhelming amounts of research that establish a co-occurrence of disorders (Carragher et al., 2015). Co-morbidity, or the presence of multiple diagnoses, raises the fundamental question of whether clinical disorders are mutually exclusive in the first place and whether the categorizations are valid (Carragher et al., 2015). Even though this broad categorization of externalizing and internalizing disorders helps in understanding the co-occurrence of disorders within each continuum, it fails to answer

all the nosological puzzles, such as the co-occurrence of both internalizing and externalizing issues in the same individual (Carragher et al., 2015). This question is revisited in a later section, with elaborations on the underlying emotional factors in determining externalizing behaviors.

The concept of externalizing behaviors has been understood in different ways across disciplines. The major factor differentiating between different connotations of externalizing behaviors is the element of willfulness (Connor, 2002). This connotation of willfulness indicates an element of intentionality behind externalizing behavior as is typically assumed by the fields of criminal justice and law, and until recently within the mental health fields, whereby externalizing behaviors were largely understood as “behaviors of choice” (Jiron, 2009). From the criminal justice field standpoint, externalizing behavior, such as antisocial behavior and aggression, deserves punishment, whereas from the mental health perspective such behavior may be attributed to individual deficit or/and environmental triggers (Connor, 2002). Similarly, behavioral sciences propose that behavioral problems can have several underlying organic, emotional, and psychopathological causes, or they could be a result of maladaptive decision-making (Jiron, 2009).

The field of psychology describes externalizing behaviors as chronically impulsive, oppositional, aggressive, destructive, or delinquent behavior (Jiron, 2009). Externalizing behaviors is a broad category presenting across several diagnoses such as CD and ODD, and accompanied by other concerns (Kolar et al., 2008). For instance, they may be comorbidly present in attention-related disorders such as Attention Deficit

Hyperactivity Disorder (ADHD). Singh (2008) reported 30–50% of individuals meeting the criteria for ADHD also meet the criteria for CD or ODD. Reef et al. (2011) described externalizing behaviors as an umbrella term covering a variety of behavioral problems.

It is important to note that the presentation and intensity of behavioral issues may vary in individuals. Therefore, externalizing behaviors have been categorized using a variety of diagnostic approaches, including consensus-based classification, principal component analyses, or developmental theory (Bongers, Koot, van der Ende, & Verhulst, 2004). Frick et al. (1993) categorized externalizing behavior problems based on their meta-analysis of 44 factor analytic studies of approximately 28,000 youths. Their categories are aligned with the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.) (DSM–IV; American Psychiatric Association, 1994) and the Child Behavior Checklist (CBCL; Achenbach, 1991). Broadly, the four behavioral clusters were divided along two dimensions (overt and covert; destructive and nondestructive). The four types of externalizing behaviors were aggression (bullying, quarreling), oppositional behavior (defiance, non-compliance), property violations (animal cruelty, lying), and status violations (substance abuse, runaway).

Besides investigating externalizing behaviors broadly, researchers have also studied various categories of externalizing behaviors and their respective developmental trajectories from childhood to adulthood (Bongers et al., 2004). The manifestation of externalizing behaviors changes significantly with growth and development; examining studies focusing on a specific age group or phase of development may not accurately represent the overall problem (Kraemer, Yesavage, Taylor, & Kupfer, 2000). It is due to

this reason that externalizing behavior has been studied from a developmental life-span perspective (Costello & Angold, 2000). Understanding the developmental trajectories from childhood through adulthood clarifies the factors that play a role in the development as well as the potential long-term effects of such behaviors for individuals and society (Reef et al., 2011). Externalizing behaviors in children have long-lasting social, emotional, and behavioral repercussions for adults such as mood and anxiety problems, substance abuse, and disruptive behaviors (Reef et al., 2011). Therefore, the following sections will review the presentation of externalizing behaviors from childhood through adolescence and young adulthood.

### **Developmental Psychopathology of Externalizing Behaviors**

**Empirical evidence on developmental trajectories.** Although research has highlighted trajectories of externalizing behaviors from childhood to adolescence, evidence is gathering relatively gradually regarding developmental connections through adulthood. Reef et al. (2011) noted that most of the research on externalizing behaviors was conducted on children except for two studies that examined the developmental trajectories through young adulthood. Using a large sample ( $n = 2076$ ), in a longitudinal study spanning 24 years, Reef et al. (2011) explored the developmental trends of four externalizing behavior types; aggression, opposition, property violations, and status violations (substance abuse, running away) to predict the diagnosis of DSM-IV disorders in adults. Reef et al. (2011) examined the connections between children's externalizing behaviors of age four to 16 years and psychiatric diagnosis in adults in the age range of 28 to 40 years. The study demonstrated significant relationships between all four

externalizing behavior types with disruptive disorder in adults. The status violations group also predicted anxiety, mood, and substance use disorders. The study concluded that increased externalizing behaviors in children generally showed long-term repercussions. Additionally, different types of externalizing behaviors were linked to specific diagnostic presentations in adults and status violation type of externalizing was most likely to be observed in adulthood. Reef et al. (2011) suggested that developmental pathways describe two-dimensional changes, in intensity and frequency, with respect to typically developing individuals.

Bongers et al. (2004) identified status violations including substance abuse, truancy, and runaway as the only type of externalizing behavior that increased with age; in contrast to the other three types that is aggression, oppositional behavior, and property violations, which declined with age. Bongers et al. (2004) established connections between oppositional behaviors in children and status violations with problems in interpersonal interaction, consistently across directions and level of severity of the behavior. Similarly, Timmermans, van Lier, and Koot (2008) demonstrated a continuation of externalizing behaviors from childhood through adolescence. Specifically, children with opposition, aggression, and property violations demonstrated impulsivity, risky behavior, sexual issues, and other undesirable outcomes during adolescence up to age 18 years. Even though the overall results were not conclusive on the specific links between the type of externalizing behavior in children and the long-term impact as adults, there is consensus on long-term behavioral and social problems as

an outcome of childhood externalizing behaviors. This suggests a continuity of behavioral issues from childhood through adulthood.

**Social-emotional and cognitive factors.** Psychologists have explained maladaptive behaviors from various perspectives, including cognitive, operant learning, and social learning approaches (Benjamin et al., 2011). Children may exhibit externalizing behaviors as a manifestation of underlying emotional issues, which may be associated with personal and social problems in adolescence and adulthood (Meany-Walen & Teeling, 2016). This is the reason individuals who externalize may concomitantly present with tendencies to internalize behaviors such as social withdrawal as typically observed in depression, and somatic complaints, as seen in anxiety-related disorders. Therefore, when understanding externalizing behaviors, underlying emotional factors cannot be ignored.

Along these lines, Barlow's (2000) triple-vulnerability model of emotional disorders proposes the following three vulnerabilities in the development of emotional disorders: genetic vulnerability, psychological vulnerability marked by a limited self-control, and psychological vulnerability that develops because of early learned experiences. This model is understood as a dual-sided mechanism, which is a sense of decreased control because of an interaction between one's experiences with one's reactive arousal system and increased negative emotional reactions as well as with life events that are out of control. Barlow (2000) emphasized that children's social interactions with the family as well as peers in the early years play a role in contributing to emotional and behavioral disorders in the later years. This is the rationale behind the

CBT models integrating parent training, acknowledging contextual limitations, as well as developing children's sense of control over their environment (Benjamin et al., 2011).

**Environmental stressors.** Externalizing behaviors have been conceptualized in terms of the stress response of the body (Baylis, 2006). A disturbance in the activity of the body's stress response, which involves the hypothalamic-pituitary-adrenal axis (HPA) and the sympathetic adrenal medullary axis has been linked to emotional problems and disruptive behavior disorders (Baylis, 2006). Individuals who have problems managing their affect in response to stressors tend to externalize their problems, instead of resorting to adaptive coping strategies. Therefore, externalizing behaviors may be understood as a disturbance or a dysregulation of the stress response system. Moreover, a continued exposure to environmental stressors has been associated with an over-activation of the HPA axis and exposure to cortisol, which negatively affects the frontal lobe areas, amygdala, and the hippocampal areas of the brain (Baylis, 2006). Prenatal factors such as maternal stress, maternal mental health, and fetal exposure to nicotine have an adverse impact on the development of externalizing behaviors in children (Murray, Irving, Farrington, Colman, & Bloxsom, 2010). Murray et al. (2010) conducted a longitudinal study utilizing a survey on information about pregnancy, birth, child, parent, and socioeconomic characteristics at birth and age five. Conduct problems were reported by parents at age 10, and criminal convictions were self-reported by adults in the ages of 30 and 34. Further, economic stress from low socioeconomic status, adverse family dynamics, and low cognitive stimulation were also linked with long-term behavioral issues such as conduct problems. Ziv (2012) established links between direct and indirect

exposure to violence and the tendency to make negative attributions, including blaming others or self, versus taking responsibility for actions and problem solving.

**Parenting factors.** Positive and negative reinforcement play a role in shaping an individual's behavior, self-efficacy, and maladjustment (Benjamin et al., 2011). Bandura (1965) explained behavioral change in terms of modeling or observational behavior learning. If behaviors are learned by observing others, then individuals can develop behavioral problems by imitating their role models such as parents, siblings, and peers, and then generalize those behaviors to other settings. In addition, parenting styles play a role in shaping children's behaviors (Patterson, 1982). Patterson (1982) proposed the idea of coercion theory, which emphasizes the role of reinforcement in strengthening problem behaviors. For instance, when parents are inconsistent and do not keep their word about addressing undesirable behavior via a negative or positive consequence, undesirable behavior is reinforced. Further, research has also indicated associations between a lack of warmth in parenting with the extent of social maladjustment issues (Haskett & Willoughby, 2007). Early experiences devoid of parental warmth and inconsistent discipline have been identified as signs linked to elevations in aggressive behavior.

**Neurological factors.** Research has established links between externalizing behaviors and certain neuroanatomical structures such as the limbic system and the hippocampus (Jiron, 2009). The limbic system plays a role in regulating aggression and rage while the hippocampus plays a part in encoding new information particularly non-verbal information, which plays a crucial role in social interaction (Jiron, 2009).



Regarding the role of neurotransmitters, research has indicated the contribution of a 7-repeat allele of the dopamine D4 receptor gene as a moderator in the links between poor cognitive abilities and externalizing behavior (Jiron, 2009). It is expected that advances in neuroscience will facilitate a greater understanding of externalizing behaviors with regard to the specific neurological implications. As evidenced in the previous sections, several factors play a role in the development of externalizing behaviors in children including social-emotional, environmental, parental, and neurological. The developmental trajectories of externalizing behaviors in children appear to persist through adulthood.

### **Externalizing Behaviors and Attention Concerns**

Human behavior is complex and interconnected with inter-related behavioral aspects. To understand a specific behavior in a comprehensive manner, studying multiple dependent variables is recommended (Meyers et al., 2013). Externalizing behaviors are a broad category presenting across several diagnoses and are accompanied by behavioral, social, and psychological concerns (Kolar et al., 2008). It is extremely common for adults to experience attentional and behavioral concerns concomitantly. Several psychological and medical disorders present attention or/and hyperactivity concerns (Kolar et al., 2008). ADHD is a commonly prevalent attentional disorder and is characterized by behavioral and cognitive symptoms of inattention, lack of organizational skills, and hyperactive and impulsive behavior (Kolar et al., 2008). Additionally, several disorders mimic attentional and hyperactivity concerns. The list includes anxiety disorders, mood disorders, adjustment disorders, learning and language deficits, and some

psychotic disorders, as well as the presence of increased stress in life. A study examined the percentage of comorbidly present disorders in patients with ADHD and found 81% of adults with ADHD had at least one comorbid diagnosis, while 56% had a minimum of two comorbid diagnoses (McGough et al., 2005). Due to the high comorbidity observed in externalizing behaviors and attention concerns, the current study is collectively targeting inattentiveness, hyperactivity, and anger control. As will be observed in the following diagnostic criteria listed under the DSM-V (APA, 2013), inattention and hyperactivity are the key components of attention and hyperactivity disorders. These concerns are externalizing type of behaviors and are concomitantly present with other externalizing behaviors such as anger control. Inattention refers to a difficulty maintaining necessary levels of attention that may disrupt academic performance and functioning in other areas (Reynold & Kamphaus, 2015). Hyperactivity refers to disruptive, impulsive, and uncontrolled behaviors (Reynold & Kamphaus, 2015). Anger control may be understood as a tendency to become irritable quickly and difficulty maintaining self-control (Reynold & Kamphaus, 2015). While externalizing behaviors have been broadly conceptualized in the literature, the scope of the study will be limited to inattention, hyperactivity, and anger control problems regardless of the clinical diagnosis the participants may or may not have. The DSM-V (APA, 2013) criteria for ADHD are listed below.

**“Attention Deficit Hyperactivity Disorder (ADHD, APA, 2013):** A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, as characterized by (1) and/or (2):

1. Inattention: Six (or more) of the following symptoms have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:
- a. Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate).
  - b. Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading).
  - c. Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction).
  - d. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked).
  - e. Often has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines).
  - f. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers).
  - g. Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, and mobile telephones).

h. Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).

i. Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).

2. Hyperactivity and impulsivity: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:

a. Often fidgets with or taps hands or feet or squirms in seat.

b. Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place).

c. Often runs about or climbs in situations where it is inappropriate. (Note: In adolescents or adults, may be limited to feeling restless.)

d. Often unable to play or engage in leisure activities quietly.

e. Is often “on the go,” acting as if “driven by a motor” (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with).

f. Often talks excessively.

g. Often blurts out an answer before a question has been completed (e.g., completes people’s sentences; cannot wait for turn in conversation).

h. Often has difficulty waiting his or her turn (e.g., while waiting in line).

i. Often interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people's things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing)" (APA, 2013, pp. 59-61).

In summary, externalizing behaviors have been broadly defined in the literature, and they co-exist with attention concerns. The following sections illustrate the presentation of attentional and related externalizing concerns among college students with respect to specific contextual factors.

### **The College Population**

Until Jensen Arnett proposed a new phase in human development in 2000, a dearth of research is noted in the psychosocial development of college students. Arnett (2000) proposed a separate stage in human development that encompassed the age group of 18 through 25 and termed it "emerging adulthood." This group is characterized by some unique features such as lack of stability, exploration of self-identity, individual versus collective focus, a feeling of not belonging to a distinct developmental group, and experience of a multitude of opportunities (Arnett, 2000). The U.S. Department of Education (USDOE, 2018) reports about twenty million students attend post-secondary institutions in degree-granting institutions in the United States. The college student population has increased in size and diversity and represents younger students over the past 50 years (Sulkowski & Joyce, 2012). Some important contextual factors within the college setting are discussed in the following section.

## **The College Environment**

The transition phase from adolescence to adulthood comes with many challenges and lasts for several years for most individuals, such that even well-functioning students face difficulty due to changes in their environment (Howard et al., 2016). Although high school requires students to function more autonomously than middle school, it provides academic and instructional supports as well as a similar environment to previous schooling experiences. The transition to college life, however, brings new types of contexts with increased academic workloads and reduced institutional support (Howard et al., 2016). The college environment typically reflects a lack of structure with access to immediate gratification, which puts additional demands on self-regulation (Fleming & McMahon, 2012). Moreover, young adults are still developing the neurological system that supports self-regulation as well as adjustment to the varying academic and social demands of the new setting (Fleming & McMahon, 2012). About half of the college population meets criteria for at least one psychological disorder, indicating a high need to develop and apply treatment approaches for college students (Rizvi & Steffel, 2014). Increased rates of aggression in college students have been reported over the past few decades, which brings attention to the fact that childhood behavioral issues do not vanish with advanced educational opportunities (Toppin & Pullen, 2015).

## **Comorbidity in the College Population**

College and university students who are dealing with unmanaged mental or emotional health issues tend to show externalizing behaviors when interacting with their instructors and peers, frequently causing disruptions to the classroom environment

(Toppin & Pullen, 2015). These issues are further worsened due to the presence of common and ongoing college stressors such as the pressure of performance and test anxiety. Commonly observed behavioral problems in college and university students include classroom interruptions such as talking at inappropriate times, packing up before class dismissal, arriving and leaving class at leisure, cheating, asking conflictual questions, showing disrespect, missing classes, and not respecting assignment deadlines (U.C. Berkley, Teaching, Learning, Academic Planning and Facilities, 2009). Additionally, other disruptive behaviors observed in college students are the inappropriate and unchecked use of mobile devices, asking questions to challenge authority, getting argumentative, and showing disrespect during classroom discussions and group projects (Toppin & Pullen, 2015). Behavioral problems may potentially worsen during online teaching due to reduced requirement of accountability (Toppin & Pullen, 2015).

Jacob et al. (2014) studied a large sample of adults ( $n = 910$ ) to discern connections between categories of psychological disorders such as externalizing and internalizing clusters. Internalizing behaviors depict a tendency to internalize emotional issues in the form of social withdrawal, anxiety, and somatic complaints (Reynolds & Kamphaus, 2015). Individuals diagnosed with ADHD, when compared to the reference group, were found to be low on conscientiousness and high on novelty seeking, which are characteristics of externalizing behaviors. Additionally, these adults manifested elevations in internalizing behaviors, such as depression, anxiety, and fear related

personality disorders as well as antisocial, histrionic, borderline, and narcissistic personality disorders (Jacob et al., 2014).

Adults with ADHD frequently show the following concurrent diagnoses: substance abuse and dependence, mood disorders, anxiety disorders, and personality disorders such as antisocial personality disorder and borderline personality disorder (Kolar et al., 2008). ADHD is concurrently present with 50% patients diagnosed with substance abuse disorders, 30% – 50% patients reporting depression, and 40% – 60% reporting anxiety disorder (Sobanski, 2006). In summary, college students exhibit several behavioral, emotional, and attentional concerns and these concerns appear to present concurrently.

### **The Effects of Attentional and Externalizing Behaviors on College Students**

Overall, ADHD related concerns present with emotional costs manifesting in anxiety, depression (Kessler et al., 2005), drug abuse, and antisocial behaviors (Barkley, Murphy, & Fischer, 2008) when compared to normal cohorts. The presentation of attention and hyperactivity related issues might be different in young adults as compared to children. Typically, there is a decrease in hyperactive behavior, but concerns with inattention, organizational skills, and impulsive behavior likely persist through adulthood (Kolar et al., 2008). Difficulties may be observed in respecting the personal space of others, talking out of turn, and not being able to wait for their turn to contribute ideas in a large or small group setting. Within the sub-set of college population, the most pressing concerns are likely manifested as problems in organizing and completing important academic tasks (Kolar et al., 2008). These problems are related with an increased failure



in academics, income and employment loss, and increase in motor accidents, marital distress, and increased divorce rates (Spencer et al., 2005). Overall, college students with attentional impairments struggle with peer relations, academic and employment-related success, when compared to their normal peers (Barkley et al., 2008). Their tendencies of developing maladaptive behaviors, including externalizing, and internalizing and substance abuse disorders also increase.

It can be concluded that attentional and externalizing behaviors continue to be an important concern among young adults. Approximately 50% of college students are diagnosed with a minimum of one psychological disorder each year (Blanco et al., 2008). Based on the growing mental health needs of college students, Rizvi and Steffel (2014) raised the need to develop treatment approaches to alleviate psychological concerns in the college population while considering the limitations of college life. The following sections will be devoted to a presentation of some available research on psychotherapeutic interventions specifically for attentional and externalizing behaviors such as those observed in individuals diagnosed with ADHD.

### **Psychotherapeutic Interventions**

Psychologists have an ethical obligation to address the needs of individuals with behavioral and emotional challenges. Evidence-based practice is the standard expectation for providing interventions within the field of psychology (Shaw & D'Intino, 2017). Ethical guidelines for research and practice indicate evidence-based interventions as the best practice for psychologists (APA, 2017). Furthermore, evidence-based interventions within the field of health care involve converting research into practice to

optimize benefits for individuals (Steglitz et al., 2015). In addition to meeting the internal validity and prescribed standards, a study must also demonstrate a functional relationship between the intervention and its effectiveness a minimum of three times (Kratochwill et al., 2013). The efficacy of an intervention is further enhanced when the desirable outcomes are replicated across heterogeneous groups and on multiple occasions. The following section provides an overview of empirical research on interventions for externalizing behaviors and attentional concerns with an emphasis on adolescence and young adulthood.

### **Research Based Evidence on Interventions**

Research pertaining to interventions for externalizing behaviors primarily consists of efficacy trials, wherein the effects of interventions are examined under simulated conditions (Stoltz et al., 2012), with limited ecological validity. Although useful, these studies fail to address the complex reality of mental health care in real-world settings by failing to consider real-life challenges in delivering interventions (Stoltz et al., 2012). Behavioral and pharmacological interventions have proven to be useful for treating attentional disorders, but have several limitations such as short-term benefits, a lack of generalizability, treatment fidelity issues, and side effects of medications (Van de Weijer-Bergsma et al., 2012). Moreover, adolescents with attentional issues have a higher risk of suicide, which indicates a need to explore alternative effective interventions to address attentional and associated behavioral issues (Van de Weijer-Bergsma et al., 2012).

**Treatment approaches.** Kolar et al. (2008) recommended the treatment approach for adults with attentional and behavioral disorders must focus on the specific

issues presented in individuals including poor time management, organizational skills, impulsiveness, limited problem-solving skills, academic problems, interpersonal issues, anti-social tendencies, and externalizing issues. Kolar et al. (2008) reviewed available literature to determine the efficacy of pharmacological and psychosocial treatments, particularly CBT, to address ADHD symptoms in adults. Kolar et al. (2008) concluded that a combination of medication and psychosocial approach as an effective treatment to address the needs of most of the patients with ADHD.

Some CBT models were reported to be effective in addressing ADHD symptoms. For instance, Safren (2006) developed a CBT intervention to address ADHD symptoms as well as externalizing behaviors, such as anger management and frustration tolerance. The study evaluated the efficacy of this intervention on those patients who were not responding to medication and concluded that CBT might be helpful in treating adult patients with ADHD who do not respond to pharmacotherapy as the only treatment. Several limitations were noted such as a lack of randomized control group, small sample, as well as lack of means to ensure control over medication intake. Hesslinger et al. (2002) studied the effectiveness of an intervention that applied a dialectical behavior therapy approach, CBT, and mindfulness on seven adult patients with ADHD. Although some patients continued to take medication through the intervention, improvement was reported in ADHD symptoms and overall functioning.

Although less support has been found for the use of CBT for externalizing disorders in youth, some CBT protocols such as the Rational-Emotive Mental Health Program (Ellis, 1962) are considered potentially useful for the treatment of disruptive

behaviors in youth (Thoma, Pilecki, & McKay, 2015). An early study was conducted by Wilens et al. (1999) to examine the efficacy of CBT for adults with ADHD. The study utilized an adapted CBT with a focus on dysfunctional cognitive schemas and cognitive restructuring. The intervention involved 36 sessions and improvements were reported in the symptoms of ADHD, depression, and overall functioning although the results were evaluated post completion and no control group was used. Knouse, Teller, and Brooks (2017) conducted a recent meta-analysis on the effectiveness of CBT intervention among adults with ADHD. The meta-analysis included 32 studies utilizing CBT treatment approach for ADHD in adults through December 2015. The results indicate medium to large effect sizes for pre-post studies and small to medium effect sizes for studies involving control groups (Knouse et al., 2017).

**Mindfulness based interventions.** Mindfulness based interventions have also been utilized to address externalizing behaviors and attention concerns. Mindfulness interventions incorporate CBT strategies such as reflection on thought processes. Bogels et al. (2008) utilized an adapted version of group MBCT with adolescents in the age group of 11 to 18 years with externalizing disorders. Externalizing behaviors were measured through self-report as well as parent report before and after intervention, and the results indicated a significant decrease in externalizing behavior on the rating scales after the completion of intervention (Bogels et al., 2008). O’Driscoll, Byrne, Gillicuddy, Lambert, and Sahm (2017) conducted a metanalytic review to examine the evidence on mindfulness-based interventions on health and social care undergraduate students. The purpose of this review was to critically evaluate mindfulness-based interventions among

studies that delivered MBSR, MBCT, or similar mindfulness-based interventions. Eleven studies, representing medicine, nursing, and psychology students were selected from PubMed, EMBASE, Psych Info, CINAHL, Cochrane Library and Academic Search Complete until 2016 were included in the review. In 10 out of 11 studies, short-term benefits relating to stress and mood were reported. Additionally, mindfulness-based interventions were efficacious in improving well-being, coping strategies, and self-compassion. The effectiveness of brief mindfulness-based interventions indicated there was no significant relationship between the number of hours required in mindfulness classes and the measured effect on psychological problems (Carmody & Baer, 2009).

O'Driscoll et al. (2017) noted some limitations based on a meta-analysis focused on college students with psychological problems. Most of the studies lacked a long-term follow-up with the exception of two studies that included a measurement of long-term effect at six months (Erogul, Singer, McIntyre, & Stefanov, 2014; Phang, Mukhtar, Ibrahim, Keng, & Mohd. Sidik, 2015). These two studies, however, did not demonstrate maintained improvement in psychological concerns, which raises a question about the ability to maintain benefits of mindfulness intervention. O'Driscoll et al. (2017) recommended that more research to examine sustained results is needed. Generally, mindfulness classes were conducted by trained facilitators to meet the best-practice criteria for research (Crane, Soulsby, Kuyken, Williams, & Eames, 2012); however, not all studies clearly described the specific qualifications of the facilitators (O'Driscoll et al., 2017). Additionally, the role of gender and personality factors in determining the outcome of participation in mindfulness interventions was reviewed. It

was reported that gender indirectly shapes the development of personality, which further has an impact on interventional success (O'Driscoll et al., 2017). Overall, female students showed more improvement than male students although most of the studies (eight out of 11) did not analyze gender interactions and two out of the three studies did not describe the quality of differences (O'Driscoll et al., 2017).

O'Driscoll et al. (2017) suggested future research directions with mindfulness interventions as demonstrating long-term effect, need for heterogeneous samples in terms of participation in a variety of courses, and a clear explanation of the role played by gender and personality variables in determining the outcome of interventions. Therefore, mindfulness-based interventions are being increasingly applied by researchers to ameliorate attentional, behavioral, and emotional concerns presented in adolescent and adult populations. The following sections will examine the underlying concept and philosophy of mindfulness including the cognitive, affective, neuro-psychological, and socio-cultural aspects.

### **Mindfulness Interventions: The Conceptual, Philosophical, and Practical Framework**

Mindfulness involves attending and focusing on the present experience and an attitudinal shift toward acceptance (Quaglia et al., 2014). Many mindfulness interventions have been developed and popularized in recent decades such as Mindfulness Based Stress Reduction (Kabat-Zinn, 1982) and Mindfulness Based Cognitive Therapy (Teasdale et al., 1991). MBSR develops psychological well-being by gradually acquiring mindfulness skills through sitting and moving meditation exercises to

develop self-reflection and self-awareness (Bergen-Cico et al., 2013). MBSR involves psychoeducational and cognitive-behavioral therapy techniques along with the physical practice of meditation. These strategies aim to create a metacognitive awareness toward thought processes. The cognitive-behavioral elements teach participants to appraise their maladaptive cognitions and coping strategies as well as internal and environmental triggers (Bergen-Cico et al., 2013). MBCT combines mindfulness training developed by Kabat-Zinn in 1990 and adds components of CBT for depression developed by Beck, Rush, Shaw, and Emery in 1979 (as cited in Williams et al., 2008). MBCT involves developing awareness to the present moment while abandoning an awareness of negative and ruminative modes of thought (Coelho, Canter, & Ernst, 2013). Mindfulness strategies within the MBCT intervention include a collaborative inquiry between the interventionist and the client to facilitate focusing on the present (Felder, Dimidjan, & Segal, 2012).

### **The MBSR Practice**

It is important to note that research on mindfulness treats the construct of mindfulness in two different ways (Giluk, 2009). The first conceptualization of mindfulness is that it is a trainable quality developed through instruction while the second view of mindfulness presents it as a trait or a disposition, such that some individuals are innately more mindful compared to others (Giluk, 2009). Mindfulness-based interventions such as the MBSR are based on the premise that mindfulness is an attribute that can be taught, and the long-term effects of mindfulness instruction are dependent upon maintained practice of techniques unless an individual has dispositional

mindfulness (Giluk, 2009). This is an important point to consider in the study of mindfulness interventions, as trait mindfulness can be a confounding factor. The positive effect of mindfulness interventions questions whether mindfulness can be present as a trait because trait mindfulness is associated with hereditary factors (Quaglia et al., 2014).

While it is premature to compile a list of best practices for a mindfulness intervention due to various modifications and adaptations developed recently without sufficient empirical evidence, Dobkin, Hickman, and Monshat (2013) highlighted three key criteria for an intervention to be called MBSR. These criteria are: 1) meditation practices, 2) teaching modules, and 3) training exercises. All three criteria are included in the MBSR curriculum developed by Kabat-Zinn (1982) and colleagues at the University of Massachusetts Center of Mindfulness, as well as daily mindfulness practice. The traditional MBSR is a time-intensive program requiring approximately 30 hours of session time, taught across eight weeks in ten sessions including a one-day retreat (Santorelli et al., 2017). Circumstances of certain groups of participants, however, do not always allow them to invest long hours in an intervention program (Carmody & Baer, 2009). Therefore, researchers have utilized brief and adapted versions of mindfulness intervention with a variety of populations (Bergen-Cico et al., 2013; Braden et al., 2016). Carmody and Baer (2009) reviewed the effect sizes of published literature on studies utilizing both the adapted and standard curriculum of MBSR. Although traditional MBSR has more empirical support, the overall results indicated there was no significant relationship between the number of hours required in mindfulness classes and the measured effect on psychological problems (Carmody & Baer, 2009). These findings



about abbreviated forms of mindfulness interventions are especially relevant for this study due to time restrictions faced by college students. Dobkin et al. (2013) recommended that there be an understanding of the participant characteristics and needs as an important factor when adapting or modifying the curriculum to adjust to the reality of the context in which it is delivered. At the same time, the core characteristics of the mindfulness intervention must be retained (Dobkin et al., 2013). For instance, Braden et al. (2016) utilized the shortened number of sessions, by altering the typical training by introducing more than one topic per class, allowing a shorter period devoted to each topic, and allowing less time to practice each technique in the class. These findings indicate mindfulness-based interventions of varying durations and designs as a promising venue for researchers and practitioners.

### **The Mindfulness Philosophy**

The research developments on mindfulness-based interventions have emerged from two different philosophies: The mindfulness philosophy led by Kabat-Zinn and his colleagues in the 1970s primarily based on Eastern Buddhist religious practices and the mindfulness philosophy influenced by Western and scientific principles primarily led by Langer and her colleagues (Hart et al., 2013). A brief description of both the philosophies is as follows: The Eastern Buddhist concept of mindfulness-*Sati* in Pali- represents the qualities of being aware, paying attention, and remembering, which is the key aspect of *vipassana bhava* or insightful meditation, also a Buddhist concept. According to the Buddhist philosophy, this process aims to conquer distress by creating a state of attention and awareness through introspection (Hart et al., 2013). Therefore, the

truly ancient roots of mindfulness practices can be traced back to the spiritual and Buddhist traditions in ancient times (Thoma et al., 2015). The Western influenced research on mindfulness led by Langer in the 1970's, studied the concept as a mental phenomenon as correlated with cognitive, psychological, and health functioning characterized by paying attention to the present moment in a state of heightened awareness (Hart et al., 2013). Langer conceptualized mindfulness as an attentive state characterized by self-regulation with awareness to external events and a cognitive engagement with that state of awareness. Despite the differences noted between the two legacies of mindfulness, there are common themes such as the focus on developing self-regulation (Hart et al., 2013).

### **Positive Benefits of Mindfulness**

Mindfulness training brings about changes in self-perception by creating an attentive awareness and a non-judgmental attitude (Lakey, Kernis, Hepner, & Lance, 2008). It is with these changes in self-perception, that individuals begin experiencing changes in perceptions about their social context, shifting it to more adaptive ways of interaction (Brown, Ryan, Creswell, & Niemiec, 2008). Mindfulness helps in attenuating defensive responses to social situations that are perceived as socially threatening. There are links between mindfulness and lower emotional reactivity to interpersonal problems and social exclusion, as well as an absence of a worldview defensive reaction when threatened by social identity crises (Brown et al., 2008).

Weinstein, Brown, and Ryan (2009) investigated four studies to examine the role of mindfulness on coping with stress in college students as well as appraisal styles, and

their impact on well-being. Across the four studies ( $N$ 's = 65–141), college students who were high on mindfulness made “benign” stress appraisals, reported a less frequent engagement in avoiding or escaping the stressor, and more involvement in appraising stressors and adaptively dealing with them (Weinstein et al., 2009, p. 374). Therefore, mindfulness training appears to improve psychological health by facilitating an adaptive use of coping strategies through the reduction of defensiveness and increasing an openness to the ongoing experience, thereby reducing negative and subjective appraisal (Weinstein et al., 2009). Overall, mindfulness was found to increase the ability to cope in an adaptive and flexible manner when faced with stressful stimuli (Weinstein et al., 2009).

Mindfulness interventions have been associated with positive outcomes on emotional regulation and attentional control across a variety of clinical disorders as well as age groups (Malinowski, 2013). By exclusively allowing focus on the present moment, mindfulness facilitates an effective allocation of cognitive resources, which is associated with an improved emotional regulation, mainly because the remaining resources are available to work on processing and regulating emotions. Mindfulness-based interventions facilitate a better emotional regulation by creating openness to experience, reducing both active avoidance from emotional experience and excessive engagement in emotional or inner experiences, without making deliberate efforts to change (Watford & Stafford, 2015). Multimodal measurement to explore the effects of mindfulness intervention on emotional regulation using neurological (e.g., Magnetic Resonance Imaging), and self-report measures such as Mindfulness Attention and

Awareness Scale (MAAS; Brown & Ryan, 2003) has been used. The results indicated links between brief mindfulness interventions and heightened emotional awareness, decreased avoidance of negative emotions, and subsequent changes in brain activity and parasympathetic system changes reflecting adaptive emotional experience (Watford & Stafford, 2015).

Watford and Stafford (2015) critiqued perspectives offered to understand how MBSR interventions enhance cognitive processes, and how those are related to positive emotional outcomes. Lynch, Chapman, Rosenthal, Kuo, and Linehan in 2006 suggested that mindfulness-based interventions promote a disengagement from automatic responses to emotions, therefore discouraging the maladaptive pattern of thought and behavior; whereas, Shapiro, Carlson, Astin, and Freedman in 2006 suggested that in contrast to some strategies that train individuals to negate maladaptive emotions and perceptions, mindfulness-based strategies develop adaptive emotional regulation by focusing attention on the present moment. MBSR interventions involve the “decentering processes,” which facilitate enhanced emotional stability (Semple et al., 2010, p. 220). Prakash, Hussain, and Schirda (2015) examined the relationship between dispositional mindfulness and stress as well as the role of those factors that potentially mediate this relationship. The results indicated a negative relationship between reported stress and mindfulness across two groups, young adults (age 18 to 23 years) and old adults (age 60 to 80 years). The role of enhanced emotional regulation abilities as an important contributor to the stress-reducing ability was emphasized. Prakash et al. (2015) reported an improvement in emotional regulation after following a mindfulness-based intervention as measured on

multiple self-report scales (e.g., Difficulties in Emotion Regulation Scale developed by Gratz and Roemer in 2004). The results of this study are especially relevant to the interventions targeting externalizing behaviors, which are typically an outcome of underlying emotional issues. Another component involved in the process of positive change in mindfulness-based interventions in addition to attention to the present, is a nonjudgmental attitude (Jensen, Vangkilde, Frokjaer, & Hasselbalch, 2012). However, research to identify the associated cognitive processes and implicated anatomical structures in the non-judgmental or/and acceptance component of mindfulness is practically negligible (Jensen et al., 2012).

Malinowski (2013) proposed that mindfulness practices positively affect attentional functions by bringing an improvement in allocating attentional resources. Consequently, attention is undividedly allocated in the initial phases of processing, leaving more resources for subsequent stages. Chiesa et al. (2011) reviewed 23 studies measuring the impact of mindfulness intervention on attention, memory, executive functions, and other abilities measured through cognitive testing. Chiesa et al. (2011) conducted a meta-analysis and reported overall findings indicating an improvement in the specific functions of attention. During the beginning phases of mindfulness intervention, an improvement was reported in selective and executive attention, whereas the later phases of the intervention improved the ability to sustain attention. Chiesa et al. (2011) have also reported evidence concerning reduced cognitive reactivity and a decreased avoidance and rumination in response to mindfulness-based interventions. Overall, the meta analysis suggested preliminary evidence indicating an improvement in cognitive

abilities as a function of having engaged in mindfulness interventions. The authors, however, recommended caution against over-generalizing the benefits of mindfulness interventions due to a need for more standardized studies to minimize discrepancies because of systematic differences (Chiesa et al., 2011). Overall, mindfulness-based interventions have been successfully applied to various age groups across the lifespan. Research indicates the benefits of mindfulness in emotional regulation and attentional ability across younger and older adults (Prakash et al., 2015).

### **Chapter Summary**

The term externalizing behaviors denotes chronically impulsive, oppositional, aggressive, destructive, or delinquent behavior (Jiron, 2009). Various socio-emotional, neuro-cognitive, and environmental factors play a role in the development of externalizing behaviors. Externalizing behaviors in children have long-lasting social, emotional, and behavioral repercussions for adults such as mood and anxiety problems, substance abuse, and disruptive behaviors (Reef et al., 2011). Therefore, externalizing behaviors are a broad category presenting across several diagnoses and is accompanied by other concerns (Kolar et al., 2008). Attentional problems are linked with low conscientiousness and high novelty seeking, which are characteristics of externalizing behaviors (Jacob et al., 2014). ADHD is concurrently present with other disorders such as substance abuse and dependence, mood disorders, anxiety disorders, and personality disorders (Kolar et al., 2008). This further asserts the comorbidity of disorders, thereby necessitating studying these variables concurrently from the research perspective.

Within the adult population, the subset of college students attending their first year is the focus of the current study. College students with externalizing and attentional issues face multiple challenges. The college environment brings additional stressors to the life of college students and exacerbates psychological and behavioral concerns (Howard et al., 2016). While externalizing behaviors have been broadly conceptualized in the literature, the scope of the study will be limited to inattention, hyperactivity, and anger control problems regardless of the clinical diagnosis the participants may or may not have.

Evidence-based practice is the standard expectation for providing interventions within the field of psychology (Shaw & D'Intino, 2017). The uses of mindfulness as an intervention in contemporary psychiatry and psychology have been well documented (Felver et al., 2013). Mindfulness involves attending and focusing on the present experience and an attitudinal shift toward acceptance (Quaglia et al., 2014). The truly ancient roots of mindfulness practices can be traced back to the spiritual and Buddhist traditions in ancient times (Thoma et al., 2015). The construct of mindfulness is viewed in two different ways (Giluk, 2009). The first conceptualization of mindfulness is as a trainable quality developed through instruction while the second view of mindfulness is as a trait or a disposition, such that some individuals are innately more mindful compared to others (Giluk, 2009). Mindfulness-based interventions such as the MBSR are based on the premise that mindfulness is trainable (Giluk, 2009). Overall, mindfulness-based interventions have been successfully applied with positive emotional, behavioral, and health-related outcomes to a variety of populations.

## CHAPTER III

### METHOD

The purpose of this study was to examine the effects of a brief mindfulness-based intervention (MBSR) among college students with attentional and behavioral problems. This chapter discusses the research design utilized to explore the effects of the intervention. The participants for this study and the procedures utilized during the various phases of the study are also presented. Finally, the outcome measures and data analysis approaches are described.

#### **Participants**

College students who volunteered to participate were recruited from a university in the North Texas area. Four participants were recruited allowing adequate size for group processing during the mindfulness intervention while also allowing for attrition. Recruitment targeted college students experiencing behavioral and attention concerns who may or may not be identified as having special needs or/and clinically diagnosed based on prior assessment. Participants included students who were attending first year undergraduate courses in the age range of 18 to 19. This transitional stage is associated with increased stress due to problems with adaptation for college students (Rizvi & Steffel, 2014). Information was collected regarding if participants received interventions in the past or were concurrently receiving interventions so that changes in behavior could exclusively be attributed to the current intervention. Participants with previous or current



experiences with mindfulness-based intervention were not included in this study.

Participation in related activities such as yoga did not count as an exclusionary factor unless it was learned as part of a mindfulness-based approach. The study was completed with three participants.

## **Materials**

### **Demographic Survey**

Information for all the participants was obtained via a demographic survey (see Appendix A), focused on demographic and individual variables including gender, age, ethnicity, marital status, primary language spoken, highest degree earned, major of study, employment status, and number of individuals currently residing with them. Hitchcock, Kratochwill, and Chezan (2015) stated that an important reason behind reporting detailed accounts pertaining to Single Case Design (SCD) studies is to inform the reader about the demographic and participant characteristics, and the specific characteristics of the settings to inform the consumers about the applicability of findings. Additional information was collected via a brief interview (see Appendix B) that included questions related to each subject's participation in other psychological interventions, their individual concerns addressed via those interventions, as well as previous exposure to yoga, meditation, and/or mindfulness activities. Participants were also asked as to what interested them to volunteer for this intervention. Finally, information was collected on what type of area and household the participants were raised in as well as their current household income. These characteristics of the participants' life provided pertinent information to understand the participants and interpret the findings from this study.

### **Continuous Performance Test, Third Edition (CPT-3)**

The CPT-3 (Conners, 2014) is a task-oriented computerized assessment of attention-related problems in individuals aged eight years and older. The test administration takes 14 minutes and is comprised of 360 trials, which requires respondents to push the spacebar when any letter, except "X," appears. The performance yields four indices, which are Inattentiveness, Impulsivity, Sustained Attention, and Vigilance. Per manual guidelines, Inattentiveness is measured by the ability to discriminate targets accurately as well as by measuring the response speed and consistency. Impulsivity is measured by a faster reaction time, above average rate of missed targets, and incorrect responses to non-targets. Sustained Attention is defined as the ability to maintain attention as the administration progresses. Vigilance relates to the respondent's performance at varying levels of stimulus frequency and is defined by the respondent's ability to maintain performance level even when the task is slow. The CPT-3 was specifically selected for this study to collect objective information about students' performance on attention tasks, to then complement information obtained from the Behavior Assessment System for Children Flex Monitor, Third Edition (BASC-3 FM). Each student was administered the CPT-3 pre-and post-intervention. Test administration and scoring were conducted in accordance with the instructions provided in the test manual.

According to the manual (Conners, 2014), the CPT-3 was normed on a sample of 1,400 with the demographic composition matching the U.S. population within .03% of 2010 U.S. census targets. Norms were constructed for separate age groups for both

gender specific and combined gender norm groups (Conners, 2014). The CPT-3 presents with good psychometric properties. The test-retest reliability estimates for the CPT-3 across two assessments one to five weeks apart was acceptable ( $r = .67$ ). Internal consistency reliability for the CPT-3 was high as the median split-half reliability estimate ranged from  $r = .92$  to  $.93$  across all groups, and from  $r = .92$  to  $.95$  for the clinical sample. These findings suggest good reliability and stability over repeated assessments and that the scores are likely unaffected by practice effects.

The CPT-3 also demonstrates satisfactory validity (Conners, 2014). Discriminative validity analyses measured by calculating ANOVA indicated significant difference between individuals diagnosed with ADHD and individuals not diagnosed with the disorder (Cohen's  $d = .10$  to  $.49$ ). Incremental validity analyses were obtained to examine how the CPT-3 worked together with other similar instruments measuring comparable variables. The diagnostic efficiency statistics obtained regarding sensitivity, specificity, positive predictive power, negative predictive power, diagnostic odds ratio, and kappa values showed sizable improvements in enhancing the accurate predictability of ADHD when the CPT-3 was used in conjunction with other assessment instruments such as the Conner's Parent Rating Scale, Third Edition (CPRS-3; 2014).

Clinical and developmental studies have utilized several indices on the CPT-2 (Continuous Performance Test, Second Edition) and CPT-3, and found links between poor attention and behavioral problems. For instance, Belsky et al. (2007) showed an association between children's behavioral problems and commission errors as measured on the CPT-2. Because the CPT-3 is a relatively new instrument, there is no published

empirical research as of this writing using the CPT-3 with the adult population; however, research has been conducted with the previous version, the CPT-2, which was an older version of the CPT-3. Fasmer et al. (2016) conducted a study to examine attentional problems, mood, and anxiety concerns on adults ( $n = 99$ ) in the age range of 18 to 65 years diagnosed with ADHD. The study utilized the CPT-2 and the Cyclothymic Temperament Scale (Akiskal, Akiskal, Haykal, Manning, & Connor, 2005).

When compared to the control group, patients with ADHD had more omission and commission errors and higher reaction time variability on the CPT-2. Based on their results, Fasmer et al. (2016) concluded that the CPT-2 is a useful instrument in the assessment of adults with ADHD. Because the CPT-3 is an updated version of the CPT-2, it can be expected that the newer version will give similar results. Homack and Riccio (2006) in their test review of the previous edition of this instrument described the CPT-2 as a representation of an effort to include reliable assessment techniques in the diagnoses of ADHD. Homack and Riccio reported results of a validity study conducted on adults 18 years and older for three groups, which were individuals diagnosed with ADHD, individuals with neurological problems, and non-clinical cohorts. Based on the analysis of covariance (ANCOVA) of significant differences between the three groups, both the clinical groups performed significantly lower than the nonclinical group. These findings suggest that the CPT-3 will serve as a reliable instrument in estimating attention problems in college students.

### **Conners Continuous Auditory Test of Attention (CATA)**

The CATA (Conners, 2014) is the auditory component of the task-oriented computerized assessment of attention-related problems in individuals aged eight years and older. The test administration takes 14 minutes and is comprised of 200 trials, which requires respondents to press the space bar in response to sounds of varying volumes. The performance yields indices on Inattentiveness, Impulsivity, and Sustained Attention as well as two indices measuring auditory laterality. Just as in the CPT-3, Inattentiveness is measured by the ability to discriminate targets accurately as well as by measuring the response speed and consistency. Impulsivity is measured by a faster reaction time, in addition to above average rate of missed targets and incorrect responses to non-targets. Sustained Attention is defined as the ability to maintain attention as the test progresses (Conners, 2014). The CATA was specifically selected for this study to collect objective information across modalities on attention tasks, as a method to complement information obtained from the BASC-3 FM and the CPT-3. Each student was administered the CATA pre-and post-intervention.

According to the manual, the CATA was normed on a sample of 1,080 with the demographic composition matching the U.S. population within .5% of 2010 U.S. census targets (Conners, 2014). Norms were constructed for separate age groups for both gender specific and combined gender norm groups (Conners, 2014). The test-retest reliability estimates across two assessments one to four weeks apart were acceptable ( $r = .64$ ). Internal consistency reliability for the CATA was high as the median split-half reliability estimate ranged from  $r = .97$  to  $.98$  across age and gender groups for the normative

sample, and from  $r = .95$  to  $.97$  across age and gender groups for the clinical sample. These findings suggest good reliability and stability over repeated assessments and that the scores are likely unaffected by practice effects and overall, the CATA presents with good psychometric properties.

The CATA demonstrated satisfactory validity (Conners, 2014). Discriminative validity analyses indicated significant difference between individuals diagnosed with ADHD and individuals not diagnosed with the disorder, with the ADHD sample demonstrating poorer performance (Cohen's  $d = .10$  to  $.63$ ). Incremental validity analyses were obtained to examine how the CATA worked together with other similar instruments measuring comparable variables. The diagnostic efficiency statistics when administering the CATA and Conners CPT-3 in addition to the Conners-3 parent rating scale was increased. The overall correct classification rate, that is the ability to accurately predict group membership, increased by 4.5% when the Conners CATA was added, and increased by 9.8% when both Conners CATA and CPT-3 were added.

### **BASC-3 FM**

The BASC-3 (Reynolds & Kamphaus, 2015) is a comprehensive measure of behavioral problems in the educational setting. The BASC-3 is a norm-referenced instrument designed to identify and manage behavioral and emotional strengths and weaknesses. The BASC-3 FM is based on the same standardization data as the BASC-3 (Reynolds & Kamphaus, 2015). Responses on the BASC-3 generate standard scores ( $M = 100$ ,  $SD = 15$ ) on all subscales and composites. Higher scores on the clinical scale

(i.e., Standard Score > 70) indicate clinically significant concerns when compared to individuals of that age.

The BASC-3 FM is used to monitor and track the effect of a behavioral intervention. It is an internet-based tool that provides a pool of behaviorally or emotionally based items that can be selected and customized for monitoring change by calculating change statistics using standardized age-corrected scores based on a nationally representative population sample (Reynolds & Kamphaus, 2015). The BASC-3 FM measures and displays behavioral performance over a period that allows the determination of the effectiveness of an intervention. The BASC-3 FM provides pre-designed forms that can be used to measure behavioral performance across a variety of common behavioral areas. Additionally, this instrument allows users to create specific scales and calculate reliability estimates based on a normative sample. The BASC-3 FM reports include standard scores that are generated based on the teacher, parent, and self-report standardization samples, which enables comparisons with a normative population, describing the extremeness of scores (Reynolds & Kamphaus, 2015). Additionally, intra-individual comparisons are also provided, which are used to indicate the change in externalizing behaviors and inattention as a function of the mindfulness intervention in the study.

According to the manual, the BASC-3 FM was normed on a general population sample as well as a clinical norm sample (Reynolds & Kamphaus, 2015). The general population sample was normed on approximately 4,400 individuals aged two to 18 years old across 44 states, with demographics intended to represent the United States

population in parent education level, race/ethnicity, and geographic region (Reynolds & Kamphaus, 2015). The general norms constituted an equal number of boys and girls in each age group, and emotional, behavioral, and physical diagnosis were also reported for everyone (Reynolds & Kamphaus, 2015). The clinical sample was normed on approximately 1,885 individuals in the age range of four and 18 but was not demographically matched to the U.S. population. The percentage of children with behavioral or emotional problems varied across behavioral/emotional conditions as well as gender.

The BASC-3 presents with good psychometric properties. An analysis of internal consistency indicated coefficient alpha reliabilities generally in the mean range of .84 to .90 for adolescent, parent, teacher, and self-report scales. Specifically, coefficient alpha reliabilities for the college group ranged from .78 to .93 across various composites and individual scales (Reynolds & Kamphaus, 2015). The coefficient alpha reliability for the scale specifically customized for this study was computed to be .92. Specific information about the customized scale is listed in the next section. The BASC-3 also demonstrated satisfactory validity. Subscales comprising the Externalizing scale were moderately to highly correlated with one another, but their strongest relationships were with the Externalizing composite; the same was found with the Inattention scale (Reynolds & Kamphaus, 2015). When compared with other rating scales such as the Behavior Assessment System for Children, Second Edition (BASC-2), the BASC-3 demonstrated moderate to high concurrent validity (Reynolds & Kamphaus, 2015). Although the BASC-3 is normed up to 18 years age, an insignificant difference is expected in means



for the age group of 18-19 given data also collected during the standardizing on persons up through age 21. Therefore, the standard scores for the highest age group, 18 years of age, can be used as a baseline for measuring change for participants in the age range of 18 to 21 (C. Reynolds, personal communication, November 16, 2017; April 25, 2018).

Externalizing behaviors and attention concerns selected for this study were limited to problems related with anger control, inattentiveness, and hyperactivity in college students. The Externalizing Behaviors scale was created for the purposes of this study. The scale consisted of total 29 items, including all of the 11 items measuring Hyperactivity, all of the eight items measuring Anger Control, and all of the 10 items measuring Inattention. The BASC-3 manual describes the Anger Control index as a measure of the tendency to become irritated and/or angry quickly and impulsively along with an inability to regulate affect and self-control (Reynolds & Kamphaus, 2015). Inattention is defined as a tendency to report being easily distracted and unable to concentrate more than momentarily. Further, the BASC-3 manual describes Hyperactivity as the tendency to report being overly active, rushing through work or activities, and acting without thinking (Reynolds & Kamphaus, 2015). The scale comprises of sentences that students may use to describe how they think, feel, or act. Raters are required to answer in terms of “Never,” “Sometimes,” “Often,” and “Almost Always.” Some sample items are; “When I get angry, I can't think about anything else; I throw or break things when I get angry; I talk while other people are talking” (see Appendix C). It takes about five minutes for an individual to complete the scale. For this study, the Attention Problems scale was separately computed based on items listed as

measuring attention problems within the Externalizing Problems scale. Response scores to each item were entered manually for all participants for each date administered. The Attention Problems scale is comprised of 10 items, and the reliability value was computed to be .85 (coefficient alpha) for the age group of 15 to 18 years.

### **Mindfulness Attention Awareness Scale**

The MAAS (Brown & Ryan, 2003) was designed to assess mindfulness or the ability to pay attention to the present without judgment. The MAAS is a 15-item self-report scale and takes a maximum of five minutes to complete. It has demonstrated strong psychometric properties, and has been validated with several populations, such as college students. Normative information on the MAAS has been collected on four independent samples of community adults ( $n = 436$ , MAAS mean = 4.20,  $SD = .69$ ) and on 14 independent samples of college students ( $n = 2277$ , MAAS mean = 3.83,  $SD = .70$ ). A variety of experimental studies has shown that the MAAS measures a quality that is linked to and predicts the regulation of emotion and behavior, as well as interpersonal functioning and well-being (Brown & Ryan, 2003; Carlson & Brown, 2005). Factor analytic studies with undergraduate and adult cancer populations have established mindfulness as a single factor scale structure (Brown & Ryan, 2003; Carlson & Brown, 2005). Internal consistency levels (Cronbach's alphas) for the MAAS have typically been shown to range from .80 to .90 (Brown & Ryan, 2003). The MAAS has demonstrated high test-retest reliability, discriminant and convergent validity, known-groups validity, and criterion validity (Brown & Ryan, 2003).

## **Procedures**

This study utilized a single case design (Smith, 2012) and proceeded through four phases; baseline, intervention, post-intervention, and maintenance. The baseline phase served as the control group for all the participants, to obtain information on the dependent variables, attention concerns and externalizing behaviors. These scores were then contrasted with the independent variable, the mindfulness intervention. Participants were recruited via email and class announcements, as well as flyers distributed across the university campus, with descriptions about the study and requesting participation during the fall of 2018. All individuals who responded to the initial call for participants were contacted via phone or face-to-face to assess ability and motivation to complete the intervention, as well as meeting all criteria for eligibility to participate. The first four students who contacted and met all criteria for the study were then selected for participation. After obtaining the consent for participation (see Appendix D), a short demographic questionnaire and a brief interview were completed. The participants selected to be a part of the study were then given the details of study, including time commitment, activities, etc. Those who agreed then began the study. Incentives for full participation included each participant receiving a \$25 stipend upon completion of the study. The \$25 participation remuneration was divided into two parts. Participants were paid a remuneration of \$10 after completing three sessions. They were then paid the remaining \$15 at the completion of the intervention.

### **Baseline Phase**

In the baseline phase (approximately one to two weeks), each student completed the BASC-3 FM, CPT-3, CATA, and the MAAS. Smith (2012) recommended obtaining five data points to receive the highest rating by the What Works Clearinghouse.

Therefore, this study aimed at collecting five data points during baseline and post-intervention phases. Each participant completed the BASC-3 FM eight times across the four-week intervention phase.

### **Intervention Phase**

The intervention phase consisted of eight face-to-face bi-weekly sessions lasting 45-minute each across a four-week period. This study utilized an abbreviated version of the MBSR program developed by Jon Kabat-Zinn (1982) at the University of Massachusetts Center for Mindfulness. The MBSR is a psychotherapeutic intervention, which develops psychological wellbeing by the progressive acquisition of mindfulness skills through a variety of sensory exercises, meditation, mindful body scan and movements, psycho-education, and didactic training with elements from CBT (Bergen-Cico et al., 2013). The researcher leading the intervention completed the online certificate MBSR training through the University of Massachusetts Medical School where MBSR was originally pioneered by Jon Kabat-Zinn (<https://www.umassmed.edu/cfm/mindfulness-based-programs/mbsr-courses/>). The researcher has been practicing mindfulness for four years as part of her daily routine and has also delivered group and individual mindfulness-based interventions to students with emotional and behavioral problems within the secondary school setting for several years.

The intervention was conducted by the researcher in a private room located in the library on the university campus and was delivered in a group format. Each student's progress was monitored eight times across the period of 4 weeks via the BASC-3 FM.

Considering college students' busy class schedules and limited attention span for training, the study utilized an abbreviated course of eight total training sessions. Each session lasted 45 minutes in length, and occurred twice a week for four weeks. The study covered the techniques taught in the 8-week MBSR course developed by Kabat-Zinn (1982) and recently listed in the MBSR Authorized Curriculum Guide published by the University of Massachusetts Center of Mindfulness (Santorelli et al., 2017), including experiential learning, reflection on perception, stress physiology, stress reactivity, responding, and communicating.

At the start of the study, participants were given information about potential physical and emotional risks involved with participating in the mindfulness intervention. Physical limitations could have potentially required modifications or adaptations to postures and movements (Santorelli et al., 2017); however, none of the participants reported such limitations. Additionally, current concerns with addiction, untreated psychosis, acute depression, suicidal ideation, and recent trauma would have required talking to the instructor prior to recruitment protocol; however, none of these concerns were reported. Participants were informed that during the intervention, feelings of sadness, anger, or fear could develop or intensify due to paying attention consciously. Participants were informed these circumstances would not exclude participation, but they were recommended to discuss with the instructor so that they could be appropriately

addressed via referring to medical and psychological professionals as required (Santorelli et al., 2017). It was expected that the benefits such as improved coping and improvement in externalizing and attentional concerns (Santorelli et al., 2017) would outweigh the potential risks involved in the intervention. The following sections provide more information about the content covered in each of the eight sessions.

**Session one.** The first session included an overview of the course, the fundamentals of mind-body medicine, and experiential introduction of mindful eating, mindful breathing, body-scan practice, and yoga, as stated in the MBSR curriculum. An introduction to mindfulness meditation using the ordinary act of eating, followed by a dialogue about the experience was provided as presented in the MBSR curriculum (Santorelli et al., 2017). Mindful eating meditation is intended to cultivate an awareness of the experience of eating (Kabat-Zinn, 2003). Mindful eating involved direct sensory observation of a raisin and then eating one raisin, following guidance from the instructor.

Abdominal breathing was then introduced, which involves connecting the moment-to-moment awareness of eating to experiencing the breath in a similar fashion (Santorelli et al., 2017). The breathing exercise involves learning to observe one's own breathing from moment to moment without judging it and routing the attention back to the breath in case it gets distracted (Santorelli et al., 2017). Participants were seated in a comfortable posture and taught to focus on the feeling of the abdomen rising and falling with each inhalation and exhalation mindfully experiencing the breath.

The body scan was also taught in this session. The body scan is done while students lie in a comfortable posture and the instructor guides them to pay attention to

their bodies from the toes, moving upwards, and ending at the head (Do, 2011). This exercise requires both sustaining attention to specific body parts as well as shifting attention from one location to another and forms a foundation to other meditative practices (Do, 2011). Finally, standing yoga was introduced in this session. The formal yoga sequences are a structured way of developing greater body awareness (Santorelli et al., 2017). Within the MBSR curriculum, yoga is understood as a combination of gentle stretches, where each posture is done slowly with present-moment awareness of breathing (Do, 2011).

**Session two.** The second session built upon the skills from the first session and included examining self-perceptions and utilizing the body-scan method to cultivate an awareness of reactions. Self-perceptions were examined through an experiential activity that is called the nine-dot puzzle, which requires the participants to join all nine dots arranged in a block, without lifting the pencil from the paper (Santorelli et al., 2017). Typically, individuals approach this puzzle in several ways, which potentially facilitates an awareness by giving an opportunity to identify several themes and patterns of thinking and feeling when engaged in problem-solving (Santorelli et al., 2017). As per the expectation, the participants began to recognize the self-defeating patterns in their thinking while trying to solve the puzzle and how those may have been formed due to their past experiences or beliefs. Participants also engaged in discussing the body-scan method and the problems they encountered while trying to re-route their mind repeatedly. The point of the discussion was to create an awareness of how the mind wanders while trying to focus and where it wanders in terms of what thoughts and feelings are

experienced (Santorelli et al., 2017). In addition to this simulated experience, sitting meditation was introduced in this session. Sitting meditation involves focus on breath, body sensations, and the whole body while sitting (Santorelli et al., 2017). Participants were guided to acknowledge the transient nature of bodily sensations and shifting attention to the breath if sensations are overwhelming. Additionally, participants were encouraged to explore the possibility of bringing awareness to their emotions or thoughts and shifting attention to the breath if emotions become overwhelmingly difficult. Participants were taught to modulate attention to their bodily sensations and emotions, which enables a better self-regulation (Santorelli et al., 2017).

**Session three.** The third session included lay-down yoga, sitting and walking meditation, and the theme of reflection on life events was introduced. Within this session, participants were encouraged to recall a pleasant event and then reflect upon the associated physical sensations, thoughts, and emotions as they recall it from the past and as they experience it in the present moment (Santorelli et al., 2017). Additionally, a discussion on pleasant moments experienced during the body-scan in the previous sessions was also incorporated. Finally, walking meditation was introduced in this session. Walking meditation is another type of meditation technique included in the MBSR curriculum. Kabat-Zinn (1990) described walking meditation as walking while being aware that one is walking. The goal of walking in this case is not to reach anywhere, but be where they are (Kabat-Zinn, 1990). With practice, participants learn that it is possible to be mindful even when rushing (Do, 2011). Within this session, while



doing walking meditation, participants focused in front of them without distracting themselves by other sights including their feet.

**Session four.** The fourth session included standing yoga and sitting meditation taught in the previous sessions and introduced ways of relating to stressful events and moments. Within this session, the similarities among different unpleasant events in terms of bodily and emotional reactions associated with unpleasant events are discussed (Santorelli et al., 2017). Participants were asked to recall unpleasant experiences as opposed to pleasant experiences in the previous sessions. They were encouraged to reflect upon the associated physical sensations, thoughts, and emotions as well as explore their own mind-body connections and patterns of thought and emotion as related to the events. Finally, participants were introduced to the biological and psychological bases of stress reactivity and how stress affects their body, mind, health, and behavioral functioning.

**Session five.** The fifth session included standing yoga and applying mindfulness to stressful and emotionally intense moments while learning to explore the effect of reactivity on wellness. This session teaches the importance of perception in appraising a stressful situation, and participants generate alternate ways of responding to a difficult situation with awareness instead of reacting automatically (Santorelli et al., 2017). Within this session, participants identified stressful events occurring during the past week and explored their reactions to those events. Participants were encouraged to take note of the habitual behavioral patterns, thoughts, and emotions associated with the feeling of being restrained in their automatic modes of reacting learned through conditioning. Participants

learned the difference between reacting and responding and learned how perception of stress affects health and wellbeing more than the stress itself.

**Session six.** The sixth session included standing yoga and sitting meditation with less verbal instructions and with more silence. Additionally, this session incorporated fundamentals of interpersonal mindfulness that is learning to apply mindfulness in conflict-provoking communications. Participants worked in groups or pairs and engaged in conversations to practice speaking and listening skills via activities suggested in the MBSR curriculum (Santorelli et al., 2017). Activities included interpersonal practice in which roles of listening and speaking were reversed to allow both partners to reflect upon what is said. The power of active listening was highlighted as the listener was encouraged to reflect. Participants experienced and explored specific patterns of communication (e.g., passive, assertive) by physically enacting different roles and conflictual situations (Santorelli et al., 2017) such as handling differences in approach while working on an assigned group project with peers.

**Session seven.** The seventh session included sitting yoga and focus on integrating mindfulness with personal experiences and life-style choices. In this session, participants did a standing body scan and identified an area that needs attention and explored yoga poses that address that area of the body (Santorelli et al., 2017). Further, participants explored the familiar and the unfamiliar through a simulated activity, “changing seats.” This activity involved encouraging participants to feel aware of their own feelings when they sat in their seat, paying attention to what was familiar, whether this was the seat they usually sit or if it was a new seat. Participants were encouraged to take note of their own

physical sensations, feelings, as well as thoughts towards their familiar or new seat (Santorelli et al., 2017). Next, the group was invited to switch to new seats that they had never taken before. Participants were encouraged to reflect upon their choices of seats and associated feelings and thoughts. The choice of seat is equated with a pattern of lifestyle and the message that there can be several different patterns with none of them being better than the other is emphasized in a discussion format (Santorelli et al., 2017).

**Session eight.** The final session presented a complete review of mindfulness strategies and philosophy discussed throughout the intervention. The instructor facilitated guided reflection and a brief overall reflection about the intervention experience. Participants developed goals for the future and included potential obstacles to reaching these goals as well as strategies to address them.

### **Post-intervention Phase**

After the eight-session intervention, the post-intervention phase began and lasted for one week. During this post-intervention phase, participants once again completed the CPT-3, the CATA, and the MAAS. They also completed the BASC-3 FM five times in the post-intervention phase, over the period of a week, with no more than one BASC-3 FM per day.

### **Maintenance Phase**

To obtain data to determine the maintenance of the mindfulness techniques learned through the intervention, one month after the post-intervention phase ended, all participants were asked to complete the BASC-3 FM, the MAAS, the CPT-3, and the CATA to obtain the follow-up data. All three participants completed all requested

assessments, with one doing so within the first month following the intervention and the other two within two months of the intervention.

## **Data Analysis**

### **Visual Analyses of Attentional and Externalizing Behaviors**

It is recommended that data should be analyzed utilizing both visual methods as well as statistical methods to gain a better understanding of both qualitative and quantitative aspects of the study (Riley-Tillman & Burns, 2009). Visual analysis refers to examining graphically presented data with a goal of measuring the efficacy of an intervention (McGill, 2017). Because visual inspection of data can be subjectively affected, specific methods of interpreting pictorial data should be adhered to (McGill, 2017). Kratochwill et al. (2013) divided the process of conducting a visual analysis into four steps. The first step involves establishing a predictable baseline pattern of data reflecting consistent level, trend, and variability. The second step involves examining the data within each phase to determine the presence of any patterns. The next step involves examining the overall data throughout the intervention in each phase to determine whether an effect of manipulation of the intervention occurred. The final step involves examining the information to determine whether there were at least three instances to indicate an effect of the intervention for each participant.

Five data points were collected during the baseline and the post-intervention phases, and eight data points were collected during the intervention phase. Data were analyzed via visual and statistical analyses. Pre and post comparisons were analyzed by constructing line graphs for each participant's composite scores as obtained on the

BASC-3 FM, which is designed to measure progress monitoring. Trend, level, immediacy/latency, and variability were analyzed. Level of change was examined by comparing mean and median values within one phase of intervention to the other phase of intervention. It is important to examine the trend of data, specifically if there is an increase, decrease, or a lack of change in either direction across a set of data (Riley-Tillman & Burns, 2009). Data obtained from this study were examined to check for trends across phases. Data were also examined for immediacy of effect to see if the target behavior changes immediately after the intervention is completed. Latency of change was examined by measuring the amount of time it took before the change occurred after starting the intervention. Finally, variability was measured by examining consistency across a section of data. Statistically, variability was calculated by considering the amount of overlap in data points among the phases of intervention. The calculation of percentages of overlap is addressed in the statistical analysis section.

### **Statistical Analyses of Attentional and Externalizing Behaviors**

Kratochwill et al. (2013) recommended supplementing non-parametric measures with parametric measures; therefore, this study incorporated both parametric and non-parametric methods. The Reliability Change Index (RCI) is described as a method used to measure the change between pre-intervention and post-intervention scores on a dependent variable, which is typically measured on a standardized test (Jacobson & Truax, 1991). The RCI not only measures statistical change, but also measures clinical significance, and is considered the preferred method of measuring the effects of interventions within small sample sizes (Schmitt et al., 2013). Typically, RCI is

calculated by obtaining the difference between the two scores and dividing by the standard error of measurement (Busse, McGill, & Kennedy, 2015). The RCI equation is closely tied to the reliability of the instrument, which implies highly reliable instruments need smaller difference to determine statistically significant difference as compared to less reliable instruments (Busse et al., 2015).

RCI was calculated for the MAAS. The baseline and post-intervention scores were compared using the Jacobson-Truax RCI (JT RCI; Jacobson & Truax, 1991) to determine whether there was a clinically significant decrease in attention problems and externalizing behavior scores. The JT RCI was calculated by dividing the difference between pre-intervention and post-intervention scores by the standard error of the differences. In addition to assessing the clinical significance of RCI, scores were compared using the criteria for clinical and nominal significance (Bauer, Lambert, & Nielson, 2004; Jacobson & Truax, 1991). The RCI values are statistically significant if the absolute value exceeds 1.96 (Jacobson & Truax, 1991). When post-intervention scores fall within the average range as compared to normally functioning peers per standardized norms, then the difference is considered nominally significant. Clinical significance is implied when post-intervention scores deviate two standard deviations below or above from the baseline group mean. This cutoff is selected due to its promise of a relatively low possibility of scores beyond that threshold representing false negatives (Bauer et al., 2004).

For the BASC-3 FM, the computer-generated Standard Error of the Difference using the formula provided by Anastasi and Urbina (1997), to test for statistically

significant difference between pre- and post-intervention scores was used (Reynolds & Kamphaus, 2015). For the custom flex forms, test-retest reliability coefficients are derived using the same test-retest study samples used for the standardized flex forms (Reynolds & Kamphaus, 2015). The computer program generates  $p$  values for any set of composite scores, and it is recommended to use those to analyze trends in the results over a time (C. Reynolds, personal communication, May 19, 2019).

**Non-parametric statistical analyses.** Parametric statistical methods require assumptions such as normally distributed data, which are not typically met by studies utilizing a small sample size. Moreover, as such, effect size in large samples reflects difference between groups as opposed to differences within subjects. While the effect size, such as Cohen's  $d$  (1988) appropriately calculates the magnitude of the difference between groups in large sample size studies, such a metric may not be an accurate reflection of the magnitude of the difference in a small sample size study (Riley-Tillman & Burns, 2009). Therefore, in a small sample size study, such as this, obtaining a difference between baseline and post-intervention score for each subject would be a more meaningful metric. It is argued that meta-analyses of SCD fail to tap consistencies and inconsistencies of each unit of data obtained on each subject across a period (Riley-Tillman & Burns, 2009). This partial information potentially interferes with drawing accurate conclusions about the demonstrated effects. Although guidelines for evaluating effect sizes (Cohen's  $d$ , i.e.,  $d = .20$  is "small,"  $d = .50$  is "medium," and  $d = .80$  is "large") are provided, these are more applicable to large size studies. SCD studies tend to generate higher effect sizes in comparison with larger-group research. This was taken

into consideration when evaluating effect sizes for the current study given its small sample size.

Due to the disagreement in SCD analysis regarding the most preferred method of measuring change, Kratochwill et al. (2013) recommended obtaining one or more nonparametric estimates, calculating a regression-based estimate, and comparing each estimator via a sensitivity analysis. Parker, Vannest, and Brown (2009) recommended using the following statistical approaches for SCD research: NAP (Non-overlap of All Pairs), Tau-U, and IRD (Improvement Rate Difference). Therefore, in this study, post-intervention change was analyzed using the NAP approach and the Tau-U non-parametric methods.

**NAP and Tau-U.** Complete non-overlap measures offer the most robust option, which are NAP and Tau-U (Parker & Vannest, 2009). They are complete measures and equally emphasize all scores, versus some incomplete measures emphasizing selected scores only (e.g., median) (Parker & Vannest, 2009). The NAP is calculated as the percentage of data that improve from one point to another, specifically the percentage of all pairwise comparisons from the first phase to the next phase that show improvement or growth (Parker & Vannest, 2009). NAP begins with all pairwise comparisons between phases. Each paired comparison has one of three outcomes, which are positive change, negative change, or no change over time. NAP's limitations include a lack of sensitivity to trends and outliers in the data, which led to the development of a new index that integrates non-overlap and trend: Tau-U (Parker, Vannest, Davis, & Sauber, 2011).



Tau-U combines Kendall's Tau and Mann-Whitney U, utilizes transformations of each other, and shares the same sampling distribution. The Tau-U score is not affected by the ceiling effect present in other non-overlap methods and performs well in the presence of autocorrelation. The Tau-U score is calculated by conducting the same pairwise comparisons ( $n_A \times n_B = \# \text{ Pairs}$ ) across phases as is NAP, resulting in a Pos, Neg, or Tie for each pair. Thus, NAP is percent of non-overlapping data, whereas Tau-U is percent of non-overlapping minus overlapping data. Parker and Vannest (2009) recommended that NAP scores of 0 to .65 indicate weak effects, .66 to .92 indicate medium effects, and .93 to 1.0 indicate strong effects. Rakap (2015) suggested these guidelines might be used for interpreting Tau-U.

### **Summary and Revisiting Questions and Hypotheses**

This study recruited four students aged 18-19 in their first year at a university in the North Texas area. The study was completed with three students. This study utilized a single case design, and it proceeded through four phases: baseline, intervention, post-intervention, and maintenance. The baseline phase served as the control for all the participants, as it represented the dependent variables, attention problems, and externalizing concerns prior to receiving the mindfulness group intervention. Baseline, post-intervention, and maintenance data were collected by administering CPT-3, CATA, BASC-3 FM, and MAAS. Data analysis included a visual analysis, non-overlap analysis via the NAP and Tau-U techniques to obtain effect size. Data obtained via the standardized measures were also analyzed using the Jacobson-Truax RCI. Conclusions

were drawn based on a thorough analysis of all these methods to determine the effectiveness of mindfulness intervention on attentional and externalizing behaviors.

The data were analyzed with respect to specific hypotheses taken from the research questions outlined in Chapter 1, which include:

1. After implementation of a mindfulness intervention, will the externalizing behavior and inattention problems decline post-intervention?
  - a. Hypothesis 1: It is hypothesized that Externalizing Behaviors composite scale scores from the BASC-3 FM will be significantly lower after the mindfulness intervention than at baseline.
2. After implementation of a mindfulness intervention, will the attentional concerns decline post-intervention?
  - a. Hypothesis 2a: It is hypothesized that Inattention composite scale scores from the BASC-3 FM, will be significantly lower after the mindfulness intervention than at baseline.
  - b. Hypothesis 2b: It is hypothesized that Inattention scale scores from the CPT-3 will be significantly lower after the mindfulness intervention than at baseline.
  - c. Hypothesis 2c: It is hypothesized that Impulsivity scale scores from the CPT-3 will be significantly lower after the mindfulness intervention than at baseline.

- d. Hypothesis 2d: It is hypothesized that Sustained Attention scale scores from the CPT-3 will be significantly higher after the mindfulness intervention than at baseline.
  - e. Hypothesis 2e: It is hypothesized that Vigilance scale scores from the CPT-3 will be significantly higher after the mindfulness intervention than at baseline.
  - f. Hypothesis 2f: It is hypothesized that Inattentiveness scale scores from the CATA will be significantly lower after the mindfulness intervention than at baseline.
  - g. Hypothesis 2g: It is hypothesized that Impulsivity scale scores from the CATA will be significantly lower after the mindfulness intervention than at baseline.
  - h. Hypothesis 2h: It is hypothesized that Sustained Attention scale scores from the CATA will be significantly higher after the mindfulness intervention than at baseline.
3. What effects will mindfulness intervention have on improving dispositional mindfulness?
- a. Hypothesis 3a: It is hypothesized that Dispositional Mindfulness total scale scores from the MAAS will be significantly higher after the mindfulness intervention than at baseline.
4. Will the positive effects on externalizing behavior and attentional issues be maintained at one month following post mindfulness intervention?

- a. Hypothesis 4a: It is hypothesized that Externalizing Behaviors composite scale scores from the BASC-3 FM will be significantly lower after one-month post completion of mindfulness intervention than at baseline.
- b. Hypothesis 4b: It is hypothesized that Inattention scale scores from the BASC-3 FM will be significantly lower after one-month post completion of mindfulness intervention than at baseline.
- c. Hypothesis 4c: It is hypothesized that Inattention scale scores from the CPT-3 will be significantly lower after one-month post completion of mindfulness intervention than at baseline.
- d. Hypothesis 4d: It is hypothesized that Impulsivity scale scores from the CPT-3, will be significantly lower after one-month post completion of mindfulness intervention than at baseline.
- e. Hypothesis 4e: It is hypothesized that Sustained Attention scale scores from the CPT-3 will be significantly higher after one-month post completion of mindfulness intervention than at baseline.
- f. Hypothesis 4f: It is hypothesized that Vigilance scale scores from the CPT-3 will be significantly higher after one-month post completion of mindfulness intervention than at baseline.
- g. Hypothesis 4g: It is hypothesized that Inattentiveness scale scores from the CATA will be significantly lower after the mindfulness intervention than at baseline.

- h. Hypothesis 4h: It is hypothesized that Impulsivity scale scores from the CATA will be significantly lower after the mindfulness intervention than at baseline.
- i. Hypothesis 4i: It is hypothesized that Sustained Attention scale scores from the CATA will be significantly higher after the mindfulness intervention than at baseline.
- j. Hypothesis 4j: It is hypothesized that Dispositional Mindfulness total scale scores from the MAAS will be significantly higher after one-month post completion of mindfulness intervention than at baseline.

## CHAPTER IV

### RESULTS

This chapter presents the results of the study, including an analysis of the demographic characteristics of the data set, descriptive statistics of the variables, and primary analyses to address the four primary research questions. Data from the BASC-3 FM, the CPT-3, the CATA, and the MAAS were analyzed using multiple techniques as recommended by Kratochwill et al. (2013). All measures are nonparametric, including visual analysis, non-overlap of all pairs (NAP), Tau-U, and the reliable change index (RCI).

#### **Preliminary Analysis**

Three participants completed the full set of mindfulness intervention sessions and follow-up surveys, providing a complete set of data for analysis. There was a fourth participant who only completed 10 out of a total of eighteen pre- and post- BASC-3 FM administrations amounting to 55% of the total data and significantly less than the data completed by other participants. Due to the fourth participant's low completion rate compared to others and the incomplete nature of data, it was determined that the fourth participant would be excluded from all analyses.

#### **Demographics of the Participants**

Information was collected on demographic and individual variables, including gender, age, ethnicity, current college classification, marital status, primary language spoken, highest degree earned, major of study, employment status, and number of

individuals of different age groups currently residing in the household. Demographic information for each participant was obtained via a demographic questionnaire and is presented in the following section. In addition to the demographic questionnaires, the participants also completed a brief face-to-face interview lasting for an average of five to seven minutes. Through this interview, information was collected on (a) past participation in other psychological interventions/psycho-therapy; (b) concerns addressed via those interventions; (c) experience with yoga/meditation/mindfulness in the past and the kind of experience; (d) what brought them to this intervention; (e) what type of area and household the participants were raised in; (f) physical or mental limitations that could impact ability to participate in mindfulness activities; (g) what they were hoping to learn from this experience; and (h) current household income.

The participants consisted of two female students and one male student enrolled in their first year of college, in the age range of 18 to 19 years. Participants were randomly assigned a pseudonym and their data will be reported accordingly. Their pseudonyms were John, Beth, and Sue. These pseudonyms were referred to throughout the presentation of results to protect the confidentiality of participants. The following is a synopsis of the key points of information collected through the interview as well as from the demographic questionnaire for each participant.

### **John**

John is a 19-year-old, White/Hispanic male, Legal Studies major enrolled in his first year of college. His primary language is English and he is currently employed part-time. John reported his highest degree earned as high school diploma or equivalent to

high school diploma. Regarding his current living situation, John reported he is living in a dorm. John is not married, and no other individuals live in his household. John was brought up in a suburban area, in a single-parent household. He did not share his average household income, so his current socio-economic status is unknown.

Regarding specific experience with mindfulness/meditation/yoga in the past, John did not report participating in any mindfulness-based interventions. John has tried yoga in the past, but without the mindfulness framework. However, John reported that he found it difficult to do yoga and did not continue it beyond a brief exposure. John reported receiving therapy at the age of 13 due to depression; he was unable to recall further details about the treatment. No major mental health concerns were reported at the present. John did not report any physical or mental limitations that could potentially impact his ability to participate in mindfulness activities. Regarding goals in participating in this intervention, John reported a desire to improve his ability to focus and well-being.

### **Beth**

Beth is an 18-year-old, White/Hispanic female, Psychology major enrolled in her first year of college. Her primary language is English and she is currently unemployed, but looking for a job. She reported her highest degree as high school diploma or equivalent to high school diploma. Beth is unmarried and currently lives in a dorm on campus. She reported that her parents live at home, as well as three siblings between the ages of 17 and 21. She was brought up in an urban area, but did not provide information regarding the structure of the family she was brought up in. Beth reported her average household income between \$20,000 and \$34,999.



Regarding specific experience with mindfulness/meditation/yoga in the past, Beth reported no prior experience or exposure. Beth related that she had received counseling during high school due to lack of self-confidence. Beth did not report any physical or mental limitations that could potentially impact her ability to participate in mindfulness activities. Regarding goals in participating in this intervention, Beth stated that she had an interest in this intervention to help her learn how to better deal with her anger issues and inattention as well as a desire to gain an increased understanding of her mind or inner self.

### **Sue**

Sue is an 18-year-old, Hispanic female, Chemistry major enrolled in her first year of college. Her primary language is Spanish. She is currently unemployed, and is not planning to work at the present time. Sue reported her highest degree as high school diploma or equivalent to a high school diploma. Sue is currently living in a dorm and is unmarried. Sue reported three individuals under the age of 16 years and four individuals over the age of 21 years living in her household. She was brought up in an urban area, in a single-parent household. Sue reported her average household income between \$20,000 and \$34,999.

Regarding specific experience with mindfulness/meditation/yoga in the past, Sue did not report participating in such interventions. Sue stated that she had engaged in a relaxation/calming down training program due to anger and depression three years prior to this study. During that time, Sue also reported that she was hospitalized due to self-harming attempts. Current concerns with depression were denied, although persistent anger issues were reported. Sue did not report any physical or mental limitations that

could potentially impact her ability to participate in mindfulness activities. Finally, Sue reported participating in this study in hopes of learning how to improve her anger management skills.

### **Demographics of TWU**

The demographic data of the current sample was compared in the context of available demographic information for the population attending Texas Woman's University (TWU), Denton, TX. Data on ethnic make-up at TWU includes, White 39.6%, Hispanic 28.3%, Black 19.9%, Asian 9.2%, and American Indian/Alaskan Native 1.3%. The undergraduate population is comprised of 1,301 males and 9,106 females, which is a ratio of one male to approximately seven females. With regard to the age range at TWU, 13.6 % students are in the age range of 18 to 19 years and 27.4% of students are in the age range of 18 to 21 years. The sample for the current study has proportionally more Hispanics including White/Hispanics than in the campus population, with no representation of the student body belonging to other ethnicities. Furthermore, the current sample consists of two females and one male, which reflects proportionally less females in comparison to males within the sample as compared to the gender proportion evident in the campus population. Notably, however, the current sample size for the single-case research would have not allowed to mimic the realistic male to female ratio. In regards to the age of participants, the current sample comprised individuals in the age range of 18 to 19 years due to the focus of the study specifically on first and second year college students.

## Descriptive Statistics

### BASC-3 FM

As described previously, a customized scale was constructed through the BASC-3 FM, in accordance with the BASC-3 FM manual. It was labeled the Externalizing Behaviors scale. The means of the Externalizing Behaviors scale on the BASC-3 FM (baseline) for all three participants exceeded the average score of 50. This indicates all of the participants reported more externalizing behaviors than what was deemed average in the standardization population. The scores for two participants, John and Beth, were significantly elevated based on the guidelines provided in the manual (i.e.,  $t > 60$ ). Sue's score was above average but not clinically significant (i.e.,  $t = 58.70$ ). At the end of both the post-intervention phase and the follow-up phase, the means of all three participants indicated a lower than average score (i.e.,  $t < 50$ ), reporting fewer externalizing behaviors than what was deemed average in the standardization population.

The means for the Attention Problems scale on the BASC-3 FM (baseline) exceeded the average score of 50 for two participants, John and Beth. They both reported more attention problems than average per the standardization population (i.e.,  $t > 60$ ). Sue's score was slightly above average but not clinically significant (i.e.,  $t = 52$ ). Similar to the results for the externalizing scale, at the end of both the post-intervention phase and the follow-up phase for the attention problem scale, the means of all participants indicated lower than average score (i.e.,  $t < 50$ ), reporting less attention problems than what was deemed average when compared to the standardization population. Descriptive results for the BASC-3 FM are presented in Table 1.

Table 1

*Descriptive Results for BASC-3 FM*

Participant	BASC-3 FM Externalizing Behaviors	BASC-3 FM Attention Problems
<b>John</b>		
Pre Mean	72.00	68.20
Pre SD	2.82	3.63
PostMean	49.60	52.40
Post SD	1.67	2.61
FU Mean	41.00	48.00
<b>Beth</b>		
Pre Mean	60.44	63.00
Pre SD	1.51	2.80
PostMean	42.00	41.60
Post SD	2.73	2.19
FU Mean	41.00	38.00
<b>Sue</b>		
Pre Mean	58.20	52.00
Pre SD	2.38	2.83
PostMean	47.00	49.20
Post SD	3.39	3.03
FU Mean	37.00	38.00

Note. Pre = Pre-intervention, Post = Post-intervention, FU = Follow-up.

**CPT-3**

The composite scales on the CPT-3 include Inattentiveness, Impulsivity, Sustained Attention, and Vigilance Problems. Each participant was administered the CPT-3 pre- and post-intervention. Additionally, two of the three participants participated in the CPT-3 assessment for follow-up data. The progress report generated for the CPT-3 reported change in three different ways, *No Indication* (denoted by zero), *Some Indication* (denoted by one), and *Strong Indication* of problems (denoted by two), across

the four indices. The results are derived based on a proprietary algorithm, which is not available to the test users; however, the manual states these results are based on statistically significant changes ( $p < .10$ ) and/or indicates a difference of at least one standard deviation (10  $t$ -score points) between any of the two descriptions reported above (Conners, 2014). All of the pre- and post-test administrations for each participant were reported as valid. Additionally, two participants, John and Beth, completed follow-up data at one month and two months respectively, and results for follow-up testing were also reported as valid. Beth mentioned after completing the CPT-3 and the CATA that her performance on the follow-up administration may have been impacted by a lack of sleep she received the previous night. Sue did not complete the second set of follow-up materials. The following section presents results on Inattentiveness, Impulsivity, Sustained Attention, and Vigilance Problems.

**Inattentiveness problems.** John's pre-intervention scores indicated *Strong Indication* and Beth's scores indicated *Some Indication* on Inattentiveness Problems. At post-intervention, both John and Beth reported *No Indication* on Inattentiveness Problems. Sue's scores reported *No Indication* on Inattentiveness Problems at pre-intervention as well as post-intervention. John's follow-up scores reported *No Indication*, while Beth's scores reported *Some Indication*.

**Sustained attention problems.** Both John's and Beth's scores reported *Some Indication* on Sustained Attention Problems at pre-intervention, but reported *No Indication* on Sustained Attention Problems when measured at post-intervention. Sue's scores stated *No Indication* on Sustained Attention Problems at pre-intervention as well

as post-intervention. John's follow-up scores reported *No indication*, while Beth's scores reported *Some Indication*.

**Impulsivity problems.** Profile scores for all three participants reported *No Indication* on Impulsivity Problems during pre-intervention as well as during post-intervention. John and Beth's follow-up scores also reported *No Indication* on Impulsivity Problems.

**Vigilance problems.** John, Beth, and Sue's pre-intervention scores all stated *No Indication* on Vigilance Problems. John and Sue's scores reported *No Indication* at post-intervention and Beth's scores indicated *Some Indication*. John's follow-up scores reported *No indication* and Beth reported *Some Indication*. Descriptive results for the CPT-3 are presented in Table 2.

Table 2

*Descriptive Results for the CPT-3*

	Inattentiveness Problems	Sustained Attention Problems	Impulsivity Problems	Vigilance Problems
<b>John</b>				
Pre	2	1	0	0
Post	0	0	0	0
FU	0	0	0	0
<b>Beth</b>				
Pre	1	1	0	0
Post	0	0	0	1
FU	1	1	0	1
<b>Sue</b>				
Pre	0	0	0	0
Post	0	0	0	0

Note. 2 = Strong Indication, 1 = Some Indication, 0 = No Indication. Pre = Pre-intervention, Post = Post-intervention, FU = Follow-up. Sue did not complete follow-up data for the CPT-3.

## CATA

The scales on the CATA measure Inattentiveness, Impulsivity, and Sustained Attention Problems as well as two indices measuring auditory laterality, which were not included in this study because they were not related to the hypotheses. The progress report generated for the CATA reported change in three different ways, *No Indication* (denoted by zero), *Some Indication* (denoted by one), and *Strong Indication* of problems (denoted by two). Similar to the CPT-3, the results were derived based on a proprietary algorithm, which is not available to the test users; however, the manual states these results are based on statistically significant changes ( $p < .10$ ) and/or indicates a difference of at least one standard deviation (10 *t*-score points) between the two scores (Conners, 2014). The following section presents results on Inattentiveness, Impulsivity, and Sustained Attention Problems on the CATA.

**Inattentiveness problems.** John and Beth's scores reported *No Indication* on Inattentiveness Problems at pre-intervention as well as at post-intervention. Sue's scores reported *No Indication* on Inattentiveness Problems at pre-intervention, but Sue reported *Some Indication* of Inattentiveness Problems at post-intervention. During follow-up, both John's and Beth's scores stated *No Indication* on Inattentiveness Problems.

**Sustained attention problems.** John's scores reported *Some Indication* on Sustained Attention Problems at pre-intervention, but reported *No Indication* of Sustained Attention Problems at post-intervention. Beth and Sue's scores reported *No Indication* on Sustained Attention Problems at pre-intervention as well as at post-intervention. At

follow-up, John's scores reported *No Indication*, and Beth's scores reported *Some Indication*.

**Impulsivity problems.** John and Beth's scores reported *No Indication* on Impulsivity Problems at pre-intervention as well as during post-intervention. Sue's scores reported *No Indication* on Impulsivity Problems at pre-intervention, but *Some Indication* at post-intervention. During follow-up, both John and Beth's scores reported *No Indication* on Impulsivity Problems. Descriptive results for the CATA are presented in Table 3.

Table 3

*Descriptive Results for the CATA*

	Inattentiveness Problems	Sustained Attention Problems	Impulsivity Problems
John			
Pre	0	1	0
Post	0	0	0
FU	0	0	0
Beth			
Pre	0	0	0
Post	0	0	0
FU	0	1	0
Sue			
Pre	0	0	0
Post	1	0	1

Note. 2 = Strong Indication, 1 = Some Indication, 0 = No Indication. Pre = Pre-intervention, Post = Post-intervention, FU = Follow-up. Sue did not complete follow-up data for the CATA.

**MAAS**

Each student was administered the MAAS pre-and post-intervention in accordance with the directions found in the MAAS manual; scores were obtained by



computing the mean for all test items. Higher scores (i.e., > 3) reflect higher levels of dispositional mindfulness (Brown & Ryan, 2003). The means for the MAAS (baseline) ranged from 2.30 for John to 3.40 for Beth and 3.60 for Sue. The maximum possible mean score is 6. Therefore, at baseline, John showed a lower score on dispositional/trait mindfulness than was deemed average (i.e., < 3), in the standardization population. The scores for Beth and Sue fell within the slightly higher than average range. At the end of the post-intervention phase, the means of all three participants indicated a higher than average score (i.e., > 3), reporting more dispositional/trait mindfulness than was seen as average in the standardization population. Several months later, at the end of the follow-up phase, the means of John and Beth continued to indicate a higher than average score (i.e., > 3), reporting more dispositional/trait mindfulness than was deemed average. Descriptive statistics for the MAAS are presented in Table 4.

Table 4

*Descriptive Statistics for the MAAS*

Participant	MAAS
John	
Pre Mean	2.30
Post Mean	4.20
FU Mean	4.80
Beth	
Pre Mean	3.40
Post Mean	4.90
FU Mean	5.40
Sue	
Pre Mean	3.60
Post Mean	3.80
FU Mean	--

Note: Pre = Pre-intervention, Post = Post-intervention, FU = Follow-up. Sue did not complete follow-up data on the MAAS. The MAAS was given one time in each phase; therefore, *SD* values are not available.

**Primary Analyses**

Nonparametric tests were conducted to examine the following research questions:

**Research Question One**

After implementation of the mindfulness intervention, will the externalizing behavior decline post-intervention? Hypothesis 1 has been proposed to address the first research question: It is hypothesized that Externalizing Behaviors scale scores on the BASC-3 FM will be significantly lower after the mindfulness intervention than at baseline. Testing this hypothesis involved visual analysis, statistical analysis using NAP (Parker & Vannest, 2009), and Tau-U (Parker et al., 2011) per the recommendations of Kratochwill et al. (2013). Additionally, computer-generated *p* values for the standard error of the difference (Anastasi & Urbina, 1997), were also used to compare changes

from baseline to post-intervention. The baseline measures were administered one week prior to the implementation of the intervention, followed by a 4-week period with the intervention. Follow-up data were collected one month and two weeks after the intervention was completed.

**Visual analysis.** The level, trend, variability, immediacy, and latency among the data in both baseline and intervention phases were examined. Data were examined for level of change, which reflects mean or average performance, the trend, which represents the slope and the variability, which reflects the range or spread of data per phase. Data were also examined for immediacy of effect to see if the target behavior changed immediately after the intervention was completed. Latency of change was examined by measuring the amount of time it took before the change occurred after starting the intervention. Additionally, patterns within and between phases were examined for reported externalizing behaviors. Analysis of the overlap between the baseline and intervention phases is discussed further in the statistical analysis section.

Level of Change was examined by comparing mean values within one phase of intervention to the other phase of intervention and was focused on externalizing behaviors for this study. The Level of Change represents the *t*-scores obtained on the Externalizing Behaviors scale administered five times a week during the intervention phase; thus, higher levels represent greater amounts of externalizing behaviors. The average *t*-score for externalizing behaviors for John ranged from 72.00 in the pre-intervention phase to 49.60 in the post-intervention phase. Beth's average *t*-score for externalizing behavior for Beth ranged from 60.44 in the pre-intervention phase to 42.00

in the post-intervention phase. In addition, Sue's average *t*-score for externalizing behavior ranged from 58.00 in the pre-intervention phase to 47.00 in the post-intervention phase. Therefore, all three displayed fewer externalizing behaviors on average, at post-intervention than at baseline.

Variability was measured by examining consistency across sections of data. The variability represents the spread of data points. Typically, the lower the variability, the more consistency the participants displayed in their behavior across the administrations, and thus, they were less likely to have atypical scores. The variability among John's externalizing behaviors was more consistent across data points during the intervention phase (1.67) than at baseline (2.82). In Beth's case, the variability in the post-intervention phase (2.73) was more than in the pre-intervention phase (1.51), with the last *t*-score being the lowest of all the readings taken for Beth across the study. Sue's variability in the pre-intervention phase (2.38) was less than in the post-intervention phase (3.39). As seen in Figure 1, most of Sue's variability in the intervention phase is likely accounted for by the behavior observed during the fourth observation of the intervention phase, as behavior was more consistent in previous observations within the same phase.

The trend represents the slope of the data. Larger trends equate a higher slope within each phase, suggesting inconsistency within that phase. Therefore, downward trends reflect fewer externalizing behaviors with each successive data point in a phase, whereas upward trends reflect more externalizing behaviors with each successive data point in a phase. As seen in Figure 1, within the post-intervention phase, all three

participants showed a downward or negative trend, indicating less externalizing behavior in subsequent reports. Alternatively, all three participants exhibited increased non-externalizing behaviors in subsequent reports compared to earlier administrations. Data were also examined for immediacy of effect to see if the target behavior changed immediately after the intervention was completed. For John, a steady maintenance of change was observed after the intervention was over, which was in continuity with the positive change observed during the intervention phase. Beth displayed an immediate change after the intervention was completed (i.e., the first *t*-score was 45.00). Sue also had an immediate change after the intervention was completed (i.e., the first *t*-score was 48.00). Latency of change was examined by measuring the amount of time it took before the change occurred after starting the intervention. An immediate change was observed in all three participants after the first session, and the trend continued. Figure 1 provides information on the level, trend, and variability for each participant in baseline and post-intervention phases. Table 5 provides information on the level and variability for each participant in baseline and post-intervention phases.

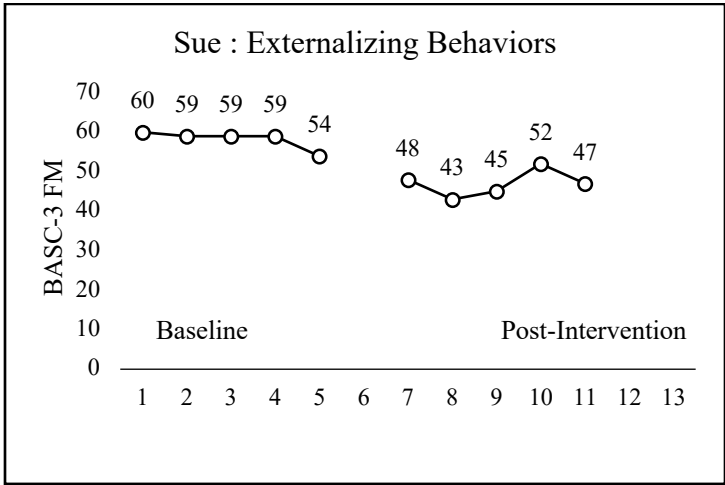
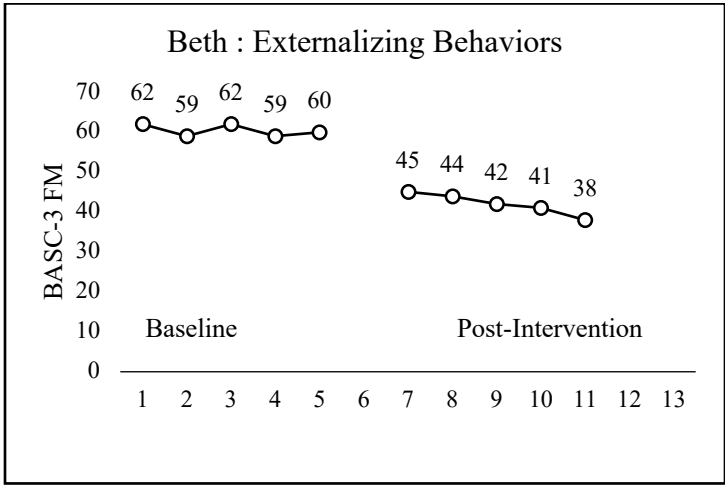
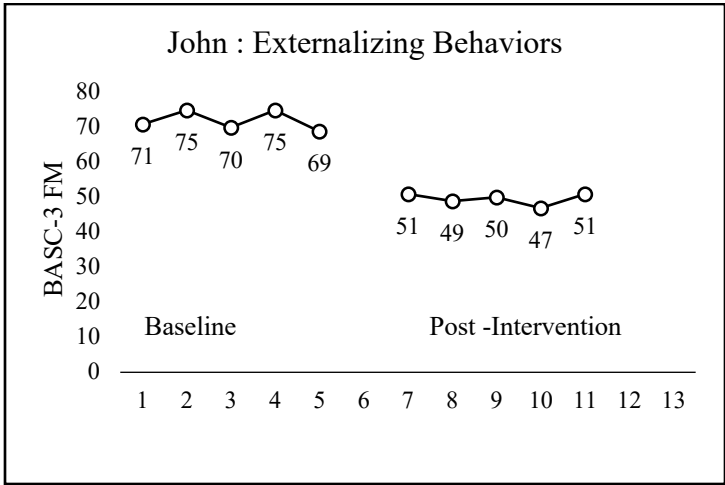


Figure 1. Externalizing Behaviors

Table 5

*Level, Variability in Baseline and Post-Intervention Phases*

	Level (M)	Variability (SD)
John		
Pre	72.00	2.82
Post	49.60	1.67
Beth		
Pre	60.44	1.51
Post	42.00	2.73
Sue		
Pre	58.20	2.38
Post	47.00	3.39

**Statistical analyses for BASC-3 FM. *Non-overlap of all pairs (NAP)*.** NAP was measured using the calculator at the single case research website [www.singlecasereserach.org](http://www.singlecasereserach.org) (Vannest, Parker, Gonen, & Adiguzel, 2016). NAP scores closer to 1.00 reflect a higher probability that a score randomly drawn from the intervention phase will exceed that of a score randomly drawn from the baseline phase (Parker & Vannest, 2009). NAP score of 0.50 indicates 50% probability that the difference in the two groups of scores from baseline to intervention is attributable to chance levels. Therefore, higher NAP effect sizes reflect significantly lower frequencies of externalizing behaviors at intervention than at baseline (Parker & Vannest, 2009). The results of the NAP analysis are displayed in Table 6, which indicates hypothesis 1 (externalizing behaviors will decline post-intervention) was statistically supported for all John, Beth, and Sue (NAP = 1.00,  $p < .05$ ). The NAP values of all three participants represent strong effects per Parker and Vannest’s (2009) recommendations for NAP

effect size interpretation. Parker and Vannest (2009) recommended that NAP scores of 0 to .65 indicate weak effects, .66 to .92 indicate medium effects, and .93 to 1.0 indicate strong effects. Table 6 provides NAP values for the participants.

Table 6

*Non-overlap of All Pairs*

Participant	NAP	<i>z</i>	<i>p</i>	CI (90%)
John	1.00	2.61	.009**	.63-1.37
Beth	1.00	2.61	.009**	.63-1.37
Sue	1.00	2.61	.009**	.63-1.37

Note. NAP = non-overlap of all pairs. CI = confidence interval of NAP at 90%. \*\*Significant effects represented by  $p < .05$ .

***Tau-U.*** Tau-U was also calculated via the single case research website [www.singlecasereserach.org](http://www.singlecasereserach.org) (Vannest et al., 2016). Tau-U results were obtained without correcting baseline as monotonic trend in the baseline was not significant. Tau-U values reflect a comparison of each data point with all data points ahead of it in time, therefore, generating several pairwise comparisons within and between phases of intervention (Brossart, Vannest, Davis, & Patience, 2014). Similar to NAP, Tau-U scores closer to 1.00 reflect a higher probability that a score randomly drawn from one phase will be less than that of a score randomly drawn from another phase. In this case, higher Tau-U effect sizes reflect significantly lower frequencies of externalizing behavior at post-intervention than at baseline (Parker & Vannest, 2009; Rakap, 2015). Parker and Vannest (2009) recommended that NAP scores of 0 to .65 indicate weak effects, .66 to .92 indicate medium effects, and .93 to 1.0 indicate strong effects. John, Beth, and Sue



exhibited strong effects per Parker and Vannest’s (2009) recommendations for effect size interpretation.

These guidelines are also used for interpreting Tau-U (Rakap, 2015). All the three participants exhibited a statistically significant trend ( $\tau = -1, p < .05$ ), indicating a significant, negative slope. Therefore, Hypothesis 1 was supported for all three participants. Table 7 provides Tau-U values for all participants.

Table 7

<i>Tau-U</i>				
Participant	Tau-U	<i>z</i>	<i>p</i>	CI (90%)
John	-1.00	-2.61	.009**	-.63 - -1.37
Beth	-1.00	-2.61	.009**	-.63 - -1.37
Sue	-1.00	-2.61	.009**	-.63 - -1.37

Note. CI = confidence interval of Tau-U at 90%. \*\*Significant effects represented by  $p < .05$ .

***Standard error of the difference.*** Testing this hypothesis also entailed analyzing the computer-generated Standard Error of the Difference using the formula provided by Anastasi and Urbina (1997), to test for statistically significant difference between pre- and post-intervention scores (Reynolds & Kamphaus, 2015). For the custom flex forms, test-retest reliability coefficients are derived using the same test-retest study samples used for the standardized flex forms (Reynolds & Kamphaus, 2015). The computer program generates *p* values for the standard error of the difference for any set of composite scores, and it is recommended to use those to analyze trends in the results over a time (C.

Reynolds, personal communication, May 19, 2019).

Regarding externalizing behaviors, John experienced clinically significant change as mean scores were above average at baseline ( $M = 72.00$ , initial  $t$ -score = 71), whereas they were within the average range at post-intervention ( $M = 49.60$ , last  $t$ -score = 51,  $p < .05$ ). Furthermore, because the average  $t$ -score placed him within the average range at post-intervention, John also achieved nominally significant change. Beth experienced clinically significant change with mean scores within the above average range at pre-intervention ( $M = 60.44$ , initial  $t$ -score = 62), whereas her mean scores were within the average range at post-intervention ( $M = 42.00$ , last  $t$ -score = 38,  $p < .05$ ). Furthermore, because the average  $t$ -score placed Beth's score in the average range at intervention, Beth also achieved nominally significant change. Sue experienced clinically significant change from above average mean score at pre-intervention ( $M = 58.20$ , initial  $t$ -score = 60) to below average score at post-intervention ( $M = 47.00$ , last  $t$ -score = 47,  $p < .05$ ). Because Sue's baseline score was not within the clinically significant range, and her post-intervention  $t$ -score placed her within the same nominal range at post-intervention, the clinically significant score is not considered a nominally significant change. Overall, all three participants achieved clinically significant change in externalizing behaviors during post-intervention as compared to pre-intervention.

**Summary of results of hypothesis 1.** Statistically, all three methods, NAP, Tau-U, and the Standard Error of the Difference results indicated significant effect sizes for all participants. Overall, the mindfulness intervention was found to yield statistically significant effects in ameliorating the externalizing behaviors for all three participants.

## **Research Question Two**

After implementation of the mindfulness intervention, will attention concerns decline post-intervention? Hypothesis 2 was proposed to address the second research question: It is hypothesized that attention problems will be significantly lower after the mindfulness intervention than at baseline. The following sets of hypotheses were proposed. Hypothesis 2a: It is hypothesized that Inattention scale scores from the BASC-3 FM will be significantly lower after the mindfulness intervention than at baseline. Hypothesis 2b: It is hypothesized that Inattention scale scores from the CPT-3 will be significantly lower after the mindfulness intervention than at baseline. Hypothesis 2c: It is hypothesized that Impulsivity scale scores from the CPT-3 will be significantly lower after the mindfulness intervention than at baseline. Hypothesis 2d: It is hypothesized that Sustained Attention scale scores from the CPT-3 will be significantly higher after the mindfulness intervention than at baseline. Hypothesis 2e: It is hypothesized that Vigilance scale scores from the CPT-3 will be significantly higher after the mindfulness intervention than at baseline. Hypothesis 2f: It is hypothesized that Inattentiveness scale scores from the CATA will be significantly lower after the mindfulness intervention than at baseline. Hypothesis 2g: It is hypothesized that Impulsivity scale scores from the CATA will be significantly lower after the mindfulness intervention than at baseline. Hypothesis 2h: It is hypothesized that Sustained Attention scale scores from the CATA will be significantly higher after the mindfulness intervention than at baseline.

**Visual analysis.** The level, trend, variability, immediacy, and latency among the data obtained at both baseline and intervention phases were examined. The Level of

Change represents the subjects obtained *t*-score on the Attention Problems scale five times a week; thus, higher levels represent greater amounts of attention problems. John's average *t*-score ranged from 68.20 in the pre-intervention phase to 52.40 in the post-intervention phase. The average *t*-score for attention problems for Beth ranged from 63.00 in the pre-intervention phase to 41.60 in the post-intervention phase. Sue's average *t*-scores ranged from 52.00 in the pre-intervention phase to 49.20 in the post-intervention phase. Therefore, all three displayed less attention problems on average during intervention than at baseline. The difference between Sue's pre- and post-intervention scores was minimal across baseline and intervention phases with none of the *t*-scores within the clinically significant range per the standardization manual.

The variability among John's attention problems was more consistent across data points during the intervention phase (2.19) than at baseline (2.60). Beth's variability among attention problems was more consistent across data points during the intervention phase (2.80) than at baseline (3.63). Sue displayed more variability across scores on attention problems during the intervention phase (3.00) as compared to baseline (2.83).

John and Beth experienced a negative trend, indicating less attention problems in the post-intervention phase. Alternatively, both these participants exhibited increased attentional abilities in subsequent reports compared to earlier administrations of the BASC-3 FM. Sue failed to show a noteworthy trend within the baseline and within post-intervention phases, although clinically significant attentional concerns were not reported in the first place.

Data were also examined for immediacy of effect to see if the target behavior changed immediately after the intervention was completed. For John, a steady maintenance of change was observed after the intervention was over, which was in continuity with the positive change observed throughout the intervention phase. In Beth's case, an immediate change occurred after the intervention was over. Sue did not demonstrate an immediate change after the intervention was over. Latency of change was examined by measuring the amount of time it took before the change occurred after starting the intervention. John did not report an immediate change after the first session, but an improvement was observed starting at the third session. Beth stated an immediate change occurred after the first session. Sue did not show an immediate change after the first session. Table 8 provides information on the level and variability for each participant in baseline and post-intervention phases. Figure 2 provides information on the level and variability for each participant in baseline and post-intervention phases.

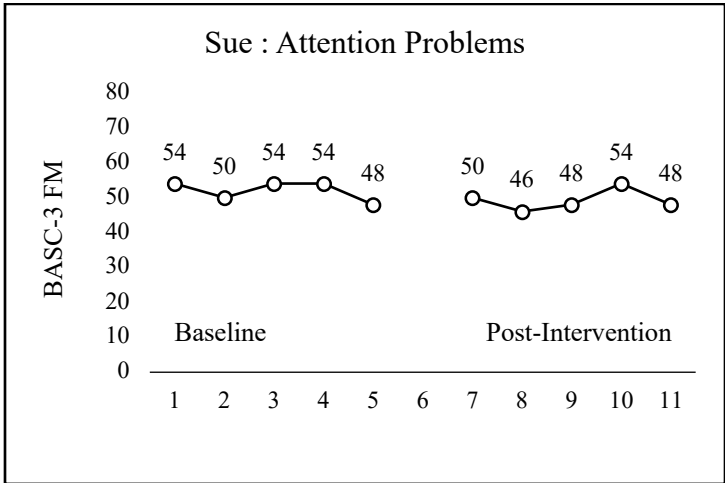
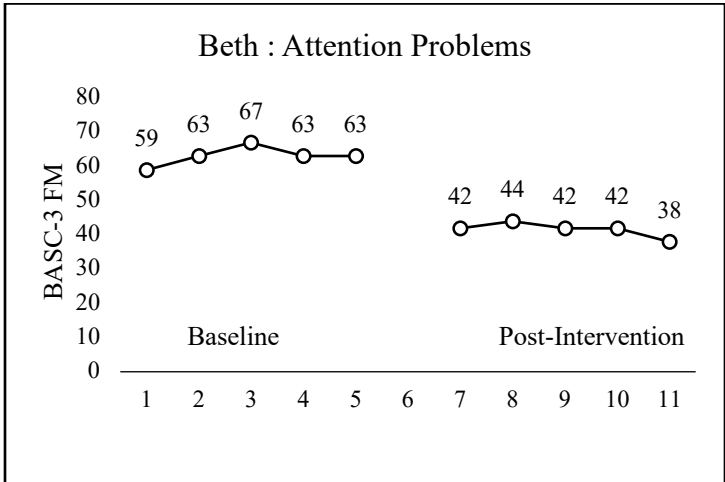
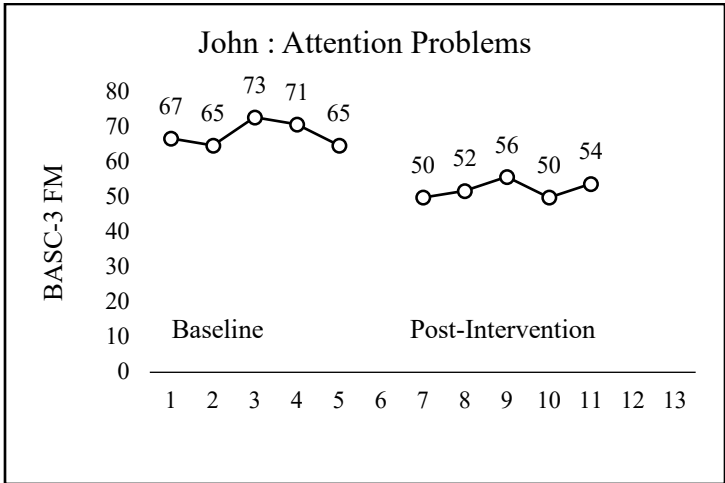


Figure 2. Attention Problems

Table 8

<i>Level, Variability in Baseline and Post-Intervention Phases</i>		
	Level (M)	Variability (SD)
John		
Pre	68.20	3.63
Post	52.40	2.61
FU		--
Beth		
Pre	63.00	2.80
Post	41.60	2.19
FU	41.00	--
Sue		
Pre	52.00	2.83
Post	49.20	3.03

**Statistical analyses for BASC-3 FM. *Non-overlap of all pairs (NAP)*.** NAP was measured using the calculator at the single case research website [www.singlecasereserach.org](http://www.singlecasereserach.org) (Vannest et al., 2016) and results of the NAP analysis are displayed in Table 9. As seen in Table 9, Hypothesis 2 was statistically supported for two of the three participants, John and Beth ( $NAP = 1.00, p < .05$ ), and represents strong effects per Parker and Vannest's (2009) recommendations for NAP effect size interpretation. Sue's NAP effect size was not significant ( $NAP = .76, p > .05$ ). Table 9 provides NAP values for all participants.

Table 9

<i>Non-overlap of All Pairs</i>				
Participant	NAP	<i>z</i>	<i>p</i>	CI (90%)
John	1.00	2.61	.009**	.63 - 1.37
Beth	1.00	2.61	.009**	.63 - 1.37
Sue	.76	1.36	.1745	.89 - 1.11

Note. NAP = non-overlap of all pairs. CI = confidence interval of NAP at 90%. \*\*Significant effects represented by  $p < .05$ .

***Tau-U.*** Tau-U was also calculated via the single case research website [www.singlecasereserach.org](http://www.singlecasereserach.org) (Vannest et al., 2016). Tau-U results were obtained without correcting baseline as the monotonic trend in the baseline was insignificant. The Tau-U includes a comparison of each data point with all data points ahead of it in time, therefore, generating several pairwise comparisons within and between phases of intervention (Brossart et al., 2014). Higher Tau-U effect sizes reflect significantly lower frequencies of attention problems at post-intervention than at baseline. Both John and Beth exhibited a statistically significant trend ( $\tau = -1, p < .05$ ;  $\tau = -1, p < .05$ ), indicating the slope was significant. Sue’s Tau-U value was not significant ( $\tau = -.52, p > .05$ ). As seen in Table 10, Hypothesis 1 was supported for John and Beth ( $\tau = -1, p < .05$ ), and represents strong effects per Parker and Vannest’s (2009) recommendations for effect size interpretation. Hypothesis 2 is not supported for Sue ( $\tau = -.52, p > .05$ ). Table 10 provides Tau-U values for all participants.

Table 10

<i>Tau-U</i>				
Participant	Tau-U	<i>z</i>	<i>p</i>	CI (90%)
John	-1.00	-2.61	.009**	-.63 - -1.37
Beth	-1.00	-2.61	.009**	-.63 - -1.37
Sue	-.52	-1.35	.1745	-.89 - -1.11

Note. CI = confidence interval of Tau-U at 90%. \*\*Significant effects represented by  $p < .05$ .

***Standard error of the difference.*** Testing this hypothesis also entailed analyzing the computer-generated Standard Error of the Difference using the formula provided by



Anastasi and Urbina (1997), to test for statistically significant difference between pre- and post-intervention scores (Reynolds & Kamphaus, 2015). Regarding attention problems, John experienced clinically significant change as mean scores were above average at baseline ( $M = 68.20$ , initial  $t$ -score = 67), whereas they were within the average range at post-intervention ( $M = 52.40$ , last  $t$ -score = 54,  $p < .05$ ). Furthermore, because the average  $t$ -score placed him within the average range at post-intervention, John also achieved nominally significant change. Similarly, Beth also exhibited a clinically significant change with mean scores within the above average range at pre-intervention ( $M = 63.00$ , initial  $t$ -score = 59), whereas they were within the average range at post-intervention ( $M = 41.00$ , last  $t$ -score = 38,  $p < .05$ ). Because the average  $t$ -score placed Beth's score in the average range at intervention, Beth also achieved nominally significant change. Sue's baseline score was not within the clinically significant range, and her post-intervention  $t$ -score placed her within the same nominal range at post-intervention. Thus, Sue's score is not considered a nominally significant change. Sue did not experience clinically significant change from pre-intervention to post-intervention ( $M = 52.00$ , initial  $t$ -score = 54) to below average score at post-intervention ( $M = 49.20$ , last  $t$ -score = 48,  $p < .05$ ). Thus, John and Beth who reported concerns with attention problems, achieved clinically significant change during post-intervention as compared to pre-intervention.

***Summary of BASC-3 results.*** Statistically, NAP, Tau-U, and the Standard Error of the Difference results indicated significant effect sizes for John and Beth. The mindfulness intervention was found to yield statistically significant effects in their

attention problems, regardless of the procedure used to measure effect; this effect was strong. Sue did not show clinically significant improvements; however, she did not report clinically significant concerns with attention problems at baseline.

**Statistical analyses for CPT-3.** The next set of hypotheses addressed the second research question pertaining to attention problems. It was hypothesized that the scores on Inattentiveness, Sustained Attention, Impulsivity, and Vigilance Problems composites as measured on the CPT-3 will be significantly lower after the mindfulness intervention than at baseline. The following section presents results on Inattentiveness, Impulsivity, Sustained Attention, and Vigilance Problems.

***Inattentiveness problems.*** At pre-intervention, John's scores indicated *Strong Indication* and Beth indicated *Some Indication* on Inattentiveness Problems. At post-intervention, both John and Beth reported *No Indication* on Inattentiveness Problems. Sue's scores reported *No Indication* on Inattentiveness Problems at pre-intervention as well as at post-intervention.

***Sustained attention problems.*** Both John and Beth's scores reported *Some Indication* on Sustained Attention Problems at pre-intervention, but reported *No Indication* on Sustained Attention Problems at post-intervention. Sue's scores stated *No Indication* on Sustained Attention Problems at pre-intervention as well as at post-intervention.

***Impulsivity problems.*** Scores for all three, John, Beth, and Sue, were reported as *No Indication* on Impulsivity Problems at pre-intervention as well as at post-intervention.

**Vigilance problems.** Scores of *No Indication* on Vigilance Problems at pre-intervention were reported for all three. John's and Sue's scores were *No Indication* at post-intervention, while Beth's scores indicated *Some Indication* at that time. Descriptive results for the CPT-3 are presented in Table 11.

Table 11

*Descriptive Results for the CPT-3*

	Inattentiveness Problems	Sustained Attention Problems	Impulsivity Problems	Vigilance Problems
<b>John</b>				
Pre	2	1	0	0
Post	0	0	0	0
FU	0	0	0	0
<b>Beth</b>				
Pre	1	1	0	0
Post	0	0	0	1
FU	1	1	0	1
<b>Sue</b>				
Pre	0	0	0	0
Post	0	0	0	0

Note. 2 = Strong Indication, 1 = Some Indication, 0 = No Indication. Pre = Pre-intervention, Post = Post-intervention, FU = Follow-up. Sue did not complete follow-up data for the CPT-3.

**Summary of CPT-3 results.** Regarding attention problems measured via the CPT-3, Hypothesis 2 was supported for John for the indices measuring inattentiveness and sustained attention problems. Therefore, the mindfulness intervention was found to yield statistically significant effects for John. Hypothesis 2 was supported for Beth for the indices measuring inattentiveness and sustained attention problems. Beth reported

some concerns on the Vigilance index, which were not reported at baseline. Sue did not report attention problems on any of the indices at baseline or intervention.

**CATA.** Another set of hypotheses was proposed to address the second research question pertaining to attention problems. It was hypothesized that the scores on Inattentiveness, Sustained Attention, and Impulsivity Problems composites as measured on the CATA will be significantly lower after the mindfulness intervention than at baseline. The following section presents results on Inattentiveness, Impulsivity, and Sustained Attention Problems.

***Inattentiveness problems.*** John and Beth's scores reported *No Indication* on Inattentiveness Problems at pre-intervention as well as at post-intervention. Sue's scores reported *No Indication* on Inattentiveness Problems at pre-intervention, but reported *Some Indication* of Inattentiveness Problems at post-intervention.

***Sustained attention problems.*** John's scores reported *Some Indication* on Sustained Attention Problems at pre-intervention, but reported *No Indication* of Sustained Attention Problems at post-intervention. Beth and Sue's scores reported *No Indication* on Sustained Attention Problems at pre-intervention as well as during post-intervention.

***Impulsivity problems.*** John and Beth's scores reported *No Indication* on Impulsivity Problems during pre-intervention as well as at post-intervention. Sue reported *No Indication* on Impulsivity Problems at pre-intervention, but *Some Indication* during post-intervention. Descriptive results for the CATA are presented in Table 12.

Table 12

*Descriptive Results for the CATA*

	Inattentiveness Problems	Sustained Attention Problems	Impulsivity Problems
John			
Pre	0	1	0
Post	0	0	0
FU	0	0	0
Beth			
Pre	0	0	0
Post	0	0	0
FU	0	1	0
Sue			
Pre	0	0	0
Post	1	0	1

Note. 2 = Strong Indication, 1 = Some Indication, 0 = No Indication. Pre = Pre-intervention, Post = Post-intervention, FU = Follow-up. Sue did not complete follow-up data for the CATA.

**Summary of CATA results.** Regarding attention problems measured via the CATA, hypothesis 2 was supported for John for the index measuring sustained attention problems. No concerns on the other indices were reported during baseline and post-intervention. Therefore, the mindfulness intervention was found to yield statistically significant effects in John's attention problems. Beth did not report attention problems on any of the indices at baseline or intervention. For Sue, Hypothesis 2 was not supported for indices measuring inattentiveness and impulsivity problems.

### Research Question Three

What effects will mindfulness intervention have on improving dispositional mindfulness? Hypothesis 3 was proposed to address the third research question: It is hypothesized that dispositional mindfulness measured via the MAAS will be significantly

higher after the mindfulness intervention than at baseline. Testing this hypothesis entailed obtaining the RCI as a measure of clinically and statistically significant change (Jacobson & Truax, 1991). Scores higher than +1.96 represent significant increases in mindfulness. Hypothesis 3 was supported for all the participants as John, Beth, and Sue attained clinically significant change,  $p > .05$ . With regard to dispositional mindfulness, John experienced clinically significant change (RCI = 2.29,  $p < .05$ ), with a total score of 35.00 at pre-intervention to 63.00 at post-intervention. Beth experienced clinically significant change (RCI = 2.05,  $p < .05$ ), with a total score of 51.00 at pre-intervention to a total score of 74.00 at post-intervention. Sue did not experience clinically significant change (RCI = .22,  $p < .05$ ), as reflected by a total score of 54.00 at pre-intervention to a total score of 57.00 at intervention. Table 13 provides RCI values for all participants.

Table 13

*Reliable Change Indices for the MAAS*

Participant	MAAS
John	2.29**
Beth	2.05**
Sue	.22

Note. Based on BASC-3 FM scores at baseline and intervention. †Positive scores indicate desired change. \*\*Clinical significance at  $p < .05$ .

**Summary of hypothesis 3.** Hypothesis 3, which addresses improving dispositional mindfulness, was supported for John and Beth. Statistical analysis indicated that they both experienced significant improvements in dispositional mindfulness from baseline to intervention. Both had change in the desired direction as illustrated by positive

RCI values. Sue's change of scores was in the desired direction, but it was not statistically significant.

#### **Research Question Four**

Will the positive effects on externalizing behavior and attentional issues be maintained at one month (or two months) following the mindfulness intervention?

Hypothesis 4 was proposed to address the last research question: It is hypothesized that the positive effects on externalizing behavior and attentional issues be maintained at one month (or two months) following the mindfulness intervention. Testing these hypotheses entailed analyzing the computer-generated RCI values for the BASC-3 FM, and calculating the RCI values for the MAAS (Jacobson & Truax, 1991), as a measure of clinically and statistically significant change.

Regarding externalizing behaviors measured via the BASC-3 FM, hypothesis 4 was supported for all three participants. John, Beth, and Sue attained clinically significant change ( $p < .05$ ). Regarding attention problems measured via the BASC-3 FM, hypothesis 4 was all supported for all three ( $p < .05$ ). However, Sue did not attain a clinically significant change at pre-intervention; but she did report clinically significant improvement in attention problems at follow-up.

When addressing attention problems measured via the CPT-3 and the CATA, hypothesis 4 was supported for John as his profile indicated *No Problems* on Inattentiveness, Sustained Attention, Impulsivity, and Vigilance Problems. Beth's CPT profile indicated maintained improvement on Impulsivity Problems; however, it indicated *Some Problems* on Inattentiveness, Sustained Attention, and Vigilance Problems. Beth's

CATA profile indicated maintained improvement on Impulsivity Problems and Inattentiveness, however, it indicated *Some Problems* on Sustained Attention. (Note: Sue did not complete the follow-data for the CPT-3, CATA, or MAAS.)

With regard to dispositional mindfulness, hypothesis 4 was supported for John as he experienced clinically significant change from baseline to follow-up ( $z = 3.01, p < .05$ ). Hypothesis 4 was also supported for Beth, reporting that she experienced clinically significant change from baseline to follow-up ( $z = 2.74, p < .05$ ). Table 14 provides RCI values for all participants.

Table 14

*Reliable Change Indices for the MAAS*

Participant	MAAS
John	3.01**
Beth	2.74**
Sue	---

Note. Based on scores at baseline and follow-up. †Positive scores indicate desired change on MAAS. Sue did not complete follow-up data on MAAS. \*\*Clinical significance at  $p < .05$ .

### Chapter Summary

This chapter presented the results of the study, including a preliminary analysis of demographic characteristics of the data set, descriptive statistics of the variables, and primary analyses to address the four research questions. Participants completed the BASC-3 FM, the CPT-3, the CATA, and the MAAS at baseline, post-intervention, and follow-up. The results obtained on all measures were analyzed via multiple non-parametric methods within the single-case research paradigm.



Descriptively, John, Beth, and Sue showed a significant improvement in externalizing behaviors at post-intervention. These improvements were maintained at a follow-up conducted one month later for Beth and two months later for John and Sue. John and Beth both reported clinically significant improvements on attention problems at post-intervention as well as at follow-up. Sue did not show clinically significant improvements at post-intervention, and did not report clinically significant concerns with attention problems at baseline. However, she did show clinically significant improvement at follow-up. Regarding computerized assessments, John reported attention problems on some indices at baseline, and showed improvement on those indices at intervention and follow-up. Similarly, Beth reported attention problems at baseline, showed improvement at intervention, but she also indicated some attention problems at follow-up, which she attributed to a lack of sleep received the previous night prior to completing the assessment measures. Sue did not report improvement consistently at post-intervention, although no concerns were reported at baseline. John and Beth showed significant improvements in dispositional mindfulness after the intervention was completed. To better understand the results, the following section provides a case-by-case analysis along with pertinent demographic characteristics for John, Beth, and Sue.

### **John**

John is a 19-year-old, White/Hispanic male, Legal Studies major enrolled in his first year of college. His primary language is English and he is currently partly employed. Hypothesis 1 (externalizing behaviors will decline post-intervention) was supported for John. Statistical analyses indicated that regardless of the statistical method used, John

experienced significant improvements in externalizing behaviors from baseline to intervention. A visual analysis of the observations indicated that he improved in terms of the average amount of externalizing behavior displayed between baseline and intervention phases. Hypothesis 2 (attention problems will decline post-intervention) was tested via the BASC-3 FM, the CPT-3, and the CATA. Regarding attention problems measured via the BASC-3 FM, hypothesis 2 was supported for John, who reported clinically significant improvement on attention problems from baseline to intervention. Regarding attention problems measured via the CPT-3, hypothesis 2 was supported for John for the indices measuring inattentiveness and sustained attention problems. No concerns on the other indices were reported during baseline and post-intervention. Regarding attention problems measured via the CATA, hypothesis 2 was supported for John for the index measuring sustained attention problems. No concerns on the other indices were reported during baseline and post-intervention. Hypothesis 3, which addresses improving dispositional mindfulness, was supported for John. Statistical analysis indicated he experienced significant improvements in dispositional mindfulness from baseline to intervention. Hypothesis 4, which addresses the positive effects on externalizing behaviors and attentional problems will be maintained one month later (two months later in John's case) following the mindfulness intervention, was supported for John.

### **Beth**

Beth is an 18-year-old, White/Hispanic female, Psychology major enrolled in his first year of college. Her primary language is English and she is currently unemployed, but looking for a job. Hypothesis 1 (externalizing behaviors will decline post-intervention)

was supported for Beth. Statistical analyses indicated that regardless of the statistical method used, Beth experienced significant improvements in externalizing behaviors from baseline to intervention. A visual analysis of the observations indicated that Beth improved in terms of the average amount of externalizing behavior displayed between baseline and intervention phases. Hypothesis 2 (attention problems will decline post-intervention) was tested via the BASC-3 FM, the CPT-3, and the CATA. Hypothesis 2 was supported for Beth, who reported clinically significant improvement on attention problems from baseline to intervention across all three measures. However, Beth did report concerns on the CPT-3 index measuring vigilance. No concerns on the other indices were reported during baseline and post-intervention. Hypothesis 3, which addresses improving dispositional mindfulness, was supported for Beth. Statistical analysis indicated she experienced significant improvements in dispositional mindfulness from baseline to intervention. Hypothesis 4, which addresses if positive effects in externalizing behavior and attentional problems will be maintained at one month following the mindfulness intervention, was supported for Beth with the exception of inattentiveness and sustained attention problems on CPT-3 and sustained attention on CATA. Regarding the index measuring vigilance problems, the results were maintained at follow-up, although no improvement, rather increased problems were measured at post-intervention as well as follow-up. Beth mentioned after completing the CPT-3 and the CATA that her performance on the follow-up administration may have been impacted by a lack of sleep she received the previous night.

## **Sue**

Sue is an 18-year-old, Hispanic female, Chemistry major enrolled in her first year of college. Her primary language is Spanish. She is currently unemployed, and not planning to work, currently. Hypothesis 1 (externalizing behaviors will decline post-intervention) was supported for Sue. Statistical analyses indicated that Sue experienced significant improvements in externalizing behaviors from baseline to intervention via all statistical methods. A visual analysis of the observations indicated that Sue improved in terms of the average amount of externalizing behaviors displayed between baseline and intervention phases. Hypotheses 2 (attention problems will decline post-intervention) was tested via the BASC-3 FM, the CPT-3, and the CATA. Sue did not report clinically significant improvements, and did not report clinically significant concerns with attention problems during the baseline phase on either the CPT-3 or CATA. However, she did report some problems on the CATA indices measuring inattentiveness and impulsivity at post-intervention. Regarding hypothesis 3, which addresses improving dispositional mindfulness, Sue experienced mild improvement in dispositional mindfulness, which was not statistically significant from baseline to post-intervention. Hypothesis 4, which addresses if positive effects in externalizing behaviors and attentional problems will be maintained at one month (two months in Sue's case) following the mindfulness intervention, was supported for both externalizing behaviors and attention problems on the BASC-3 FM. Sue did not complete other measures for follow-up data.

Overall, the intervention proved to be successful for all three participants based on multiple methods of self-report and performance measures. All participants reported

improvement in externalizing behaviors at post-intervention, and those results were maintained at follow-up. Sue did not report attention problems at baseline or intervention, but she reported sub-clinical improvement at follow-up. The computerized assessment for John and Beth indicated significant improvement in attention at post-intervention. Beth yielded mixed results at follow-up, which she attributed to a lack of sleep received the previous night. Furthermore, John and Beth showed significant improvements in dispositional mindfulness after the intervention was completed.

## CHAPTER V

### DISCUSSION

The purpose of this study was to examine the efficacy of a mindfulness intervention in ameliorating externalizing behaviors and attention problems among college students. Based on the visual analysis and multiple non-parametric methods used to analyze the obtained data, this chapter will present a discussion of the results and implications for psychological practice, limitations, and future directions for research.

#### **Summary of Results**

Overall, the mindfulness intervention, Mindfulness Based Stress Reduction (Kabat-Zinn, 1982), proved to be successful for all three participants based on multiple methods of self-report and performance measures of externalizing behaviors and attention problems. All participants reported improvement in externalizing behaviors at post-intervention, and those results were maintained at follow-up. One participant, Sue, did not report attention problems at baseline or intervention, but she reported sub-clinical improvement at follow-up. The computerized assessment of attention problems for both John and Beth indicated significant improvement in all or most areas of attention at post-intervention. However, at follow-up, Beth yielded mixed results, which she attributed to a lack of sleep received the previous night. Furthermore, John and Beth showed significant improvements in dispositional mindfulness after the intervention was

completed. The following section provides an overall, individual summary of results for each participant.

### **John**

Statistical analyses indicated that regardless of the method used, John experienced significant improvements in externalizing behaviors and attention concerns from baseline to post-intervention and follow-up. Furthermore, John reported significant improvements in dispositional mindfulness from baseline to post-intervention as well as follow-up. Overall, the intervention was deemed successful for John in ameliorating his reported externalizing behaviors and attention problems.

### **Beth**

Statistical analyses indicated that regardless of the method used, Beth experienced significant improvements in her externalizing behaviors from baseline to post-intervention and follow-up. Regarding attention problems, Beth reported clinically significant improvement in her attention problems from baseline to post-intervention and follow-up as measured via the rating scales. When her attention problems were measured via computerized testing, Beth reported significant improvement on two of the three scales; however, these improvements were not maintained at follow-up. Beth mentioned after completing those assessments that her performance on the follow-up administration may have been impacted by a lack of sleep she received the previous night. Overall, the intervention was successful for Beth in ameliorating her reported externalizing behaviors and attention problems, but it yielded mixed results on computerized testing of attention

problems. Statistical analysis indicated Beth experienced significant improvements in dispositional mindfulness from baseline to post-intervention.

### **Sue**

Statistical analyses indicated Sue experienced significant improvements in externalizing behaviors from baseline to intervention and follow-up. Sue did not report clinically significant attention problems at baseline across the three instruments used. Interestingly, she reported significant sub-clinical improvement in her attention problems at follow-up after two months. Although Sue did not report attention problems on the computerized testing, she demonstrated some concerns with inattentiveness and impulsivity on the auditory component of computerized testing, at post-intervention. These elevations may be attributed to test fatigue as Sue's other testing did not indicate any concerns with attention problems at any other point through the course of the study across all instruments. Statistical analysis indicated Sue experienced mild improvement in dispositional mindfulness, which was not statistically significant from baseline to post-intervention.

Research has demonstrated that mindfulness-based interventions have proven to be effective with a variety of emotional and behavioral concerns. Therefore, it is expected that the current mindfulness intervention (MBSR) would be successful in effectively addressing behavioral and attention concerns of college students. O'Driscoll et al. (2017) conducted a meta-analytic review to examine the evidence on mindfulness-based interventions on health and social care undergraduate students. In 10 out of 11 studies, short-term benefits relating to stress and mood were reported. Additionally,



mindfulness-based interventions were efficacious in improving well-being, coping strategies, and self-compassion. The effectiveness of brief mindfulness-based interventions indicated there was no significant relationship between the number of hours required in mindfulness classes and the measured effect on psychological problems (Carmody & Baer, 2009). The current study involved an abbreviated version of MBSR in consideration of college students' multiple responsibilities and busy schedules. All three participants persisted through the end of the intervention, and frequently shared during the sessions how this mindfulness approach and techniques were helping them in improving their behavioral and attention concerns. They voluntarily shared how they found it worthwhile attending each session despite long hours of academic obligations each day. Participants often stated how the mindfulness session was the best part of their day, and how they could see that it was starting to impact their overall well-being and life in general. For instance, John shared that regular mindfulness practice helped him to improve his attention and concentration for the first time in his life; subsequently, he reported his academic performance and overall well-being were also positively impacted. Both Beth and Sue shared how paying attention to the present moment amidst conflictual situations helped them make better decisions in a calm manner.

As past research has shown, mindfulness training brings about changes in self-perception by creating an attentive awareness and a non-judgmental attitude (Lakey et al., 2008). These changes help individuals revise perspectives about their social context, shifting them to more adaptive ways of interaction (Brown et al., 2008). All three participants reported changes in their own self-perception. Mindfulness research has also

demonstrated that it helps in attenuating defensive responses to social situations that are perceived as socially threatening. As would then be expected, all the participants unanimously reported less defensiveness when interacting with others, which reportedly improved their inter-personal interactions. Therefore, as consistent with the literature on mindfulness, these participants demonstrated improvement in their behavioral concerns by participating fully in this study.

While mindfulness-based interventions have positive outcomes, several limitations have also been noted in mindfulness research. O'Driscoll et al. (2017) noted some limitations based on the meta-analysis of eleven mindfulness studies conducted on college students with psychological problems. Most of the studies lacked a long-term follow-up with the exception of two studies that included a measurement of long-term effect at six months (Erogul et al., 2014; Phang et al., 2015). These two studies failed to demonstrate maintained improvement in psychological concerns, which raises a question about the ability to maintain benefits of mindfulness intervention. Therefore, O'Driscoll et al. (2017) recommended more research to examine sustained results with mindfulness intervention. A strength of the current study is that it collected follow-up data from participants at an interval of one month and two months. The follow-up results for all three participants indicated an improvement in reported externalizing behaviors and attention problems. However, it should be pointed out that the direct computerized assessment of attention problems yielded mixed results for Beth at follow-up. It is also noteworthy that the computerized assessments were given as a snap shot of attentional functioning at a point in time, whereas, the rating scales were administered multiple times

across a period of time. By obtaining data at multiple time-points during the course of a week, a more stable data pattern may be expected. In contrast, an isolated computerized assessment may be influenced by contextual factors.

Another strength of the study is collecting relevant critical information about participant characteristics. Maggin, Briesch, Chafouleas, Ferguson, and Clark (2013) discussed the importance of thoroughly reporting relevant critical information about participant characteristics, settings, and baseline data, as well as objectively defining the dependent variables in SCD research. This information aids the researcher in informing the consumers about the applicability of findings. Therefore, this study included collecting relevant demographic and setting details via a demographic survey and a brief interview. For instance, all three participants were enrolled in their first year of college, and all of them had experienced emotional-behavioral problems in the past. While each had received some intervention to address their concerns in the past, none had previous experience with a mindfulness intervention. Even though one participant had tried yoga as a physical exercise, it was experienced without the mindfulness framework, which is training to pay attention to the present in a non-judgmental way. He found it difficult to do yoga and did not continue it beyond a brief exposure. Thus, the results of the study suggest the potential usefulness of mindfulness intervention for college students with behavioral and attentional problems even if they have no prior experience with such an intervention.

### **Limitations of Study**

Even though the intervention yielded positive results, this study is not without limitations. First, the sample size was small and limited to participants recruited from a university in North Texas, which implies the sample is not representative of the United States' population and may not generalize to other students experiencing externalizing behaviors and attentional problems in other parts of the country. The sample of participants was fairly homogeneous (i.e., Hispanic, first-year college students), and so the results may be difficult to generalize to student populations of different races and ethnicities, or older students. Furthermore, due to the homogeneity of the sample, an important question arises as to whether this type of intervention is more suited to some cultures than others.

In addition to the limitations related to the sample, there are also limitations identified that are related to the research design used to analyze the data. While SCD offers several advantages in studying the effects of the intervention on the target behavior, it potentially threatens the external validity of the conclusions (Hitchcock et al., 2015). Further, there were some potential threats to external validity in the current study. This study lacked a control group of students identified as experiencing problems with externalizing behaviors and attention problems, who did not participate in the mindfulness intervention for comparison. Typically, this prevents the researcher from attributing post-intervention effects solely to the intervention. The intervention was delivered across four weeks, and data were collected over a period of six weeks for the first three phases. The possibility of the presence of other factors that may have occurred

in the lives of participants and their influence on the participant's externalizing behaviors and attention during the course of the semester cannot be ruled out either.

In SCD research, essentially, the baseline phase is regarded as the "control" as it represents the absence of the intervention (Kratochwill et al., 2013). Furthermore, a number of ratings were collected at baseline and at intervention as recommended by Kratochwill et al. (2013). Just as larger sample sizes are desirable as they are more likely to represent the population being studied, a larger number of data points are also desired as they are more likely to represent the population of behavior for each participant, especially if there is minimal variability among scores (Kratochwill & Levin, 2014). This study did not allow returning to baseline by allowing another period of no intervention and re-introducing mindfulness sessions again. This would have allowed a comparison of post-intervention results twice and potentially more evidence to solely attribute the results to the intervention.

Chiesa et al. (2011) discussed the role of confounding factors, including motivation and stress-reduction in experiments utilizing mindfulness-based interventions. Some factors that could potentially interfere with the results of this study were the ability to sustain motivation, and to cope with life-changes during the period of study. All three participants persisted through the course of the study, which required a commitment of approximately nine hours over a period of several weeks. Given the multiple and challenging demands of the first semester of college and the time required to complete this study, this was a time-intensive commitment. Yet, each participants' persistence in completing the intervention suggests a high motivation and need for help, which may not

be universally present amongst the population at large. At the same time, participants must see value in the effectiveness of the intervention in order to continue and complete the intervention. For instance, the fourth participant could not complete the required number of sessions as well as assessments due to their reported multiple responsibilities at that time of the semester.

Tang and Posner (2013) discuss several of the problems with the methodology of mindfulness research being related to its lack of an adequately matched control group, a lack of uniformity in the mindfulness techniques and strategies being used, and a variation in stages of mindfulness training in which research participants find themselves. These factors are believed to have not been considered when many researchers design studies with mindfulness intervention due to a lack of standardized protocols for mindfulness interventions (Tang & Posner, 2013). Although the researcher is relatively new to the MBSR program, which could have impacted the delivery of the intervention, the intervention covered all techniques taught in the 8-week MBSR course developed by Kabat-Zinn (1982) and as listed in the MBSR Authorized Curriculum Guide published by the University of Massachusetts Center of Mindfulness (Santorelli et al., 2017), including experiential learning, reflection on perception, stress physiology, stress reactivity, responding, and communicating in each session.

The current study also has limitations regarding the selected instruments. A customized scale was constructed for the purposes of this study using the BASC-3 FM. The BASC-3 FM is normed on individuals up to 18 years of age while this study included participants in the age range of 18 to 19 years of age. Furthermore, the BASC-3 FM

presents with good psychometric properties, although there is no published research on these customized scales and perhaps an alternative scale with more extensive research on its psychometric properties would have been a better selection. Notably, however, an insignificant difference is expected in means for the age group of 18-22 given data also collected during the standardizing on persons up through age 21 (C. Reynolds, personal communication, November 16, 2017). Moreover, the current study intended to measure post-intervention change, which was estimated by calculating the RCI value for the BASC-3 FM composites.

Similarly, there is no currently published empirical research on using the CPT-3 with the adult population; however, research has been conducted with the previous version, the CPT-2, which is a similar instrument. Fasmer et al. (2016) conducted a study to examine attentional problems, mood, and anxiety concerns on adults ( $n = 99$ ) in the age range of 18 to 65 years diagnosed with ADHD. The study utilized the CPT-2 and the cyclothymic temperament scale. When compared to the control group, patients with ADHD had more omission and commission errors and higher reaction time variability on the CPT-2. Based on their results, Fasmer et al. (2016) concluded that the CPT-2 is a useful instrument in the assessment of adults with ADHD. Because the CPT-3 is an updated version of the CPT-2, it could be expected that the newer version would give similar results. Another limitation of the CPT-3 and the CATA is that these two instruments detect statistical significance at  $p < .10$  values, which gives them a lower sensitivity to detect small changes, as compared to the other instruments that detected statistical significance at  $p < .05$ .

## **Future Directions**

Based on the findings of the present study, future studies can expand on the outcomes with regard to mindfulness as an effective intervention to address externalizing behavior and attention problems. As previously noted, this study has limited generalizability to other parts of the country and other cultural groups. Future research should examine the efficacy of mindfulness in addressing concerns among students within an urban environment, different cultural groups, as well as different age groups. O'Driscoll et al. (2017) suggested future research directions with mindfulness interventions as demonstrating long-term effect, need for heterogeneous samples in terms of participation in a variety of courses, and a clear explanation of the role played by gender and personality variables in determining the outcome of interventions. This study attempted to build some on those directions and future studies should expand even further.

Externalizing behaviors targeted in this study included anger control, hyperactivity, and inattention. Future research should examine how mindfulness may address alternate manifestations of externalizing behaviors with reference to the specific population being studied. Furthermore, additional variables can be studied to gain a comprehensive understanding of the impact of mindfulness intervention on emotional and behavioral problems. Due to a co-occurrence of disorders, it is important to study multiple variables simultaneously to gain a comprehensive understanding of psychopathology (Meyers et al., 2013). Externalizing behaviors have underlying emotional, psycho-pathological, and organic factors (Jiron, 2009), and future studies



may study the effect of mindfulness intervention on comorbidly present internalizing behaviors such as anxiety and depression.

The age group of the participants in the current study, between 18 and 19 years, is also seen as a limitation. Even though the focus of the current study was a population of first-year college students, the application of this intervention may be expected to be extended downward to secondary students. This has implications for psychologists serving adolescents within the school settings as well as for private practice. For instance, school psychologists may consider applying mindfulness-based intervention to students attending high school with attention problems and externalizing behaviors. Furthermore, individual mindfulness-based strategies can be incorporated into the individualized education plans of students with special needs with regard to attentional and behavioral concerns.

Finally, future research can examine how mindfulness may be implemented within the college education system. Approximately half of the college population meets criteria for at least one psychological disorder, indicating a high need to develop and apply treatment approaches for college students (Rizvi & Steffel, 2014). Therefore, it is critical to find effective and efficient interventions that can be applied to the college population. Mindfulness has traditionally been implemented in either an individual or group therapy format. Future studies could examine the utility of mindfulness-based strategies such as deep breathing and stress awareness, singularly. These strategies can be adopted by university counseling centers to help college students deal with emotional, behavioral, and attentional problems. Furthermore, these strategies can be implemented

during a portion of a class period or other opportunities where students gather together. Martin (2018), in her article on community college students, discussed the benefit of utilizing mindfulness in classrooms to facilitate a connection amongst students with their own internal processes. Consequently, this connection potentially facilitates better learning outcomes for community college students, who come from diverse backgrounds and have tendencies to be self-critical (Martin, 2018). Therefore, future studies may investigate the implementation of mindfulness with larger groups of students in a classroom format across a variety of educational settings.

### **Conclusions and Implications**

This study examined the efficacy of MBSR (Kabat-Zinn, 1982) as an intervention to address externalizing behaviors and attention problems among first-year college students. The results of the study suggest that mindfulness is a promising intervention to address externalizing behaviors and attention problems. The MBSR intervention was implemented with college students, and due to its narrow focus, the results may not be as generalizable, outside of that setting. Future research may investigate externalizing behaviors in specific contexts as well as the efficacy of mindfulness in addressing externalizing behaviors among culturally different students.

This study provides a significant contribution to the current research base to determine if college students are able to attain as well as maintain the benefits of a mindfulness intervention over a period of one to two months. As such, practitioners and researchers are continuously involved in pursuits to develop more effective intervention approaches to address attentional and behavioral concerns, and mindfulness may be a

viable venue for further exploration and application. Ethical guidelines listed by various psychological organizations indicate evidence-based interventions as the best practice for psychologists (Shaw & D’Intino, 2017), which further suggests the significance of the current study is paramount to the knowledge of effective interventions and the discipline of psychology. Importantly, research pertaining to interventions for externalizing behaviors mainly consists of efficacy trials, which fail to address the complexities of mental health care in real-world settings (Stoltz et al., 2012). Therefore, the current study adds to the empirical knowledge base of the potential efficacy of mindfulness-based intervention. Behavioral and pharmacological interventions have proven to be useful for treating attentional disorders, but they have several limitations such as short-term benefits, a lack of generalizability, treatment fidelity issues, and side effects of medications (Van de Weijer-Bergsma et al., 2012). Given sustained improvements in behavioral and attentional concerns demonstrated in this study, mindfulness-based interventions may be promising in countering some of the limitations of the traditional approaches.

Overall, the results of this study contribute critical insight into the use of mindfulness as an intervention, specifically for college students with attentional and behavioral problems. Based on the growing mental health needs of college students, Rizvi and Steffel (2014) raised the need to develop treatment approaches to alleviate psychological concerns in the college population while considering the limitations of college life.

From a theoretical perspective, “mindfulness” may be viewed as a mental characteristic that potentially develops self-regulation by optimizing top-down processes such as memory, while addressing bottom-up influences such as anxiety (Zelazo & Lyons, 2012). From a philosophical standpoint, the study addresses the question of whether individuals can be trained to pay attention to the present in a non-judgmental way. Further, the question of whether this trainable quality of mindfulness could be helpful in ameliorating externalizing behaviors and attentional concerns has been successfully addressed with these participants. Evidently, a mindfulness-based intervention could be a potential answer to helping individuals who display a wide array of concerns in the educational environment.

## REFERENCES

- Achenbach TM. Manual for the Child Behavior Checklist/4-18 and 1991 profile. Burlington: Department of Psychiatry, University of Vermont; 1991.
- Akiskal, H. S., Akiskal, K. K., Haykal, R. F., Manning, J. S., & Connor, P. D. (2005). TEMPS-A: Progress towards validation of a self-rated clinical version of the Temperament Evaluation of the Memphis, Pisa, Paris, and San Diego Autoquestionnaire. *Journal of Affective Disorders, 85*(1), 3-16.
- American Psychiatric Association. (1994). Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). 4th Ed. Washington DC: American Psychiatric Press.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorder* (5th ed.). Washington, DC: Author.
- American Psychological Association. (2017). *Ethical principles of psychologists and code of conduct: 2017 amendments*. Retrieved from <http://www.apa.org/ethics/code/ethics-code-2017.pdf>
- Anastasi, A., & Urbina, S. (1997). *Psychological Testing* (7th ed.). Upper Saddle River, NJ: Prentice Hall.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*, 469-480. doi:10.1037/0003-066X.55.5.469
- Bandura, A. (1965). Influence of model's reinforcement contingencies on the acquisition of imitative responses. *Journal of Personality and Social Psychology, 1*, 589-595.

- Barkley, R. A., Murphy, K. R., & Fischer, M. (2008). *ADHD in adults: What the science says*. New York, NY: Guilford Press.
- Barlow, D. H. (2000). Unraveling the mysteries of anxiety and its disorders from the perspective of emotion theory. *American Psychologist, 55*, 1247-1263.
- Bauer, S., Lambert, M. J., & Nielsen, S. L. (2004). Clinical significance methods: A comparison of statistical techniques. *Journal of Personality Assessment, 82*, 60-70. doi: 10.1207/s15327752jpa8201-11
- Baylis, P. J. (2006). The the neurobiology of affective interventions: A cross theoretical model. *Clinical Social Work Journal, 34*(1), 61-81. doi:10.1007/s10615-005-0002-8
- Blanco, C., Okuda, M., Wright, C., Hasin, D., Grant, B., Liu, S., & Olfson, M. (2008). Mental health of college students and their non-college-attending peers: Results from the national epidemiologic study on alcohol and related conditions. *Archives of General Psychiatry, 65*(12), 1429-1437.
- Belsky, J., Pasco, F., & Bell, B. (2007). Parenting, attention and externalizing problems: Testing mediation longitudinally, repeatedly and reciprocally. *Journal of Child Psychology, 48*(12), 1233-42.
- Benjamin, C. L., Puleo, C. M., Settapani, C. A., Brodman, D. M., Edmunds, J. M., Cummings, C. M., & Kendall, P. C. (2011). History of cognitive-behavioral therapy (CBT) in youth. *Child and Adolescent Psychiatric Clinics of North America, 20*(2), 179-189. doi:10.1016/j.chc.2011.01.011

- Bergen-Cico, D., Possemato, K., & Cheon, S. (2013). Examining the efficacy of a brief mindfulness based stress reduction (Brief MBSR) program on psychological health. *Journal of American College Health, 61*, 348-360.
- Bögels, S., Hoogstad, B., van Dun, L., de Schutter, S., & Restifo, K. (2008). Mindfulness training for adolescents with externalizing disorders and their parents. *Behavioural and Cognitive Psychotherapy, 36*(2), 193-209. doi: 10.1017/S1352465808004190.
- Bongers, I.L., Koot, H.M., van der Ende, J., & Verhulst, F.C. (2004). Developmental trajectories of externalizing behaviors in childhood and adolescence. *Child Development, 75*, 1523-1537.
- Braden, B. B., Pipe, T. B., Smith, R., Glaspy, T. K., Deatherage, B. R., & Baxter, L. C. (2016). Brain and behavior changes associated with an abbreviated 4-week mindfulness-based stress reduction course in back pain patients. *Brain and Behavior, 6*(3), e00443. doi:10.1002/brb3.443
- Brossart, D. F., Vannest, K. J., Davis, J. L., & Patience, M. A. (2014). Incorporating nonoverlap indices with visual analysis for quantifying intervention effectiveness in single-case experimental designs. *Neuropsychological Rehabilitation, 24* (3-4), 464-491. doi:10.1080/09602011.2013.868361
- Brown, K.W., & Ryan, R.M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822-848. doi:10.1037/0022-3514.84.4.822

- Brown, K. W., Ryan, R. M., Creswell, J. D., & Niemiec, C. P. (2008). Beyond me: Mindful responses to social threat. In H. A. Wayment & J. J. Bauer (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 75-84). Washington, DC: American Psychological Association.
- Busse, R. T., McGill, R. J., & Kennedy, K. S. (2015). Methods for assessing single-case school-based intervention outcomes. *Contemporary School Psychology, 19*, 136-144. doi:10.1007/s40688-014-0025-7
- Carlson, L. E & Brown, K. W. (2005). Validation of the Mindful Attention Awareness Scale in a cancer population. *Journal of Psychosomatic Research, 58*, 29-33.
- Carmody, J., & Baer, R. A. (2009). How long does a mindfulness-based stress reduction program need to be? A review of class contact hours and effect sizes for psychological distress. *Journal of Clinical Psychology, 65*(6), 627-638. doi:10.1002/jclp.2055
- Carragher, N., Krueger, R., Eaton, F., & Slade, N. (2015). Disorders without borders: Current and future directions in the meta-structure of mental disorders. *Social Psychiatry and Psychiatric Epidemiology, 50*(3), 339-350.
- Chiesa, A., Calati, R., & Serretti, A. (2011). Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical Psychology Review, 31*, 449-464.
- Coelho, H. F., Canter, P. H., & Ernst, E. (2013). Mindfulness-based cognitive therapy: Evaluating current evidence and informing future research. *Psychology of*



*Consciousness: Theory, Research, and Practice, 1*, 97-107. doi:10.1037/2326-5523.1.S.97

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Conners, C. K. (2014). *Conners' Performance Test, 3rd Edition Manual*. Toronto, Ontario, Canada: Multi-Health Systems.

Connor, D. F. (2002). *Aggression and antisocial behavior in children and adolescents: Research and treatment*. New York, NY: Guilford.

Costello, E. J., & Angold, A. C. (2000). Developmental epidemiology: A framework for developmental psychopathology. In A. J. Sameroff & M. Lewis (Eds.), *Handbook of developmental psychopathology* (2nd ed., pp. 57–73). New York, NY: Kluwer Academic/Plenum.

Crane, R. S., Soulsby, J. G., Kuyken, W., Williams, J. M. G., & Eames, C. (2012). The Bangor, Exeter & Oxford Mindfulness-Based Interventions Teaching Assessment Criteria (MBI-TAC) for assessing the competence and adherence of mindfulness-based class-based teaching. Retrieved from <http://mindfulnessteachersuk.org.uk/pdf/MBI-TACJune2012.pdf>

Do, T. (2011). *Mindfulness-based stress reduction (MBSR): A qualitative study of MBSR with older adults (Doctoral dissertation)*. Retrieved from ProQuest Dissertations & Theses Global. (886472519).

- Dobkin, P. L., Hickman, S., & Monshat, K. (2013). Holding the heart of mindfulness-based stress reduction: Balancing fidelity and imagination when adapting MBSR. *Mindfulness, 5*, 710. doi:10.1007/s12671-013-0225-7
- Ellis, A. (1962). *Reason and emotion in psychotherapy*. Secaucus, NJ: Lyle Stuart.
- Erogul, M., Singer, G., McIntyre, T., & Stefanov, D. G. (2014). Abridged mindfulness intervention to support wellness in first-year medical students. *Teaching and Learning in Medicine, 26*, 350–356. doi:10.1080/10401334.2014.945025
- Fasmer, O., Mjeldheim, K., Førland, W., Hansen, A., Syrstad, V., Oedegaard, K., & Berle, J. (2016). Linear and non-linear analyses of Conner's continuous performance test-II discriminate adult patients with attention deficit hyperactivity disorder from patients with mood and anxiety disorders. *BMC Psychiatry, 16*, 284. doi:10.1186/s12888-016-0993-4
- Felder, J. N., Dimidjian, S., & Segal, Z. (2012). Collaboration in mindfulness-based cognitive therapy. *Journal of Clinical Psychology, 68*, 179–186. doi:10.1002/jclp.21832
- Felver, C. J., Doerner, E., Jones, J., Kaye, N. C., & Merrell, K. (2013). Mindfulness in school psychology: Applications for intervention and professional practice. *Psychology in the Schools, 50*, 531-547.
- Fleming, A., & McMahon, P. (2012). Developmental context and treatment principles for ADHD among college students. *Clinical Child and Family Psychology Review, 15*(4), 303-329.

- Frick, P. J., Lahey, B. B., Loeber, R., Tannenbaum, L., Van Horn, Y., Christ, M. A. G., ...Hanson, K. (1993). Oppositional defiant disorder and conduct disorder: A meta-analytic review of factor analyses and cross-validation in a clinical sample. *Clinical Psychology Review, 13*, 319-340.
- Giluk, T. L. (2009). Mindfulness, big five personality, and affect: A meta-analysis. *Personality and Individual Differences, 47*, 805-811. doi: 10.1016/j.paid.2009.06.026
- Gratz, K.L. & Roemer, L. (2004). *Journal of Psychopathology and Behavioral Assessment* 26-41. doi:10.1023/B:JOBA.0000007455.08539.94
- Hart, R., Ivtzan, I., & Hart, D. (2013). Mind the gap in mindfulness research: A comparative account of the leading schools of thought. *Review of General Psychology, 17*, 453-466.
- Haskett, M., & Willoughby, M. (2007). Paths to child social adjustment: Parenting quality and children's processing of social information. *Child: Care, Health and Development, 33*(1), 67-77.
- Heiligenstein, E., Guenther, G., Levy, A., Savino, F., & Fulwiler, J. (1999). Psychological and academic functioning in college students with attention deficit hyperactivity disorder. *Journal of American College Health, 47*, 181-185. doi: 10.1080/07448489909595644
- Hesslinger, B., Tebartz van Elst, L., Nyberg, E., Richter, H., Berner, M., & Ebert D. (2002). Psychotherapy of attention deficit hyperactivity disorder in adults: A pilot

- study using a structured skills training program. *European Archives of Psychiatry and Clinical Neurosciences*, 252(4), 177-184. doi:10.1007/s00406-002-0379-0
- Hitchcock, J. H., Kratochwill, T. R., & Chezan, L. C. (2015). What works clearinghouse standards and generalization of single-case design evidence. *Journal of Behavioral Education*, 24, 459-469. doi:10.1007/s10864-015-9224-1
- Homack, S. & Riccio, C. A. (2006). Conners' continuous performance test (2nd ed.; CCPT-II). *Journal of Attention Disorders*, 9(3), 556-558. doi: 10.1177/1087054705283578
- Howard, A., Strickland, N., Murray, D., Tamm, L., Swanson, J., Hinshaw, S., . . . Molina, B.S.G. (2016). Progression of impairment in adolescents with attention-deficit/hyperactivity disorder through the transition out of high school: Contributions of parent involvement and college attendance. *Journal of Abnormal Psychology*, 125(2), 233-247. doi:10.1037/abn0000100
- Jacob, C., Gross-Lesch, S., Jans, T., Geissler, J., Reif, A., Dempfle, A., & Lesch, K. (2014). Internalizing and externalizing behavior in adult ADHD. *ADHD Attention Deficit and Hyperactivity Disorders*, 6(2), 101-110. doi: 10.1007/s12402-014-0128-z
- Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59(1), 12-19. doi:10.1037/0022-006X.59.1.12

- Jensen, C. G., Vangkilde, S., Frokjaer, V., & Hasselbalch, S. G. (2012). Mindfulness training affects attention--Or is it attentional effort? *Journal of Experimental Psychology: General*, *141*(1), 106-23. doi:10.1037/a0024931.
- Jiron, C. (2009). Assessing and intervening with children with externalizing disorders, in best practices in school neuropsychology. *Guidelines for Effective Practice, Assessment, and Evidence-Based Intervention*. D. C. Miller (Ed.). Hoboken, NJ: John Wiley & Sons, Inc. doi:10.1002/9781118269855.ch15
- Kabat-Zinn, J. (1982) An out-patient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry*, *4*, 33–47.
- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York, NY: Delta Trade Paperbacks.
- Kabat-Zinn, J. (2003) Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, *10*, 144-156.  
doi:10.1093/clipsy.bpg016
- Kessler, R., Adler, L., Ames, M., & Barkley, R., Bernbaum H., Greenberg, P....Ustun, T. B. (2005). The prevalence and effects of adult attention deficit/hyperactivity disorder on work performance in a nationally representative sample of workers. *Journal of Occupational Environmental Medicine*, *47*, 565–72. doi: 10.1097/01.jom.0000166863.33541.39

- Knouse, L., Teller, J., & Brooks, M. (2017). Meta-analysis of cognitive-behavioral treatments for adult ADHD. *Journal of Consulting and Clinical Psychology, 85*, 737-750. doi:10.1037/ccp0000216.
- Kolar, D., Keller, A., Golfopoulos, M., Cumyn, L., Syer, C., & Hechtman, L. (2008). Treatment of adults with attention-deficit/hyperactivity disorder. *Neuropsychiatric Disease and Treatment, 4*(2), 389-403.
- Kraemer, H. C., Yesavage, J. A., Taylor, J. L., & Kupfer, D. (2000). How can we learn about developmental processes from cross-sectional studies, or can we? *American Journal of Psychiatry, 157*(2), 163-171. doi:10.1176/appi.ajp.157.2.163
- Kratochwill, T. R., & Levin, J. R. (Eds.). (2014). *School psychology series. Single-case intervention research: Methodological and statistical advances*. Washington, DC, US: American Psychological Association. doi: 10.1037/14376-000
- Kratochwill, T. R., Hitchcock, J. H., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2013). Single-case intervention research design standards. *Remedial and Special Education, 34*(1), 26-38. doi: 10.1177/0741932512452794
- Krueger, R. F., McGue, M., & Iacono, W. G. (2001). The higher-order structure of common DSM mental disorders: Internalization, externalization, and their connections to personality. *Personality and Individual Differences, 30*(7), 1245-1259.
- Lakey, C. E., Kernis, M. H., & Heppner, W. L., & Lance, C. E. (2008). Individual differences in authenticity and mindfulness as predictors of verbal defensiveness.

*Journal of Research in Personality*, 42(1), 230-238.

doi:10.1016/j.jrp.2007.05.002

Lynch, T. R., Chapman, A. L., Rosenthal, M. Z., Kuo, J. R., & Linehan, M. M. (2006).

Mechanisms of change in dialectical behavior therapy: Theoretical and empirical observations. *Journal of Clinical Psychology*, 62(4), 459–480.

doi:10.1002/jclp.20243

Maggin, D. M., Briesch, A. M., Chafouleas, S. M., Ferguson, T. D., & Clark, C. (2013).

A comparison of rubrics for identifying empirically supported practices with single-case research. *Journal of Behavioral Education*, 23(2), 287–311.

doi:10.1007/s10864-013-9187-z

Malinowski, P. (2013). Neural mechanisms of attentional control in mindfulness meditation. *Frontiers in Neuroscience*, 7(6), 1-11.

Martin, M. (2018). Mindfulness and transformation in a college classroom. *Adult*

*Learning*, 29(1), 5–10. doi:10.1177/1045159517744752

McGill, R. J. (2017). Single-case design and evaluation in R: An introduction and tutorial

for school psychologists. *International Journal of School and Educational Psychology*, 5(1), 39-51. doi:10.1080/21683603.2016.1173610

McGough, J., Smalley S., McCracken, J.T., Yang M., Del'Homme M., Lynn D. E., &

Loo, S. (2005). Psychiatric comorbidity in adult attention deficit hyperactivity

disorder: Findings from multiplex families. *American Journal of Psychiatry*, 162, 1621-1627.

- Meany-Walen, K., & Teeling, S. (2016). Adlerian play therapy with students with externalizing behaviors and poor social skills. *International Journal of Play Therapy, 25*(2), 64-77. doi: 10.1037/pla0000022
- Meyers, L. S., Gamst, G., & Guarino, A. J. (2013). *Applied multivariate research: Design and interpretation*.(2nd ed.). Thousand Oaks, CA: SAGE Publications.
- Murray, J., Irving, B., Farrington, D. P., Colman, I., & Bloxsom, C. A. J. (2010). Very early predictors of conduct problems and crime: Results from a national cohort study. *The Journal of Child Psychology and Psychiatry, 51*, 1198-1207. doi: 10.1111/j.1469-7610.2010.02287.x
- O'Driscoll M., Byrne A., Gillicuddy, M., Lambert, S., & Sahm, L. J. (2017). The effects of mindfulness-based interventions for health and social care undergraduate students – A systematic review of the literature. *Psychology, Health & Medicine, 22*, 851-865. doi:10.1080/13548506.2017.1280178
- Parker, R. I., & Vannest, K. J. (2009). An improved effect size for single case research: Non-overlap of all pairs (NAP). *Behavior Therapy, 40*(4), 357-367
- Parker, R. I., Vannest, K. J., Davis, J. L., & Sauber, S. B. (2011). Combining nonoverlap and trend for single case research: Tau-U. *Behavior Therapy, 42*(2), 284-299. doi:10.1016/j.beth.2010.08.006
- Patterson, G. R. (1982). *Coercive family process*. Eugene, OR: Castalia.
- Phang, C. K., Mukhtar, F., Ibrahim, N., Keng, S.-L., & Mohd. Sidik, S. (2015). Effects of a brief mindfulness-based intervention program for stress management among medical students: The mindful-gym randomized controlled study. *Advances in*



*Health Sciences Education: Theory and Practice*, 20, 1115-34.

doi:10.1007/s10459-015-9591-3

Prakash, R.S., Hussain, M. A., & Schirda, B. (2015). The role of emotion regulation and cognitive control in the association between mindfulness disposition and stress.

*Psychology and Aging*, 30(1), 160-171.

Quaglia, J. T., Brown, K. W., Lindsay, E. K., Creswell, D., & Goodman, R. J. (2014).

From conceptualization to operationalization of mindfulness. *Journal of*

*Psychophysiology*, 25(4), 180-189.

Radvansky, G.A., & Ashcraft, M. H. (2014). *Cognition*. Upper Saddle River, NJ: Pearson Education Inc.

Rakap, S. (2015). Effect sizes as result interpretation aids in single-subject experimental research: Description and application of four nonoverlap methods. *British Journal of Special Education*, 42, 11-33. doi:10.1111/1467-8578.12091

Reef, J., Diamantopoulou, S., Meurs, I. V., Verhulst, F. C., & Ende, J. v. (2011).

Developmental trajectories of child to adolescent externalizing behavior and adult

DSM-IV disorder: Results of a 24-year longitudinal study. *Social Psychiatry and*

*Psychiatric Epidemiology*, 46(12), 1233-41. Retrieved from

<https://ncbi.nlm.nih.gov/pmc/articles/pmc3214259>

Reynolds, C.R. & Kamphaus, R.W. (2015). Behavior Assessment System for Children (3rd ed.) [Assessment instrument]. Bloomington, MN: Pearson.

- Riley-Tillman, T. C., & Burns, M. K. (2009). *Evaluating educational interventions: single-case design for measuring response to intervention*. New York, NY: Guilford Press.
- Rizvi, S., & Steffel, L. (2014). A pilot study of two brief forms of DBT skills training for emotion dysregulation in college students. *Journal of American College Health, 62*, 434-439. doi: 10.1080/07448481.2014.907298
- Safren, S. (2006). Cognitive-behavioral approaches to ADHD treatment in adulthood. *The Journal of Clinical Psychiatry, 67*(8), 46-50.
- Santorelli, S. F., Meleo-Meyer, F., & Koerbel, L. (2017). *Mindfulness-based stress reduction (MBSR) authorized curriculum guide*. Retrieved from <https://umassmed.edu/cfm/training/mbsr-curriculum/>
- Schmitt, A. L., Livingston, R. B., Dykes, F., Scott, B. M., Galusha, J. M., Hua, S. B., & Garland, A. D. (2013). A theoretical model for measuring change: Reliable change index. *Research and Practice in the Schools, 1*, 8-14. Retrieved from <https://www.txasp.org>
- Semple, R. J., Lee, J., Rosa, D., & Miller, L. F. (2010). A randomized trial of mindfulness-based cognitive therapy for children: Promoting mindful attention to enhance social-emotional resiliency in children. *Journal of Child and Family Studies, 19*(2), 218-229.
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*, 373-386. doi: 10.1002/jclp.20237

- Shaw, S. R., & D'Intino (2017). Evidence-based practice and the reproducibility crisis in psychology. *NASP Communique*, 45(5), 23-24.
- Singh, I. (2008). Beyond polemics: Science and ethics of ADHD. *Nature Reviews Neuroscience*, 9, 957–964.
- Smith, J. D. (2012). Single-case experimental designs: A systematic review of published research and current standards. *Psychological Methods*, 17(4), 1-70. doi: 10.1037/a0029312
- Sobanski E. (2006). Psychiatric comorbidity in adults with attention-deficit/hyperactivity disorder (ADHD). *European Archives of Psychiatry Clinical Neuroscience*, 256(1), 26–31.
- Spencer, T., Biederman, J., Wilens, T., Doyle, R., Surman, C., Prince, J., ... Faraone, S. (2005). A large, double-blind, randomized clinical trial of methylphenidate in the treatment of adults with attention-deficit/hyperactivity disorder. *Biological Psychiatry*, 57, 456–63. doi:10.1016/j.biopsych.2004.11.043
- Steglitz, J., Wright, J. D., Warnick, J. L., Hoffman, S. A., Johnston, W., & Spring, B. (2015). Evidence-based practice. In J.D. Wright (Ed.), *International encyclopedia of social and behavioral sciences* (2nd ed., pp. 332-338). London: Oxford Elsevier.
- Stoltz, S., van Londen, M., Dekovic, M., de Castro, B. O., Prinzie, P., Lochman, J. E. (2012). Effectiveness of an individual school-based intervention for children

with aggressive behaviour: a randomized controlled trial. *Behavioural and Cognitive Psychotherapy*, 41(5), 525-548. doi:10.1017/S1352465812000525

Sulkowski, M. L., & Joyce, D. J. (2012). School psychology goes to college: The emerging role of school psychology in college communities. *Psychology in the Schools*, 49, 809-815.

Tang, Y.-Y., & Posner, M. I. (2013). Special issue on mindfulness neuroscience. *Social Cognitive and Affective Neuroscience*, 8(1), 1–3. doi:10.1093/scan/nss104

Teasdale, J. D., Segal, Z. V., Williams, J. M. G., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology*, 68(4), 615-623.

doi: 10.1037/0022-006X.68.4.615

Thoma N., Pilecki B., & McKay D. (2015). Contemporary cognitive behavior therapy: A review of theory, history, and evidence. *Psychodynamic Psychiatry*, 43, 423-461. doi:10.1521/pdps.2015.43.3.423

Timmermans, M., van Lier, P.A., & Koot, H.M. (2008). Which forms of child/adolescent externalizing behaviors account for late adolescent risky sexual behavior and substance use? *Journal of Child Psychology and Psychiatry*, 49, 386–394.

Toppin, I. N. & Pullens, L. M. (2015). Reducing classroom disputes between faculty and students. *Journal of Instructional Research*, 4, 118-125.

- Van de Weijer-Bergsma, E., Formsma, A. R., de Bruin, E. I., & Bögels, S. M. (2012). The effectiveness of mindfulness training on behavioral problems and attentional functioning in adolescents with ADHD. *Journal of Child and Family Studies*, *21*, 775–787. doi:10.1007/s10826-011-9531-7
- Vannest, K.J., Parker, R.I., Gonen, O., & Adiguzel, T. (2016). Single Case Research: web based calculators for SCR analysis. (Version 2.0) [Web-based application]. College Station, TX: Texas A&M University. Retrieved Wednesday 7th August 2019. Available from [singlecaseresearch.org](http://singlecaseresearch.org)
- Watford, T. S., & Stafford, J. (2015). The impact of mindfulness on emotion dysregulation and psychophysiological reactivity under emotional provocation. *Psychology of Consciousness: Theory, Research, and Practice*, *2*(1), 90-109. doi:10.1037/cns0000039
- Weinstein N., Brown, K. W., & Ryan, R. M. (2009). A multi-method examination of the effects of mindfulness on stress attribution, coping, and emotional wellbeing. *Journal of Research in Personality*, *43*, 374-385.
- Wilens, T., McDermott, S., Biederman, J., Abrantes, A., Haahes, A., & Spencer, T. (1999). Cognitive therapy in the treatment of adults with ADHD: A systematic chart review of 26 cases. *Journal of Cognitive Psychotherapy: An International Quarterly*, *13*, 215-226.
- Williams, J. M. G., Russell, I., & Russell, D. (2008). Mindfulness-based cognitive therapy: Further issues in current evidence and future research. *Journal of*

*Consulting and Clinical Psychology*, 76, 524–529. doi: 10.1037/0022-006X.76.3.524

World Health Organization. (2010). *International statistical classification of diseases and related health problems* (10th Revision).

U.C. Berkley, Teaching, Learning, Academic Planning and Facilities. (2009). *Problem Students and Disruptive Behavior*. University of California, Berkley. Retrieved from: <http://teaching.berkeley.edu/teaching.html>

U.S. Department of Education. (2018). *Students with disabilities at degree-granting postsecondary institutions*. Washington, D.C.: National Center for Education Statistics. Retrieved from <https://nces.ed.gov/pubs2011/2011018.pdf>

Zelazo, P. D., & Lyons, K. E. (2012). The potential benefits of mindfulness training in early childhood: A developmental social cognitive neuroscience perspective. *Child Development Perspectives*, 6(2), 154–160. doi:10.1111/j.1750-8606.2012.00241.x

Ziv, Y. (2012). Exposure to violence, social information processing, and problem behavior in preschool children. *Aggressive Behavior*, 38, 429-441. doi:10.1002/ab.21452

APPENDIX A  
DEMOGRAPHIC INFORMATION SURVEY

**Participant Code: \_\_\_\_\_(Assigned by researcher)**

Age:

Gender:

Primary Language:

Major:

- What is your primary ethnic identity?
  - African American
  - Asian American
  - White, non-Hispanic
  - White, Hispanic
  - Middle Eastern
  - Other: \_\_\_\_\_
  
- What is your current employment status?
  - Employed full time (40 or more hours per week)
  - Employed part time (up to 39 hours per week)
  - Unemployed and currently looking for work
  - Unemployed and not currently looking for work
  
- What is the highest degree or level of school you have completed?
  - High school degree or equivalent (e.g. GED)
  - Some college, no degree
  - Associate degree (e.g. AA, AS)
  - Other \_\_\_\_\_
  
- What is your current college classification?
  - First year
  - Sophomore
  - Other
  
- What is your marital status?
  - Married
  - Separated
  - Divorced
  - Never married
  - Other \_\_\_\_\_
  
- Where do you currently live?



- Dorm
  - Off-campus apartment
  - Off-campus house
  - With parents
  - Other \_\_\_\_\_
- How many individuals under 16 years live in your household?
  - 0
  - 1
  - 2
  - 3
  - Other \_\_\_\_\_
- How many individuals between the ages 17 to 21 years live in your household?
  - 0
  - 1
  - 2
  - 3
  - Other \_\_\_\_\_
- How many individuals over the age of 21 years live in your household?
  - 0
  - 1
  - 2
  - 3
  - Other \_\_\_\_\_

APPENDIX B  
INTERVIEW QUESTIONS

- Do you have any experience with yoga/meditation/mindfulness? How was your experience?
- What brings you to this mindfulness intervention?
- What is your average household income?
  - Less than \$20,000
  - \$20,000 to \$34,999
  - \$35,000 to \$49,999
  - \$50,000 to \$74,999
  - \$75,000 to \$99,999
  - Over \$100,000
- What kind of family were you raised in?
  - Both biological parents
  - Single parent
  - Another relative
  - Adopted
  - Fostered
  - Other \_\_\_\_\_
- What kind of area were you raised in?
  - Rural
  - Small town
  - Suburban
  - Urban
  - Other \_\_\_\_\_
- Have you received psychological interventions/ psychotherapy in the past?
- What concerns were addressed via those psychological interventions?
- Do you have any physical or mental limitations that could impact your ability to participate in mindfulness activities (e.g., yoga)?
- What do you hope to learn or get from this experience?

APPENDIX C  
BASC-3 FLEX MONITOR – SELF-REPORT FORM

Your Name: \_\_\_\_\_ Today's Date: \_\_\_\_\_

Your Birth Date: \_\_\_\_\_ Your Gender: \_\_\_Male \_\_\_Female

Instructions: This form contains sentences that young people may use to describe how they think or feel or act. Read each sentence carefully. Select **N** if the sentence **never** describes you or how you feel. Select **S** if the sentence **sometimes** describes you or how you feel. Select **O** if the sentence **often** describes you or how you feel. Select **A** if the sentence **almost always** describes you or how you feel. Give the best answer for you for each sentence, even if it is hard to make up your mind. There are no right or wrong answers. Please do your best, tell the truth, and answer every sentence.

Remember: N = Never      S = Sometimes      O = Often      A = Almost Always

1. I have trouble standing still in lines. ....N S O A
2. I am easily distracted. .... N S O A
3. I have trouble sitting still. ....N S O A
4. When I get angry, I want to break something. ....N S O A
5. I talk while other people are talking. ....N S O A

6. I forget things. ....N S O A
7. People tell me to be still. ....N S O A
8. I yell when I get angry. ....N S O A
9. I listen when people are talking to me. ....N S O A
10. I talk without waiting for others to say something. ....N S O A
11. I get angry easily. ....N S O A
12. I feel like I have to get up and move around. ....N S O A
13. I pay attention when someone is telling me how to do something. ....N S O A
14. People tell me that I am too noisy. ....N S O A
15. I have trouble paying attention to what I am doing. ....N S O A
16. I keep calm when I'm angry. ....N S O A
17. I get into trouble for not paying attention. ....N S O A
18. I have trouble paying attention to the teacher. ....N S O A
19. People tell me to slow down. ....N S O A
20. I have a hard time concentrating. ....N S O A
- Remember: N = Never      S = Sometimes      O = Often      A = Almost Always
21. I talk really fast. ....N S O A
22. I pay attention to details. ....N S O A
23. I try to be done first. ....N S O A
24. When I get angry, I can't think about anything else. ....N S O A
25. I forget to do things. ....N S O A
26. I threaten to hurt others when I get angry. ....N S O A
27. People tell me to be more careful. ....N S O A
28. I throw or break things when I get angry. ....N S O A
29. When I get angry, I want to hurt someone. ....N S O A

APPENDIX D  
TEXAS WOMAN'S UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH  
COLLEGE STUDENT CONSENT FORM

**Title: The Efficacy of Mindfulness-Based Intervention in Ameliorating Externalizing Behaviors and Attentional Concerns among College Students**

Principal Investigator: Shailja Sharma, .....shailjats@twu.edu@twu.edu, phone: 214/701-3355  
Faculty Adviser: Ronald Palomares-Fernandez, PhD....rpalomares@twu.edu, phone 940/898- 2333

**Explanation and Purpose of the Research**

You are being asked to participate in a research study that will study the effect of mindfulness-based intervention in improving behavioral and attentional problems among college students in the age group of 18 to 22. You have been asked to participate in this project due to your report of attentional and behavioral concerns.

**Description of Procedures**

Mindfulness involves attending and focusing on the present experience in a non-judgmental way. The mindfulness intervention will be delivered as follows. The first session will include an overview of the course, the fundamentals of mind-body medicine, and experiential introduction of mindful eating, mindful breathing, and the body-scan practice. The second session will include self-perceptions and body-scan method to cultivate an awareness of reactions. The third session will include yoga (stretching exercises), sitting and walking meditation, and a reflection on life experiences. The fourth session will include an introduction to the biological and psychological bases of stress reactivity and mindful strategies for responding in positive, proactive ways to stressful situations. The fifth session will teach applying mindfulness at the stressful or emotionally intense moments while learning to explore the effect of reactivity on wellness. The sixth session will involve learning to apply mindfulness in conflict-provoking communications. The seventh session will focus on integrating mindfulness with personal experiences and decision-making. The final session will present a complete review of the mindfulness strategies and philosophy as well as educating about available resources.

The project will begin with the “pre-intervention phase” where data will be collected by administering the Behavior Assessment System for Children, Third Edition, Flex Monitor (BASC- 3 FM) five times. Additionally, each participant will complete the Continuous Performance Test, Third Edition (CPT-3), Continuous Auditory Test of Attention (CATA), and the Mindfulness Attention and Awareness Scale (MAAS) once. Next, during the intervention phase, you will participate in group sessions of mindfulness-based intervention, twice a week, for 45 minutes each for four weeks. You will complete the BASC-3 FM eight times, once after each session during the intervention. After the eight-session intervention, the post-intervention phase will begin and last for one week. You will once again complete the CPT-3, the CATA, and the MAAS. You will also complete



the BASC-3 FM five times in the post-intervention phase. One month after the intervention, the four measures will be repeated once to see if the changes have been maintained.

### **Potential Risks**

A potential risk is the loss of confidentiality. Your privacy will be protected at all times. Only those individuals directly involved in the project (e.g., instructional staff, research team) will have access to your data. Each participant will be given a code number at the initiation of the project. This code number will be used on all rating scales, observation forms, and interview forms. The master list with the code number and corresponding participant's name will be stored separately from the other identifiable data. There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. The interviews will be held over the phone or in a private location. A code number will be used on all identifiable information. All paper documents will be stored in a locked cabinet in the psychology department at TWU. The paper documents will be shredded within one year after the study is finished. The results of the study may be reported in scientific magazines or journals but your name or any other identifying information will not be included.

You will possibly experience feelings of sadness, anger, or fear as mindfulness practice develops, since paying attention in a conscious way for the first time can make you feel emotional. You will be encouraged to speak with the teacher if this occurs, and together the best course of action (i.e., modifying practice, dropping the course) will be developed. The scientific literature reports mindfulness interventions as useful in improving attention, behavior, and stress management. But, results cannot be guaranteed or promised from participation. Rather, emphasis is placed on the participant's active engagement in the program with openness and curiosity, suspending judgement and a sense of healthy questioning. It is possible to feel embarrassed as students will be participating together in a small group. You will be informed before-hand what will take place during each session. Should you feel embarrassed or emotionally uncomfortable, you have the right to stop participating at any time. Because this is a group intervention, there is no guarantee of anonymity since the intervention will be conducted in a group; however, test results will not be shared with other group members.

All participants have the right to ask questions at any time during the project. The researcher will try to prevent any problem that could happen because of this research. You should let the researcher know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research. A referral list of area mental health professionals is provided with this form. Please contact the primary investigator, Shailja Sharma at 214-701-3355 or email at [shailjats@twu.edu](mailto:shailjats@twu.edu) should you have any questions or concerns.

## **Participation and Benefits**

Your involvement in this study is completely voluntary and you may withdraw from the study at any time. You will have the opportunity to take part in the mindfulness-based intervention free of charge. Given the engaging nature of the intervention with the participants, the intervention is typically enjoyable to participants. You will receive a \$25 stipend upon completion of the intervention by missing no more than one session. You will be paid a remuneration of \$10 after completing three sessions. You will be paid the remaining \$15 at the completion of the intervention. Also, potentially participants will see an improvement in attentional and externalizing concerns which possibly impacted their educational and social functioning.

## **Questions Regarding the Study**

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study, you should ask the researcher; the phone numbers are at the top of this form. If you have questions about your rights as a participant in this research or the way this study is being conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at [IRB@twu.edu](mailto:IRB@twu.edu).

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

\_\_\_\_\_ Email

\_\_\_\_\_ Date

\_\_\_\_\_ Phone Number

\*If you would like to know the results of this study tell us where you want them to be sent: Address:

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