RETROSPECTIVE EVALUATION OF MINDFULNESS SKILLS GROUP
FOR ADULTS WITH COGNITIVE DISABILITIES

by

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Research shows that mindfulness-based interventions are effective in reducing symptoms of anxiety, depression, pain, and stress (Baer, 2003; Kabat-Zinn, 1990). Mindfulness Based Stress Reduction (MBSR) was developed for individuals with these symptoms and strives to help participants embrace all present-moment life experiences, regardless of positive or negative emotions (Kabat-Zinn, 1985). This present-moment awareness is developed with a non-judgmental attitude of acceptance (Kabat-Zinn, 1985). MBSR can be conceptualized as an intervention that utilizes internal self-regulatory strategies to improve attention, awareness, acceptance, life satisfaction, and emotional regulation (Baer, 2003; Kabat-Zinn et al., 1985; Robertson, 2011). Individuals with cognitive disabilities experience poor emotion regulation, attention problems, anxiety, depression, and low quality of life (American Psychiatric Association, 2013). Given the benefits of MBSR, researchers developed an adapted MBSR group for a group of individuals with cognitive disabilities. Researchers anticipated the adapted Mindfulness Skills Group (MSG) would be efficacious in reducing symptoms of anxiety while improving life satisfaction, mindfulness awareness, and on-task behaviors. A sample of 24 individuals with varying cognitive disability diagnoses participated in the MSG curriculum as a part of a larger cognitive rehabilitation program. Following the 12-week intervention, pre post assessments of mindfulness awareness, anxiety, satisfaction with life, and on-task behaviors were analyzed. Participants demonstrated a significant increase in life satisfaction (t=3.06, p=.005). However, hypotheses surrounding improving symptoms of anxiety, mindfulness awareness, and

total on-task behaviors were not supported. This study suggests that mindfulness-based interventions, specifically MBSR-adapted programs, may be efficacious in significantly improving individuals' quality of life. Further research is needed to explore relationships between awareness and anxiety and the potential role of mindfulness as a therapeutic intervention for individuals with cognitive disabilities. This research study demonstrates that mindfulness can be implemented in real-world clinical Rehabilitation Counseling practice while significantly improving the lives of individuals with cognitive disabilities.

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ACKNOWLEDGEMENTS

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1.0   INTRODUCTION

The overall aim of this research study is to retrospectively evaluate the effectiveness of an adapted Mindfulness Based Stress Reduction intervention, the Mindfulness Skills Group (MSG), for a group of individuals with cognitive disabilities that participated in a larger cognitive rehabilitation program. Outcome measures of life satisfaction, mindfulness awareness, state anxiety, trait anxiety, and on-task behaviors were measured to determine the effectiveness of this adapted MBSR intervention. The study utilized a retrospective evaluation design investigating participation in the Mindfulness Skills Group and the relationship with life satisfaction, mindfulness awareness, state anxiety, trait anxiety, and on-task behaviors.   The following hypotheses were evaluated to assess the effectiveness of this Mindfulness Skills Group within the context of the cognitive rehabilitation program:

1. Participants of the Mindfulness Skills Group reported statistically significantly higher rates of mindfulness awareness compared to the control group. (Measured by the MAAS)

2. Participants of the Mindfulness Skills Group reported statistically significant increases in mindfulness awareness at the completion of the intervention group. (Measured by the MAAS)

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3. Participants of the Mindfulness Skills Group reported statistically significant increases in life satisfaction at the completion of the intervention group. (Measured by the Life Satisfaction Scale)

4. Participants of the Mindfulness Skills Group reported statistically significant decreases in state anxiety at the completion of the intervention group. (Measured by the STAI)

5. Participants of the Mindfulness Skills Group reported statistically significant decreases in trait anxiety at the completion of the intervention group. (Measured by the STAI)

6. Participants of the Mindfulness Skills Group recorded a significant increase in proportion of on-task bell measured at four specific times: week 3, week 6, week 9, and week 12.

1.1   MINDFULNESS-BASED INTERVENTIONS

Mindfulness-based interventions are therapeutic interventions developed to assist individuals with attending to life in the present moment (Kabat-Zinn, J., Lipworth, L., & Burney, R., 1985). Mindfulness can be defined as, "paying attention on purpose in the present moment, without judgment or reaction to whatever appears in the field of your experience" (Kabat-Zinn et al., 1985). It requires complete suspension of judgments and the ability to avoid automatic reactions to unpleasant situations (Robertson, 2011). This acceptance principle, which has its roots in Buddhist practices, has been cultivated into non-religious based stress reduction programs for a variety of populations, including chronic pain, illness, and a variety of disabilities. These

interventions can be conceptualized as interventions that utilize internal self-regulatory strategies to improve attention, awareness, acceptance, life satisfaction, and emotional regulation (Kabat-Zinn et al., 1985; Robertson, 2011). Mindfulness-based interventions help individuals cultivate the psychological perspective necessary for attending happily to life (McCown, D., Reibel, D., & Micozzi, M. S., 2010).

1.1.1   Mindfulness Based Stress Reduction

University of Massachusetts researcher, Jon Kabat-Zinn, first developed the standard eight-week group intervention program titled Mindfulness-Based Stress Reduction (MBSR) in 1979, which serves as the blueprint for other mindfulness-based interventions (Baer, 2003; Cheisa & Malinowski, 2011; McCown et al., 2010; Robertson, 2011). MBSR is composed of orientation, eight weekly formal group sessions, daily homework practices, and one full day meditation retreat. Formal group sessions are between 2 and 2.5 hours in length and include the following components (McCown et al., 2010):

- Short opening meditation exercise
- Homework review, open group discussion
- New didactic mindfulness lesson, assign new homework
- Break
- Instructor led formal meditation practice (45 minutes)
- Open group discussion.

Participants are encouraged to make a commitment to the MBSR curriculum and complete daily homework exercises for a minimum of 45 minutes per day. Homework completion, challenges, and questions are discussed at the beginning of each weekly formal group session. Instructors

lead 45-minute formal meditation practices each week that the participants practice formally every day between weekly sessions. Instructors lead a full (8 hour) day meditation retreat between weeks 6 and 7 (McCown et al., 2010). MBSR groups vary in size depending on the comfort and experience level of each instructor. At the commencement of the eight-week program, participants are well versed in many mindfulness concepts, formal mindfulness meditation practices, informal mindfulness meditation practices, and resources for continued practice.

Jon Kabat-Zinn developed MBSR after studying Buddhist Mahayana and Theravada traditions in the Kwan Um School of Zen Buddhism (Cheisa & Malinowski, 2011). There are several brief meditation practices in MBSR that take their root from Vipassana and Zen Buddhist meditations, including the body scan (one hour), sitting meditation (45 minutes or longer), walking meditation (45 minutes or longer), and Hatha Yoga practice, which is gentle, beginner yoga stretching. These meditation practices are both instructor lead during weekly classes and assigned as formal homework assignments. Despite its religious Buddhist roots, MBSR is intentionally secular so that all may benefit from it without changing one's own religious practice (Cheisa & Malinowski, 2011).

The MBSR 8 week curriculum focuses on a specific theme each week. Group leaders provide didactic presentations and lead one of the above-mentioned meditation exercises to participants based on the appropriate theme (Baer, 2003; McCown et al., 2010). Each theme and meditation practice progress on each other each week so attendance is mandatory to each weekly group session. McCown et al. developed a table depicting the general development of the 8-week MBSR curriculum, which is displayed in Figure 1 (2010).

MBSR first focuses on an acceptance of suffering in a supportive environment, as participants are encouraged to accept their unpleasant experiences rather than aiming to change them (Baer & Krietemeyer, 2006; McCown et al., 2010). As an open awareness is cultivated in the first few weeks of the MBSR curriculum, leaders encourage participants to attend to both unpleasant and pleasant events and sensations instead of avoiding these thoughts or experiences (Baer & Krietemeyer, 2006; McCown et al., 2010). Subsequently, participants learn about stress reactivity and how negative interpretations of events can elevate stress hormones and ultimately have a negative impact on health (Baer & Krietemeyer, 2006; McCown et al., 2010). These lessons are paired with the meditation practices of walking meditation and choiceless awareness, in which individuals make no attempt to evaluate thoughts as 'good' or 'bad' but instead nonjudgmentally observe their constantly changing thoughts and sensations (Baer & Krietemeyer, 2006; McCown et al., 2010).

Half-way through the MBSR program, leaders begin to emphasize participants' ability to maintain the non-judgmental acceptance of difficult events, critical choices, and interpersonal conflict throughout daily living (Baer & Krietemeyer, 2006; McCown et al., 2010). Mindfulness teachers lead communication activities to highlight the importance of being neutral and present during interpersonal interactions. The MBSR curriculum concludes by focusing on developing compassion and kindness towards oneself, one's thoughts, one's experiences, and others (Baer & Krietemeyer, 2006; McCown et al., 2010).

It should be noted that this curriculum is supplemented with a minimum of forty-five minutes of daily formal homework practice. MBSR is designed to be maintained for the rest of participants' lives with formal practice; thus participants are encouraged to implement these meditation skills in their own lives (Baer & Krietemeyer, 2006; McCown et al., 2010).

Occasionally, the MBSR teacher will assign other homework assignments in addition to the daily formal meditation practice. These additional assignments include: eating a meal mindfully, abstract thinking puzzles, pleasant and unpleasant event calendars, and communication calendars (Baer & Krietemeyer, 2006; McCown et al., 2010).

Four Ennobling Truths (See detailed description in Chapter 3)	Foundations of Mindfulness (see detailed description in Chapter 3)	MBSR Curriculum: Themes and content by week	MBSR Curriculum: Formal home practice assignments by week	Spectrum of Teaching Intention (listed by intensity of focus in class)
• Fully understanding suffering	• Mindfulness of body	1: There's more right than wrong with you 2: Perception and creative responding	1 &2: Body scan meditation (plus sitting meditation with focus on breath)	• Experiencing new possibilities • Discovering embodiment
• Letting go of craving	• Mindfulness of feelings	3: Pleasure and power of presence (pleasant events) 4: Shadow of stress (unpleasant events)	3 & 4: Alternate the body scan with standing or floor yoga practice (plus sitting meditation with focus on breath)	• Discovering embodiment • Cultivating observation
• Realizing liberation	• Mindfulness of mind states	5: Finding space for responding 6: Working with difficult situations	5 & 6: Alternate sitting w/ choiceless awareness with yoga; add walking meditation	• Cultivating observation • Moving toward acceptance
• Cultivating the path	• Mindfulness of mental contents	7: Cultivating kindness 8: A new beginning	7 & 8: Choose the practices you prefer	• Moving toward acceptance • Growing compassion

McCown, D., et al. (2010). Teaching Mindfulness: A practical guide for clinicians and educators. New York: Springer

Figure 1: MBSR Curriculum

1.1.2   Other mindfulness interventions

Jon Kabat-Zinn's successful MBSR program was modified into other mindfulness-based interventions, such as Mindfulness Based Cognitive Therapy (MBCT), Acceptance Commitment Therapy (ACT), and Dialectic Behavior Therapy (DBT). These adapted interventions utilize the same basic mindfulness principles as MBSR (Segal, Williams, & Teasdale, 2002; Linehan, 1993; Hayes, Strosahl, & Wilson, 1999). MBCT is most closely related to Kabat-Zinn's MBSR

program in that it is also a standard 8 week program that utilizes Vipassana and Zen meditations, two hour weekly meetings, and requires homework (Cheisa & Malinowski, 2011). Specifically, MBCT and MBSR practice the same three core mindfulness meditation practices, body scan, sitting meditation, and Hatha Yoga. However, unlike MBSR, MBCT also utilizes cognitive behavioral exercises in its curriculum, as it is designed specifically for prevention of relapses in major depression (Segal et al., 2002; Cheisa & Malinowski, 2011). ACT and DBT do not utilize specific meditation practices as part of the intervention but still embrace the non-judgmental attitudes that are the root of all mindfulness practices (Cheisa & Malinowski, 2011). These four popular mindfulness interventions vary in their targeted purpose, implementation, and group design, but all remain focused on the core principle of attending to one's life mindfully in the present moment with suspended judgment (Cheisa & Malinowski, 2011).

1.1.3   Effectiveness of MBSR interventions

For the purpose of this research study, focus will be placed on MBSR interventions, as it is the original mindfulness-based intervention from which other interventions are modified. MBSR programs have increasingly grown in popularity, and, as a result, have been determined through research to be "probably efficacious" for various populations and symptom reductions (Baer, 2003). Formal MBSR programs have been studied for a variety of populations: including chronic pain conditions, anxiety, depression, binge eating, fibromyalgia, psoriasis, cancer patients, fatigue, stress, mood disturbances, among many other populations (Baer, 2003). Despite methodological limitations, prominent mindfulness researchers have concluded MBSR to have, on average, a medium to large effect size in positive results (Baer, 2003).

MBSR has also been modified in curriculum to fit the needs of other specific populations, with a recent focus on individuals with cognitive and physical disabilities (Hofmann, Sawyer, Witt, & Oh, 2010); Hwang & Kearney, 2013; Kabat-Zinn et al., 1985; Klainin-Yobas, Cho, & Creedy, 2012). In these studies, the modified MBSR curriculums aim to increase quality of life and participation while decreasing anxiety or depression (Hofmann et al., 2010; Hwang & Kearney, 2013; Kabat-Zinn et al., 1985; Klainin-Yobas et al., 2012). Researchers have reported significant positive effects despite methodological limitations of small samples, lack of randomized control groups, and variable instructor training (Hwang & Kearney, 2013; Marchard, 2012; Miller, Fletcher, & Kabat-Zinn, 1995; Singh, Lancioni, Manikam, Winton, Singh, Singh, & Singh, 2011).

1.1.4   Mechanisms of mindfulness

New research on understanding the mechanisms behind the successful outcomes of these mindfulness interventions suggest that 'mindful emotion regulation' is the mechanism for positive outcomes, such as increase of quality of life and decreased anxiety and depression (Chambers, Gullone, & Allen, 2009). It is suggested that the nonjudgmental acceptance mindfulness concept changes the 'relationship' individuals have with distressing emotions (Chambers et al., 2009), in that instead of avoiding unpleasant emotions, individuals train themselves into developing mindful emotion regulation (Chambers et al., 2009). Mindful emotion regulation occurs when individuals no longer instinctually react to experienced distressing emotions (Chambers et al., 2009). It is suggested that this mechanism of mindful emotion regulation explains the significant increase in quality of life and decrease in anxiety and depression following completion of a mindfulness-based intervention (Chambers et al., 2009).

This mechanism theory supports the conceptualization of mindfulness interventions are efficacious interventions for individuals that have cognitive deficits. Cognitive behavioral interventions often require advanced executive functioning and awareness to identify and modify distorted thought patterns. Contrastingly, there has been no evidence to suggest that mindfulness emotion regulation cannot be cultivated in individuals with limitations in cognitive functioning. Thus, researchers have begun to study mindfulness interventions in cognitive disability populations (Hofmann et al., 2010; Hwang & Kearney, 2013; Kabat-Zinn et al., 1985; Klainin-Yobas et al., 2011). Studies that evaluate quality of life, depression, and anxiety in this population are needed to support the mindful emotion regulation mechanism theory (Chambers et al., 2009).

1.2   COGNITIVE DISABILITIES

Cognitive disabilities are defined differently according to varying classification systems. The International Classification of Functioning, Disability and Health, classifies mental functions as: attention, memory, psychomotor, emotional, perceptual, thought, higher-level cognition, mental functions of language, expression of language, calculation functions, mental function of sequencing complex movements, and experience of self and time functions (World Health Organization, 2001). The American Psychiatric Association define cognitive deficits within the Neurodevelopmental Disorders and Neurocognitive Disorders sections of the DSM-5 (American Psychiatric Association, 2013). Thus, cognitive disabilities encompass a wide range of diagnoses and functional impairments.

Specifically, cognitive disabilities include diagnoses such as Intellectual Disability (specified by severity), Global Developmental Delay, Autism Spectrum Disorder, Traumatic Brain Injury, Attention Deficit Hyperactivity Disorder, Specific Learning Disability, etc. (American Psychiatric Association, 2013). Other medical conditions, such as Spina Bifida and Cerebral Palsy, may also present with cognitive impairments. Many of these disorders co-occur with each other and other psychiatric disabilities, which creates compounding cognitive, social, and personal limitations (American Psychiatric Association, 2013). These diagnoses typically onset within the developmental period, with the exception of traumatic brain injury, which can occur at any point in life, and these disabilities are expected to be lifelong conditions (American Psychiatric Association, 2013). The commonly presenting deficits prevent these individuals from meeting developmental milestones, societal learning standards, social responsibility, and personal independence (American Psychiatric Association, 2013). For the purpose of this paper, cognitive disabilities will consist of individuals with medical or psychological diagnoses whose symptoms result in limitations of cognitive functioning.

1.2.1 Functional limitations

Functional limitations and presenting obstacles vary based on the individual and diagnosis. For instance, individuals diagnosed with Autism Spectrum Disorder experience deficits mostly social in nature; limited awareness, nonverbal social cues, group interactions, reciprocal social interactions, and displaying appropriate emotional affect are common obstacles that these individuals experience (American Psychiatric Association, 2013). In addition to the social difficulties, individuals with Autism Spectrum Disorder often demonstrate difficulty with abstraction and generalization and repetitive, restrictive behaviors and thought patterns, which

can be interpreted by others as abnormal or obsessive (American Psychiatric Association, 2013). Individuals diagnosed with Specific Learning Disorder experience a biologically-based cognitive limitation that impedes learning key skills imperative to development (American Psychiatric Association, 2013). This learning disorder can prevent individuals from developing alongside peers the same age and can provide obstacles to successful employment and independent living. Finally, individuals diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) experience limitations in attention span, distractibility, disorganization of things, thoughts, and time, hyperactivity, and impulsivity (American Psychiatric Association, 2013). These limitations are present in more than one setting each an individual's life and have been shown to negatively impact social and vocational outcomes (American Psychiatric Association, 2013).

Research indicates that individuals with cognitive disabilities report lower levels of life satisfaction and are more likely to have comorbid mental health disorders, such as anxiety and depression, than people without cognitive disabilities (Fletcher, Stavakaki, Loschen & First, 2007; Kessler Foundation & National Organization on Disability, 2010; Robertson, 2011; Spek, van Ham, & Nyklicek, 2013). There are many possible explanations for this occurrence. Individuals with the aforementioned cognitive disabilities experience strained interpersonal relationships, low community participation, difficulty maintaining employment, and the inability to independently care for oneself (American Psychiatric Association, 2013). In addition, many of these individuals have deficits in emotional regulation and stress tolerance, which contributes to the inability to process complex social and emotional situations, ultimately contributing to the presence of depression or anxiety disorders. Thus, there is a large need for therapeutic interventions that assist individuals with cognitive disabilities in developing higher levels of life satisfaction, emotional regulation capacity, and awareness.

1.3 COGNITIVE DISABILITIES AND MINDFULNESS-BASED INTERVENTIONS

MBSR embraces two core components: specific awareness or attention of the present-moment experience and non-judgmental acceptance of that experience. Chambers et al. suggest that mindfulness interventions are successful in increasing quality of life because of the development of mindful emotional regulation (2009). This is the ability to regulate and suspend reactions to stimuli by simply establishing non-judgmental awareness (Chambers et al., 2009). Mindful emotional regulation could potentially be an efficacious mechanism for individuals with cognitive disabilities to increase quality of life and decrease anxiety and depression.

Mindfulness interventions designed for individuals with cognitive disability are becoming increasing popular (Harper, Webb, Rayner, 2013). Researchers have examined the effect of mindfulness-based interventions in cognitive disability populations including: Autism Spectrum Disorder, Traumatic Brain Injury, Learning Disability, Intellectual Disability, and Attention Deficit Hyperactivity Disorder (Harper et al., 2013; Haydicky, Wiener, Badali, Milligan, Ducharme, 2012; Hwang & Kearney, 2013; Semple, R., 2010; Singh, et al., 2011; Singh et al., 2006; Spek et al., 2013; Zylowska, Ackerman, Yang, Futrell, Horton, Sigi Hale, Pataki, & Smalley, 2008). Although mostly pilot studies with methodological limitations, these studies demonstrate the potential for mindfulness interventions to increase quality of life and decrease anxiety and depression in individuals with cognitive disabilities (Haydicky et al., 2012; Semple, R., 2010; Spek et al., 2013; Zylowska et al., 2008).

For the purpose of this study, articles examining the effects of MBCT, DBT, or ACT interventions were not referenced. Due to the level of abstraction and thought identification needed for MBCT, DBT, and ACT, these interventions are inappropriate for the population of cognitive disabilities. Populations including individuals diagnosed with cognitive disabilities,

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anxiety and/or depression were referenced, as cognitive disabilities commonly co-occur with anxiety and depression. However, it should be noted that there is a dearth of MBSR interventions for cognitive disabilities. Many therapeutic interventions for this population only contain a few mindfulness meditation components within the studied intervention (Appendix A).

1.3.1   MBSR and cognitive disabilities

Few studies were found that examine variations of the MBSR curriculum with populations of individuals with cognitive disabilities (Haydicky et al, 2012; Semple, 2010; Spek et al., 2013; Zylowska, et al., 2008). Haydicky et al. examined the effects of a Mindfulness Martial Arts program in adolescents with Learning Disability co-occurring with ADHD, with respect to executive functions, social skills, unwanted behaviors (2012). Researchers found that inappropriate behaviors and conduct significantly decreased at the posttest, but none of these changes were fully explained by the intervention itself (Haydicky et al., 2012). Semple (2010), Spek et al. (2013), and Zylowska et al. (2008) all examined interventions more closely related to the original MBSR curriculum. These researchers examined individuals with Autism Spectrum Disorder and ADHD with respect to distressing emotions, attention skills, and positive affect (Semple, 2010; Spek et al., 2013; Zylowska, et al., 2008). Statistical analyses indicated a significant decrease in distressing emotions of anxiety, depression, and mood states, while no difference was found in positive affect (Semple, 2010; Spek et al., 2013; Zylowska, et al., 2008). These results indicate that MBSR based interventions are likely an effective intervention for decreasing depression and anxiety in populations of cognitive disabilities (Appendix A).

1.3.2 Mindfulness exercises and cognitive disabilities

Numerous studies examining mindfulness exercises and their impact in populations with cognitive disabilities have been published recently (Appendix A). Several researchers designed the mindfulness-based intervention to reduce unwanted aggressive behaviors in individuals diagnosed with Autism Spectrum Disorder and Intellectual Disabilities (Harper et al., 2013; Hwang & Kearney, 2013; Singh et al., 2011; Singh et al., 2006). These mindfulness interventions varied in design and implementation, but many utilized the informal mindfulness exercise of 'Meditation on the Soles of the Feet'. For this exercise, individuals shift their attention to a neutral body part (soles of feet) when they are experiencing intense emotional reactions to something. All five of these studies found reported aggressive behaviors to be significantly reduced following mastery of the Meditation on the Soles of the Feet exercise (Harper et al., 2013; Hwang & Kearney, 2013; Singh et al., 2011; Singh et al., 2006). However, it should be noted that this mindfulness exercise was used in isolation from the rest of the MBSR curriculum, with sample sizes of 6 or less, implemented on an individual basis instead of a group setting, and instructors were participants' parents and family members whom were not trained in mindfulness exercises. Despite these limitations, these studies demonstrate that mindfulness exercises have the potential to be an efficacious intervention for improving emotional regulation in individuals with cognitive disability.

1.3.3 MBSR and co-occurring anxiety or depression diagnoses

MBSR has been extensively researched and shown to be statistically significant in reducing symptoms of anxiety and/or depression while increasing quality of life for individuals with mental health disorders (Hofmann, et al., 2010; Kabat-Zinn, Massion, Kristeller, Peterson, Fletcher, Pbert, Lenderking, & Santorelli. 1992; Klainin-Yobas, et al., 2011) Individuals with cognitive disabilities often have co-occurring diagnoses with anxiety and depression disorders (Fletcher, et al., 2007; Kessler Foundation & National Organization on Disability, 2010; Robertson, 2011; Spek et al., 2013). Thus, studies examining the effects of MBSR on anxiety and depression were also referenced for the development of this study (Appendix B). All referenced studies demonstrated statistically significant reductions in depression, anxiety, and stress (Hofmann et al., 2010; Kabat-Zinn, et al., 1992; Klainin-Yobas et al., 2011; Miller et al., 1995; Paulik, Simcocks, Weiss, & Albert, 2010; Vollestad, Sivertsen, & Nielsen, 2011). Both meta-analyses also found MBSR to be statistically significant in reducing symptoms of anxiety and depression, which can be conceptualized to improve quality of life (Hofmann et al., 2010; Klainin-Yobas et al., 2011).

Standard MBSR curriculums are commonly used for populations of anxiety and depression disorders. MBSR teaches individuals to shift their relationship with thoughts, emotions, sensations, and experiences. Instead of thoughtlessly experiencing, avoiding, or reacting to unpleasant emotions, MBSR embraces full attentive participation in all activities, unpleasant or pleasant. It is in this attention that individuals are encouraged to suspend all judgment of experience so that they may regulate their emotional reactivity in response to their experiences. Individuals with cognitive disabilities have shown to have deficits in awareness, emotional regulation, stress tolerance, reported quality of life, and co-occurring diagnoses of

anxiety and depressive disorders (Fletcher et al., 2007; Kessler Foundation & National Organization on Disability, 2010). MBSR has shown benefits of relaxation, improvements in cognitive functioning, and brain structure changes (Baer, 2003). However, these results are secondary to the main purpose of MBSR, which is to fully attend to all of life's experiences with an open, accepting, and non-judgmental attitude (Baer, 2003; McCown, et al., 2010).

1.4   INTERVENTION DEVELOPMENT

MBSR and MBCT were initially considered for the Mindfulness Skills Group curriculum, as they have both been show to successfully target low life satisfaction, poor emotional regulation, depression, and anxiety (Baer, 2003). MBCT contains traditional MBSR activities with the addition of didactic lessons on Cognitive Behavioral Therapy (CBT) automatic and distorted thought patterns. CBT is a common psychotherapy used to help individuals with distorted thoughts, high emotional reactivity, depression, anxiety, among other conditions. However, cognitive behavioral therapy depends on higher levels of cognitive capacity to restructure emotion and event processing, which can be problematic for individuals with cognitive deficits (Kroese, 1998; Spek et al., 2013). Research shows that individuals with cognitive disabilities are able to make emotional and behavior changes through the implementation of Cognitive Behavioral Therapy, but it is not efficacious for all cognitive deficits, such as Autism Spectrum Disorder due to the requirement for abstract thinking and cognitive restructuring (Kroese, 1998; Spek et al., 2013). Thus, the Mindfulness Skills Group (MSG) curriculum was modeled after the MBSR curriculum for its lack of dependence on abstract thinking, cognitive processing, and thought content exploration. The MSG was developed based on the MBSR program (Kabat-Zinn

et al., 1985; McCown et al., 2010), with adjustments made for the population of cognitive disabilities.

Traditionally, MBSR programs include eight weeks of two-hour sessions, including both didactic and experiential learning activities (McCown et al., 2010). Adults with cognitive disabilities experience difficulties with attention span, understanding of attention skills, and intellectual awareness (Hwang & Kearney, 2012; Haydicky, 2012; Robertson, 2011). Thus, this group was adapted to consist of 45-minute group sessions to accommodate participants' limited attention span and to provide consistency between therapeutic groups in the overall rehabilitative program. Due to the shortened session time, an additional 4 sessions were added for a total of 12 group sessions to ensure that the standard curriculum would be met within the time constraints.

In order for this population of subjects to learn mindfulness concepts and skills, participants must have a general understanding of attention skills and present moment awareness. Given this knowledge is typically lacking for individuals with cognitive disabilities, the MSG was divided into two separate modules: (a) attention and (b) mindfulness (Hwang & Kearney, 2012; Haydicky et al., 2012; Robertson, 2011). The first module was psychoeducational and focused on learning general attention skills and developing effective strategies for shifting and discriminating attention. Once the group completed the first module and demonstrated a basic understanding of attention skills, the second module of present moment mindfulness was implemented (Figure 2). Participants practiced meditations, awareness of breath, and other mindfulness exercises for both self-regulatory strategies and stress reduction in the second module.

Figure 2. Mindfulness Skills Group Module Structure

Each week consisted of a lesson, interactive learning activity, and an overall MBSR theme consistent with standard curriculum (Table 1). Although this MSG consisted of a separate Attention Skills module not consistent with traditional MBSR, the curriculum still included the standard MBSR structured themes throughout each lesson (Table 1). Thus, participants were cultivating attitudes of acceptance and mindfulness while developing general attention skills. These themes were both explicitly and implicitly incorporated into weekly group sessions. For instance, week 1 of the MSG had a duel psychoeducational and therapeutic focus. Participants first brainstormed the definition of attention and then participated in a mindfulness 'play attention' activity that required them to monitor their attention and focus. Discussion was led about limitations in attention and non-judgmental acceptance of 'there is more right with you than wrong with you'.

Weekly homework assignments were also assigned to be consistent with traditional MBSR curriculum. Participants were encouraged to practice one of their mindfulness meditation practices daily for a minimum of 5-10 minutes in order to accommodate for this population's cognitive limitations in attention span, time management, and problem solving capabilities. Homework completion was monitored on a paycheck system that was used for all the groups in the cognitive rehabilitation program. Participants' primary clinicians discussed the benefit of meditation practices with clients on a weekly basis.

Table 1: Mindfulness Skills Group Curriculum

Week	MBSR Theme	Lesson	Activity
1	There's more right than wrong with you	What is Attention? (2 Lessons	Play Attention Discussion of disability and acceptance of limitations
2	Perception and creative responding	What is Metacognition? Different perceptions of same situation	Play Attention 3 Sighs Thought Clouds
3	Pleasure and power of presence	Shifting Attention Remaining present among various stimuli	Alternating Stimuli
4	Pleasure and power of presence	Distractions • Internal • External	Stickers Highlighters Remaining present with the assistance of colors
5	Shadow of Stress (unpleasant events)	Distraction Strategies	3 Sighs-during stress Meditation
6	Shadow of Stress (unpleasant events)	Discriminating Attention Managing stress, focusing	Making Choices Meditation
7	Finding space for responding	Mindfulness Skills Stop, Take a breath, before responding	Awareness of Breath Thought Clouds
8	Working with difficult situations	Emotional Control, Self Talk	Body Scan Strategies-for difficult situations
9	Working with difficult situations	Emotional Control Remaining neutral & non-judgmental	Pleasant Events Happy Place Strategies
10	Cultivating kindness	Non-judgmental Awareness Strategies-positive self talk	Walking Meditation Sitting Meditation
11	Cultivating kindness	Metacognition, Non-judgmental self talk	Thought Clouds Strategies –positive self talk
12	A new beginning	Termination	Reflection Strategies

2.0   METHODS

The current study was operated within a larger cognitive rehabilitation program. The Cognitive Skills Enhancement Program (CSEP) is a fifteen-week intensive cognitive rehabilitation program that aims to assist individuals with cognitive disabilities in developing strategies for cognitive skills, social skills, and vocational cognition. CSEP aims to assist individuals with cognitive disabilities in increasing self-awareness while developing strategies for limitations in cognitive skills, social skills, and vocational skills. The Mindfulness Skills Group (MSG) was designed as a new program component and embedded within this cognitive rehabilitation program, with the focus on improving strategies for attention and emotional regulation. Assessments were retrospectively evaluated to determine the influence of this MSG and CSEP program. Due to this setting and the parameters of this program, randomized trials were not possible or appropriate for this study.

The overall aim of this research study was to retrospectively evaluate the effectiveness of an adapted Mindfulness Based Stress Reduction intervention, the Mindfulness Skills Group (MSG), for a group of individuals with cognitive disabilities that participated in a larger cognitive rehabilitation program. Outcome measures of life satisfaction, mindfulness awareness, state anxiety, trait anxiety, and on-task behaviors were measured to determine the effectiveness of this adapted MBSR intervention. The study utilized a retrospective evaluation design investigating participation in the Mindfulness Skills Group and the relationship with life

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satisfaction, mindfulness awareness, state anxiety, trait anxiety, and on-task behaviors. The following hypotheses were evaluated to assess the effectiveness of this Mindfulness Skills Group within the context of the cognitive rehabilitation program:

1. Participants of the Mindfulness Skills Group reported statistically significantly higher rates of mindfulness awareness compared to the control group. (Measured by the MAAS)

2. Participants of the Mindfulness Skills Group reported statistically significant increases in mindfulness awareness at the completion of the intervention group. (Measured by the MAAS)

3. Participants of the Mindfulness Skills Group reported statistically significant increases in life satisfaction at the completion of the intervention group. (Measured by the Life Satisfaction Scale)

4. Participants of the Mindfulness Skills Group reported statistically significant decreases in state anxiety at the completion of the intervention group. (Measured by the STAI)

5. Participants of the Mindfulness Skills Group reported statistically significant decreases in trait anxiety at the completion of the intervention group. (Measured by the STAI)

6. Participants of the Mindfulness Skills Group recorded a significant increase in proportion of on-task bell measured at four specific times: week 3, week 6, week 9, and week 12.

2.1   STUDY DESIGN

This study was a retrospective evaluation design investigating the implementation of a MSG and its relationship with satisfaction with life, mindful awareness, state anxiety, trait anxiety, and on-task behaviors. Individuals participating in the cognitive rehabilitation program completed pre and post assessments as well as demographics, disability diagnosis, intelligence testing, and medication information. The information collected allowed for the comparison of scores among individuals with varying cognitive disabilities. Institutional Review Board (IRB) approval was obtained by the University of Pittsburgh prior to any data collection or analysis (PRO13120163). All subjects completed an informed consent to participate in the cognitive rehabilitation program.

2.2   PARTICIPANTS

Participants were twenty-four individuals enrolled as students in a state-run vocational facility for individuals with disabilities, the Hiram G. Andrews Center. Students were chosen to participant in a 15-week cognitive rehabilitation program. These students underwent a systematic thorough admission screening completed by a team of Certified Rehabilitation Counselors, a neuropsychologist, Certified Brain Injury Counselor, and rehabilitation specialists to determine eligibility into the cognitive rehabilitation program. Inclusion criteria included: (a) Primary diagnosis of cognitive disability; (b) Displayed verbal proficiency; (c) Documented full scale IQ greater than 70; (d) Willing to fully participate in the program. Exclusion criteria included: (a) Documented primary diagnosis of psychiatric diagnosis; (b) Full scale IQ less than 70; (c)

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Testing scores that indicate significant impairment in verbal abstract memory (i.e. WAIS IV Similarities <6); (d) Active drug or alcohol use; (e) Documented difficulty working in group settings; (f) Lack of interest to participate fully in the program.

CSEP participants from sessions of the program without the MSG were utilized as 'controls'. Control group participants were recruited from two previous sessions of the cognitive rehabilitation program (Table 2). Control group 1 consisted of twelve individuals from the January-April 2012 session. Control group 2 consisted of fourteen individuals from the September-December 2012 session. These two control groups were combined into a larger sample (n=26) for this research study.

Intervention participants were enrolled from two separate 15-week sessions of the cognitive rehabilitative program, which were combined into a larger sample (n=25) for this research study (Table 2). The subjects include eleven individuals from the May-August 2013 session and fourteen individuals from the September-December 2013 session.

Table 2: CSEP sessions and study participant groups

	September-December 2012	January-April 2013	May-August 2013	September-December 2013
No MSG Intervention	Control Group 1 n=12	Control Group 2 n=14	x	x
MSG Intervention	x	x	Intervention Group 1 n=11	Intervention Group 2 n=14

2.3   STUDY PROTOCOL AND IMPLEMENTATION

Retrospective evaluation was measured by analyzing pre and post measures in addition to a control versus treatment analysis. For the control group, pre and post measures were collected on the first and last day of participation in the standard cognitive rehabilitation program by clinical staff. For the intervention group, established valid and reliable instruments were administered together as a battery before each participant's first mindfulness group session. Participants then completed a 12-week MSG, which consists of two separate six-week modules, as a component of the cognitive rehabilitation program curriculum. After completion of the group, clinicians administered the battery of measures again. One measure, the on-task bell, was recorded daily throughout the 12-week intervention (Figure 3).

Raw data was collected by the cognitive rehabilitation program clinicians and kept securely locked in participant files until the completion of their 15-week program. Assessment data was recorded in Microsoft Excel by program clinical staff and then provided to an honest broker for de-identification. The designated honest broker did not have any involvement in the research study. Number/name assignments were kept in a secure location inaccessible to study researchers.
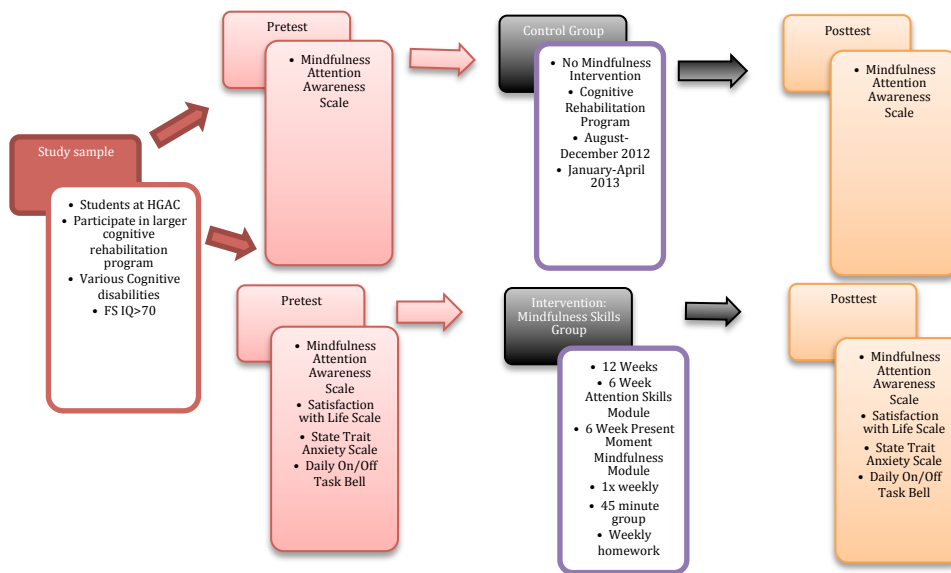
Figure 3: Study Design

2.4   HYPOTHESES

1. Participants of the MSG (intervention groups 1 and 2) reported statistically significantly higher rates of mindfulness awareness compared to the control groups 1 and 2 at post assessment. (Measured by the MAAS)

2. Participants of the MSG (intervention groups 1 and 2) reported statistically significant increases in mindfulness awareness at the completion of the group. (Measured by the MAAS)

3. Participants of the MSG (intervention groups 1 and 2) reported statistically significant increases in life satisfaction at the completion of the group. . (Measured by the Life Satisfaction Scale)

4. Participants of the MSG (intervention groups 1 and 2) reported statistically significant decreases in state anxiety at the completion of the group. (Measured by the STAI)

5. Participants of the MSG (intervention groups 1 and 2) reported statistically significant decreases in trait anxiety at the completion of the group. (Measured by the STAI)

6. Participants of the MSG (intervention groups 1 and 2) will record a significant increase in proportion of on-task bell measured at four specific times: week 3, week 6, week 9, and week 12.

2.5   OUTCOME MEASURES

2.5.1   Hypotheses 1 & 2: Mindfulness Attention Awareness Scale

Hypotheses 1 and 2 were examined by analyzing pre and post evaluations of the Mindfulness Attention Awareness Scale (MAAS). The MAAS is a unidimensional self-report 15-item measure assessing the ability to attend to present moment experiences, which is a skill that is learned through mindfulness training. The MAAS has demonstrated high reliability as well with alpha coefficients ranging from .8 to .87 (Brown, Kirk, & Ryan, 2003). Researchers recorded a

Pearson's r coefficient of .81 as well (Brown et al., 2003). Scores of the 15 items are averaged with a possible range from 1.0 (low mindfulness awareness) to 6.0 (highest mindfulness awareness). It was expected that higher levels of mindfulness awareness at the posttest in comparison to the pretest assessment would occur. It was also expected that higher levels of mindfulness awareness in the intervention group would be observed in comparison to the control group.

2.5.2   Hypothesis 3: Satisfaction with Life Scale

Hypothesis 3 was examined by analyzing pre and post evaluations of the Satisfaction with Life Scale (SWLS). The SWLS has five items asking participants to self-report their holistic well-being. This scale reports a reliability alpha coefficient of .87 at the time of the assessment and an alpha coefficient of .82 two months following the original assessment (Diener, Robert, Larnsen, Griffin, 1985). These 5 items are ranked on a 7-point Likert scale and are summed for a total score of life satisfaction. Summed scores are interpreted as follows (Diener, et al., 1985):

- 31-35   Extremely Satisfied
- 26-30   Satisfied
- 21-25   Slightly Satisfied
- 20   Neutral
- 15-19   Slightly Dissatisfied
- 10-14   Dissatisfied
- 5-9   Extremely Dissatisfied

Higher levels of life satisfaction were expected at the posttest in comparison to the pretest assessment.

2.5.3   Hypotheses 4 &5: State-Trait Anxiety Inventory

Hypotheses 4 and 5 were examined by analyzing pre and post evaluations of the State Trait Anxiety Inventory (STAI). The STAI is a self-report measure that scores state anxiety and trait anxiety. State anxiety measures tension, worry, nervousness, and apprehension while trait anxiety measures the tendency to interpret stressful situations as threatening. The original STAI-X form demonstrated alpha reliability coefficients ranging from .27-.54 on the state anxiety scale and alpha coefficients ranging from .76-.86 on the trait anxiety scale (Spielberger, Gorsuch, & Lushene, 1970). The revised STAI-Y form demonstrated alpha reliability coefficients ranging from .83-.92 on the state anxiety scale and alpha reliability coefficients ranging from .86-.92 on the trait anxiety scale (Spielberger, 1983). Both scales (STAI-X and STAI-Y) were used in the course of this research study (see statistical analyses for more details). Decreased state or trait anxiety was interpreted as participants having a positive stress reduction or mindful emotion regulation effect as a result from the MSG and the cognitive rehabilitation program.

2.5.4   Hypothesis 6: On-task bell

Hypothesis 6 was examined by analyzing participants' self-reporting their on-task behaviors. The on-task bell is a self-report measurement designed to track participants' ability to stay on or off task throughout each day of cognitive rehabilitation programming. The on-task bell measure was developed as an ecological momentary assessment (EMA). Rehabilitation programs aim to impact daily living limitations. However, many of the assessments evaluating individuals' limitations are either self-report or completed in a controlled environment. Shiffman, Stone, and Hufford describe the benefits of EMA: "EMA involves repeated sampling of subjects' current

behaviors and experiences in real time, in the natural environment" (2008). The on-task bell measure functioned as a EMA for participants ability to monitor their attention and stay on task.

A bell prompt was administered several times each day to have participants evaluate their on and off task behaviors. This included days that participants did not attend the MSG. Clinical staff randomly administered the bell prompt and participants responded privately by indicating whether they were on or off task during that group or lesson. Participants tracked their behaviors throughout the week and clinical staff collected the tally sheets the end of each week (Figure 4).

Participant Name	
On Task	Off Task
Monday	Monday
Tuesday	Tuesday
Wednesday	Wednesday
Thursday	Thursday
Friday	Friday

Figure 4: On-task bell sheet

Standard bell protocols were implemented at the beginning of each session to ensure that different clinicians were consistent in providing the bell prompt for self-assessment. Standard protocols delineated that for the first module, the prompt was to be administered (once for 1-2 seconds) 3- 4 times per day, with the exception of Wednesdays, because the scheduling was different for individual schedules. For the second module, the prompt was to be administered (once for 1-2 seconds) 2 times per day, with the exception of Wednesdays because of individual programming. Clinicians were to record the number of times participants were prompted per day of programming. Participants were reminded to consider their attention focus seconds prior to hearing the bell prompt. Subjects were also encouraged to be honest, as clinicians did not review

these measures to target unwanted behaviors during groups; instead, the self-reported on-task behaviors were to evaluate focused attention. The following is a list of guidelines provided to clinicians for administering the bell prompt:

- At the start of a group and/or when checking homework.
- During group discussion.
- During worksheet/homework time.
- Another time when they were supposed to be completing a worksheet/homework.

Participants' on-task bell data were condensed into four specific time points. Weeks 1-3 were averaged to result in a percentage of on-task behaviors at the end of week 3. The same process was used for weeks 4-6, 7-9, and 10-12. Analyses were run on the average proportion of on-task behaviors at the end of week 3, 6, 9, and 12. A statistically significant increase in on-task behaviors was expected between these four time points for each individual.

2.6   STATISTICAL ANALYSES

Statistical analyses were run using SPSS, Version 21 (SPSS, Inc). Power analyses were run using GPower: specifically p<.05 posthoc testing (Faul, Erdfelder, Lang, & Buchner, 2007).

Hypothesis	Measure	Statistical Analysis
Descriptive	All	Descriptive, frequencies
1. Mindfulness awareness: control versus intervention	MAAS	ANOVA
2. Mindfulness awareness: intervention only	MAAS	ANOVA
3. Life satisfaction: intervention only	SWLS	Paired t-test
4. State anxiety: intervention only	STAI	Paired-t-test
5. Trait anxiety: intervention only	STAI	Paired t-test
6. On-task percentage: intervention only	Bell Task	ANOVA

2.6.1 Descriptive Statistics

Descriptive statistics were run on all of the demographic and assessment measures to ensure homogeneity and assumptions of normality. Specifically, mean, median, range, maximum, and minimum values, and skewness were evaluated. A chi-squared test was also run to evaluate any significant demographic differences in groups.

2.6.2 Hypotheses 1 & 2

Hypotheses 1 and 2 were examined by analyzing pre and post evaluations of the Mindfulness Attention Awareness Scale (MAAS). Repeated measures ANOVA (2 x 2) was run to compare the differences between and within subjects.

2.6.3 Hypothesis 3

Hypothesis 3 was examined by analyzing pre and post evaluations of the Satisfaction with Life Scale (SWLS). Significant differences in SWLS scores were examined with a paired sample t-test.

2.6.4 Hypotheses 4 &5

Hypotheses 4 and 5 were examined by analyzing pre and post evaluations of the State Trait Anxiety Inventory (STAI). The STAI was measured through two separate paired t-tests, one for trait anxiety and one for state anxiety.

Errors occurred during data collection of the State Trait Anxiety Inventory due to clinician administering inconsistent versions of the assessment. Intervention group 1 did not receive the State-STAI pre-test. Thus, Intervention group 1 was examined for significant changes in the Trait-STAI only.

A second data collection error occurred when Intervention group 2 was inadvertently given two different versions of the STAI for pre and posttests. The STAI-X was administered at pre-test and STAI-Y was administered at post-test. Each version was therefore scored with their appropriate scoring measure and will be compared to each other. Intervention group 2 was examined for significant changes in both state and trait scales. In the event of significant findings, it must be noted that two different versions were used in Intervention group 2.

2.6.5 Hypothesis 6

Hypothesis 6 was examined by analyzing participants' self-reported on-task behaviors. Participants on-task bell data were examined individually at four specific time points, week 3, week 6, week 9, and week 12. Weeks 1-3 were averaged to result in a proportion of on-task behaviors at the end of week 3. The same process was used for weeks 4-6, 7-9, and 10-12. Repeated measures ANOVA were run on the average proportion of on-task behaviors at the end of week 3, 6, 9, and 12.

3.0   RESULTS

3.1   DESCRIPTIVE STATISTICS

3.1.1   Subjects

A total of 51 participants were involved in this study. The intervention group consisted of a total n=25. The control group consisted of a total n=26. Each group included participants from two separate cognitive rehabilitation group sessions that were combined for a larger sample size and increased power. Demographic information was collected for each of the participants and examined. 76.5% of the total participants were between the ages of 19 and 21, with a range from 18-28. The majority of participants were Caucasian (84.3%) males (78.4%).

A large portion of the study participants had a primary diagnosis of Autism Spectrum Disorder (41.2%). Other common disorder diagnoses consisted of Learning Disorder, Attention Deficit Hyperactivity Disorder, Depression Disorder, and Anxiety Disorder. Participants of the cognitive rehabilitation program are referred from a public vocational rehabilitation program. Diagnoses are made and tracked cumulatively from medical and high school IEP records for the purposes of eligibility for the vocational rehabilitation program. As a result, participants often have multiple diagnoses, with the primary diagnosis relating to the largest vocational limitation and not necessarily reflecting the most significant diagnosis.

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Thus, the disability diagnoses of this study population are not those of a clinical research study. 86% of participants in this study have two comorbid disability diagnoses and 41% of the participants in this study have three or more comorbid disability diagnoses. Half of participants have a co-occurring anxiety or depression disorder (49%); 31.4% of participants actively took medications to manage depression and 19.6% actively took medications to manage anxiety. See Table 4 below for a summary of diagnoses within this sample.

Table 4 : Prevalence of Participants' Diagnoses

	Autism Spectrum Disorder	ADHD	Learning Disorder	Anxiety Disorder	Depressive Disorder
Primary Diagnosis	41.2%	13.7%	25.5%	2%	2%
Secondary Diagnosis	13.7%	29.4%	17.6%	3.9%	7.8%
Third Diagnosis	2%	21.6%	9.8%	3.9%	9.8%
Fourth Diagnosis	3.9%	5.9%	5.9%	13.7%	5.9%

3.1.2 Assessments

Descriptive statistics were analyzed for normality for each of the five measures. Sample size, mean, median, standard deviation, and skewness for each assessment are displayed in Table 5. MAAS, SWLS, S-STAI, and on-task bell all had skewness and kurtosis of less than 1, which indicates that the measures are very close to normal distribution. Thus, statistical tests operating under the assumption of normality were utilized for hypotheses 1, 2, 3, 4, and 6. Demographic statistics for trait anxiety violate assumptions of normality due to an elevated skewness value of 1.4 for the Pre T-STAI. Thus, a related-samples Wilcoxon signed rank nonparametric test was run for the trait anxiety measures.

Table 5: Descriptive statistics of assessments

	n	Mean	Median	St. Dev.	Skewness
Pre MAAS	51	3.8	3.8	0.88	-0.226
Post MAAS	50	3.9	3.8	0.78	0.211
Pre SWLS	25	23.16	1.65	8.2	-0.94
Post SWLS	25	25.64	28	6.99	-0.686
Pre S-STAI	14	32.85	32	10.15	0.708
Post S-STAI	14	34.64	36	9.6	0.037
Pre T-STAI	25	35.2	36	8.88	1.4
Post T-STAI	25	39.48	41	7.79	-0.358
Bell 3	23	0.82	0.86	11.2	0.03
Bell 6	24	0.85	0.84	0.16	0.02
Bell 9	24	0.92	1	0.13	0.02
Bell 12	23	0.83	0.9	0.19	0.04

3.2   INFERENTIAL STATISTICS

3.2.1   Hypotheses 1 & 2

Repeated measures ANOVA were run to compare the differences in control and intervention groups at both time points, pre and post assessments. Analyses indicate there were no significant differences between or within groups. Hypothesis 1 was not supported, as there was no significant difference in MAAS scores between intervention and control groups (F=.457, p=.502). Hypothesis 2 was not supported either, as there was no significant difference in MAAS scores between pre and post assessments (F=.148, p=.702). Power analyses indicate that this sample had sufficient power (.95) and that a total sample size of 45 is needed to detect a small

effect size. Tables 6 and 7 below depict results of statistical analyses. Figure 5 below also demonstrates the lack of significant differences between and within groups (MAJGroup 1= Mindfulness Intervention, MAJGroup 2= Control Group).

Table 6: MAAS ANOVA Within Subjects Effects

	df	Mean Square	F value	Significance
Time (Pre Post)	1	.176	.48	.492
Time * Group	1	.054	.148	.702

Table 7: MAAS ANOVA Between Subjects Effects

	df	Mean Square	F value	Significance
Group	1	.49	.457	.502
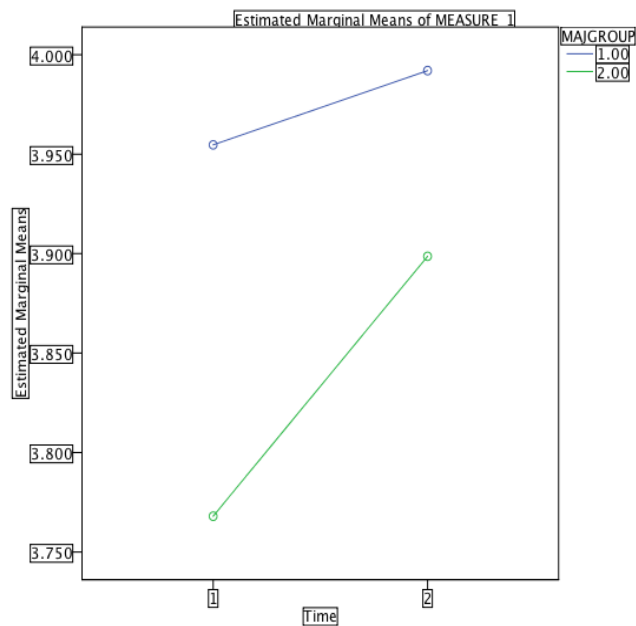
Figure 5: MAAS Repeated Measures ANOVA Results

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3.2.2   Hypothesis 3

Hypothesis 3 was examined by analyzing pre and post evaluations of the Satisfaction with Life Scale (SWLS) though a paired samples t-test. Intervention groups 1 and 2 were combined into a larger sample of 25. Analyses indicate that hypothesis 3 was supported and the null hypothesis was false. There were significant increases in satisfaction with life for the intervention group between pre and post assessments (t=3.06, p=.005). An effect size and power analysis were also run, indicating that this increase in Satisfaction with Life has a medium effect size (Cohen's d=.6125) and power=.908. Figure 6 depicts results of the t-test and power analysis.

Difference in mean	Difference: -2.48
Df	24
Critical t value	1.71
t value	-3.06
Statistical Significance	**.005**
Effect Size	**.68**
Power	**.95**

Figure 6: SWLS t-test results

3.2.3   Hypotheses 4 &5

Hypotheses 4 & 5 were examined by analyzing pre and post evaluations of the State Trait Anxiety Inventory (STAI) though a paired samples t-test. Due to data collection errors, sample sizes for the state and trait anxiety assessments were different. The pre state STAI was

administered to intervention group 2 only, resulting in a sample size of only 14. The trait STAI was administered to all intervention group participants, resulting in a sample size of 25.

Analyses indicate that Hypothesis 4 was not supported and the null hypothesis remains true. There was not a significant decrease in state anxiety for the intervention group between pre and post assessments (t=-.65, p=.524, n=14). Table 8 depicts results of the t-test and power analysis.

Analyses also indicate that Hypothesis 5 was not supported. There was a significant *increase* in trait anxiety for the intervention group between pre and post evaluations. Hypothesis 5 stated that there would be a significant *decrease* in trait anxiety. A Wilcoxon signed rank nonparametric test was run for the trait anxiety measures due to the elevated skewness value for the Pre T-STAI (1.4). These results indicated that there was a significant difference between the pre and post trait anxiety levels for the intervention group (p=.049). As stated earlier, interpretation of results should consider that different versions of the STAI were administered between pre and post evaluations.

Table 8: S-STAI Results

State Anxiety	
Difference in mean	Difference: -1.78
df	13
Critical t value	1.77
t value	-.65
Statistical Significance	.524
Effect Size	.29
Power	.27

3.2.4 Hypothesis 6

Hypothesis 6 was examined by running repeated measures ANOVA on the average proportion of on-task behaviors at the end of weeks 1-3, 4-6, 7-9, and 10-12. Analyses revealed a significant effect of time on participants' on-task behaviors. Table 10 displays this result.

Pairwise comparisons were analyzed to determine the time points of the significant changes in on-task behaviors (Tables 9 and 10; Figure 7). There was no significant difference between weeks 1-3 and 4-6 (p=1.0). There was a significant increase in on-task behaviors between weeks 4-6 and 7-9 (p=.024). There was a decrease in on-tasks between weeks 7-9 and 10-12 that is approaching significance (p=.083). Thus, Hypothesis six was not supported by these analyses; however, significant relationships were found between two different time points.

Table 9: On-task bell within subjects effects

	df	F value	Significance
Time	3	2.85	**.044**

Table 10: On-task bell pairwise comparisons

	Mean Difference	Significance
Week 1-3	Week 4-6: -.028 Week 7-9: -.086 Week 10-12: .045	Week 4-6: 1.0 Week 7-9: .242 Week 10-12: 1.0
Week 4-6	Week 1-3: .028 Week 7-9: -.058 Week 10-12: .024	Week 1-3: 1.0 Week 7-9: **.024** Week 10-12: 1.0
Week 7-9	Week 1-3: .086 Week 4-6: .058 Week 10-12: .082	Week 1-3: .242 Week 4-6: **.024** Week 10-12: **.083**
Week 10-12	Week 1-3: .004 Week 4-6: -.024 Week 7-9: .082	Week 1-3: 1.0 Week 4-6: 1.0 Week 7-9: **.083**
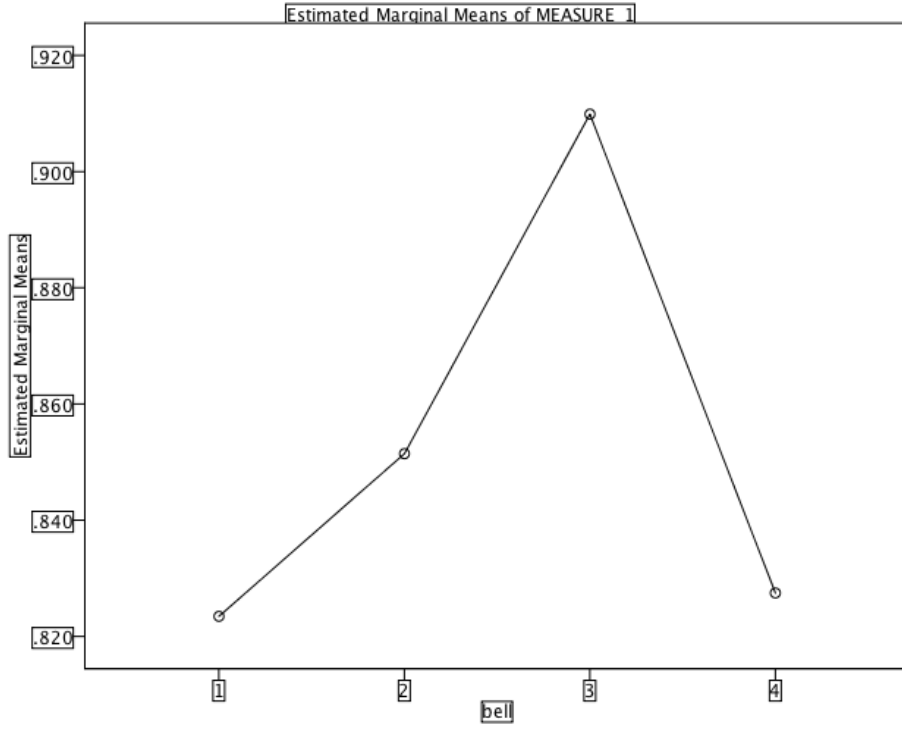
Figure 7: On-task bell measure results

4.0   DISCUSSION

A total of one out of six hypotheses were fully supported in this research study. Reports of life satisfaction significantly increased at the completion of the intervention sessions (t=3.06, p=.005). Self-reported on-task behaviors were significantly increased through week 9, but these increased on-task behaviors were not sustained through the end of the curriculum. Analyses did not find participants of the MSG to significantly change in mindfulness awareness or state anxiety. Analyses indicated that trait anxiety scores were significantly different from pre to post; however, they were significantly increased when it was predicted that scores would decrease. Overall, the current study demonstrated some very interesting results that can be influential in various clinical settings. Although researchers were anticipating more significant effects in this research study following the completion of the MSG, the results of this study should be analyzed in the context of other mindfulness research (Baer et al., 2004).

4.1   EXPLANATION OF RESULTS

4.1.1   Satisfaction with life and mindfulness awareness

Reports of life satisfaction of the MSG participants were significantly increased, with a medium effect size. This suggests that the MSG could have possibly influenced participants' reported increases in life satisfaction.

Results of this study did not support the original conceptualization of the benefits of mindfulness. It was thought that the measure of MAAS would indicate the level of successful internalization or development of mindfulness skills (Brown & Ryan, 2003) Thus, it was expected that higher levels of MAAS would correlate with higher levels of satisfaction of life and lower levels of anxiety. However, results indicate that life satisfaction significantly improved for participants while there was no change in mindfulness awareness and trait anxiety significantly worsened. Given these results, it is likely that something in the cognitive rehabilitation program contributed to improve life satisfaction that cannot be explained through trait mindfulness awareness.

During scale development and validation, the MAAS was shown to be inversely correlated to anxiety, measured by the STAI ($r= -.4$ $p <.001$) and positively correlated to life satisfaction (measured by the SWLS, $r=.26$, $p < .001$) (Brown & Ryan, 2003). However, the MAAS is a unidimensional construct of present-moment attention (Brown & Ryan, 2003). Brown & Ryan state, "The MAAS is focused on the presence or absence of attention to and awareness of what is occurring in the present rather than on attributes such as acceptance, trust, empathy, gratitude, or various others that have been associated with Mindfulness" (Brown & Ryan, 2003, p.824). While, Jon Kabat-Zinn defines mindfulness as a duel faceted concept,

including present-moment awareness and non-judgmental acceptance (Kabat-Zinn, 1990). The delivery of this scale could explain the lack of mindfulness change found in this research study, as individuals with cognitive disabilities have deficits in attention skills. Although the MSG curriculum contained a six-week module dedicated to understanding attention skills, the cognitive rehabilitation model does not support remediation or correction of deficits, in this case attention. Since the MAAS focuses solely on present attention, this may have been an inappropriate measure of mindfulness in this study.

In contrast with the MAAS approach to measuring mindfulness, many researchers suggest there are several other constructs that comprise mindfulness (Baer, Smith, Allen, 2004; Kabat-Zinn, 1990). Baer et al. recognized the limitations in the unidimensional factor approach to the MAAS and developed a four factor mindfulness scale (2004). The Kentucky Inventory of Mindfulness Skills measures mindfulness with four factors: observing, describing, acting with awareness, and accepting without judgment (Baer et al., 2004). The KIMS significantly correlates with the Satisfaction with Life Scale ($r=.28$, $p<.001$). Researchers found that the factor that correlated most with life satisfaction was the "describing" factor, which is not included on the MAAS. As stated earlier, it is plausible that the MAAS is not an optimal measure of mindfulness for this population of individuals with cognitive disabilities.

Furthermore, the MSG curriculum that was implemented placed a high focus on non-judgmental acceptance and self-awareness of thoughts, emotions, and feelings. Yet, no measure assessing the adoption of non-judgmental attitudes were collected in this sample. It is possible that the non-judgmental attitude developed in this and other mindfulness interventions could explain the significant increase in life satisfaction. Jon Kabat-Zinn specifically states that MBSR's primary aim is not to reduce symptoms or suffering but to have participants develop a

non-judgmental attitude towards all positive and negative experiences (1992). Thus, it is suggested that the KIMS should be evaluated in addition to the MAAS because of its factorial analysis including non-judgmental attitudes.

4.1.2   State and trait anxiety

The STAI has been used in published research studies examining the effects of MBSR interventions with individuals with cognitive disabilities. This suggests that the STAI is an appropriate measure for this population (Hofmann et al., 2010; Semple R., 2010; Vollestad et al., 2011). Despite the appropriateness of this measure, there were errors in data collection during this study, resulting in limitations drawing sound conclusions on this measure.

MBSR has been found to be consistently effective in reducing both state and trait anxiety in individuals with primary anxiety disorders (Hofmann et al., 2010; Kabat-Zinn et al., 1992; Klainin-Yobas et al., 2011; Miller, et al., 1995; Paulik et al., 2010; Vollestad et al. 2011). However, analyses of demographics indicated that this study population was comprised of mostly comorbid depression disorders rather than anxiety disorders, as 31.4% of this sample is currently taking depression medication. Mindfulness interventions, specifically MBSR and MBCT, have been shown in numerous clinical trials to reduce severity of depression (Baer, 2003). It is possible that a depression outcome measure would have been helpful in this research study's assessment battery, as it could have had a significant effect in reducing depression given its prevalence in the sample's diagnoses.

In addition, the overarching goal and target of the cognitive rehabilitation program is increasing self-awareness in individuals with cognitive disabilities. Clinical staff record clinical impressions of self-awareness at the beginning and end of each CSEP session. The clinical staff

reporting of study participants' self-awareness suggests that there is an outcome of increased self-awareness. Increased self-awareness could potentially significantly increase state or trait anxiety, as individuals generally gain understanding of their strengths, limitations, and appropriate need for support in future employment. As a result, this increased awareness of limitations could potentially increase anxiety in study participants, which could explain the statistically significant increase in trait anxiety found in this study.

4.1.3   On-task bell

Finally, the on-task bell measure analyses indicate that time significantly influenced the effect of on-task attention behaviors. This measure recorded daily incidents of on-task behaviors. Scores were consolidated and examined at 4 specific time points. Results indicated that a positive increase of on-task behaviors occurred during the session and through week 9. However, following week 9, there was a nearly significant decrease in on-task behaviors. This suggests that the programming had a significant effect of change in participants that was not sustained through the end of programming.

There are several possible explanations for this found pattern of effects. Since the MAAS, SWLS, and STAI were not given at 4 times points as well, it is not possible to determine if this significant increase followed by decrease was consistent across measures. If this pattern was systemic, it could account for the lack of change in mindfulness awareness, state anxiety, and trait anxiety. It is possible that changes in mindfulness awareness, state anxiety, and trait anxiety occurred but were not sustained until the end of the session. Future studies would benefit from multiple assessment time points on both this battery and other assessments independent to the MSG.

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4.2   CHALLENGES OF THIS STUDY

The targeted population of this research study poses unique challenges for evaluating the effectiveness of mindfulness-based interventions. Individuals with cognitive disabilities often experience low self-awareness, limitations in attention, and limited understanding of cognitive processes and could confound the impact of mindfulness interventions on mindfulness awareness, life satisfaction, anxiety, and on-task behaviors. Low awareness and limited understanding of cognitive processes proves to be a challenge when teaching individuals to shift their attention to the present moment. MSG leaders found that participants consistently had a difficult time in recognizing their thoughts and had difficulty in shifting their attention back to the present due to confounding attention limitations, such as a diagnosis of ADHD.

Due to sampling limitation in awareness, attention, and understanding of cognitive processes, the traditional MBSR curriculum was modified in hope to fit the needs of the participating individuals. The six weeks of the MSG intervention were spent teaching participants about attentional and cognitive processes. This knowledge was assumed to be necessary to utilize mindfulness, as attention is the foundation for present-moment awareness. It is possible that in order to see anticipated results, individuals with cognitive disabilities would need a longer mindfulness module than was possible in this setting. Traditionally, MBSR consists of 8 weeks, 28 hours of instructor lead groups, and 50 hours of independent practicing. The current research study's MSG consisted of 12 weeks, 9 hours of instructor lead instruction, and limited independent practicing. It is likely that this population would need considerable more hours of mindfulness intervention instruction following the 6-week attention module. In addition, many research studies have found mindfulness to be efficacious for populations of cognitive disabilities when utilizing individualized mindfulness treatment (Harper et al., 2013; Hwang and

Kearney, 2013;Singh et al., 2011; Singh et al., 2006). Although traditional MBSR is designed to be a group intervention, this population of cognitive disabilities could possibly benefit from individual treatment.

Finally, MBSR is traditionally a very intense intervention that requires a high level of motivation on the part of the participants. This research study added the MSG curriculum to a cognitive rehabilitation program. Although participants agreed to participate in the overall program, they did not specifically seek out the MSG as in traditional MBSR programs. MSG instructors found that several participants per session were very resistant to the concepts of mindfulness and practices of meditation.

4.3   LIMITATIONS

This research study should be considered within context of its methodological limitations. Errors in data collection of the STAI are considered to be the most serious limitations by researchers of this study. Two separate errors in data collection occurred, which caused problems in reliability and validity for both state and trait anxiety assessments. State anxiety analyses were only made with a sample size of 14, which is too small to detect even large effect sizes. Trait anxiety assessments were not completed with the same scale. There are six items on the STAI-Y that were updated from the original X form. Although scored appropriately, it is not possible to perform a true pre post test analysis on different measures.

A second limitation of this research study is the small sample size, which results in likely Type II Errors in analyses. The power of this study was not high enough to detect small effects. Power analyses indicated that 44 participants are needed to detect a medium effect size between

pre and post intervention group measures (Faul et al., 2007). Hypotheses one and two were found to have appropriate power due to the inclusion of a control group in addition to the intervention group.

As stated earlier, this research study would have benefited from more assessments throughout the session. The on-task bell measure suggests that there is a significant relationship of time for the MSG intervention. It would be helpful to see if the other assessments followed a similar pattern as the on-task behaviors. This would be clinically helpful for staff to diagnosis a possible explanation for the significant regression in targeting symptoms.

The MSG intervention is embedded into a cognitive rehabilitation program that focuses on cognitive skills, social cognition, and vocational cognition with aims to increase awareness, independence, and life skills. Thus, it is not possible to distinguish the effect of the MSG from the overall cognitive rehabilitation program on the measures of life satisfaction, anxiety, and on-task behaviors. The significant medium effect of increased life satisfaction cannot be solely attributed to the MSG curriculum. It is not possible to determine if the significant increase in on-task behaviors or the ending decrease in on-task behaviors was a result of an error in curriculum or lack of interest in the MSG. Similarly, it is not possible to determine if changes in anxiety were influenced by the MSG and to what extent.

In order to create a larger sample size, participants across two separate sessions were combined to create a larger convenient sample of 24. Although clinicians followed a standard protocol for the MSG, there is variability between groups in the exact content of each group session. Clinicians follow a curriculum but are encouraged to tailor each group session to the individual progress of the group. Thus, it is possible that each session could receive slightly different therapeutic interventions.

All of the assessment measures used in this proposed research study were self-report measures. Thus, results were dependent on the reliability and validity of each participant. Participants could have been motivated to report inaccurately in order to please clinicians and staff, despite the constant prompting of the importance of honesty. Particularly for this population, limited or impaired awareness could cause inaccurate self-reporting of awareness, anxiety, task behaviors, and life satisfaction. However, it was not possible for clinical staff to accurately assess participants' attention, awareness, anxiety, or life satisfaction, as these are all internal indicators that cannot be assessed by others.

4.4   FUTURE RESEARCH

Future research is needed that studies the effects adapted MBSR interventions have for individuals with cognitive disabilities. Replication of this study including control groups for all measures would be beneficial to reproduce the found effect in life satisfaction. This study replication requires a minimum sample size of 44 in order to safely detect small effect sizes. Additional research that includes a depression assessment, an assessment that evaluates the non-judgmental component of mindfulness, an attention measure, and proper evaluation of state and trait anxiety would be beneficial. The evaluation of a lone intervention of MBSR adapted for cognitive disabilities would allow researchers to develop better understanding of the impact of MBSR itself for this population.

Much is still unknown about the role of mindfulness interventions for individuals with cognitive disabilities. Very few studies utilize a group intervention, as did this study (Singh et al., 2011; Singh et al., 2006). Mindfulness was originally designed for group interactions; so,

additional research studies examining this with groups of individuals with cognitive disabilities would be very beneficial. The reported benefits of MBSR still appear to be very relevant to the limitations that individuals with cognitive disabilities experience.

Once future research is developed for this population, it would be helpful to compare the curriculum of the MSG to other adapted interventions. Due to the presence of so many confounding variables, it is not suggested that the MSG curriculum is drastically modified at this point. Further evaluation of this curriculum with the aforementioned additions of control groups with large sample sizes would be helpful. Multiple time point interventions would allow researchers to evaluate the potential influence of each individual weekly lesson. This would be helpful in the eventual modification or update of the MSG curriculum. Finally, it is suggested that future leaders of the MSG are familiar with MBSR and are trained to this specific curriculum so that the intervention may be further evaluated.

4.5   CLINICAL IMPLICATIONS FOR REHABILIATION COUNSELING

Although future research studies would be methodologically stronger with a single intervention, it is difficult to examine the effects of only one intervention in the clinical world. Mindfulness appears to be very beneficial to populations with similar limitations as individuals with cognitive disabilities. This research study is limited in its ability to distinguish the effect of the MSG versus the cognitive rehabilitation program. However, this research study is strong in its generalizability because of the in vivo treatment of the cognitive rehabilitation program. Participants in this study are students that live at a single location and receive consistent rehabilitation services for 15 consecutive weeks. Thus, this research study is far more

generalizable than a mindfulness intervention that stands alone one time per week in a research office. It has been suggested that an eclectic approach to therapeutic interventions is beneficial in the field of rehabilitation counseling. Clinical interventions rarely occur in isolation. Thus, this study provides very strong clinical implications for rehabilitation counselors that work with individuals with cognitive disabilities. This MSG that is embedded within a cognitive rehabilitation program is reflective of real-world clinical practice.

Rehabilitation counselors are counselors trained to assist individuals with disability in their participation, employment, and quality of life. Life satisfaction is arguably the most important outcome goal of rehabilitation counseling services. People with disabilities are the largest minority group in the United States, and recent research indicates that individuals with cognitive disabilities report lower levels of life satisfaction and are more likely to have comorbid mental health disorders, such as anxiety and depression, than people without disabilities (Fletcher et al., 2007; Kessler Foundation & National Organization on Disability, 2010; Robertson, 2011; Spek et al., 2013). Although several of this research study's hypotheses were not supported, the life satisfaction of the MSG participants was significantly increased, with a medium effect size. This suggests that mindfulness-based interventions have significant potential benefits for individuals with disabilities, specifically cognitive disabilities. The effects of mindfulness interventions and individuals with disabilities are still underexplored. There is great potential for further exploration of this intervention across populations of disabilities. Rehabilitation counseling's unique combination of clinical skills, research skills, and evidence-based practices proves to be a beneficial degree for the exploration of this intervention for individuals with disabilities.

5.0   CONCLUSION

Individuals with cognitive disabilities experience limitations in cognitive skills, social skills, participation, employment, and quality of life. These areas of limitations are the primary focuses of rehabilitation counselors. Mindfulness-based interventions have been shown across a variety of populations to assist individuals in adopting a non-judgmental awareness to all of life's challenges, which results in increased quality of life and participation (Baer, 2003). Thus, a mindfulness group intervention was developed to assist individuals with cognitive disabilities in improving quality of life, reports of distressing emotions, and targeted behaviors.

This study examined the influence of a 12-week MSG embedded into a cognitive rehabilitation program for individuals with cognitive disabilities. While previous research has shown mindfulness interventions to improve self-reported assessments of anxiety and awareness, this research study found that mindfulness awareness and anxiety were not improved. However, this study found that despite those results, life satisfaction was significantly improved for intervention participants. In addition, analyses indicated that targeted on-task behaviors were improved for 9 weeks before losing the positive effect. Despite varied results, this research study provides valuable clinical implications for rehabilitation counselors that are incorporating mindfulness into therapeutic interventions. Mindfulness interventions for cognitive disabilities have the potential to be an efficacious intervention, this study found significant improvements in life satisfaction. Further studies are needed to explore and replicate these findings while

examining the relationship of mindfulness and populations of individuals with cognitive disabilities.

MBSR & COGNITIVE DISABILITIES LITERATURE REVIEW

Author	Population/Diagnosis	n	Method	Intervention/Treatment Exposure	Dependent Variables	Findings	Methodological Limitations
Harper, S; Webb, T.; Rayner, K. (2013).	Intellectual Disabilities. FS WAIS < 70	18 studies	Multiple baseline and pre post	Mindfulness, Soles of Feet, ACT and DBT	Aggressive or inappropriate behaviors.	Reduction in aggressive or inappropriate behaviors. Statistical analyses were not calculated in 9 of the studies. General reductions in observed behaviors and self report measures from family members were used.	Small sample sizes, lack of reliability and validity, low generalizability, no information in the training or quality of Mindfulness instruction. Was not standardized.
Haydicky et al., (2012)	Adolescents with LD and cooccurring ADHD. IQ>80	60 ages 12-18, all male; 4 drop out	Quasiexperimental. Wait list control. Pre Post	20 Week MMA (Mindfulness Martial Arts).	Executive functions, internalizing/externalizing behaviors/social skills. BRIEF, WASI, CBCL	Externalizing, rule breaking, ODD, conduct significant decreases at posttest, social problems . Nothing completely because of MMA itself	WL particpants may have sought treatment elsewhere, no indication on decision of WL, parent questionnaires, self report questionnaires
Hwang and Kearney (2013).	Review Article- Varied	12 studies-taught MBI to mild-severe DD. Total of n=62	Multiple baseline	Varied. Summarized to 5 elements: 1. awareness of breathing. 2. awareness of bodily sensations. 3. awareness of actions. 4. awareness of mental states, thoughts, feelings. 5. shifting attention. 11 of 12 studies had individual mindfulness training. Only Beauchanin did in a group/classroom setting.	Varied. Anxiety, Aggressive behaviors, weight loss, deviant sexual behaviors.	Most reported positive effects. Mindfulness to control deviant sexual arousal was less clinically successful than reducing aggressive behaviors.	None of the studies defined mindfulness as a construct. The fidelity of Mindfulness was not discussed in any of the studies.The quality of instructors was not evaluated in any of the studies-as many were just family members. All but one used single subject design so results are not very generalizable
Semple, R.J. (2010).	General adult volunteers. Examined for 4 components of attention.	Total n=53, split between 3 groups. Mindfulness Meditation group n=15. Progressive Relaxation n=14. Wait list control n=16. 5 drop out	Controlled randomzd. 3 x 2 Factorial design repeated measures ANOVA	1. 4 week Mindfulness Meditation Group. 2. 4 week Progressive Relaxation Group. 3. Wait list control group	Continuous Performance Test (CPT), Digit Symbol Substitution, Stroop Color and Word test. STAI, Profile of Mood States	Significant decreases in Stroop, STAI and Mood states for both interventions BUT no difference between groups. Only significant difference between groups was for CPT related to mindfulness group. This measures sustained attention.	Short intervention duration. Low power with small samples.
Singh, N.N., et al. (2006)	Developmental disabilites, severe or profoud mental retardation.	18	Multiple baseline design	Behavioral treatment followed by Mindfulness treatment. Was not a traditional Mindfulness treatment-workers learned mindfulness principles but did not implement an intervention	# of aggressive behaviors, learning objectives performed independently	Significant decrease in aggressive behaviors, significant increase in learning objectives	Convenient sample.
Singh, N.N., et al. (2011a)	Adolescents Asperger	3	Multiple baseline design	17-24 weeks. Soles of the Feet Meditation. When negative emotions, switch attention from triggers to neutral. Daily 15 minutes practies	Instances of Aggression	Significant decrease in aggressive behaviors	Small sample. Mothers gave intervention. Mothers collected data. No information on recruitment of particpants
Singh, N.N. et al (2011b)	Adolescents Autism	3	Multiple baseline design	No information on weeks. Soles of the Feet Meditation. When negative emotions, switch attention from triggers to neutral. Daily 15 minutes practies	Instances of Aggression	Significant decrease in aggressive behaviors	Small sample. Mothers gave intervention. Mothers collected data. No information on recruitment of particpants. No weeks
Spek, A.A., et al., (2013)	High functioning Adults with ASD recruited from Adult Autism Center in Netherlands. Need to experience dep, anx, or rumination	41. 21 control group 20 intervention. Between 18 and 65. IQ>85	Randomized controlled. MANOVA. Pre post.	9 Weeks MBT-AS	Depression/ anxiety symptoms, rumination, positive affect	Depression, rumination and anxiety significant. Not Positive affect. Effect size medium-large	Adults average to high verbal abilities. Small sample size. Self report limitations
Zylowska, et al., (2008)	ADHD diagnosis recruited locally UCLA	24 adults, 8 adolescents. 78% adherence	Pre Post Feasability Study	8 Week Mindfulness Intervention. MAPS for ADHD. 1x a week, 2.5 hours per week	ADHD, Depression BDI, Anxiety BAI, Attention Network Test (ANT), Stroop, Trail Making Test, Vocab WAIS subtest	Stroop and ANT significant. Depression and anxiety. Younger age, more improvement	Small sample, limited generalizability. Majority female. Higher SES. Self report measures.

APPENDIX B

MBSR & ANXIETY DISORDERS LITERATURE REVIEW

Author	Population/Diagnosis	n	Method	Intervention/ Treatment Exposure	Dependent Variables	Findings	Methodological Limitations
Kabat-Zinn, J. et al. (1992).	DSM-III Diagnosis of GAD or panic disorder	n=24 (2 drop out)	Repeated Measures ANOVA	8 week MBSR curriculum.	Beck Anxiety Inventory, Beck Depression Inventory, Hamilton Panic Score, Fear Survey	Hamilton Anxiety F=21.1, Hamilton Depression F=8.87, BAI F=15.36, BDI F=9.96, Fear Survey F=9.79	Lack of randomized control trial. Small sample. Although used the sample of 50 other MBSR participants to compare for generalizability. Results were confirmed in both groups. Sound longitudinal pre/post study.
Hofmann et al. (2010).	Anxiety Depression, pain, cancer	39 studies, total n=1140.	Pre Post. Some control some not	Mindfulness varied.	Anxiety, depression, varous measures. Many STAI.	Prepost effect size .63 anxiety, .59 depression. Prepost effect size clinical populations .67 anxiety .53 depression. Control group effect size .33anxiety and .41 depression. ITT group effect size 1.06 anxiety and .55 depression. Follow-up effect size .6 anxiety, and depression.	Varied measures and varied study designs. Varied intervention plans.
Miller, J.J., Kletcher, K., Kabat-Zinn, J. (1995).	DSM-III Diagnosis of GAD or panic disorder	n=22 original study. n=18	Repeated Measures ANOVA	Original study: 8 week MBSR curriculum. 3 year follow-up on participants of original MBSR study	Beck Anxiety Inventory, Beck Depression Inventory, Hamilton Panic Score, Fear Survey	Hamilton Score F=13.22, Beck F=9.83. Both p<.001. Independent practice was evident and original 8 week MBSR benefits are sustainable.	Lack of randomized control trial. Small sample. Although used the sample of 50 other MBSR participants to compare for generalizability. Results were confirmed in both groups. Sound longitudinal pre/post study.
Paulik et al. (2010)	No exclusion criteria. Community mental health setting. 2=bipolar, 2=schizoaffective, 2=schizophrenia	n=12 (5 drop out)	3 paired t-tests	12 week pilot intervention of combined MBSR, MBCT, DBT: Stress Less with Mindfulness	DASS (Depression, Anxiety, Stress Scale)	Significant decrease in depression and anxiety levels both at post test and 12 month follow up. Statistically significant decrease in stress-not significant at the 12 month follow-up.	Small sample size, naturalistic setting of volunteers-also a limitation, no control group.
Vollestad, J., et al. (2011)	Recruited if experiencing an anxiety problem	76 between 18-65 years old. Excluded for suicide ideation, substance abuse, severe mental disorder, Axis I primary (8 drop out)	Control randomized. Pre post, 6 month follow up	8 week MBSR 2.5 hours, half day mediation after week 6.	BAI, Worry Questionnaire, STAI, BDI, Symptom checklist, Insomnia, FFMQ, Practice log,	Mindfulness fully mediated depression and anxiety, not fully for trait anxiety or worry. Maintained 6 months after at follow-up. Generally strong effect sizes across measures, no p values calculated	WL was not an active control group. Lack of information on meditation practices. Non specific factors-attention. No diagnostic interview. No assessment of protocol adherence,
Yobas et al. (2011)	Depression	39 studies, 10 countries. 105 effect sizes. Total n=1847	Many pre post, quasi experimental approach	Exposure based Cognitive therapy, MBSR, Acceptance Based Behavior Therapy, Stress Less with Mindfulness	Depression. Over half used BDI. Others used clinical symptoms checklists	Exposure based cog therapy largest effect size of d=2.09, MBSR d=1.92, ABBTd=1.33, SLWM=1.31. Effect sizes were statistically correlated with length of intervention regardless of the methological quality of studies.	

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