Mindfulness Training for Adults with Autism Spectrum Disorder: A Pilot Study

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ABSTRACT

Despite the rising prevalence of autism spectrum disorders (ASD), interventions for the adult population, most of whom do not achieve independent living, are limited (Seltzer, Shattuck, Abbeduto, & Greenberg, 2004). Additionally, many individuals with ASD experience impaired emotion regulation (ER), which is thought to contribute to higher rates of psychiatric comorbidities among adults with ASD as well as indirect effects upon adaptive functioning, interpersonal relationships, and vocational status (Mazefsky et al., 2013; Samson, Huber, & Gross, 2012). The primary purpose of the current study was to investigate the initial feasibility and efficacy of an adapted mindfulness-based individual therapy for adults with ASD to target ER difficulties, and evaluate ER as a potential change process. Initial feasibility of mindfulness-based approaches among adults with ASD was supported by acceptable treatment fidelity and participant satisfaction ratings. Efficacy of the intervention was partially supported; four of the participants demonstrated significant improvements in impulse control, access to ER strategies, and emotional acceptance, and two of the participants evidenced significant decreases in emotional symptom distress. Analysis of ER as a potential change process found significant improvement for four participants, but slopes demonstrated that improvement initiated before treatment, a confound for determination of change processes. Further research is recommended, including additional timepoints, a clinical cutoff-derived sample, and further understanding of the role of self-regulatory deficits for individuals with ASD.

GENERAL AUDIENCE ABSTRACT

Despite the rising numbers of people with autism spectrum disorders (ASD), interventions for adults with ASD, most of whom do not achieve independent living, are limited (Seltzer, Shattuck, Abbeduto, & Greenberg, 2004). Many adults with ASD have impaired emotion regulation (ER), which is thought to contribute to higher rates of co-occurring diagnoses such as depression and anxiety disorders, and reduces overall quality of life (Mazefsky et al., 2013; Samson, Huber, & Gross, 2012). The primary purpose of the current study was to investigate the practicality and usefulness of an adapted mindfulness-based individual therapy for adults with ASD to target these difficulties in ER, and to judge whether ER is a potential change process in the improvement of overall functioning. Nine individuals with ASD who were between the ages of 18-25 participated in the study. After their diagnosis of ASD was confirmed, they were assigned to either 3- or 4-week baseline period in order to assess their functioning before the treatment, and then began the 6 weekly therapy sessions on mindfulness. Initial practicality to conduct mindfulness-based approaches among adults with ASD was supported by acceptable treatment fidelity (adherence) and participant satisfaction ratings. Helpfulness of the intervention was partially supported; four of the participants saw significant improvements in control of emotional impulses, learned to use more ER strategies, and accepted their emotions more often, and two of the participants showed significant decreases in emotional distress. Study of ER as a potential change process found that four participants had significant improvements in their overall ER skills, but graphs showed that improvement began before the treatment, leading to questions about whether the intervention was the only reason for improvement. Further research is recommended.

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Chapter 1- Introduction

ASD and Emotion Regulation

According to recently released prevalence estimates, 1 in 68 children are diagnosed with an autism spectrum disorder (ASD) in the United States (CDC, 2014). Although individuals with ASD are heterogeneous in presentation of cognitive and language abilities, all individuals diagnosed with ASD are characterized by deficits in social communication and interactions and the presence of restricted or repetitive behaviors and interests (American Psychiatric Association, 2013). As the prevalence and awareness of ASD has raised dramatically, much of the intervention research to date has focused on early identification and treatment of young children; however, effective assistance and treatments for adults with ASD remains an under-studied arena. Previous research which has focused upon outcomes for adults with ASD have found that while some attenuation of symptoms may occur, the majority of adults with ASD do not achieve independence in living or employment (Eaves & Ho, 2008; Seltzer et al., 2004). In a review of ASD trajectory research, Seltzer and colleagues (2004) found that long-term follow-up studies have indicated that between 75-85% of adults studied do not live independently, marry, obtain living-wage providing employment, go to college, or have a large support network of friends. Furthermore, adults with ASD who were consistently employed and experienced a higher level of independence in living were found to exhibit fewer maladaptive behaviors, such as aggression, and fewer ASD-related behaviors regardless of initial levels when observed five years later (Taylor, Smith, & Mailick, 2013), suggesting that higher levels of adaptive functioning are associated with improvements in social and emotional functioning. Overall, these findings indicate that adults with ASD are susceptible to lower overall quality of life, in economic, social, and daily living domains. Considering the larger health, social, and large-

scale economic ramifications of these outcomes, research concerning methods for improving the outcomes and daily functioning of adults is imperative.

Many adults, up to 60% with ASD, also are likely to have a comorbid psychiatric condition such as depressive or anxiety disorders (Eaves & Ho, 2008; Hofvander et al., 2009; Seltzer et al., 2004). Some have argued that difficulties with emotional functioning common in ASD, including emotion recognition and emotion regulation (ER), are responsible for high levels of diagnosed comorbidity. ER is typically defined as the ability to alter or control one's emotions in automatic or deliberate methods, usually in order to increase adaptive behaviors (Gross, 2005; Thompson, Lewis, & Calkins, 2008). Previous literature has demonstrated that ER difficulties are prominent among individuals with various forms of psychopathology including depression, anxiety, and eating disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Keenan, 2000).

Emotion dysregulation is an especially vital arena of treatment for many individuals with ASD. Prior research has also shown that individuals with ASD experience difficulties in emotional functioning, including emotion recognition and ER. Furthermore, aggression, irritability, anxiety, and tantrum-like behaviors are common among individuals with ASD (Mazefsky et al., 2013; Samson, Huber, & Gross, 2012). Up to 80% of a community based ASD sample had been diagnosed with at least one co-occurring psychiatric diagnosis (Simonoff et al., 2012). Relatedly, many individuals with ASD have been shown to experience difficulties with other self-regulatory areas such as executive functioning (EF) and attention, especially shifting one's attention (Keehn, Müller, & Townsend, 2013; Wallace et al., 2015); however, ER difficulties often result in distress and comorbid conditions that trigger clinical services (Weiss, 2014; White et al., 2014). While the associated behavioral difficulties in ASD have been well-recognized clinically, ER difficulties in ASD has only recently begun to be the subject of

research (Mazefsky et al., 2013; Samson et al., 2014). Furthermore, the degree to which ASD etiology may influence ER is unknown, as ASD symptoms such as cognitive inflexibility may account for the ER difficulties seen in this population (Mazefsky et al., 2013). Thus, the development of ASD-specific treatments targeting ER is a critical area for effective treatment of individuals with ASD.

Mindfulness and Acceptance-Based Interventions

Mindfulness- and acceptance-based (MA) interventions have been successfully utilized in order to treat ER difficulties (Robins & Chapman, 2004; Stange et al., 2011). Mindfulness is a broad construct and has been defined and operationalized (e.g., as a dispositional trait, ER strategy, set of practices, process variable, or a type of meditation (Bishop et al., 2004; Brown, Ryan, & Creswell, 2007); however, Kabat-Zinn defines mindfulness as the ability to be aware of the present moment, attending to thoughts and emotions without judgment (commonly referred to as mindful awareness), and meditative practices (Kabat-Zinn, Lipworth, & Burney, 1985). Unlike cognitive behavioral therapies (CBT), where the purpose is to identify and change cognitions and emotions that are labeled as maladaptive, MA-based interventions seek to modify how individuals relate to their thoughts and emotions through separation of the self from their thoughts or emotions (Baer, 2003). Mindful awareness practices are often incorporated into everyday activities, such as walking, running, or yoga stretches, or can be as simplistic as focusing on one's breathing. When practicing mindful awareness, individuals are instructed to acknowledge their thoughts and emotions but not to evaluate them (Baer & Krietemeyer, 2006). Seen in this context as a related context, acceptance is defined by engaging with presently-occurring thoughts and emotions without effecting behavior, such as engaging in behaviors to prolong or avoid (Herbert & Forman, 2011). Mindfulness meditation (MM) practices similarly

involve focusing one's attention on present awareness in a more focused way, and unique to other meditation practices such as transcendental meditation, MM does not require immediately redirecting one's attention when it strays from an area of focus (Baer & Krietemeyer, 2006).

Multiple therapeutic approaches such as Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT), Acceptance and Commitment Therapy (ACT), Dialectical Behavior Therapy (DBT), Mindfulness-Based Relapse Prevention (MBRP), Integrative Behavioral Couples Therapy (IBCT), and Acceptance-Based Behavioral Therapies (ABBT) have incorporated MA-based techniques (Hayes, 2004; Roemer & Orsillo, 2009). These therapies have varied significantly in terms of the duration, populations targeted, and standardization of the treatment. MBSR and MBCT are group-based therapies consisting of eight, 2.5 hour sessions where participants are taught and practice mindfulness practices, such as a body scan exercise, sitting and Hatha yoga mindfulness (Baer & Krietemeyer, 2006). While MBSR was among the first utilizations of mindfulness practices removed from Buddhist philosophy in health conditions, it typically lacks further psychoeducation beyond the mindfulness practices. MBCT was originally developed for relapse prevention among individuals with a history of prior major depressive episodes (Segal, Teasdale, & Williams, 2004). Several randomized control trials (RCTs) of MBCT in depression have shown that it is effective in reducing the prevalence of future depressive episodes; additionally, MBCT has been adapted to other conditions, including bipolar disorder, anxiety disorders, and HIV (Evans et al., 2008; Gonzalez-Garcia et al., 2014; King et al., 2013; Perich, Manicavasagar, Mitchell, & Ball, 2013). The combination of education regarding mindfulness practices and cognitive therapy-derived content was concordant with the overall aims of the current study.

ACT (pronounced as a word, rather than the letters of the acronym) is an acceptance-based therapy in which the target is to reduce psychological inflexibility, where individuals equate their emotions and thoughts as their objective reality and truth. ACT also teaches processes such as present moment awareness and acceptance as part of the overarching goal (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes & Pierson, 2005). ACT is also distinct from MBSR and MBCT due to its flexibility in duration, skills upon which it focuses, and lack of MM practices (Hayes, Strosahl, & Wilson, 1999). DBT, which was primarily developed for the treatment of chronic suicidality and among individuals with borderline personality disorder, utilizes several acceptance- and change-based strategies, such as acceptance and mindfulness (Linehan, 1993; Robins & Chapman, 2004). Like ACT, DBT employs mindful awareness practices and does not traditionally include MM practices as part of its intensive, long-term regimen (Robins & Rosenthal, 2011).

Beyond these highly developed and standardized MA-based treatments, the source of much new MA-based intervention research has focused upon other means of incorporating mindfulness and acceptance into intervention. For example, Orsillo and Roemer have utilized both traditional CBT and MA-based approaches into individual psychotherapy for anxiety disorders, such as the focus of modifying one's relationship to their thoughts and emotions, promoting valued action, mindful awareness exercises, and compassion (Roemer & Orsillo, 2009). MA-based interventions have also begun to be utilized in school-based and community settings and have been associated with improvements in stress levels, anxiety, and attentional difficulties (Felver, Frank, & McEachern, 2014; Sibinga et al., 2013; Tan & Martin, 2013).

While the literature on such MA-based therapies has been promising, others have questioned whether shorter, more accessible forms of mindfulness-based treatments are similarly

effective (Carmody & Baer, 2009). A study by Josefsson and colleagues (2012) compared a shortened (six-week) version of MBSR to both a relaxation training group and waitlist control. Results suggested that the relaxation group, which utilized deep breathing and progressive muscle relaxation, and the mindfulness group did not significantly differ from one another in their effects on executive attention, well-being, anxiety, depression, and coping. A review of the effect of class contact hours on MA-based therapy's effectiveness found that among a sample of 30 studies of MBSR with varying class length, the number of class hours was not found to be significantly associated with reduction of stress and psychopathology symptoms or with increases in mindfulness (Carmody & Baer, 2009). Individual mindfulness training interventions have also begun to be shown to be effective in reducing perceived stress and negative affect (Johnson, Gur, David, & Currier, 2015; Wahbeh, Lane, Goodrich, Miller, & Oken, 2014). A one-session mindfulness intervention did not find significant changes in attentional processes when compared to control groups, but significant improvements in mood and stress were reported (Johnson et al., 2015). Overall, research to date has shown support for shortened MA-based interventions.

While the literature supporting MA-based interventions has grown, one of the most difficult issues has been measurement of mindfulness as a construct. To date, most of the extant literature has assessed mindfulness as a dispositional trait, measured indirectly via self-report measures (Brown et al., 2007; Ciarrochi, Bilich, & Godsell, 2010). Additionally, as the pace of research on the effectiveness of MA-based therapies has dramatically increased, questions about the potential mechanisms of change in these therapies remain. Improved understanding of mechanisms, the processes that underlie change in MA-based treatments, allows for better knowledge of therapy selection, implementation, and distinguishing between diverse therapies

(Kazdin, 2007). To date, the majority of the study of mechanisms in MA-based treatment research has been accomplished via the usage of a mediator variable of the relationship between treatment and a measure of treatment outcome (Johansson & Høglend, 2007; Kazdin, 2007). However, the majority of studies have not accounted for temporal precedence of the mediating variable, nor have they allowed for assessing multiple potential mediators (Johansson & Høglend, 2007; Kazdin, 2007). Such studies of mechanisms have identified several potential constructs, including self-regulatory processes of attention and ER, trait levels of mindfulness, and worry and rumination.

Understanding and improved treatment of ER difficulties may hold particular promise. Research regarding transdiagnostic constructs and mechanisms of change that affect treatment or course and outcome of psychopathology has increased, and ER is a relevant target mechanism for many forms of psychopathology (Aldao et al., 2010; Berking & Wupperman, 2012). The role of ER, in particular, has been supported via neurological and physiological changes, such as increased activation in adaptive-ER related areas (hippocampus, amygdala, and dorsal and medial PFC) as well as decreases in HRV and cortisol levels (Bränström, Kvillemo, & Akerstedt, 2013; Chiesa, Serretti, & Christian, 2013; Hölzel et al., 2011; Mankus, Aldao, Kerns, Mayville, & Mennin, 2013).

MBIs and ASD

Adapting MA-based interventions to individuals with ASD has several potential strengths. MA-based interventions have been shown to be beneficial in targeting ER difficulties, such as inflexibility, rumination, or reappraisal and perspective taking, which are frequently seen in individuals with ASD. As individuals with ASD have been known to experience more cognitive rigidity in forms of perseveration on preferred topics, previous research has suggested

that this inflexibility or "stickiness" of ruminative thought or worrying may also extend from this type of cognitive style (Eack et al., 2013; Rieffe et al., 2011; Samson et al., 2014). Furthermore, research has also found that individuals with ASD are more likely to utilize suppression and avoidance ER strategies and less likely to be flexible in their ER strategy usage (Mazefsky, Borue, Day, & Minshew, 2014; Rieffe et al., 2011; Samson et al., 2012). Inversely, MA-based techniques focus on tolerance of negatively-valenced mood states and cognitions. Thus, MA-based interventions may be considered ideally suited to target ER difficulties in ASD.

Another facet of MA-based treatment which allows for adaptation to ER focused-treatment in ASD is the effects that it has on directing the form and intensity of sensory input. MA-based treatments have been shown to effectively lessen the amount of attention given to one's sensory input, which could be utilized by individuals with ASD to modify the intensity of their emotional experiences (Chiesa et al., 2013). In addition, the acceptance-based approach to handling ER difficulties may be particularly pertinent for usage in the ASD population. Given the disorder's chronicity, dissocation of negatively perceived symptoms from the affected individual's self-identity and maximizing their view of their own strengths can be powerful for adults with ASD.

Collectively, the reviewed research indicates that manifest difficulties with ER such as irritability, anxiety, and explosivity are common among adults with ASD, and that these difficulties may also impact impairments in interpersonal and vocational functioning. Individuals with ASD are also commonly diagnosed with comorbid psychiatric conditions associated with ER difficulties such as anxiety, depression, ADHD, and externalizing disorders. In addition, MA-based interventions, which have been found to be effective in treating emotion dysregulation, may provide particular utility for individuals with ASD. The primary purpose of

this study is to develop and analyze the feasibility and preliminary efficacy of an MA-based intervention focused upon ER difficulties among adults with ASD. The current study was among the first of MA-based treatments for adults with ASD, and the first to target a transdiagnostic process in ER.

Several prior studies have begun to assess the effectiveness of MA-based treatments among individuals with ASD. Among a heterogeneous sample of adolescents with externalizing disorders, four of which also had an ASD diagnosis, modified MBCT was administered to the adolescents and their parents (Bögels, Hoogstad, van Dun, de Schutter, & Restifo, 2008). MBCT was modified via shortened mindfulness exercises and the usage of more activities, such as mindful eating and yoga. Self- and parent-report indicated improvements in awareness, social problems, impulsivity, and attentional difficulties (Bögels et al., 2008). Singh and colleagues (2011; 2011) implemented a mindful awareness "meditation in the soles of the feet" technique with six adolescents with ASD, which was previously shown to be effective with individuals with intellectual disabilities. This technique was associated with decreases of aggressive behaviors (Bögels et al., 2008). A study including concurrent mindfulness training for 23 adolescents with ASD and their parents found that a 9-week group program was associated with a reduction in rumination and improvement in social responsivity and overall quality of life (de Bruin, Blom, Smit, van Steensel, & Bögels, 2014). A similar parent-child design was utilized in a study of six children and adolescents with ASD aged 8-15 years and their parents (Hwang, Kearney, Klieve, Lang, & Roberts, 2015). This intervention trained parents to deliver the mindfulness intervention in 8 weekly 2.5 hour sessions, and followed their home implementation of the intervention over one year. Reductions in anxiety and thought problems subscales of the CBCL were observed in the children and adolescents. The only known school-based MA

intervention for children with ASD was a 6-week adaptation of ACT of 28 students aged 13-21 years (Pahnke, Lundgren, Hursti, & Hirvikoski, 2014). Results were supportive of feasibility of the treatment and decreased stress, emotional distress, and hyperactivity, which were maintained at a 2 month follow-up (Pahnke et al., 2014).

The only studies to investigate a MA-based treatment among adults with ASD have both come from the same group of clinicians in the Netherlands who conducted two studies utilizing an adapted form of MBCT. The first study contained 42 adults with comorbid depressive and anxiety symptoms (Spek, van Ham, & Nyklíček, 2013). Participation in a modified MBCT group was associated with reduced depression and anxiety symptoms and rumination, as well as increases in positive affect. Modifications included reduction of metaphors and imaginative language, shortened meditative practices, and audio tape practices to be used in weekly homework (Spek et al., 2013). In the second study, 50 adults with ASD between the ages of 20 and 65 participated in one of five identical MBCT groups. Reductions in anxiety, depression, somatization, sleeping problems, and rumination were observed, and increased positive affect and overall well-being were noted. Additionally, a 9-week followup assessment found that decreased rumination influenced anxiety levels at followup, and that intervention effects did not lessen at the followup (Kiep, Spek, & Hoeben, 2015). A recent review of the extant literature on mindfulness interventions for individuals with ASD identified six of the aforementioned studies and recommended improved methodology in future studies (Cachia, Anderson, & Moore, 2016). Overall, these studies provide preliminary evidence that individuals with ASD can benefit from MA-based interventions.

The purpose of the current study was twofold: 1) to develop and analyze the feasibility and preliminary efficacy of a short-term MA-based intervention focused upon ER difficulties

among adults with ASD, and 2) to measure the potential change of ER processes during mindfulness. The current study was among the first of MA-based treatments for adults with ASD, and the first to target a transdiagnostic process (i.e., increased mindful awareness) in ER. Based upon prior research of MA-based approaches among adults with ASD, the intervention consisted of individual psychotherapy rather than a group format to allow for individualization. Change was examined in targeted potential mechanisms of clinical outcome such as dispositional mindfulness, ER, and overall distress throughout the intervention (see Figure 1). The primary aim was to examine the change in ER following instruction in mindfulness.

Chapter 2- Method

Participants

Participants included 9 adults (7 male, 2 female) with diagnosed ASD. Inclusion criteria were: a) 18-25 years of age, b) current DSM-5 diagnosis of ASD supported by the Autism Diagnostic Observation Schedule, Second Edition revised module 4 algorithm (Hus & Lord, 2014; Lord et al., 2012), c) verbally fluent and cognitively unimpaired (i.e., have an assessed Verbal IQ score greater than 80) in order to benefit fully from the treatment and to provide a more homogeneous sample, and d) absence of severe comorbid psychopathology, such as psychotic symptoms and severe aggression, assessed via the Mini International Neuropsychiatric Interview (MINI; Sheehan & Lecrubier, 2006).

Participants were recruited from Southwest Virginia via multiple methods (e.g., university and non-university clinics, registries). A two-stage eligibility process was used. First, individuals or parents who expressed interest in the study completed a phone interview to screen for study eligibility. Individuals who appeared to meet eligibility criteria and who were still

interested in the study based on the phone screen were then scheduled for an assessment appointment to confirm diagnosis and eligibility. Ten individuals completed the phone screen, and nine participants were found to be eligible to participate in the study. One individual who called to complete a phone screen chose not to participate.

All sample characteristics are presented in Table 2. The final sample (*n*= 9) was primarily male (77.8%) with ages ranging from 18 to 25 years (*M* = 19.56 yrs; *SD* = 2.19). Eight participants identified as White (88.9%), and 1 as Black and Hispanic (11.1%). All 9 participants identified as currently living with their parents, and as having completed high school. Additionally, 7 were previously or currently pursuing post-secondary education. Three of the participants (33.3%) were employed. In accordance with eligibility requirements, all 9 participants met at threshold or higher for ASD on the ADOS-2. Mean Verbal IQ for the sample was 98.33 (*SD*= 10.32; range 84-119) estimated from the Vocabulary and Similarities subtests of the Wechsler Abbreviated Scales of Intelligence, Second Edition (WASI-II; Wechsler, 2011). After completing the MINI as a brief screener of psychiatric diagnoses, three participants met the screening criteria for hypomania (33.3%), two (22.2%) each met screening criteria for major depressive disorder and GAD, one (11.1%) participant each for dysthymia, agoraphobia, OCD, PTSD, generalized social phobia, and non-generalized social phobia. Six of the participants (66.7%) reported that they had previously received some form of therapy, while 8 of the participants (88.9%) had ever been prescribed psychiatric medications, the most utilized of which was for depressive symptoms (3; 33.3%).

Measures

Eligibility.

Autism Diagnostic Observation Schedule, Second Edition *(ADOS-2;* Lord et al., 2012). The ADOS-2 is a semi-structured, observational assessment of ASD characteristics. Participants are rated based on their responses to social presses and scored for social communication, reciprocal social behavior, and repetitive behaviors and stereotyped interests. Module 4 of the ADOS-2, indicated for use with adolescents and adults with fluent speech and takes approximately 45-60 minutes to administer. Sensitivity for an ASD diagnosis compared to non-diagnosis is 90.5% and specificity is 82.2% (Hus & Lord, 2014). The ADOS-2 was administered by the study investigator, who has research reliability on the measure, at the eligibility appointment for six participants (participants 1,2,3,4, and 6) when scores from an ADOS-2 administered by a research reliable clinician within the prior three years was not available.

Mini International Neuropsychiatric Interview (MINI; Sheehan & Lecrubier, 2006)**.** The MINI is a brief, structured diagnostic screening interview for current psychiatric problems. The MINI includes 17 anxiety, mood, or substance abuse disorders; however, for the present study, 14 modules were administered (major depressive disorder, dysthymia, hypo/manic episode, panic disorder, agoraphobia, social phobia, obsessive-compulsive disorder, alcohol abuse, substance abuse, psychotic disorder, anorexia nervosa, bulimia nervosa, post-traumatic stress disorder, and generalized anxiety disorder (Sheehan & Lecrubier, 2006). The suicide, mood disorder with melancholic features, and antisocial personality disorder modules were not administered due to overlap with other mood disorder modules or to the sensitive nature of such questions. Inter-rater reliability for the utilized modules ranged from 0.88 to 1.00, sensitivity from .52-.96, and kappa ranged from .51 to .90 (Sheehan et al., 1998). Four master's level graduate students administered the MINI to the participants at the initial eligibility appointment and the same rater administered the MINI to the participant at post-test.

Wechsler Abbreviated Scale of Intelligence, Second Edition (WASI-II; Wechsler, 2011). The WASI-II is a reliable and valid brief measure of intelligence (Wechsler, 2011). Participants completed the two verbal subscales of the WASI-II to provide an estimate of Verbal IQ at the intake/eligibility appointment. No assessed participants were excluded from participation due to having a Verbal IQ below 80.

ER and Related Problems.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)**.** The DERS is a self-report questionnaire that assesses ER difficulties. It consists of six subscales (nonacceptance of emotional responses, difficulties engaging in goal-directed behaviors, impulse control difficulties, lack of emotional awareness, limited access to ER strategies, and lack of emotional clarity), as well as a total score. Higher scores indicate more ER difficulties, and the 36 items are rated on a 1 to 5 scale. The DERS has been shown to have high internal consistency ($\alpha = .93$ overall and $\alpha > .80$ for all subscales), and adequate test-retest reliability ranging from .69-.89 for the subscales among a college sample (Gratz & Roemer, 2004). Internal consistency for the current sample was $\alpha = .90$. The DERS was administered at each timepoint.

Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997)**.** The ERC is a 20-item measure that provides 2 subscales; Emotion Regulation, a measure of adaptive ER strategy usage, and Negative Affect/Lability, a measure of negative emotionality and maladaptive ER. The ERC has been traditionally utilized as a parent-report measure of children up to age 18 years; however, it was slightly modified for this study to be a self-report measure for adults. Reliability for the subscales is good ($\alpha > .80$) among a sample of maltreated and non-maltreated children (Shields & Cicchetti, 1997). In this sample, the ER subscale reliability was $\alpha = .59$ and the negative affect/lability subscale was $\alpha = .80$. The ERC was administered at each timepoint.

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ is a ten-item scale which derives two subscales of habitual emotion regulation strategies, reappraisal and suppression, which are rated on a 1 ("strongly disagree") to 7 ("strongly agree") scale, and higher scores indicate increased usage of the strategy. Internal consistency (reappraisal $\alpha = .79$, suppression $\alpha = .73$) and test-retest reliability ($r = .69$ for each scale) have been reported (Gross & John, 2003). The internal consistency for the current sample was $\alpha = .61$ for reappraisal subscale and $\alpha = .58$ for the suppression subscale. The ERQ was administered at each timepoint.

Line tracing task. The participants completed several line tracing tasks, including unsolvable tasks. For each line drawing, the participant was to trace over the entire design once without picking up their pencil from the paper and tracing over any line twice. Each administration consisted of a five-minute period to complete two unique line tracing tasks (the first one solvable and the second unsolvable). At the beginning of the five minutes, the participant was instructed on the rules of the task, and reminded of the five minute time limit. This task was administered to measure frustration tolerance and emotion regulatory skills, as the administration was behaviorally coded for signs of reactivity. The line tracing task was administered at pretest, midpoint, and endpoint.

Behavioral coding of the line tracing task utilized an emotional reactivity rating scale based on Melnick and Hinshaw (2000), where adolescent males with and without ADHD were asked to build a difficult Lego pattern without help from their parent. Seven behaviors (mild emotion ventilation, intense emotion ventilation, problem-solving, help seeking, accommodating, negative responses, and shutting down) were measured using either a simple count of the times that a targeted behavior was observed, or via a 4-point Likert scale (1= "not at all," 2= "somewhat" or "seems to once," 3= "most of the time" or "two times," and 4= "all of the time"

or "< 2 times"). Accuracy of the line tracing task was also recorded (i.e., if the participant completed the task correctly, incorrectly, or did not complete the task). Behavioral coding was completed by two trained research assistants who demonstrated >80% reliability (within 1 point) with the investigator on three separate coding tapes and watched all line tracing administrations. Inter-rater reliability was calculated via weighted Cohen's kappa (k_w) for Likert scale items and via intra-class correlation (ICC) for items where a behavior was counted throughout the coding period. None of the Likert scale items were found to have a significant k_w (uses problem solving $k_w = .175$; seeks help $k_w = -.138$; accommodation/acceptance $k_w = .098$). Rates of mild emotional ventilation ($\alpha = .428$) and negative responses ($\alpha = .783$) were found to be acceptable, while rates of negative emotional ventilation and shutting down were too low to calculate an ICC.

Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). The 15 items comprising the MAAS are rated on a 6-point Likert scale (0= almost always to 5=almost never) to yield a total score that reflects the person's tendency to be attentive and mindful of present experiences, where higher scores indicate higher levels of trait mindfulness. Previous research has demonstrated internal reliability of $\alpha = .82$ (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The current study's internal consistency was $\alpha = .86$. The MAAS was administered at each timepoint.

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS consists of 20 descriptors, 10 of each positive and negative affect, which participants use to measure their mood state at that moment on a 5-point Likert scale from 1 (very slightly or not at all) to 5 (extremely). The reliability for the state version of the PANAS is high (positive affect $\alpha= .89$, negative affect $\alpha= .85$) (Watson, Johnson, & Tellegen, 1988). Internal consistency for the current sample was similarly high (positive $\alpha = .91$, negative $\alpha = .91$). The PANAS was

administered at all timepoints and was also administered as part of the ecological momentary assessment throughout the intervention.

Ruminative Thought Style Questionnaire (RTS; Brinker & Dozois, 2009). The RTS is a 20-item measure of repetitive, recurrent, intrusive, and uncontrollable thinking style, not accounting for current mood. Each item is rated on a 7-point Likert scale, where higher scores are indicative of more rumination. The internal consistency of the RTS is good ($\alpha = .87$) (Brinker & Dozois, 2009), although the measure has not been previously used with an ASD population. For the current sample, the internal consistency is high ($\alpha = .96$). The RTS was administered at the baseline, midpoint, and endpoint.

Toronto Alexithymia Scale-20 (TAS-20; Bagby, Parker, & Taylor, 1994)**.** The TAS-20 is a measure of alexithymia that comprises three subscales; the ability to identify feelings, to describe feelings, and externally oriented thinking. The scale has demonstrated good internal consistency ($\alpha = .81$) and test-retest reliability ($r = .77$) (Bagby et al., 1994; Parker, Taylor, & Bagby, 2003). The current sample's internal consistency was acceptable (total $\alpha = .61$, describing $\alpha = .21$, identifying $\alpha = .67$, & externally orienting $\alpha = .04$). The TAS-20 was administered at all timepoints.

Wisconsin Card Sorting Test (WCST; Heaton, Chelune, Talley, Kay, & Curtiss, 1993). The WCST is a task designed to measure EF; more specifically, perseveration and impulsivity. Individuals are asked to sort cards with unstated, changing rules about how to sort (e.g., color, shape, number of items on the cards, etc.). Participants are asked to match 128 cards to one of the four target cards based on color, shape, or number of symbols on each card, and are instructed whether they were right or wrong after each sort. After ten consecutive correct matches, the administrator changes the rule to another option without informing the participant.

The WCST-Learning Potential version (Wiedl & Wienöbst, 1999) is a variation on the traditional WCST that uses dynamic assessment in order to determine how well participants can learn and apply feedback. For the WCST-LP, a test-train-retest design is used where the participant completes the traditional WCST and then performs the WCST a second time with additional feedback from the examiner (e.g., "this is wrong, we are either sorting by color or number" and "with 10 correct now, the rule will change. You will no longer sort for color but by shape or number"). The third administration is also identical to the traditional administration. The Raw Gain Score (GS), computed as [post-test – pre-test score], has been theorized to indicate a participant's learning potential, or ability to shift actions and learn given specific feedback (Wiedl, 1999). For the current study, the WCST- LP was administered at pre-testing. At midpoint and endpoint, the WCST was administered in its traditional format. Raw GSs were calculated from the pre-test administration only.

Global Assessment and Improvement.

Clinical Global Impressions Scale- Severity and –Improvement (CGI; Guy, 1976)**.** The CGI-Severity [S] is a single-item global rating of disorder severity with scores ranging from 1 ("normal- no illness") to 7 ("among the most extremely ill"). Similarly, the CGI-Improvement [I] is a single-item rating of clinical improvement in disorder symptoms from 1 ("very much improved") to 7 ("very much worse"). For the current study, the CGI S and I ratings were completed by master's level graduate students who functioned as independent evaluators of global functioning. Raters completed the CGI-S at the initial eligibility appointment, and the same rater completed the CGI-I at the endpoint appointment. In order to be utilized as a rater for this study, the graduate students reviewed three ASD-specific vignettes and assigned CGI ratings to them within 1 point prior to evaluating participant cases.

Outcome Questionnaire (OQ; Lambert et al., 1996). The OQ is a 45-item self-report measure designed for repeated measure of client status throughout the course of therapy and at termination. Item responses range from 0-4 and responses are based on how the participant felt in the previous week. The OQ has high internal consistency (α = .93; Lambert et al., 1996). Internal consistency for the OQ in this sample was α = .66. The OQ was administered at eligibility, baseline, midpoint, and endpoint.

Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985)**.** The SWLS is a 5-item measure of overall life satisfaction where individuals are asked to rate how much they agree with satisfaction-related items from a 1 (strongly disagree) to 6 (strongly agree) scale. Internal consistency of the scale has ranged within the .80s and the measure has also displayed test-retest reliability over periods of several years (Kobau, Sniezek, Zack, Lucas, & Burns, 2010). The internal consistency for the current sample is acceptable (α= .77). For this study, the SWLS was administered at pre- and endpoint.

Social Responsiveness Scale, Second Edition, Adult Version (SRS-2; Constantino & Gruber, 2012). The SRS-2 is a 65-item self-report measure of ASD-related symptoms among adults. It produces a total scale of ASD-related symptoms, as well as subscales of social impairment, social cognition, social motivation, social awareness, and restricted interests and repetitive behavior. T-scores are provided within ranges of 59 or less (normal range), 60-65 (mild range), 66-75 (moderate range), and 76 or greater (severe range). Test-retest reliability has been previously reported at .88 (John N Constantino et al., 2004). Internal consistency for this study is high (α= .98). The SRS was administered at eligibility, pretest, posttest, and follow-up timepoints.

Waisman Activities of Daily Living Scale (W-ADL; Maenner et al., 2013). The W-ADL is a brief measure of activity limitations among adolescents and adults with ASD and any level of cognitive functioning. The W-ADL consists of 17 items which are rated either 0 ("does not do at all"), 1 ("does with help"), or 2 ("independent"). The scale was found to have high correlations with established ADL scales, such as the Vineland, and was also found to distinguish among gradients of ID (Maenner et al., 2013). For the initial ASD sample used for development of this measure, internal consistency was high ($\alpha = .90$), as was test-retest reliability ($r = .92$) (Maenner et al., 2013). For this study, self-report was utilized instead of the typical parent or caregiver report, due to the possibility of having participants who lived independently. The internal consistency for the current sample is $\alpha = .86$.

Ecological Momentary Assessment. EMA allows for repeated momentary time sampling of information from participants through the usage of diaries, electronic timers, or other devices. EMA lessens the chance of recall bias in research and can be used to investigate changes within processes over extended amounts of time in the participant's actual environment (Shiffman, Stone, & Hufford, 2008). In this study, EMA was utilized via text or email alerts to complete a brief questionnaire regarding the participant's mood and recent experience regarding mindfulness practices. This message was delivered using the SurveySignal app (https://www.surveysignal.com) which allowed the investigator to randomly contact the participant 2-3 times each week during the intervention. The message contained a link to the survey and reminded the participant to complete the survey within 24 hours of receiving the survey. The survey, which was located on SurveyMonkey (https://www.surveymonkey.com) a secure website, contained the PANAS (Watson et al., 1988) to report on their current affective state using the PANAS, as well as report on whether they utilized any mindfulness practices in

the previous 24 hours, which practices they practiced, the duration of the practices, and the perceived effectiveness of the practice.

Treatment Satisfaction, Adherence, and Therapeutic Alliance.

Treatment satisfaction. The participants' satisfaction with the treatment was assessed at endpoint by asking participants to answer a questionnaire assessing how helpful they believe the program to be on an 10-point scale (1 = not at all helpful, 10 = definitely helpful), if they learned anything in the program, anything that they found useful or not helpful, and any recommendations for the program.

Treatment fidelity. Session fidelity was coded by two independent, trained research assistants who coded 50% of each participant's sessions selected at random. Adherence to the session objectives, reviewing participant homework completion, and ratings of therapeutic relationship and participant involvement were coded. In order to be considered trained to reliability, coders had to match > 80% of the investigator's codes for three consecutive tapes. Weighted Cohen's Kappa (k_w) were calculated in order to assess inter-rater reliability on interval ratings of fidelity, therapeutic alliance, and participant involvement (see below).

Therapy Process Observational Coding System-Alliance Scale (TPOCS-A; Mcleod & Weisz, 2005)**.** The TPOCS-A is a therapy alliance coding system initially designed for child-therapist and parent-therapist working alliance. It consists of six items rated on a 6-point Likert scale (0= "not at all" to 5= "great deal") for therapist-client bond, and three items related to client's participation in therapeutic tasks. Two independent, trained research assistants coded a random 50% selection of each participant's sessions. Coders were considered reliable after achieving >80% agreement with the investigator on three consecutive coding tapes. Weighted

Cohen's Kappa for the items ranged from *Kw* = -.550 to .558. Additionally, the mean level of each item was calculated across sessions (see Table 5).

Vanderbilt Psychotherapy Process Scale (VPPS: Malley, Suh, & Strupp, 1983)**.** The VPPS is a process measure for intervention research that assesses patient, therapist, and therapeutic relationship characteristics. Five items (withdrawn, inhibited, passive, actively participated in the interaction, and spontaneous) from the VPPS patient participation subscale were utilized for the current study. Each item was rated on a 5-point Likert scale (1= "not at all" to 5= "a great deal"). Two independent, trained research assistants rated 50% of the participant therapy sessions (the same sessions as the TPOCS-A) after achieving reliability with the investigator, defined as >80% agreement across three consecutive sessions. Weighted Cohen's Kappa for scale items ranged from *Kw* = -.044 to .555. Additionally, the mean level of each item was calculated across sessions (see Table 6).

Procedure

The current study utilized a nonconcurrent multiple baseline design which allows for a series of A-B replications with randomization of the baseline period (Watson & Workman, 1981). In this design, the length of the baselines are predetermined and randomly assigned to the participants; in this way, the participants serve as their own comparison through measuring change in the baseline period and can be compared to changes during the intervention (Watson & Workman, 1981). While the nonconcurrent design does not control for the environment of the subjects, single-case design has been recommended for initial piloting of an applied intervention, especially for difficult-to-recruit populations such as individuals with ASD (Bulkeley, Bundy, Roberts, & Einfeld, 2013). Suggested methodology for multiple baseline designs includes independent evaluators for pre- and post-testing of outcome, repeated measurement across

baseline and intervention periods (at least four), and allowances for individualizability of the treatment for participant needs (Gast, Ledford, Gast, & Ledford, 2014; Kratochwill et al., 2012).

All potential participants who expressed interest were first phone screened. Interested participants who passed the preliminary eligibility phase via phone screen were then scheduled for the eligibility appointment. Following the intake appointment, the participants were randomized to either a three- or four-week baseline period, after which time they began the intervention. Participants attended 6 weekly individual therapy sessions held either at the VT Child Study Center or Roanoke Higher Education Center with the study investigator as therapist. Data was also collected at pre-intervention (prior to the first session), midpoint (following the third therapy session), end-point (following the final therapy session), and three week follow-up timepoints. See Table 1 for the complete battery at each timepoint.

Treatment development. The goal of the current study was to develop and evaluate an intervention targeting ER difficulties with mindfulness practices for young adults with ASD. After reviewing MA-based manuals, synthesizing the relevant research base (Conner & White, 2016), and consulting with experts in this area, a treatment manual was assembled. The main source of the manual is Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2013). Modifications to the traditional MBCT protocol included the following: 1) session length was shortened from 2.5 hours to 1 hour in duration due to individuals' with ASD attentional difficulties; 2) meditation practices were also shortened from up to 1 hour to 20 minutes or less due to the attentional difficulties, practicality, and applicability of the practices in a real-world environment; 3) reduction of metaphors and idiomatic speech during meditative practices and throughout the sessions, which are typically difficult for individuals with ASD's concrete thinking style, and replacement with metaphors comparing cognitive processes to

physical examples (e.g., 'sticky' thoughts, finger trap metaphor for acceptance); and 4) utilizing individual therapy modality as opposed to group therapy in order to focus upon the intra-group differences, such as unique presentation and strengths and difficulties, of adults with ASD.

In addition, the psychoeducation and discussion of depression was removed from sessions and replaced with psychoeducation and content regarding ER. The first two sessions contained psychoeducation on emotions and ER, and Compas, Connor-Smith, and colleagues' framework for ER responses (2001), which conceptualizes coping responses as either voluntary or involuntary, and either engaging or disengaging, was used. Six modules (acceptance, reappraisal, problem solving, rumination, avoidance, and blowing up/shutting down) were implemented and administered across sessions 3-6. After administering the RSQ in session 2, ER modules were assigned to sessions based upon higher maladaptive ER strategies usage and low adaptive ER usage, targeting the highest-rated maladaptive and lower-rated adaptive skills first.

Data Analysis

Treatment feasibility, adherence, and satisfaction. Acceptable treatment fidelity was considered to be 80% (i.e., at least 80% of stated objectives reached, for each module, across sessions for each participant), and no program drops or adverse events. The agreement between coders for each item of the TPOCS-A, VPPS, and fidelity coding was calculated through the use of Cohen's kappa and weighted kappa, and responses were averaged across participants. Session duration was reported as an average. The objectives accomplished in session and homework reviewed rates were presented as percentages. Participant treatment satisfaction was assessed via an average of how helpful they found the treatment to be, as well as qualitative feedback

concerning helpful and unhelpful aspects of the program as well as recommendations for changes to the program.

Efficacy and Change across Time. Statistical analyses included approaches used in single-case design and clinical replication literature. Reliable Change Indices (RCI; Jacobson & Truax, 1991) were first calculated in order to determine the amount of change occurring from the treatment, accounting for imprecise measurement. RCIs are calculated by dividing the difference of scores between an initial and endpoint, divided by the standard difference, which accounts for test-retest reliability of the measure (X_{ep}-X_{bl}/ S_{diff}). The recommended cutoff of the RCI is 1.96 in order to infer statistically significant and meaningful change. Average scores (across all participants) were averaged for each timepoint separately, and then these scores were used to calculate the RCI for both the DERS total score and subscales as well as the OQ total score and subscales. Next, RCIs for these same measures were calculated for each participant separately. The test-retest reliabilities and standard deviations utilized for the S_{diff} score were obtained from the literature; when available, an adult ASD sample from the literature was also employed and both scores were reported.

In addition, Simulation Modeling Analysis (SMA; Borckardt et al., 2008) was also used as a means to analyze single-case outcome data. SMA is an available software package designed for analyzing time-series data (www.clinicalresearcher.org). SMA allows for the analysis of changes in symptom level and the slope of symptom change from pretreatment baseline to endpoint and other timepoints. Bootstrapping techniques are used to reduce the autocorrelation effects (results in a high rate of Type I errors) of measuring across timepoints, as repeated measure administration results in subsequent administrations being dependent on the value of the previous administrations. SMA tests the data stream for participants individually against five

slope vectors: an increasing baseline and decreasing treatment [| 1 | 2 | 3| 3 | 2 | 1 | 0 | -1 | -2 | -3 | -4 | -5 |]; a flat baseline and increasing treatment [| 0 | 0 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |]; an increasing baseline and flat treatment [| 1 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |]; increasing from baseline throughout treatment [| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |]; and increasing during treatment, return to pre-treatment level at the initiation of treatment, and then increasing throughout treatment [| 1 | 2 | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9|]. In addition, SMA tests for level change, a significant change between baseline and treatment [| 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |]. In determining whether a slope of a participant's data 'matches' a particular vector slope, SMA allows for both autocorrelation and calculation of the correlation of the outcome measure and phase vector. The probability of potential effect sizes' occurrence by chance in null findings is also calculated. SMA was used to examine potential multivariate process analyses, specifically in whether changes in ER precede changes in overall functioning (measured via the OQ) and whether changes in mindfulness precede changes in ER. This form of SMA allows for examination of cross-lagged correlations between two variables of interest in order to determine potential processes of change on variables. Per Borckhardt and colleagues' (2008) recommendation that each phase have between 5-15 data points per phase (baseline and treatment), the SMA results for the DERS and OQ should be interpreted with caution.

In addition to modeling and examination of statistically significant change within treatment, other methods to evaluate clinically significant change are also often suggested for use in pilot studies of interventions with small samples (Conover & Iman, 1981; Edgington, 1992). Given the small sample size, a non-parametric Wilcoxon Signed Rank Test (equivalent to a dependent *t*-test) was utilized to compare baseline and endpoint/follow-up scores for participants. Elevated scores (i.e., above established cutoffs) on the DERS and OQ at baseline and endpoint

(as determined by cutoffs of the mean of Gratz & Roemer, 2004, and the OQ cutoff of 63, respectively) and changes of ≥1 *SD* from eligibility to endpoint and eligibility to followup (for the DERS) were also used as another measure of clinical significance. In addition, CGI-I scores were also collected to assess clinical global improvement.

Additional analyses were run to ascertain other factors and mechanisms affecting treatment outcomes. EMA data were reported via percentages and averaged across participants, and SMA analyses were utilized for PANAS measures. Biserial correlations were used to analyze the RCI from the DERS total score and WCST-LP raw GS of correct matches and perseverative errors.

Chapter 3- Results

Data Check and Clinical Circumstances

Data were analyzed to determine the legitimacy of responses and possible outliers (i.e., non-patterned responses) and unusual item responses. Additionally, personal circumstances regarding the participants were noted throughout the intervention phase in order to have a record of mitigating factors that may have influenced treatment progress and outcome.

Participant two experienced interpersonal conflict with family members during his participation in the study, including elopement following an argument between the first and second sessions, which required a police search for several hours.

Participant three, while not diagnosed with any comorbid conditions via the MINI, described a short, intense depressive period in the first three sessions of the intervention.

Participant four, who had comorbid depression and trauma, sent a note along with his follow-up questionnaires reporting that his depressive symptoms had worsened in the six weeks

since finishing the intervention. The clinician called the participant and recommended that he follow through with the referral information that was given to him.

Participant six informed the clinician that his girlfriend ended their relationship the day prior to his final intervention session.

Participant seven appeared to have patterned responses (specifically, responding "2" or "some") on many of the self-report questionnaires throughout timepoints. When asked about these responses at the baseline appointment, midpoint, and endpoint, he reported that he read and responded accurately to all items. However, his responses should be interpreted with caution, and some analyses (reliable change index) could not be calculated due to his pattern of responses remaining the same across timepoints. Furthermore, this participant's final treatment session and endpoint assessment was delayed for approximately four weeks due to a family health emergency, which prohibited his transportation to and from sessions.

Participant eight reported increasing stress regarding her college coursework during the course of the intervention. She asked to reschedule sessions 5 and 6 due to studying and coursework.

Feasibility

Treatment adherence. All nine participants completed the six sessions of treatment. Across all participants, session length averaged 49 minutes (*SD*= 14.00). In 92.6% of the coded sessions, all treatment objectives were accomplished. In non-initial sessions, homework was reviewed 100% of the time in randomly selected sessions. On a 5-point Likert scale, therapeutic relationship averaged 3.80 (*SD*= 0.93) across all sessions, while participant involvement averaged 3.87 (*SD*= 1.09).

Using the TPOCS-A to measure therapeutic relationship, coders rated the level of positive affect directed towards the therapist (*M*= 3.02, *SD*= 1.46), sharing with the therapist (*M*= 3.54, *SD*= 1.38), and collaborative work in the session (*M*= 3.71, *SD*= 1.08) as high.

A portion of the VPPS was also utilized to assess level of client involvement. The items were rated on a four-point Likert scale (1= not at all, 2= somewhat, 3= mostly, 4= all the time) and means were calculated across participants and all sessions. Participants were not rated highly on being withdrawn (*M*= 1.58, *SD*= 0.79), inhibited (*M*= 1.58, *SD*= .71), or spontaneously participating in the session (*M*= 2.11, *SD*= .79). Active participation in the sessions was high (*M*= 3.22, *SD*= 0.85).

Participant Satisfaction. All participants completed a treatment satisfaction survey at endpoint. Most of the participants (*n*=8) rated the program as quite helpful (*M*=8.13, *SD*= 2.10; range 4-10) on a ten-point Likert scale. Participant 1 gave the overall helpfulness rating of 4, while all other participants rated the program helpfulness from 7-10. Figure 3 displays the scores for treatment helpfulness. All participants (100%) reported that they had learned something from the program.

Efficacy and Treatment Mechanisms

On the CGI-S, all participants ranged between 3-5 ("mildly ill," "moderately ill," or "markedly ill"). At endpoint, six of the participants (66.7% of sample were minimally or much improved (3 had CGI-I ratings of 3"minimally improved" and 3 had ratings of 2 "much improved"; (see Figure 4). Baseline and endpoint scores were observed on the DERS and OQ compared to clinical cutoff or elevations. On the DERS, five (55.56%) of the participants remained at elevated scores, one remained non-elevated throughout the treatment, one participant (participant 8) went from non-elevated to an elevated score at treatment, and two participants

(22.22%) went from elevated to non-elevated scores during the course of treatment. On the OQ, two participants remained above the clinical cutoff, two participants remained below the clinical cutoff, three participants decreased from clinical to subclinical level during the course of treatment, and two participants went from subclinical to clinical during treatment. As can be seen in Table 3, mean scores on the PANAS-Negative affect subscale decreased across the course of treatment from 24.56 (*SD*= 6.13) at baseline to 15.78 (*SD*= 3.23) at endpoint.

RCIs were calculated for the DERS and OQ total score and subscales (See Table 8 and 9). For the DERS, participant 3 was observed to have a clinically significant decrease in emotion dysregulation via the DERS total score. No other participants were observed to have a significant decrease in the total score; however, many participants exhibited significant improvement on the DERS subscales. Three participants demonstrated significant improvement in 'acceptance of emotions' (6 at EP, 3 at EP and FU, 4 at FU only). Reliable change in decreased difficulties with impulse control was observed for four participants (1 and 3 at EP and FU, and for 5 and 8 at FU only). Decreased difficulties with emotional clarity were demonstrated for two participants (1 at EP and FU when compared to ASD norms and 3 at EP only). Participant 8 reported increased difficulties with emotional clarity at EP. Increased access to ER strategies was observed for four participants (1, 3, and 9 at EP and FU compared to ASD norms and 4 at EP only).

On the OQ and its subscales, a reliable change was observed in total score only for participant 4. Reliable change was observed on the symptom distress subscale for participants 4 and 7. Additionally, reliable change was seen in social role difficulties for participants 4 and 5, although reliable change in increased social role difficulties was seen for participants 7 and 9. No reliable changes were observed in the interpersonal relationships subscale.

SMA was utilized to detect significant changes in mean scores between the baseline and treatment phases for the DERS and OQ total scores in order to assess changes in ER and overall distress as potential mechanisms of change during treatment (See Table 10). For the DERS, significant mean changes were observed for participant 3 and for the mean scores for all participants. On the OQ, no significant mean changes were observed. Although few significant changes were observed for level change between baseline and treatment, more significant changes were found in slope analysis, where the pattern of scores for the DERS and OQ were tested against the previously mentioned slope vectors. Again, as Borckardt et al. (2008) recommends between 5-15 data points for each data phase, the current results should be interpreted with caution.

Table 11 presents the highest correlation slopes for each case, and Figures 6 and 7 display the slopes for each participant. For the DERS, the most common significant slope is slope 3 (participants 1 and 3, and the overall mean). Slope 2 (participant 2) and slope 4 (participant 5) had one significant each. For the OQ, the only significant slope was slope 4 (participant 4).

Multivariate process analysis was also used in SMA, which allowed for the temporal analysis of the DERS and OQ, and MAAS and DERS. Table 12 presents the significant lags. For the analysis of the DERS and OQ total scores, two participants (1 and 8) observed a significant positive correlation at Lag 0, which indicates that either 1.) Increases in the DERS and OQ occurred concurrently at one of the lags, 2.) Decreases in the DERS and OQ occurred concurrently, or 3.) Both occurred. In addition, two participants (6 and 7) evidenced significant positive correlations at Lag -2, which indicates that either 1.) A decrease in the OQ proceeded a decrease in the DERS by 2 weeks at a lag, 2) an increase in the OQ proceeded an increase in the DERS by 2 weeks, or 3.) Both occurred. Only one significant finding was observed for the

MAAS and DERS, with participant 2 evidencing a positive significant correlation at Lag 2. This suggests that either 1.) An increase in the MAAS preceded an increase in the DERS by 2 weeks at one of the lags, 2.) A decrease in the MAAS preceded a decrease in the DERS by 2 weeks, or 3.) Both occurred. Overall clinical improvement as the independent clinicians' CGI ratings suggest that overall severity ranged from mildly to markedly ill (range 3-5; *M*= 3.67; *SD*= .707), while CGI-Improvement scores indicated that all participants experienced some symptomic improvement, ranging from mild to much improvement in at least one domain (range 2-3; *M*= 2.67; *SD*= .500).

EMA. Analysis of the EMA data, collected during the intervention period, was completed to examine treatment dosage factors and assess positive and negative affect over time. Of the nine participants, eight completed at least one EMA session (see Table 14). Across the eight participants with EMA data, response rates ranged from 7.69- 100% (*M*= 67.81%). For the item concerning whether the participant practiced mindfulness in the prior 24 hours, six of the eight responding participants stated 'yes' 100% of the time (i.e., for all completed timepoints), while participant 1 stated yes 72.7% of the time and participant 5 stated yes 81.8% of the time. Table 14 reports the form(s) of mindfulness practices that participants used; all of the eight participants reported utilizing the body scan (taught in the first session) or the breathing space during the majority of their practices, and across all participants, average duration of the practices for that day were either less than five minutes (26%) or 5-10 minutes (32.9%).

The PANAS was also administered at each EMA timepoint in order to measure levels of positive and negative affect across the intervention period. Positive affect scores averaged 29.93 (*SD*= 5.77; range 24.00-34.71) for the eight participants, and negative affect averaged 18.93 (*SD*= 6.39; range 14.20-24.00). Figure 8 displays graphs for the positive and negative affect

scores across timepoints. Five participants completed greater than three timepoints. For these 5 participants, the PANAS subscales administered via EMA were divided into the first and second halves of the intervention period and compared (see Table 13). Across the five participants, 2, 4, and 5 evidenced decreases on the negative affect subscale of five or more points, while participants 1 and 8 saw minimal increase or decrease on the negative affect scale. No changes were seen beyond three points on the positive affect scale from the first half to second half of treatment.

WCST-LP. Analyses with the administration of the WCST-LP were undertaken in order to determine a potential relationship between cognitive flexibility and treatment outcome. The raw GS for the total number of correct matches and the number of perseverative errors were utilized. The RCI for the DERS and the raw GS for the number of correct matches was found to be significantly correlated (r = .824, p= .006); however, the WCST- LP GS for the number of perseverative errors was not significantly associated with improvement in emotion regulation (r = .239, p= .536).

Chapter 4- Discussion

Summary

This study was the first attempt to implement a brief, individual mindfulness-based intervention targeting emotion dysregulation among young adults with ASD. As the primary role of pilot studies is to determine the feasibility of the intervention (Leon, Davis, & Kraemer, 2011), two aims of the current study were examined: 1.) analyzing the feasibility and efficacy of a MA-based intervention targeting ER difficulties for adults with ASD, and 2) measure change in ER processes during the intervention. A modified form of MBCT was selected as the

intervention for this study, with adaptations including fewer sessions, shortened session duration, shortened mindfulness practice duration, individual instead of group modality, less reliance on metaphors and idioms when describing mindfulness practices, and a focus on ER strategies and usage as opposed to depressive symptoms. A nonconcurrent multiple baseline design was utilized to enable comparison of baseline and treatment periods with randomization of the baseline period.

Nine young adults with ASD were recruited and found eligible to participate in the intervention. No attrition or adverse events were reported, and all nine participants completed all the six sessions. Homework was reviewed in all relevant (i.e., not initial) sessions, and 92.6% of observed sessions completed all stated objectives. Coding of therapeutic alliance and participant involvement and inter-rater reliabilities on the measures evidenced fair agreement for some of the items; however, other items had low levels of inter-rater reliability. Additionally, participant satisfaction averaged eight out of ten. In terms of preliminary efficacy, all participants were rated as either minimally or much improved via CGI-I ratings by an independent evaluator. Decreases in negative affect, but not increases in positive affect (via the PANAS) were observed. RCIs demonstrated significantly decreased difficulties with impulse control for four of the participants, increased acceptance of emotions for three participants, and increased access to ER strategies for four participants on the DERS, while the OQ subscale RCIs evidenced significant decreases in overall symptom distress for two participants, and decreases for two participants on the social role subscale for two participants (while increases were seen for two participants).

Overall, these results suggest some support for Aim 1; the intervention was found to be feasible and efficacious for several of the participants. However, it should be noted that participants were not required to meet any cutoff in ER difficulties or have any psychiatric

comorbidities to be eligible for the current study, and this may have produced a floor effect, where minimal changes occur in scores across treatment due to pre-existing low or high scorers. For example, two of the three participants who were rated as "much improved" on the CGI-I had also met criteria for several comorbid conditions via the MINI at the initial eligibility appointment. Additional limitations of the feasibility and efficacy results also include the usage of a single clinician for both assessment (other than the CGI and MINI) and treatment, as the generalizability of effects across additional clinicians is unknown. Recruitment of a self-selecting sample may also lessen the ability to extrapolate the results of the study to other individuals with ASD who experience ER difficulties but may be more reticent to enter treatment or a mindfulness-specific treatment. Furthermore, the current sample recruited participants with average or higher levels of verbal functioning, which does not allow for generalizability of the current findings to individuals with ASD who also have intellectual disability. In addition, levels of inter-rater reliability on the TPOCS-A and VPPS ranged widely by item, from less-than-chance disagreement to high levels of agreement. This level of variability also highlights the fact that neither of these measures has been previously utilized with individuals with ASD, and the TPOCS-A was developed and normed with a child and adolescent sample. Additional training of coders on the measures, as well as specific training regarding the differences in social interaction and emotional expression that individuals with ASD are known to exhibit (Adolphs, Sears, & Piven, 2001; Baron-Cohen, 2004; Eack, Mazefsky, & Minshew, 2015) would assist in future studies in order to potentially ameliorate such disparities.

Regarding the attempt to investigate potential change processes throughout treatment (Aim 2), SMA analyses observed significant mean change scores for one participant on the DERS between baseline and treatment phases. Group mean slopes (as well as two participants)

found a slope with improving baseline and stable treatment, and other participant slopes for the DERS (as well as the only significant slope observed for the OQ) included continuing improvement throughout the baseline and treatment phases, suggesting that improvements may not be attributable to treatment alone. Cross-lag analysis of the DERS and OQ, and the MAAS and DERS, found that two participants experienced significant decreases of ER difficulties and overall distress concurrently, while two other participants experienced increases or decreases in overall distress before changes in ER difficulties, and only one participant experienced increases in trait mindfulness before changes in ER difficulties These findings suggest that overall functioning and ER difficulties may act in concert, as opposed to changes occurring in sequence. For two participants who experienced interpersonal stressors at the end of the program (6 and 7), results indicated the opposite of the hypothesized order, that is, overall distress increases proceeded ER difficulty increases. These findings, when paired with clinical knowledge of outside events (being broken up with by a girlfriend and health emergency of a parent), highlight the importance of considering how increases in overall stress may increase ER difficulties. EMA data regarding momentary affect and engagement in mindfulness practices suggested that when participants engaged in mindfulness practices, duration ranged from 1-10 minutes a day. Reflecting the main timepoint measurements of the PANAS, the EMA data observed a decrease in negative affect for most of the participants, while positive affect remained relatively stable across time. Overall, results evidence some support of change processes across the course of the intervention, such as decreases in negative affect, although slopes of ER difficulties and overall distress with improvements in the baseline period suggest that improvements may not be attributable to treatment alone.

Notably, clinically significant changes were seen from this brief intervention for some participants, despite a briefer intervention period (6 hours versus 20 hours seen in traditional group MBCT) and a focus on a population where other treatments that have demonstrated efficacy have been time-intensive (Wong et al., 2015). Given such results, the utilization of MA-based interventions for individuals with ASD should be further investigated. Furthermore, the current study provides evidence in the modification of MA-based treatments in individual therapy format. Such modifications may be beneficial for flexible and personalized adaptation of treatment. Another strength of the current study is the assessment of potential change processes (ER difficulties) via multiple modalities, including self-report, behavioral coding of a laboratory task, and EMA. Assessment of mechanisms as well as treatment outcome in this manner is recommended methodology (Johansson & Høglend, 2007; Kazdin, 2007).

More research into the usage of MA-based approaches for individuals with ASD needs to be undertaken, as the potential to target common co-occurring difficulties in ER holds promise (Eack et al., 2013; Rieffe et al., 2011; Samson et al., 2014). Furthermore, results from the current study regarding decreased negative affect may also serve as evidence that MA-based approaches, even in the form of a brief intervention, may have positive ramifications for adults with ASD. While the proposed link seen in Figure 1 between mindfulness and improved ER functioning was not supported via SMA analyses for this study, this study adds to the growing literature regarding the positive effects that have been seen in MA-based interventions for individuals with ASD, which can be conceptualized in such a model (Cachia et al., 2016).

Feasibility results from the current study also lend evidence towards utilizing such an intervention as a stand-alone therapy to improve ER difficulties and reduce negative affect. However, MA-based techniques may also be efficacious when conducted in conjunction with

other treatments and techniques, such as psychoeducation and cognitive-behavioral techniques (Spek et al., 2013). Thus, future research with the current intervention may potentially utilize other treatments and techniques in tandem with the current sessions and modules.

Limitations

Limitations of the investigation into potential mechanisms of change in this study include lacking sufficient timepoints in the baseline and treatment phases for SMA analyses. Borckardt and colleagues (2008) recommend at least five data points in each phases, while only two baseline and two treatment timepoints were collected for each participant in the current study. Additionally, stability or decreasing scores in baseline periods is needed in single case designs in order to determine whether the treatment phase results are resultant from the effects of the treatment. With improvement seen in the baseline period for several of the participants, the effects of the treatment components versus the placebo effects of anticipating treatment and outside environmental factors cannot be distinguished.

While the usage of EMA was exploratory in this study, several previous studies have shown initial feasibility with individuals with ASD (Chen, Bundy, Cordier, & Einfeld, 2014; Khor, Gray, Reid, & Melvin, 2014). Additional methodological limitations include a high variability of participation in EMA (from one participant who did not complete any EMA timepoints after signing up to one participant completing 100% of them), and lack of EMA timepoints during the baseline period. These limitations resulted in difficulties in allowing comparisons to be made between the participants and from baseline to treatment phases.

Future Directions

Preliminary findings indicate that the current mindfulness-based intervention was feasible to implement with young adults with ASD, and resulted in increases in adaptive ER usage among

some of the participants. Future studies should further investigate the effects of mindfulness practices among individuals with ASD, including elucidating the potential mechanisms of mindfulness practices on ER. A more homogeneous sample, either with established, clinically impairing ER difficulties or those meeting criteria for a comorbid psychiatric diagnosis, should be utilized in order to better evaluate the potential efficacy of this intervention. Future studies of this intervention should also include a longer treatment phase, parental report on behaviors and outcomes, and more assessment timepoints in order to better assess for potential change processes. In addition, adapting such interventions for all functioning levels of ASD is also needed, as ER difficulties are seen across cognitive functioning level in ASD (Uljarevic & Hamilton, 2013; White et al., 2014), and previous research has indicated initial feasibility to teach some mindfulness skills to individuals with comorbid intellectual disability (Singh, Lancioni, Manikam, et al., 2011).

Further research into ER and its relationship to both core ASD symptomatology and other self-regulatory processes such as EF is also needed in order to better understand how to best conceptualize and treat ER dysfunction in ASD. Extant research on ER in ASD has theorized the potential source(s) of ER difficulties as inherent to ASD or via highly comorbid, but distinct mechanisms (White et al., 2014). Furthermore, research has yet to fully link ER difficulties in ASD to difficulties in other areas of self-regulation, such as attention (Keehn et al., 2013) and EF (Robinson, Goddard, Dritschel, Wisley, & Howlin, 2009), which may interact among individuals with ASD. Additionally, the utilization of EMA in ASD should be further researched as a new means to understanding individuals with ASDs' emotional experiences, with a focus on how to obtain the most naturalistic and easily usable method for obtaining such data.

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Table 1
Assessment Schedule

Schedule of Measures					
Measure	Eligibility	Pre (before 1st session)	Mid (after 3rd session)	Post (after 6th session)	Follow up (6 weeks—can be mailed out to participant)
demographics	X				
ADOS-2	X				
WASI-2	X				
MINI*	X			X	
CGI*	X			X	
ERQ	X	X	X	X	X
MAAS		X	X	X	X
OQ-45		X	X	X	
PANAS	X	X	X	X	X
RTS		X	X	X	
SRS-2-A		X		X	X
ERC	X	X	X	X	X
DERS	X	X	X	X	X
Waisman Activities of Daily Living scale		X		X	
TAS-20		X	X	X	X
Satisfaction with life scale		X		X	X
Treatment satisfaction				X	
*WCST***		*X*	*X*	*X*	
*Line tracing***		*X*	*X*	*X*	
EMA measures (online) to participants weekly		*X*	*X*	*X*	
*Completed by graduate assistant other than CC (independent evaluator)					
**Behavioral tasks- taped for coding					

Table 2

Demographic Statistics

	N (%)	*M*(*SD*)
Age	18-25 years	19.56 (2.19)
Male	7 (77.8%)	
Race/Ethnicity [a]		
African-American	1 (11.1)	
Asian-American	0	
White	8 (88.9)	
Hispanic	1 (11.1)	
Marital status		
Single	7 (77.8%)	
Unmarried, in relationship	2 (22.2%)	
Highest level of schooling		
High School	6 (66.7%)	
Some college/ technical	3 (33.3%)	
Employed	3 (33.3%)	
Live with Parents	9 (100)	
Ever been in therapy	6 (66.7%)	
Current psychiatric medication	5 (55.6%)	
Ever taken psychiatric medication	8 (88.9)	
Depression[a]	3 (33.3)	
Anxiety	1 (11.1)	
Learning disorder	1 (11.1)	

	N (%)	*M*(*SD*)
ADHD	2 (22.2)	
MINI		
MDD	2 (22.2%)	
Dysthymia	1 (11.1%)	
Hypomania-current	3 (33.3%)	
Mania-current	0 (0%)	
Mania- past	0 (0%)	
Panic d/o	0 (0%)	
Agoraphobia without panic	1 (11.1%)	
Social Phobia generalized	1 (11.1%)	
Social Phobia non-generalized	1 (11.1%)	
OCD	1 (11.1%)	
PTSD	1 (11.1%)	
Alcohol abuse	0 (0%)	
Substance abuse	0 (0%)	
Psychotic disorder	0 (0%)	
Anorexia	0 (0%)	
Bulimia	0 (0%)	
GAD	2 (22.2%)	

[a] Participants were able to mark more than one option

Table 3

Descriptive Statistics

Scale	Eligibility Mean (*SD*)	Baseline	Midpoint	Endpoint	Followup
ADOS	9.44 (1.59)				
VIQ	98.33 (10.32) range 84-119				
CGI-Severity	3.67 (.71)				
CGI-Improvement				2.67 (.50)	
WADL	28.89 (4.89)	29.56 (4.28)		29.67 (4.24)	
DERS total	102.78 (23.72)	99.63 (23.57)	92.78 (25.19)	90.00 (24.41)	89.83 (26.42)
Nonacceptance	17.22 (6.16)	17.56 (4.82)	15.33 (4.64)	14.44 (5.39)	17.50 (7.71)
Goal	18.22 (4.92)	17.89 (5.44)	17.11 (5.44)	17.67 (4.47)	16.83 (6.62)
Impulse	15.78 (7.05)	14.00 (7.12)	14.00 (7.12)	12.67 (7.63)	10.00 (3.41)
Awareness	16.00 (4.97)	14.67 (5.27)	14.67 (5.27)	13.78 (5.04)	12.50 (3.73)
Strategies	24.00 (7.05)	23.00 (7.78)	21.89 (8.80)	20.56 (9.66)	22.83 (9.70)
Clarity	11.56 (2.19)	11.67 (2.65)	10.89 (2.76)	10.89 (3.55)	10.17 (3.31)
ERC ER	23.22 (3.53)	22.78 (2.99)	23.56 (3.32)	25.56 (3.71)	25.50 (3.45)
ERC Neg.	30.22 (6.12)	28.89 (6.55)	29.56 (7.63)	28.89 (5.64)	25.50 (4.72)
ERQ Reappraisal	26.00 (5.39)	27.33 (4.06)	25.89 (5.09)	29.22 (5.45)	25.83 (6.62)
ERQ Suppression	14.56 (4.69)	15.11 (5.18)	12.56 (4.39)	14.89 (5.44)	12.83 (6.27)
MAAS	54.33 (12.44)	56.56 (12.93)	55.44 (10.04)	55.44 (13.10)	56.83 (9.87)
OQ	62.22 (25.86)	64.22 (21.61)	62.33 (23.13)	56.11 (16.63)	
PANAS Positive	30.22 (9.07)	32.89 (8.13)	30.00 (7.71)	30.44 (10.21)	32.17 (10.82)
PANAS Negative	22.89 (7.91)	24.56 (6.13)	18.33 (8.44)	15.78 (3.23)	19.50 (7.82)

Scale	Eligibility Mean (*SD*)	Baseline	Midpoint	Endpoint	Followup
RTS		85.00 (29.57)	87.78 (34.23)	82.67 (34.11)	
SWLS		20.89 (5.95)		23.33 (5.72)	25.83 (6.01)
TAS Describing	13.44 (3.81)	12.22 (3.80)	13.00 (6.10)	12.89 (5.56)	12.33 (6.71)
TAS Identifying	18.89 (4.28)	16.56 (3.50)	16.78 (4.27)	15.33 (4.00)	16.67 (6.71)
TAS externally-oriented thinking	20.33 (2.87)	20.78 (3.56)	20.33 (2.00)	20.56 (4.42)	20.50 (3.21)

Table 4

Treatment Adherence

Item	**K_w**	**Mean (*SD*)**	**Range**
Session duration		47.04 (14.80)	
Number of objectives accomplished	.787	2.71 (.94)	1-5
Was homework reviewed?	.152	1.56 (.38)	0-3
Was homework assigned?	.514	2.71 (.58)	0-3
Therapeutic relationship	.583	3.62 (.94)	1-5
Participant involvement	.625	3.72 (1.07)	1-5

Table 5

Fidelity Statistics - -TPOCS-A

Item	**K_w**	**Mean (*SD*)**	**Range**
Good session	.377	4.88 (1.39)	1-7
How involved was coder when watching	-.216	5.84 (.72)	4-7
Coder liked personally the therapist	-.550	6.51 (.58)	5-7
Coder liked personally the client	.321	5.35 (1.34)	1-7
Indicated understanding/support	.227	3.25 (1.34)	1-5
Hostile, critical, defensive towards therapist	.230	.22 (.50)	0-2
Positive affect towards therapist	.309	3.02 (1.46)	0-5
Share experiences with therapist	.255	3.54 (1.38)	0-5
Appears uncomfortable interacting with therapist	.393	.84 (1.16)	0-5
Anxious/ uncomfortable with one another	.308	.90 (1.10)	0-4
Uses therapeutic task to make changes outside	.558	2.12 (1.61)	0-5
Not comply with therapeutic task	.262	.76 (1.21)	0-4
Work equally together on the therapeutic task	-.134	3.71 (1.08)	1-5

Table 6

Fidelity Statistics - -VPPS

Item	**K_w**	**Mean (*SD*)**	**range**
Withdrawn	.555	1.58 (.79)	1-4
Inhibited	.136	1.58 (.71)	1-3
Passive	-.044	2.43 (1.04)	1-4
Actively participated	.408	3.22 (.85)	1-4
Spontaneous	.353	2.11 (.79)	1-4

Table 7

Participant diagnoses and clinical-level scores on DERS and OQ

ID	Any diagnosis	Diagnoses (MINI)	DERS clinical significance	DERS change ≥1 *SD* Elig-EP/ Elig-FU	OQ clinical significance	OQ change ≥1 *SD*
1	No	-	Remained elevated	Yes/Yes	Remained at clinical sig	No
2	Yes	Social Phobia, GAD	Remained elevated	No/-	Clinical to sub-clinical	Yes
3	No	-	Elevated to non-elevated	Yes/Yes	Clinical to sub-clinical	No
4	Yes	Depression, PTSD	Elevated to non-elevated	Yes/Worsening	Clinical to sub-clinical	Yes
5	Yes	Depression, GAD	Remained elevated	No/No	Remained at clinical sig	No
6	Yes	Panic disorder/ Agoraphobia	Remained elevated	No/-	Sub-clinical to clinical	No
7	Yes	Social Phobia	Remained elevated	No/-	Sub-clinical to clinical	Worsening
8	Yes	OCD	Non-elevated to elevated	No/Worsening	Remained sub-clinical	No
9	No	-	Remained non-elevated	No/Yes	Remained sub-clinical	No

Table 8

Reliable Change Indices for the DERS from baseline to endpoint and baseline to follow-up

	Nonacceptance	Goal	Impulse	Awareness	Strategies	Clarity	DERS total
1							
Elig	17	17	17	16	28	15	110
BL	16	15	11	15	22	12	91
EP	15	17	9	15	21	11	88
FU	16	17	9	14	23	11	90
RCI	**-0.61/-0.31**	**0/0**	**-2.33*/-2.33***	**-0.24/-0.49**	**-1.61/-1.15**	**-1.36/-1.36**	**-1.15/-1.04**
ASD RCI[t]	**-0.42/-0.21**	**0/0**	**-1.83/-1.83**	**-0.15/-0.30**	**-2.96*/-2.12***	**-2.31*/-2.31***	**-1.12/-1.01**
2							
Elig	18	24	29	18	31	13	133
BL	19	25	28	16	27	14	129
EP	14	23	24	14	27	14	116
FU	--	--	--	--	--	--	--
RCI	**-1.23/--**	**-0.29/--**	**-1.46/--**	**-0.97/--**	**-0.92/--**	**0.34/--**	**-0.89/--**
ASD RCI	**-0.83/--**	**-0.32/--**	**-1.15/--**	**-0.60/--**	**-1.69/--**	**0.58/--**	**-0.86/--**
3							
Elig	19	14	19	18	20	11	101
BL	19	14	14	12	20.57***	10	89.57
EP	11	14	9	13	10	5	62
FU	9	16	10	10	15	6	66
RCI	**-2.46*/-3.07***	**0/0.54**	**-2.91*/-2.62***	**-1.21/-1.94**	**-2.31*/-1.15**	**-2.04*/-1.70**	**-2.04*/-1.83**
ASD RCI	**-1.67/-2.09***	**0/0.63**	**-2.29*/-2.06**	**-0.74/-1.19**	**-4.23*/-2.12***	**-3.47*/-2.89**	**-1.98*/-1.78**
4							
Elig	14	17	13	12	22	10	88
BL	19	19	12	11	21	13	95
EP	9	13	9	9	11	9	60
FU	27	22	14	15	26	12	116
RCI	**-1.54/4.00****	**-1.17/1.46**	**-1.16/-.29**	**-0.73/0.73**	**-2.54*/0.92**	**-0.34/0.68**	**-1.46/1.46**
ASD	**-1.04/2.71****	**-1.27/1.58**	**-0.92/0.23**	**-0.45/0.45**	**-4.65*/1.69**	**-.58/1.16**	**-1.42/1.42**

	Nonacceptance	Goal	Impulse	Awareness	Strategies	Clarity	DERS total
5							
ELIG	28	22	15	18	36	8	127
BL	22	24	10	20	33	9	118
EP	27	24	9	14	37	7	118
FU	27	24	7	15	38	6	117
RCI	**-0.31/-0.31**	**0.58/0.58**	**-1.75/-2.33***	**-0.97/-0.73**	**0.23/0.46**	**-0.34/-0.68**	**-0.47/-0.52**
ASD RCI	**-0.21/-0.21**	**0.63/0.63**	**-1.38/-1.83**	**-0.60/-0.45**	**0.42/0.85**	**-0.58/-1.16**	**-0.46/-0.51**
6							
ELIG	25	24	22	19	28	11	129
BL	26	23	23	16	34	7	129
EP	18	20	27	17	30	10	122
FU	--	--	--	--	--	--	--
RCI	**-2.15*/--**	**-1.17/--**	**1.46/--**	**-0.49/--**	**0.46/--**	**-0.34/--**	**-0.37/--**
ASD RCI	**-1.46/--**	**-1.27/--**	**1.15/--**	**-0.30/--**	**0.85/--**	**-0.58/--**	**-0.36/--**
7							
ELIG	12	12	13	24	18	14	93
BL	12	12	14	24	18	14	94
EP	12	12	14	24	18	14	94
FU	--	--	--	--	--	--	--
RCI	**0/--**	**0/--**	**0.29/--**	**0/--**	**0/--**	**0/--**	**0.05/--**
ASD RCI	**0/--**	**0/--**	**0.23/--**	**0/--**	**0/--**	**0/--**	**-0.05/--**
8							
ELIG	9	12	6	12	18	10	67
BL	11	10	6	12	17	15	71
EP	11	15	7	12	22	16	83
FU	14	17	14	15	25	13	98
RCI	**0.61/1.54**	**0.88/1.46**	**0.29/2.33****	**0/0.73**	**0.92/1.61**	**2.04**/1.02**	**0.83/1.62**
ASD RCI	**0.42/1.04**	**0.95/1.58**	**0.23/1.83**	**0/0.45**	**1.69/2.96****	**3.47**/1.74**	**0.81/1.57**
9							

ELIG	13	22	8	7	15	12	77
BL	14	19	8	6	12	11	70
EP	13	21	6	6	9	12	67
FU	12	5	6	6	10	13	52
RCI	**0/-0.31**	**-0.29/-5.00***	**-0.58/-0.58**	**-0.24/-0.24**	**-1.38/-1.15**	**0/0.34**	**-0.52/-1.30**
ASD RCI	**0/-0.21**	**-0.32/-5.38***	**-0.46/-0.46**	**-0.15/-0.15**	**-2.54*/-2.12***	**0/0.58**	**-0.51/-1.27**
	Nonacceptance	Goal	Impulse	Awareness	Strategies	Clarity	DERS total
Mean							
ELIG	17.22	18.22	15.78	16	16.58	11.56	102.78
BL	17.56	17.89	14	14.67	17.55	11.67	99.63
EP	14.44	17.67	12.67	13.78	18.22	10.89	90
FU	17.5	16.83	10	12.5	19.25	10.17	89.83
RCI	**-0.85/0.09**	**-0.16/-0.41**	**-0.91/-1.68**	**-0.54/-0.85**	**0.38/0.61**	**-0.23/-0.47**	**-0.67/-0.68**
ASD RCI	**-0.58/0.06**	**-0.18/-0.44**	**-0.71/-1.32**	**-0.33/-0.52**	**0.69/1.13**	**-0.39/-0.80**	**-0.65/-0.66**

* Significant improvement < -1.96;
** Significant worsening > 1.96
*** Missing item was given average score of subscale items
t: RCI calculated with Swain, Scarpa, White, & Laugeson, 2015 norms for an ASD sample

Table 9

Reliable Change Indices for the OQ from baseline to endpoint

	Symptom Distress	Interpersonal Relationships	Social Role	OQ total score
1				
Elig	47	20	15	82
BL	42	18	14	74
EP	41	18	12	71
RCI/ASD RCI	**-0.61**	**-0.41**	**-0.98**	**-0.66/-0.79**
2				
Elig	42	19	12	73
BL	41	17	11	69
EP	27	15	9	51
RCI/ASD RCI	**-1.52**	**-0.83**	**-0.98**	**-1.33/-1.57**
3				
Elig	44	14	13	71
BL	34	10	13	57
EP	32	11	13	56
RCI/ASD RCI	**-1.21**	**-0.62**	**0**	**-0.91/-1.07**
4				
Elig	65	19	19	103
BL	52	24	11	87
EP	29	11	6	46
RCI/ASD RCI	**-3.64***	**-1.66**	**-4.23***	**-3.44*/-4.07***
5				
ELIG	51	8	13	72
BL	51	9	16	76
EP	49	11	5	65
RCI/ASD RCI	**-0.20**	**0.62**	**-2.60***	**-0.42/-0.50**

	Symptom Distress	Interpersonal Relationships	Social Role	OQ total score
6				
ELIG	28	12	12	52
BL	47	14	15	76
EP	41	13	13	67
RCI/ ASD RCI	**1.32**	**0.21**	**0.33**	**-0.91/1.07**
7				
ELIG	24	17	9	50
BL	44	18	13	75
EP	45	14	16	75
RCI/ASD RCI	**2.13****	**-0.62**	**2.28****	**1.51/1.78**
8				
ELIG	28	9	7	44
BL	32	9	8	49
EP	35	9	10	54
RCI/ASD RCI	**0.71**	**0**	**0.98**	**0.60/0.71**
9				
ELIG	5	5	3	13
BL	5	5	5	15
EP	3	7	10	20
RCI/ ASD RCI	**-0.20**	**0.41**	**2.28****	**0.42/0.50**
Mean				
ELIG	37.11	13.67	11.44	62.22
BL	38.67	13.78	11.78	64.22
EP	33.56	12.11	10.44	56.11
RCI/ASD RCI	**-0.36**	**-0.32**	**-0.33**	**-0.37/-0.44**

* Significant improvement < -1.96;
** Significant worsening > 1.96
t: total score RCI calculated with Pugliese & White, 2014 norms for an ASD sample

Table 10

Mean Level Changes between Eligibility and Endpoint/Follow-up for DERS and OQ total scores

	DERS	OQ
1	-0.607	-0.717
2	-0.796	-0.057
3	-0.917*	-0.669
4	-0.188	-0.937
5	-0.691	-0.191
6	-0.366	0.279
7	-0.457	0.629
8	0.539	0.228
9	-0.759	0.437
Mean	-0.962*	-0.655

* $p < .05$

** $p < .01$

Table 11

SMA: Best-fitting slopes for DERS and OQ total scores

	DERS	OQ
1	-0.856 3*	-0.937 3
2	-0.959 2* -0.961 4*	0.626 1
3	-0.940 3* -0.946 4*	-0.919 3
4	-0.448 1 0.548 5	-0.994 4 *
5	-0.868 3*	0.858 1 (subclinical worsening)
6	-0.728 2	0.781 1
7	-0.322 3	0.896 3
8	0.906 2 (subclinical worsening) 0.926 5* (worsening)	0.612 4
9	-0.866 2* -0.905 4*	0.764 2
Mean	-0.954 4* -0.958 3*	-0.899 2

* $p < .05$

** $p < .01$

Table 12

Multivariate Process Analysis for MAAS, DERS and OQ

ID	DERS total, OQ total	MAAS total, DERS total
1	0.98 (0)**	0.70 (0)
2	0.63 (0)	0.65 (2)*
3	0.77 (0)	-0.40 (-2)
4	0.88 (0)	0.34 (2)
5	0.66 (1)	0.44 (1)
6	0.83 (-2)*	-0.83 (0)
7	0.81 (-2)*	-0.62 (2)
8	0.97 (0)*	-0.49 (-1)
9	0.57 (1)	0.57 (1)
Mean	0.66 (1)	-0.45 (0)

* $p < .05$

** $p < .01$

Note: Numbers in parentheses indicates significant lag.

Table 13

PANAS subscales across intervention via EMA

ID	Positive			Negative		
	Baseline-Midpoint	Midpoint-Endpoint	1st- 2nd	Baseline-Midpoint	Midpoint-Endpoint	1st-2nd
1	27.2	26.5	-0.7	14.4	13.5	-0.9
2	35.6	37	+1.4	24.6	15.14	-9.46
4	29	26.14	-2.86	23.33	15.29	-8.04
5	24.5	24.8	+ 0.3	26.33	21.2	-5.13
8	33.25	35.5	+2.25	18.5	20.75	+2.25

Table 14

EMA responses

	EMA response % (n)	Practice Mindfulness in prior 24hrs %	Practice type					Duration (minutes, reported as %)					PANAS Pos	PANAS Neg
			Body scan	Breath -ing space	Mind-ful walk-ing	Mindful-ness of the senses	Sitting mindful-ness	< 5	5-10	10-20	20-30	> 30	M (SD)	M (SD)
1	85.71 (11)	72.7	7	7	2	--	--	--	54.5	36.4	9.1	--	27.40 (1.665)	14.20 (2.35)
2	92.31 (12)	100	7	10	6	4	5	--	16.7	83.3	--	--	37.73 (2.28)	19.08 (9.81)
3	7.69 (1)	100	1	--	--	--	--	100	--	--	--	--	26.00 (0)	19.00 (0)
4	100 (13)	100	4	9	2	4	2	30.8	69.2	--	--	--	27.46	19.00

													(3.48)	(5.02)
5	84.62	81.8	5	3	1	--	2	72.7	27.3	--	--	--	24.64	24.00
	(11)												(3.96)	(5.18)
6	30.77	100	3	2	--	--	3	--	--	--	--	100	34.00	12.67
	(3)												(3.00)	(1.53)
7	15.38	100	2	1	1	1	1	--	100	--	--	--	24.00	20 (0)
	(2)												(5.66)	
8	61.54	100	4	8	--	1	--	75	25	--	--	--	34.71	19.63
	(8)												(2.93)	(3.74)
9	0	--	--	--	--	--	--	--	--	--	--	--	--	--
M	67.81	76.7	32	40	12	10	13	26	32.9	19.2	1.4	4.1	29.93	18.93
													(5.77)	(6.39)

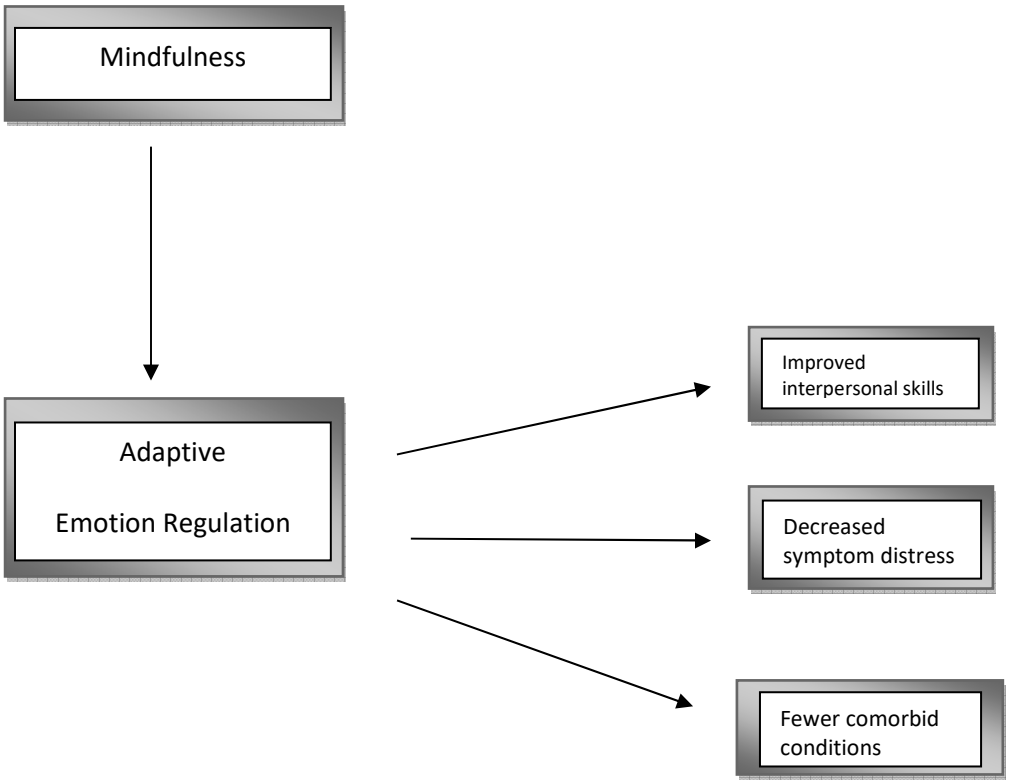


Figure 1. Model of MA-based Treatment Effect on ER.

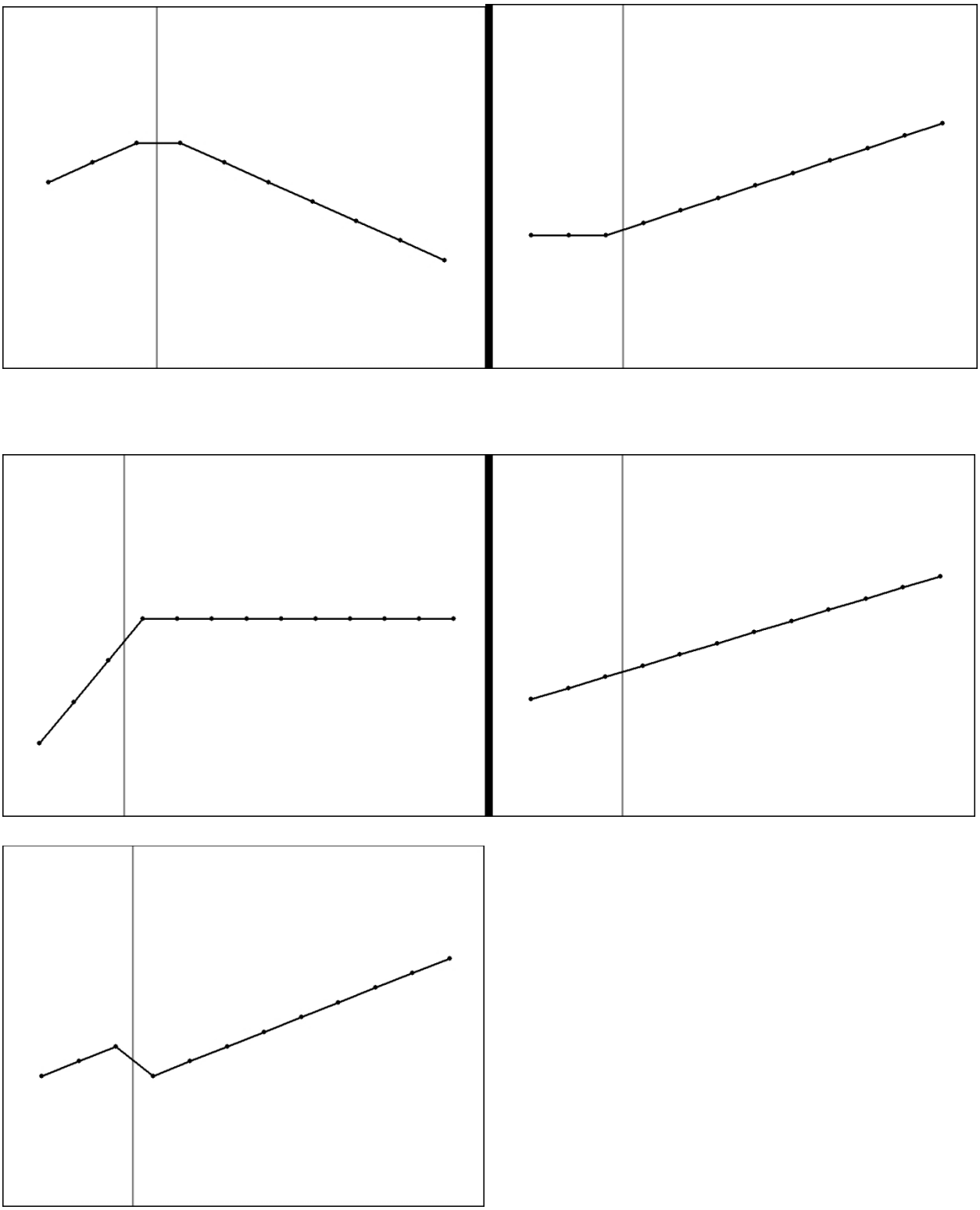


Figure 2. SMA model slopes (1-5, from left to right).

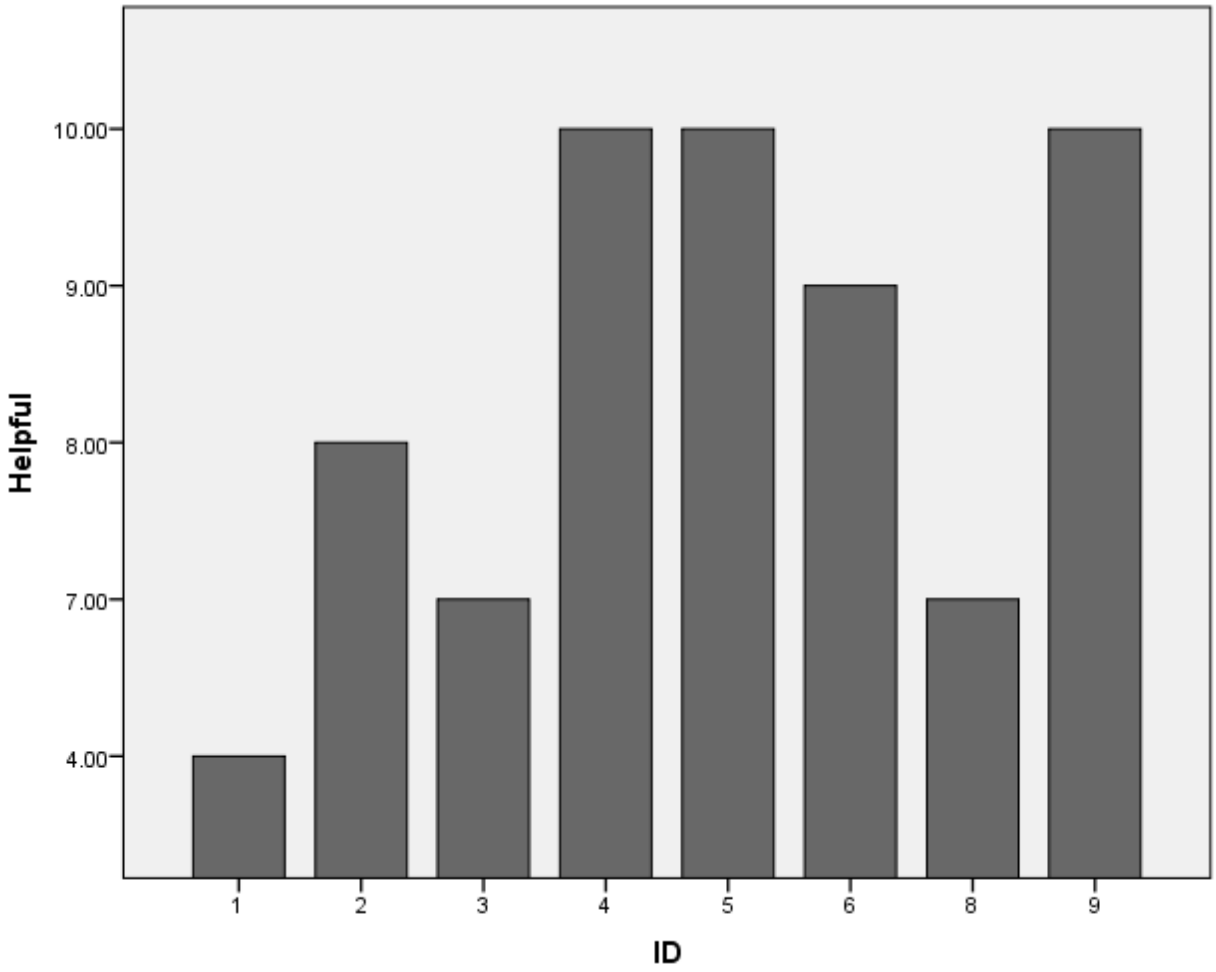
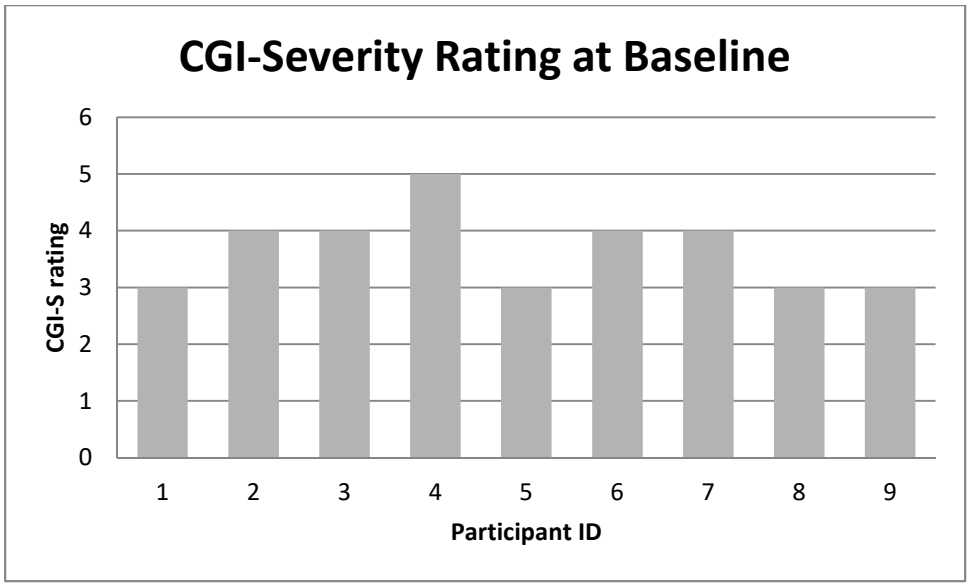


Figure 3. Participant responses on helpfulness of the program.



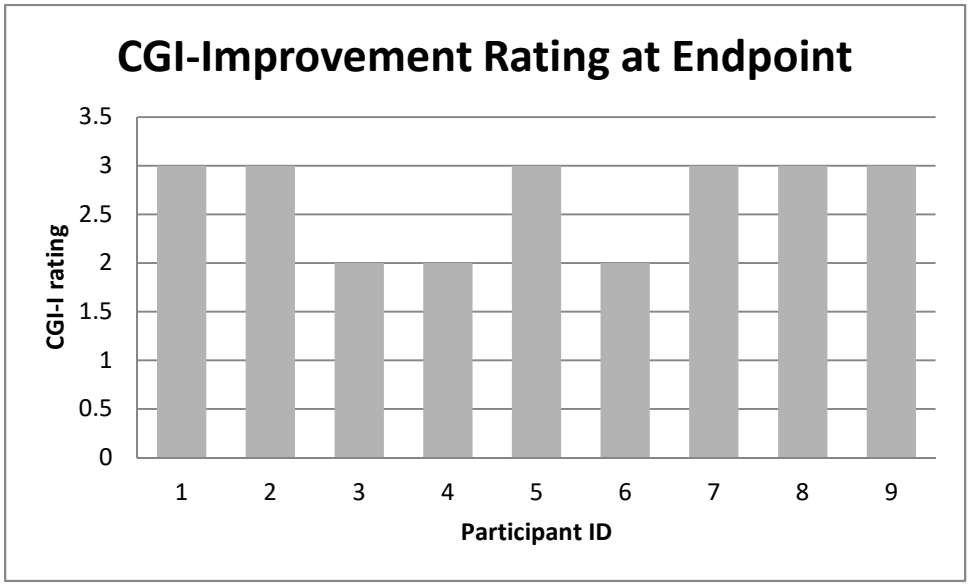


Figure 4. Clinical Global Impressions Scale- Severity and Improvement Ratings.

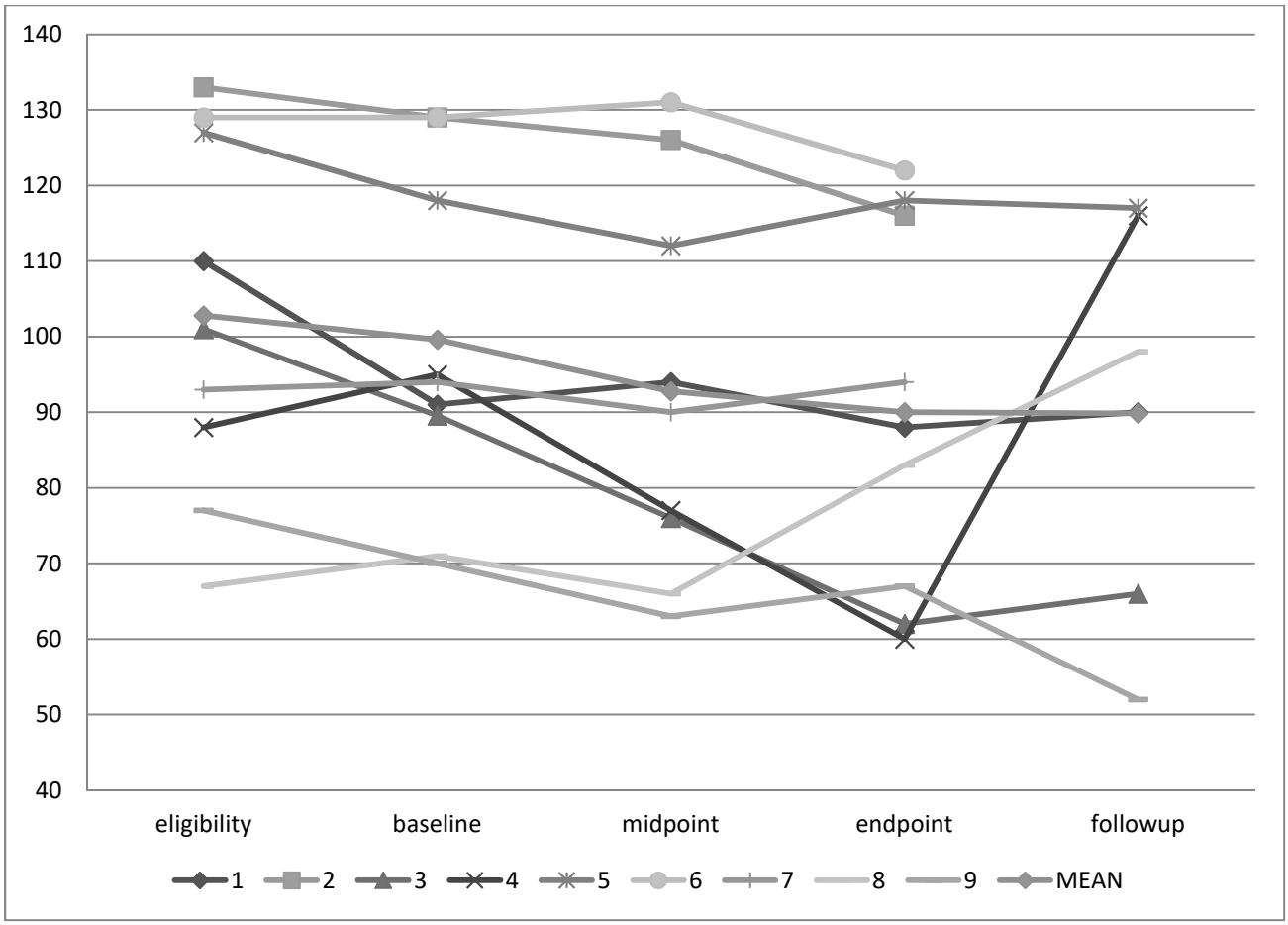
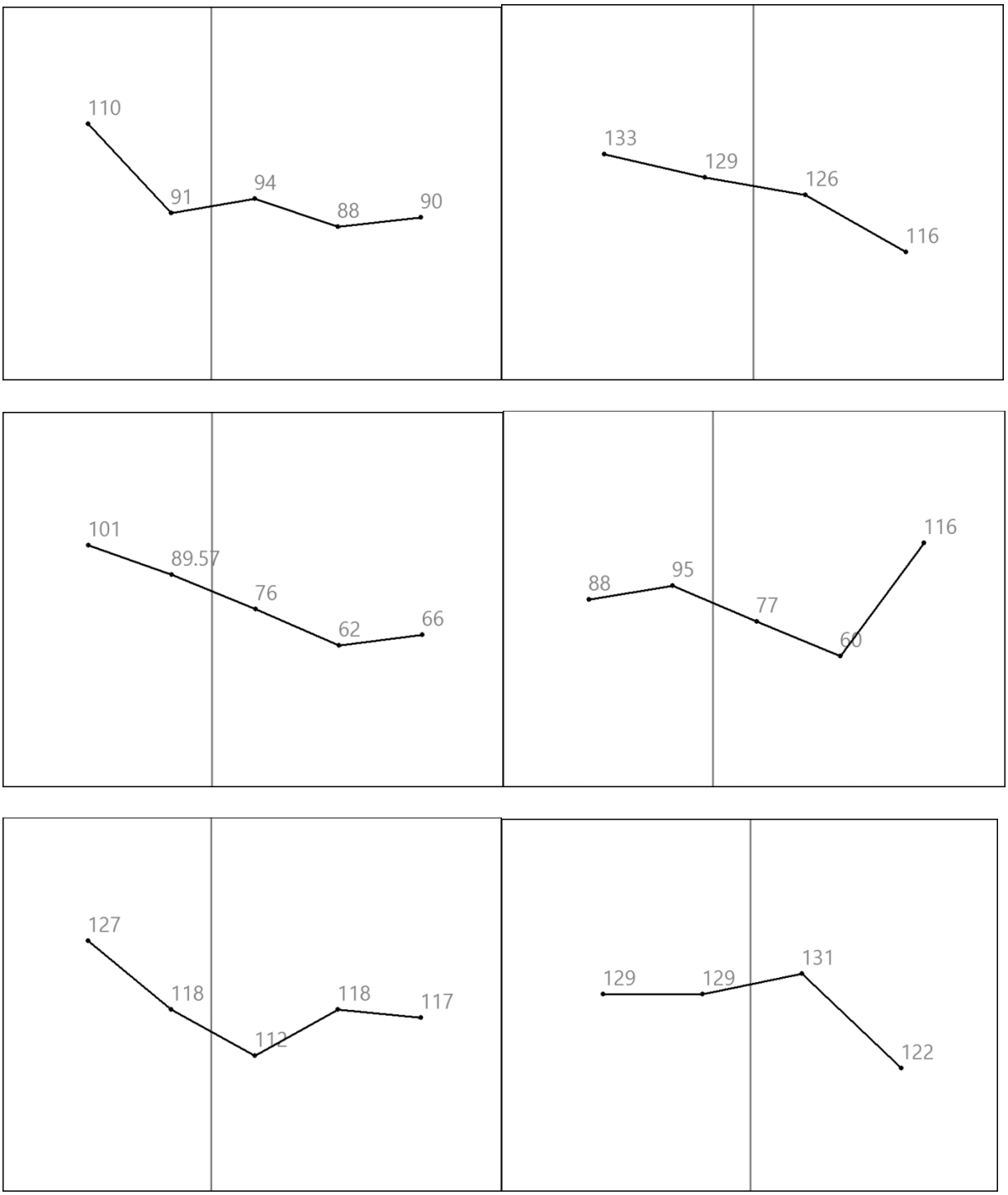


Figure 5. DERS total scores across study timepoints.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133
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129
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131
122

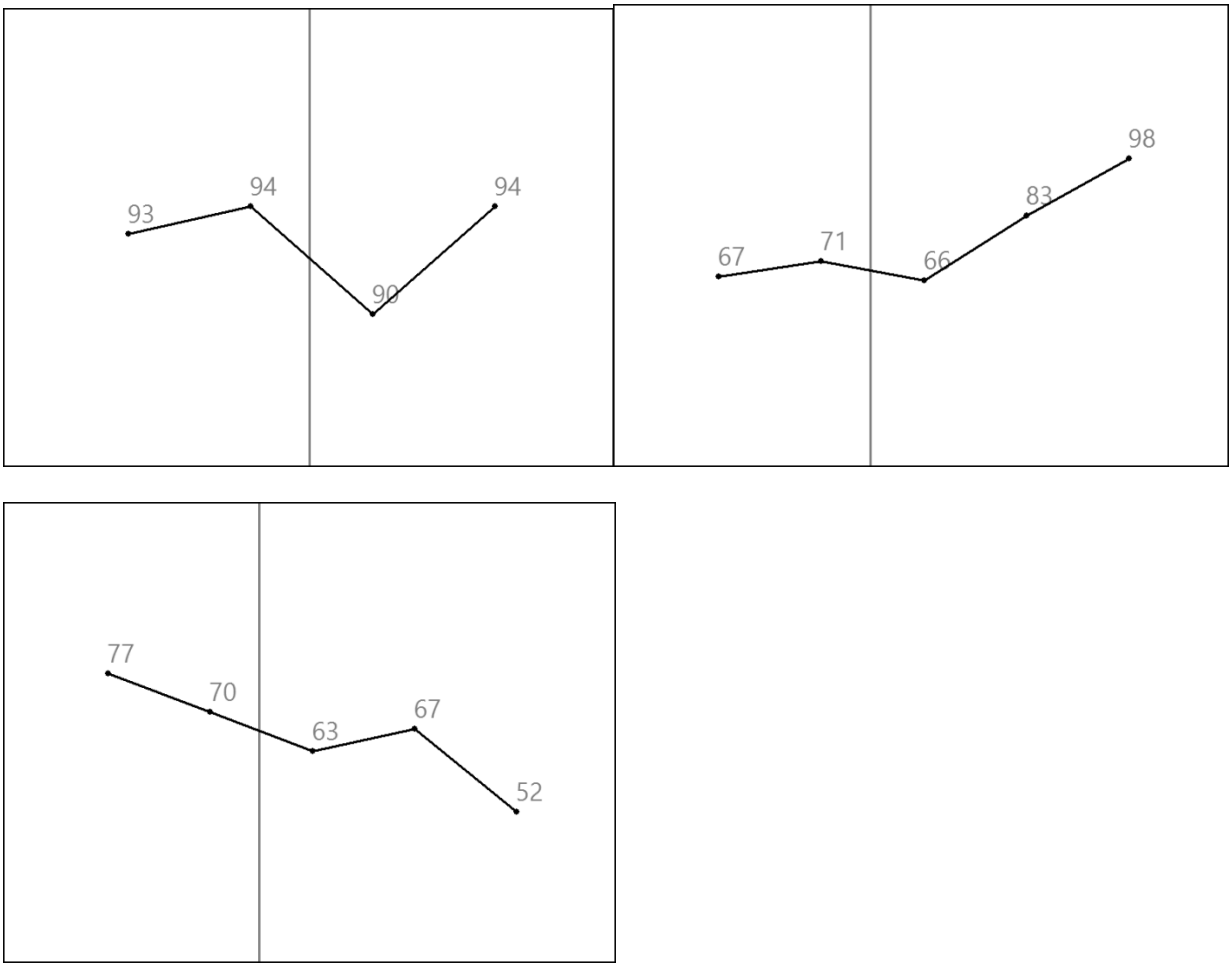
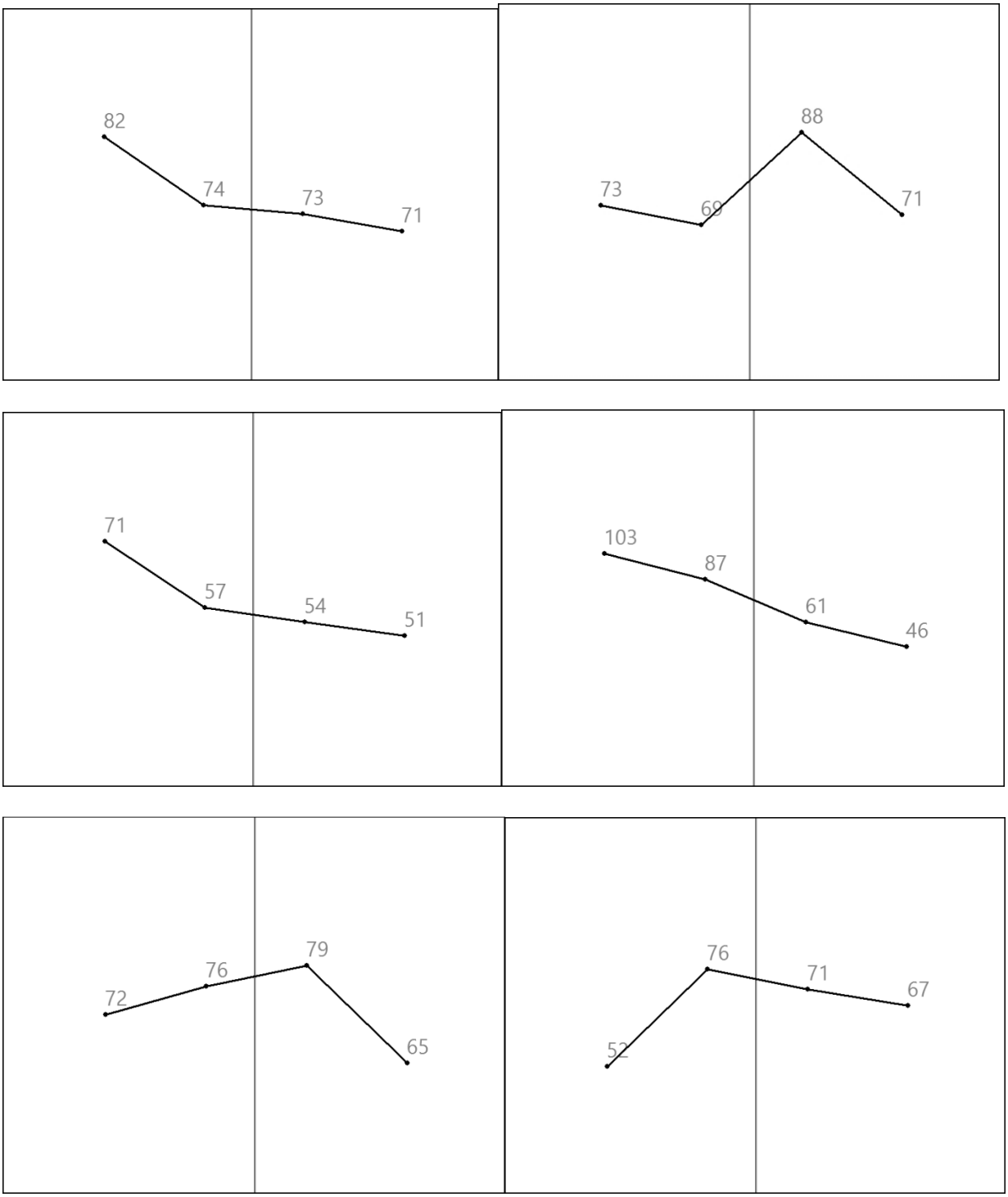


Figure 6. DERS total score across baseline and intervention timepoints (red line divides the phases) for participants 1-9 (left to right).


82
74
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67

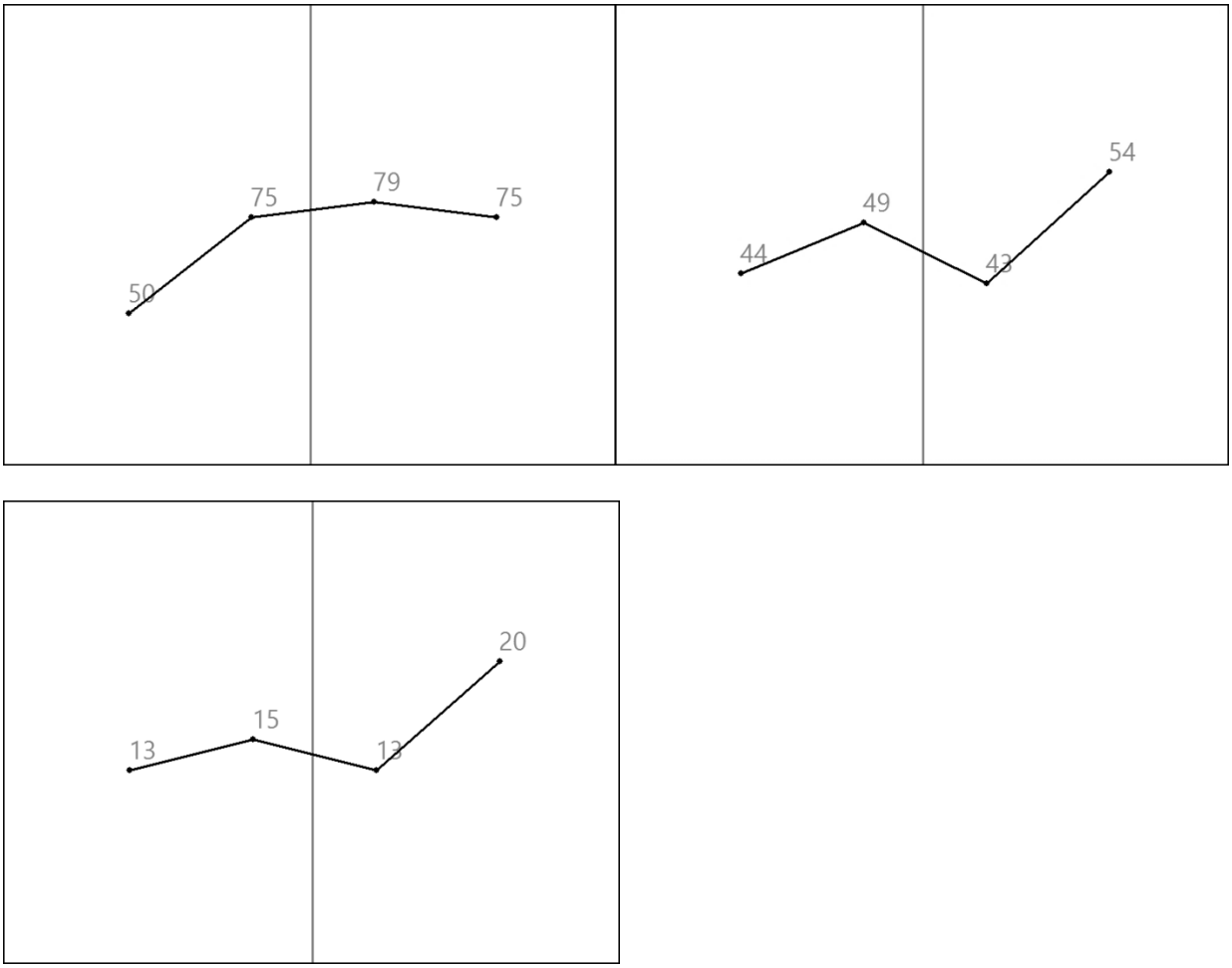
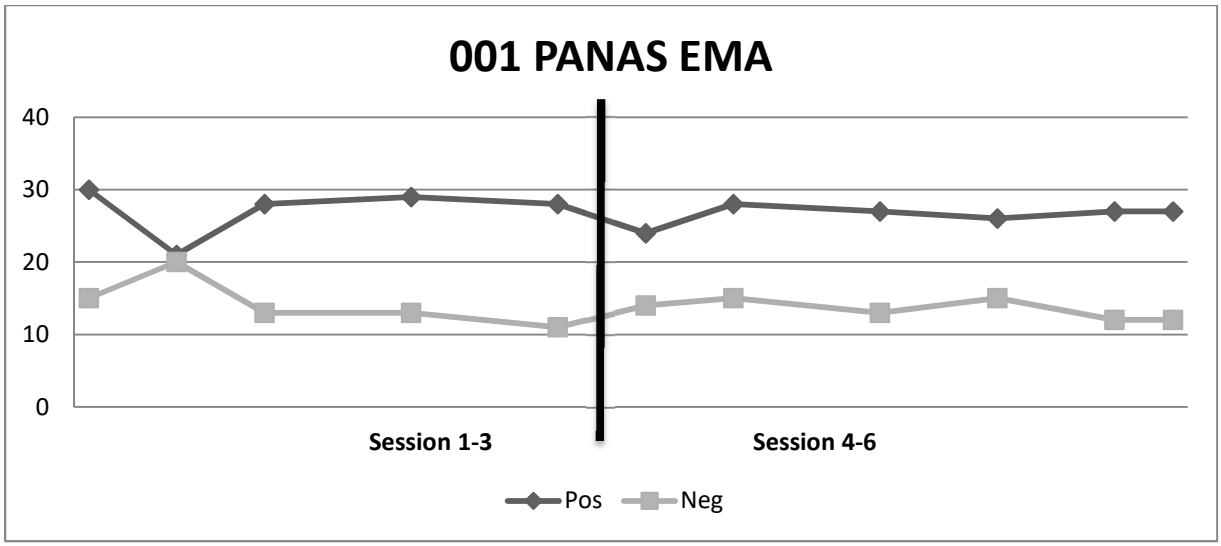
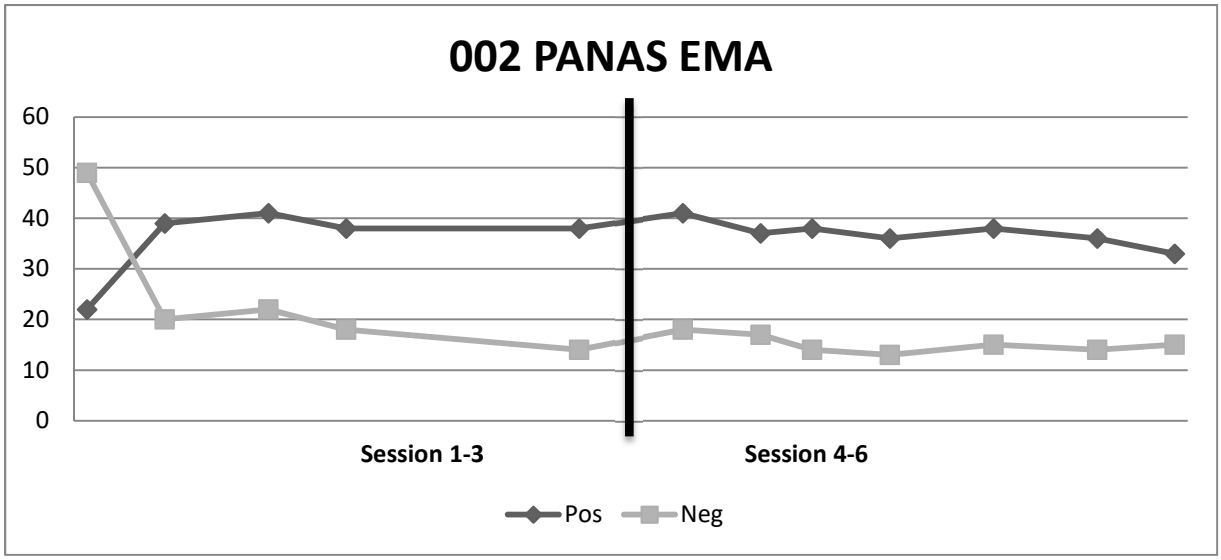
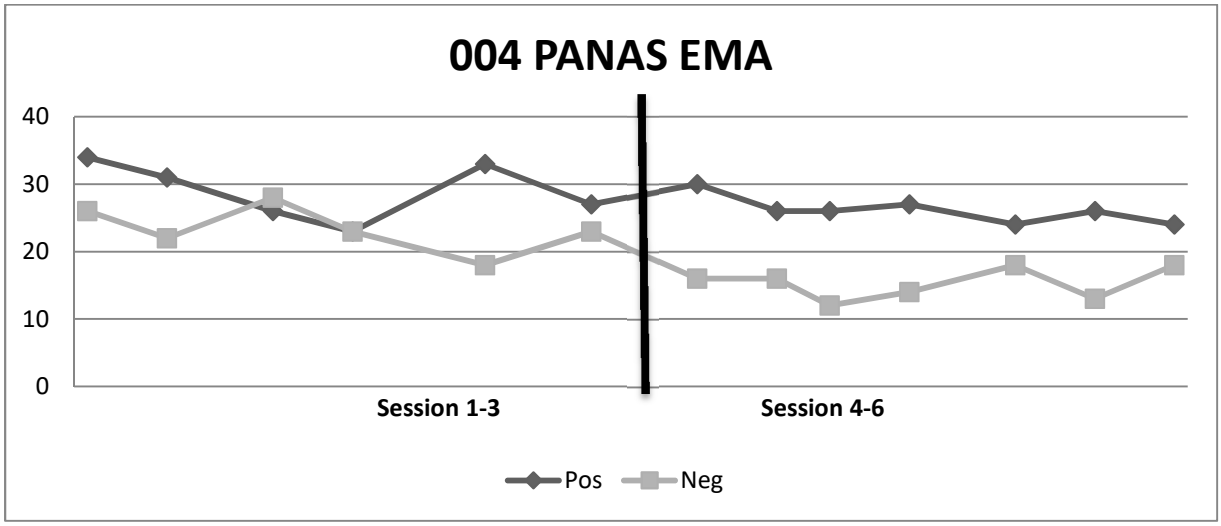


Figure 7. OQ total score across baseline and intervention timepoints (red line divides the phases) for participants 1-9 (left to right).


001 PANAS EMA
40
30
20
10
0
Session 1-3
Session 4-6
Pos
Neg


002 PANAS EMA
60
50
40
30
20
10
0
Session 1-3
Session 4-6
Pos
Neg


004 PANAS EMA
40
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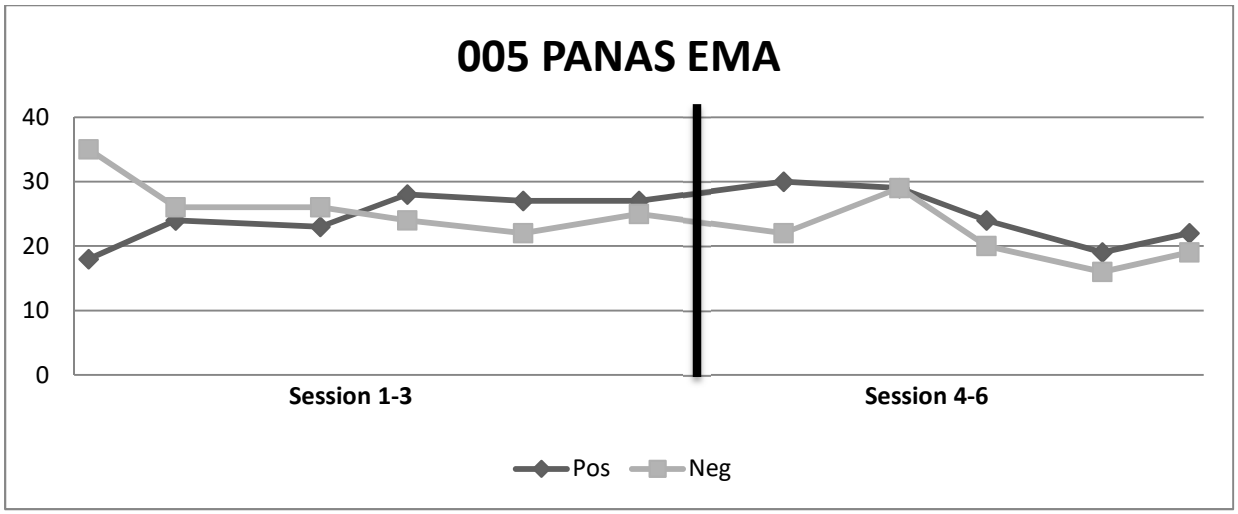
Session 1-3
Session 4-6
Pos
Neg



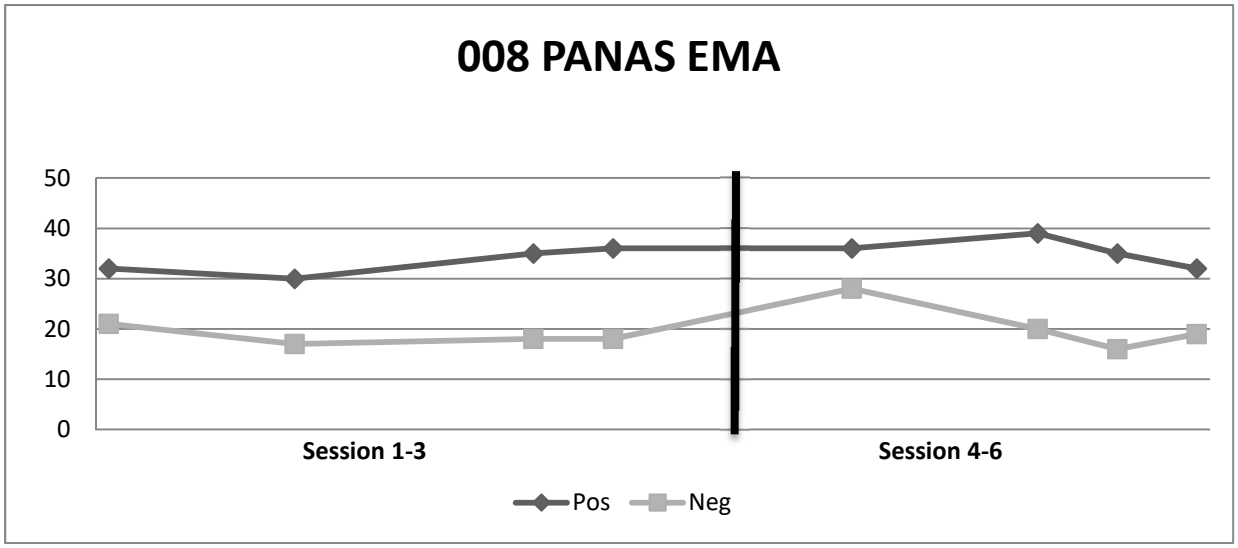


Figure 8. PANAS results via ecological momentary assessment.

Note: Participants 3, 6, and 7 completed insufficient timepoints (≤ 3) for analysis. Participant 9 did not complete any EMA analyses.

Appendix A: Mindfulness-based intervention for Adults with ASD

Overview

- Rationale for the treatment
- Population
- Targets of treatments
- Format of treatment
    - Optional modules
- Shorter sessions (1 hour vs. 2.5 hours)
    - Due to attentional differences and ability to focus on fewer important teaching points per session
- Shorter meditations (20 minutes vs. 1 hour)
    - Due to attentional differences, practicality, and 'portability' of the techniques out into the participant's actual environment
- Fewer metaphors and cognitive practices — usage of visual metaphors and less idiomatic speech
    - Due to ASD difficulties with idioms and complex metaphorical speech; removed
    - Instead, comparing cognitive processes to physical examples (i.e. finger trap, sticky thoughts)
- Individual therapy (vs. traditional group MBCT/MBSR)
    - Focus upon the individual differences and strengths of the population
- Tips from MBCT manual
    - Pg. 86-87 — how to lead mindfulness practices
        - Use the present participle when describing actions we would like participants to take (e.g., "noticing whether your mind has wandered") NOT "notice whether." DON'T sound like you are giving orders.
        - Start a meditation by asking people to spend a few moments being aware of their posture. Their back should be upright without being stiff—not using the back of the couch or chair to support it.
        - Deliver instructions for practices in a matter-of-fact way. NOT reading instructions verbatim from a page
        - Use "as best you can" instead of "try"
        - The clinician should do the practice with the class
        - Allow for spaces and stretches of silence between your instructions
    - Importance of kindness and compassion—clients are more guest than client! All responses and teaching of the client are meant to be delivered in a way that fosters self-compassion and kindness, so YOU need to exert compassion at all times.
    - Pg. 151-161 common homework responses:
        - "Am I doing it right?"
            - There is no right way to do mindfulness exercises. Becoming distracted is natural, and the experience does not need to be pleasant.
        - Dealing with painful sensations
            - Often, we not only notice painful or uncomfortable sensations, but also try to understand why. Instruct the client to try to redirect

their thoughts back to the area that was originally to be the center of focus (to note that pain, but to return to original center of focus)

- "I couldn't find time to do the practice"
    - Inform client that lacking home-based practice will affect how much they get out of the program (don't be critical!). Use an inquiring stance towards not having the time— "did you anticipate this difficulty?" "How did you handle it?"
- "I got bored" "the voice is super annoying"
    - Explore this with the client—when did they notice this arise? Etc. Try not to give direct answers to clients who ask what to do in this particular situation
    - Simply note boredom or irritation and continue on!
- "It was great, I fell asleep" "I enjoyed it because I finally was able to relax"
    - While relaxation is nice, remind the client that the purpose of the exercises is to how to be aware, not just relaxed or achieving a goal. Sometimes if we are able to focus on our minds and bodies in the present moment, it results in a peace, relaxed state.
- "I'm trying my best and I still don't think I get it;" "I think I need to work harder at it"
    - Much of the practice isn't about striving towards a goal. Settle into the moment
- "I just got too upset"
    - For many with a past history of depression or anxiety, it is much easier to think about emotions rather than to experience them without difficulty. It has been an effective way to cope. But doing this leaves emotional processing "uncompleted." Guide the client in allowing themselves to stay with these emotions, neither running away nor getting stuck in them.
- "My mind wouldn't stay still"
    - Observe the thoughts and their contents of them — use as an opportunity!

- What to do if client falls asleep:
    - Remind client that the purpose of the exercises is how to be aware, not just relaxed
- What to do with repeating/distressing thoughts:
    - Individuals with ASD often have repetitive/compulsive thoughts. If client reports these occurring during a meditation, have the client guide their focus back to the original focus. In this way, the mindfulness practices can be a valuable way to practice directing attention.

- Blurb on the main themes/purposes of the treatment
    - Teaching skills for emotion regulation
        - Broadening the skills that individuals with ASD have and use
            - E.g., easily frustrated, suppressive, anxious, avoidant, difficulties with emotion recognition before a "blow-up"

Session 1—Welcome and Psychoeducation about ASD and mindfulness and acceptance

The purpose of the first session is to provide an overview of MBI, build positive rapport, and begin to learn mindfulness techniques.

Objectives:

1. Build rapport between client and therapist.
2. Therapist will describe the purpose, structure, and goals of the sessions.
3. Therapist will provide psychoeducation about MA-based treatments and ASD in relation to emotion regulation.
4. Therapist and client will begin learning mindfulness techniques (body scan).

Materials/set-up

- Have outline of each session on a whiteboard
- Make sure data/paperwork is up to date, and the client can access the online tracking system
- Handouts:
    - Strengths/weaknesses sheet
    - Mindfulness definition (MBCT session 1, handout 1)
    - Body scan instructions (MBCT session 2, handout 2)
    - Home Practice Record Form
    - HW instructions

Session Overview:

1. The therapist will welcome the client and explain the purpose of the treatment:

    - *As you know, we will work together in 6 sessions over the next 6 weeks. This program will hopefully help you learn new strategies to handle tough emotions like anxiety, frustration, and anger as well as negative thoughts that come to us over and over again. Everyone deals with these emotions and thoughts in their lives, and hopefully these sessions will help you learn ways to deal with difficulties in a different way-using mindfulness strategies. These strategies have been used by many people in order to help them deal with difficult situations or emotions and build their strengths.*
    - *It will be important to practice these new strategies in order to have them "stick" outside of sessions- that way you can use them on your own.*

2. Discuss what ASD is, and how it can present some difficulties with handling emotions

    - As needed, talk about the basic characteristics of ASD (difficulties with social communication, repetitive and stereotyped thoughts and behaviors, sensory differences)
    - Talk about strengths and weaknesses of ASD
        - Go over a list of strengths/weaknesses, and have the client also add their own to others on the list that they relate to

    - Example: *ASD is a bit different than other diagnoses. People who have ASD often have many positive traits, like being honest and loyal, or really good at their interests. However, other traits common among people with ASD can cause problems for them, like having a hard time handling their emotions or handling change or new situations.*

3. Emotions and their recognition/regulation
   - *How do we recognize what we are feeling?*
   - Describe how emotions can be recognized via physical sensations (tension, heat rising, smiling, scowling, etc.), behaviors (avoiding, freezing) and thoughts
     - Option #1 — use body worksheet with these categories listed on them
     - Option # 2 — Use index cards with emotions written on them — client and therapist have to list physical sensations and trigger situations. The therapist can also ask whether these physical sensations are noticeable to the person experiencing them (inside) and/or are visible to others (outside)
   - *Many times we have these thoughts without even realizing it*
   - *Many times we assume that our thoughts and emotions about a situation are the truth— but not always the case*
     - Many people find the intensity of their emotions confusing and maybe even scary. It might be good to make it real clear that emotions in and of themselves are never bad, although they can feel bad.
     - Normalize this- differentiate emotions from their regulation. *ER is how we can gain better control feelings that can sometimes feel very much outside our control.*
     - *One ER strategy is to use mindfulness*, which we will practice first, then try to use in the moments when your emotions are strong.* Explain how, like any other muscle, sport, or instrument, you need to practice it a lot first before you master it.

   Note: Talk to client about mindfulness, what they know and understand about it, during this session. See the introduction to this session. If the client seems adverse to meditation or mindfulness (e.g., due to religious background, the client associates mindfulness with Buddhism and feels it is against their beliefs), feel free to rename the practices so that they are not referred to as mindfulness.

   - Talk to the client about their previous week — focus on the emotions that they felt, and any actions of regulating them
     - Get examples: *Have you ever thought something to be true and then realized you weren't correct?*
   - Explain defusion: we are in contact with present thoughts, feelings, and sensations, but "detach" them from ourselves.
     - Activity #1: Use a negative thought as an example — sit with the thought for ~30 seconds, then re-do with "I'm having the thought that….". Then re-do with "I notice that I'm having the thought that…."
     - Activity #2: Write recent/current thoughts on a sticky note — then have the client place them on themselves vs. on the table in front of them. Ask them about how it is different to handle the thoughts (literally) in both situations? How easy is it

to read and understand the thoughts when they are stuck to you vs. when they are laid out on the table in front of you?
    - Discuss both activities:
        - Is there any sense of separation from the negative thought? We tend to believe our thoughts are truth 100% but sometimes we are giving them too much credit.
- Let the client know that we will be talking more about emotions, how to recognize them, and how to manage them (not control) throughout the next weeks

4. Describe what mindfulness is- and how it can help with calming emotions in a similar way.
    - Use Kabat-Zinn definition of what mindfulness is (session 1, handout 1)
        - *"mindfulness is the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgementally to things as they are."*
    - *Strategies and activities to separate ourselves from thoughts and emotions, in order to assist in feeling calm*
    - *MA doesn't rid you of frustrations, anxieties, perseverative thoughts—but changes how you relate to them—thoughts and emotions, nothing more*

5. Practice body scan exercise—(from p. 122-124 in MBCT manual)
    1. ***Make yourself comfortable, either lying down or sitting comfortably. You may close your eyes if you feel comfortable doing so.***
    2. ***Take a few moments to pay attention to the movement of your breath and the sensations in your body. When you are ready, bring your awareness to the physical sensations in your body, especially to the sensations of touch or pressure, where your body makes contact with the floor or chair. On each breath out, allow yourself to relax.***
    3. ***Remind yourself of the reason for this practice. Its purpose is not to feel any different, relaxed, or calm; this may happen or it may not. Instead, the purpose of the practice is, as best you can, to be aware of any sensations you notice, as you focus your attention on each part of the body one at a time.***
    4. ***Now bring your attention to the physical sensations in the stomach/abdomen, becoming aware of the sensations in the walls of your stomach/abdomen as you breathe in, and as you breathe out. Take a few moments to feel the sensations as you breathe in and as you breathe out. (When you first try this practice, it may be helpful to place your hand on your lower stomach/abdomen and become aware of the changing pattern of sensations where your hand makes contact with your stomach/abdomen. Having "tuned in" to the physical sensations in this area in this way, you can remove your hand and continue to focus on the sensations there).***
    5. ***Having noticed the sensations in the stomach/abdomen, bring the focus or "spotlight" of your awareness down the left leg, into the left foot, and out to the toes of the left foot, being curious about the sensations you notice.***
    6. ***When you are ready, on an breath in, feel or imagine the breath entering the lungs, and then passing down into the stomach/abdomen, into the left leg, the left foot, and out to the toes of the left foot. Then, on the breath out, feel or imagine the breath***

coming all the way back up, out of the foot, into the leg, up through the stomach/abdomen, chest, and out through the nose. As best you can, continue this for a few breaths, breathing down into the toes, and back out from the toes. It may be difficult to get the hang of this—just practice this "breathing into" as best you can.

7. ***Continue to bring your attention to the physical sensations in each part of the rest of the body in turn—to the upper right and left leg, the right toes, right foot, right leg, pelvic area, back stomach/abdomen, chest, fingers, hands, arms, shoulders, neck, head, and face. In each area, as best you can bring the same detailed level of attention to the body sensations present. As you leave each major area, "breathe in" to it on the breath in, and let go of that region on the breath out.***
8. ***When you become aware of tension, or of other intense feelings in a particular part of the body, you can "breathe in" to them — using the breath in gently to bring your attention right into the sensations, and as best you can, have a sense of their letting go, or releasing, on the breath out.***
9. ***The mind will wander away from the breath and the body from time to time. That is entirely normal. It is what minds do. When you notice it, acknowledge it, noticing where the mind has gone off to, and then gently return your attention to the part of the body you intended to focus on.***
10. ***After you have "scanned" the whole body in this way, spend a few minutes paying attention to a sense of the body as a whole, and of the breath flowing freely in and out of the body.***
11. ***If you find yourself falling asleep, you might find it helpful to prop your head up with a pillow, open your eyes, or do the practice sitting up rather than lying down.***

From Kabat-Zinn. Copyright 1990 Jon Kabat-Zinn----

6. Go over homework for the week and plan out
    a. Practice emotion recognition in self
    b. Practice body scan 6 times before next meeting- record it each time you do the practice. Write down if anything that comes up when you practice so we can talk about it.

** Sign client up for EMA if they have not already. Get number that they want to use and send initial text in session, so you can demonstrate how to use it and ensure that they are signed up.

Session 2—Emotion regulation strategies 101

The purpose of session 2 is to discuss the types of emotion regulation strategies and identify the ones which the client uses most frequently.

Objectives:

1. Therapist will describe common ER strategies, and how they can be adaptive and maladaptive
2. The therapist and client will identify the client's most commonly used ER strategies, and whether they can be maladaptive
3. The therapist and client will practice sitting mindfulness and learn to focus upon one's breath

Materials/Set up:

- Write schedule on board
- Pens and dry erase markers

- Handouts:
    - Sitting mindfulness (MBCT Session 2, Handout 3) **note: can use mindfulness in soles of feet instead
    - ER strategies handout
    - Responses to Stress Questionnaire
    - 2 copies of the pleasant experiences handout (MBCT Session 2, handout 6)
    - Home Practice Record form
    - Homework handout

Session overview:

Welcome the client.

1. Practice body scan exercise to begin the session
   To begin this week's meeting, I would like to do the body scan activity that you learned last week.
   - Use the same instructions to complete the body scan as done in session 1.

1. ***Make yourself comfortable, either lying down or sitting comfortably. You may close your eyes if you feel comfortable doing so.***
2. ***Take a few moments to pay attention to the movement of your breath and the sensations in your body. When you are ready, bring your awareness to the physical sensations in your body, especially to the sensations of touch or pressure, where your body makes contact with the floor or chair. On each breath out, allow yourself to relax.***
3. ***Remind yourself of the reason for this practice. Its purpose is not to feel any different, relaxed, or calm; this may happen or it may not. Instead, the purpose of the practice is, as best you can, to be aware of any sensations you notice, as you focus your attention on each part of the body one at a time.***
4. ***Now bring your attention to the physical sensations in the stomach/abdomen, becoming aware of the sensations in the walls of your stomach/abdomen as you breathe in, and as you breathe out. Take a few moments to feel the sensations as you breathe in and as you breathe out. (When you first try this practice, it may be helpful to place your hand on your***

lower stomach/abdomen and become aware of the changing pattern of sensations where your hand makes contact with your stomach/abdomen. Having "tuned in" to the physical sensations in this area in this way, you can remove your hand and continue to focus on the sensations there).

5. ***Having noticed the sensations in the stomach/abdomen, bring the focus or "spotlight" of your awareness down the left leg, into the left foot, and out to the toes of the left foot, being curious about the sensations you notice.***
6. ***When you are ready, on an breath in, feel or imagine the breath entering the lungs, and then passing down into the stomach/abdomen, into the left leg, the left foot, and out to the toes of the left foot. Then, on the breath out, feel or imagine the breath coming all the way back up, out of the foot, into the leg, up through the stomach/abdomen, chest, and out through the nose. As best you can, continue this for a few breaths, breathing down into the toes, and back out from the toes. It may be difficult to get the hang of this—just practice this "breathing into" as best you can.***
7. ***Continue to bring your attention to the physical sensations in each part of the rest of the body in turn—to the upper right and left leg, the right toes, right foot, right leg, pelvic area, back stomach/abdomen, chest, fingers, hands, arms, shoulders, neck, head, and face. In each area, as best you can bring the same detailed level of attention to the body sensations present. As you leave each major area, "breathe in" to it on the breath in, and let go of that region on the breath out.***
8. ***When you become aware of tension, or of other intense feelings in a particular part of the body, you can "breathe in" to them—using the breath in gently to bring your attention right into the sensations, and as best you can, have a sense of their letting go, or releasing, on the breath out.***
9. ***The mind will wander away from the breath and the body from time to time. That is entirely normal. It is what minds do. When you notice it, acknowledge it, noticing where the mind has gone off to, and then gently return your attention to the part of the body you intended to focus on.***
10. ***After you have "scanned" the whole body in this way, spend a few minutes paying attention to a sense of the body as a whole, and of the breath flowing freely in and out of the body.***
11. ***If you find yourself falling asleep, you might find it helpful to prop your head up with a pillow, open your eyes, or do the practice sitting up rather than lying down.***

Note: If client becomes really fixated on textures and sounds, or becomes overly focused on a sense that is overwhelming or uncomfortable, focusing on another sense is advisable. Remind the participant that he or she is in control of where you place your attention or focus, like spotlight.

- Review activity
- Review homework from the week

- From MBCT (Pg. 151-161 – common homework responses)
    - "Am I doing it right?"
        - There is no right way to do mindfulness exercises. Becoming distracted is natural, and the experience does not need to be pleasant.
    - Dealing with painful sensations
        - Often, we not only notice painful or uncomfortable sensations, but also try to understand why. Instruct the client to try to redirect their thoughts back to the area that was originally to be the center of focus (to note that pain, but to return to original center of focus)
    - "I couldn't find time to do the practice"
        - Inform client that lacking home-based practice will affect how much they get out of the program (don't be critical!). Use an inquiring stance towards not having the time—did you anticipate this difficulty? How did you handle it?
    - "I got bored" "the voice is super annoying"
        - Explore this with the client—when did they notice this arise? Etc. Try not to give direct answers to clients who ask what to do in this particular situation
        - Simply note boredom or irritation and continue on!
    - "It was great, I fell asleep" "I enjoyed it because I finally was able to relax"
        - While relaxation is nice, remind the client that the purpose of the exercises is to how to be aware, not just relaxed or achieving a goal. Sometimes if we are able to focus on our minds and bodies in the present moment, it results in a peace, relaxed state.
    - "I'm trying my best and I still don't think I get it" "I think I need to work harder at it"
        - Much of the practice isn't about striving towards a goal. Settle into the moment
    - "I just got too upset"
        - For many with a past history of depression or anxiety, it's much easier to think about emotions rather than to experience them without difficulty. It's been an effective way to cope. But doing this leaves emotional processing "uncompleted." Guide the client in allowing themselves to stay with these emotions, neither running away nor getting stuck in them.
    - "My mind wouldn't stay still"
        - Observe the thoughts and their contents of them—use as an opportunity!

2. Psychoeducation--- ER/coping strategy 101
    - Define emotion regulation (ER): *everyone has tried, without knowing sometimes, to change or control their feelings/emotions. For example, sometimes people try to avoid feeling their emotions, or to push them down. But that can actually be worse for you (creates stress and your cognitive performance suffers), so hiding emotions should only be done in situations where it is socially unacceptable to let them show (discuss when those may be).*

- Have clients go through and fill out the RSQ. Ask clients to *identify a time where they used one of these ER strategies*—if they have difficulty recalling any, discuss any recent situation that they felt was difficult, unfair, or challenging.
- Explain that other than controlling one's emotions, there are other strategies to handle them. Go over these strategies, each with examples from the RSQ. Make sure to tie these in with last week's lesson on emotions (our feelings are in response to a stimulus—whether that's a situation, action, thought, etc.)

I. Rumination- I keep thinking about how I'm feeling; can't stop it
II. Problem solving- I am trying to think of more ways to change or fix the problem
III. Reappraisal- I tell myself that it isn't a big deal; I learned a lesson from the situation (viewing the situation in a new way)
IV. Acceptance- I realize I need to live with things the way that they are, the situation is not going to change
V. Avoidance- I try to stay away from the people/things that upset me
VI. Distraction – I try to do something else I like instead

**Note: If client discusses restricted interests in the course of the RSQ, determine whether the RI serves an emotion regulatory purpose or not. While RI can and often serve a soothing purpose, also discuss potential problems with using their RI (long-term distraction, dependence instead of flexibility with ER strategies).

3. Introduce the 5min **sitting mindfulness** activity (give out Session 2, handout 3 from MBCT manual) and/or mindfulness in the soles of the feet (focus on body)
    1. ***Get in a comfortable sitting position, either in a straight-backed chair or a soft surface on the floor. Allow your back to be in a comfortable posture- you do not need to be sitting up perfectly straight. If sitting on a chair, place your feet flat on the floor, with your legs uncrossed. You may close your eyes if you feel comfortable doing so.***
    2. ***Bring your attention to physical sensations by focusing your attention on the sensations of touch and pressure in your body where it makes contact with the floor and whatever you are sitting on. Spend a minute or two exploring these sensations, just like you did with the body scan.***
    3. ***Now bring your attention to the changing patterns of physical sensations in the lower stomach/abdomen as the breath moves in and out of your body. (When you first try this practice, it may be helpful to place your hand on your lower stomach/abdomen and become aware of the changing pattern of sensations where your hand makes contact with your stomach/abdomen. Having noticed the physical sensations in this area in this way, you can remove your hand and continue to focus on the sensations there).***
    4. ***Focus your attention on the sensations of moving as the stomach/abdomen rises with each breath in, and as it falls with each breath out. As best you can, follow***

with your attention the sensations in the lower stomach/abdomen all the way through as the breath enters your body on the breath out, perhaps noticing the slight pauses between one breath in and the following breath out, and between one breath out and the following breath in.

5. ***There is no need to try to control the breathing in any way — simply let the breathing happen. There is nothing to be fixed, no particular state to be achieved. As best you can simply allow your experience to be your experience, without needing it to be other than it is.***
6. ***Sooner or later (usually sooner), your mind will wander away from the focus on the breath in the lower stomach/abdomen to thoughts, planning, daydreams, drifting along — whatever. This is perfectly OK — it is simply what minds do. It is not a mistake or a failure. When you notice that your awareness is no longer on your breath, gently congratulate yourself — you have come back and are once more aware of your experience! You may want to notice briefly where the mind has been ("ah, there's thinking"). Then, gently guide the attention back to focusing on the sensations in the lower stomach/abdomen, and begin again to pay attention to the ongoing breath in or breath out.***
7. ***Whenever you notice that the mind has wandered (and this will quite likely happen over and over again), as best you can, congratulate yourself on noticing it, guiding the attention back to the breath, and simply try to go back to noticing your breathing.***
8. ***Continue with the practice for 5-10 minutes, or longer if you wish, reminding yourself from time to time that the purpose is simply to be aware of your experience in each moment, as best you can.***

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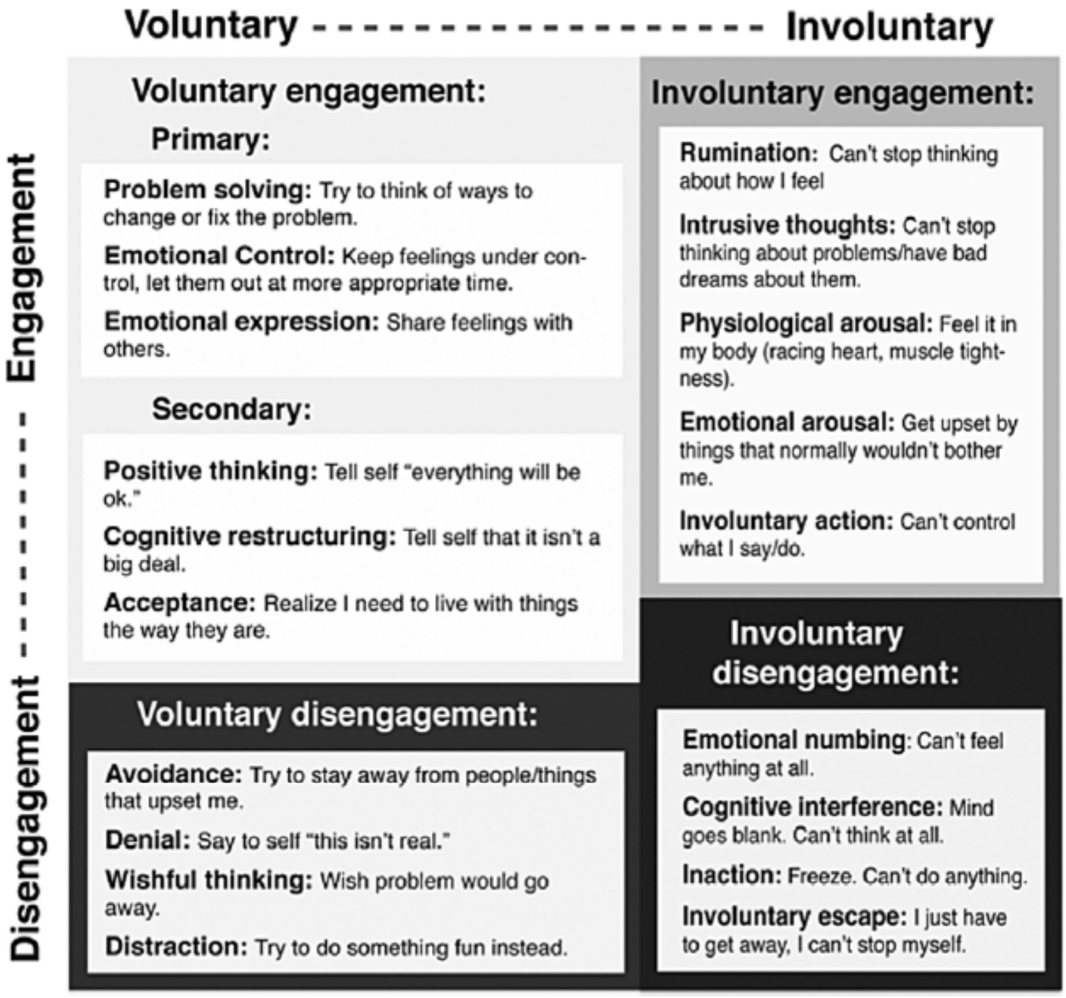
- Review activity

4. Pleasant experiences/homework preparation
   - *Think back to this week. What were some happy or pleasant things that happened? Let's think about your mood, body feelings, and thoughts that you had at the time.* ** If they have difficulty, ask about a time when they were particularly happy or what their favorite activities may be in order to assess what experiences may lead to pleasantness for them.
   - Explain that an important step in being more mindful is to notice good things when they are happening (not just to focus on the bad or difficult things) and that will be one thing for them to work on this week.
   - Explain other homework assignments:
     - Practice 5 minute meditation exercise daily
     - Practice mindfulness of everyday tasks

- *Choose one routine in your daily life and bring moment-to-moment attention to that activity each time that you do it. Possible activities include brushing your teeth, showering, getting dressed, eating, taking out the garbage, shopping, etc. Focus your attention on what you are doing when you are doing it.*

****remind the participant that they will be doing the midpoint assessment next week after their session—determine whether they want to stay post-session or will schedule another date. Schedule a date for the assessment before they leave.**



ı regulation types from the Response to Stress Questionnaire [Connor-Smith et al., 2000] with examples.

Session 3—intro to 5 minute breathing space and ER series 1

The purpose of this session is to teach the client how to use the 5-minute breathing space and discuss both a commonly-used and adaptive ER strategies in more depth.

****Is the client scheduled for a mid-point assessment? Make sure that the date/time that was scheduled is still viable for them.**

Objectives:

1. Discuss ER strategies more in-depth, including one more adaptive strategy
2. Cover the 5 minute breathing space

Materials/Set-up:

- Write schedule on the board
- Pens/dry erase markers

Handouts:

- ER strategy handouts
- 5 minute breathing space instructions (MBCT handout Session 3, Handout 3)
- Home Practice Record form
- HW handout

1. Practice/Review the 5 minute sitting mindfulness
    1. ***Get in a comfortable sitting position, either in a straight-backed chair or a soft surface on the floor. Allow your back to be in a comfortable posture- you do not need to be sitting up perfectly straight. If sitting on a chair, place your feet flat on the floor, with your legs uncrossed. You may close your eyes if you feel comfortable doing so.***
    2. ***Bring your attention to physical sensations by focusing your attention on the sensations of touch and pressure in your body where it makes contact with the floor and whatever you are sitting on. Spend a minute or two exploring these sensations, just like you did with the body scan.***
    3. ***Now bring your attention to the changing patterns of physical sensations in the lower stomach/abdomen as the breath moves in and out of your body. (When you first try this practice, it may be helpful to place your hand on your lower stomach/abdomen and become aware of the changing pattern of sensations where your hand makes contact with your stomach/abdomen. Having noticed the physical sensations in this area in this way, you can remove your hand and continue to focus on the sensations there).***
    4. ***Focus your attention on the sensations of moving as the stomach/abdomen rises with each breath in, and as it falls with each breath out. As best you can, follow with your attention the sensations in the lower stomach/abdomen all the way through as the breath enters your body on the breath out, perhaps noticing the***

slight pauses between one breath in and the following breath out, and between one breath out and the following breath in.

5. ***There is no need to try to control the breathing in any way—simply let the breathing happen. There is nothing to be fixed, no particular state to be achieved. As best you can simply allow your experience to be your experience, without needing it to be other than it is.***
6. ***Sooner or later (usually sooner), your mind will wander away from the focus on the breath in the lower stomach/abdomen to thoughts, planning, daydreams, drifting along—whatever. This is perfectly OK—it is simply what minds do. It is not a mistake or a failure. When you notice that your awareness is no longer on your breath, gently congratulate yourself—you have come back and are once more aware of your experience! You may want to notice briefly where the mind has been ("ah, there's thinking"). Then, gently guide the attention back to focusing on the sensations in the lower stomach/abdomen, and begin again to pay attention to the ongoing breath in or breath out.***
7. ***Whenever you notice that the mind has wandered (and this will quite likely happen over and over again), as best you can, congratulate yourself on noticing it, guiding the attention back to the breath, and simply try to go back to noticing your breathing.***
8. ***Continue with the practice for 5-10 minutes, or longer if you wish, reminding yourself from time to time that the purpose is simply to be aware of your experience in each moment, as best you can.***

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a. Review practice
b. Review homework from previous week

2. ER strategy usage lesson #1 and #2 — choose two of the ER strategy modules for today's session. Base one of the strategies that the client spoke about last week, and one of the "adaptives" modules.

3. Introduce the 5 minute breathing space (a lengthened version of the 3 minute breathing space from MBCT — Spek et al.'s group modified the length of the practice for individuals with ASD due to their difficulties in processing information quickly).
   1. ***We are going to do a brief meditation now called the 5-minute breathing space. Before we begin, we want to take a relaxed but upright posture. Close your eyes if you feel comfortable doing so.***
   2. ***The first step is being aware of what's going on around you right now. What <u>thoughts</u> are going through your mind? Then note the <u>feelings</u> that are around at that moment, in particular, any sense of discomfort or unpleasant feelings. Rather than pushing them away or shutting them out, just acknowledge them, perhaps saying, "Here you are, that's how it is right now." And next, with <u>sensations</u> in the body- are there sensations of tension or anything? And again, just notice them.***

3. ***So now we've got a sense of what is going on right now. The second step is to <u>collect</u> our awareness by focusing on a single object—the movements of the <u>breath</u>. So now spend a minute or two to focus on the movement of the stomach/abdomen, moment by moment, breath by breath, as best as we can. You know that the breath is moving in, and you know when the breath is moving out.***
4. ***And now as a third step, we pay attention to the breath, and <u>we also include a sense of the body as a whole</u>. Including any tightness or sensations related to holding in the shoulders, neck, back, or face, as you notice your breathing.***
5. ***And then when you are ready, just allowing your eyes to open.***
6. ***Any questions or comments about that?***

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- Review practice

4. Go over practices for the week
    a. Utilizing adaptive ER strategy that was discussed
    b. Practice 5 minute breathing space daily
    c. Practice 10 minute sitting meditation daily

Session 4—Awareness of everyday tasks and continue focus on ER strategies

The purpose of this session is to continue to instruct the client on mindful awareness exercises and adaptive ER strategies in more depth.

Objectives:

1. Discuss ER strategies more in-depth, including one more adaptive strategy
2. Introduce a 5 minute seeing/hearing exercise to further develop awareness of everyday tasks

Materials/Set-up:

- Write schedule on the board
- Pens/dry erase markers

Handouts:

- ER strategy handouts
- Home Practice Record form
- HW handout

1. Start the session by practicing the 5 minute breathing space with the client.
    1. ***Before we begin, we want to take a relaxed but upright posture. Close your eyes if you feel comfortable doing so.***
    2. ***The first step is being aware of what's going on around you right now. What thoughts are going through your mind? Then note the feelings that are around at that moment, in particular, any sense of discomfort or unpleasant feelings. Rather than pushing them away or shutting them out, just acknowledge them, perhaps saying, "here you are, that's how it is right now." And next, with sensations in the body- are there sensations of tension or anything? And again, just notice them.***
    3. ***So now we've got a sense of what is going on right now. The second step is to collect our awareness by focusing on a single object—the movements of the breath. So now spend a minute or two to focus on the movement of the stomach/abdomen, moment by moment, breath by breath, as best as we can. You know that the breath is moving in, and you know when the breath is moving out.***
    4. ***And now as a third step, we pay attention to the breath, and we also include a sense of the body as a whole. Including any tightness or sensations related to holding in the shoulders, neck, back, or face, as you notice your breathing.***
    5. ***And then when you are ready, just allowing your eyes to open.***
    6. ***Any questions or comments about that?***

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    - Review practice
    - Review homework from the previous week

2. ER strategy usage lessons #3 and #4 — choose two of the ER strategy modules for today's lesson. One should be an "adaptive" strategy- probably problem solving- and perhaps a 2nd commonly used strategy by the client.

3. Introduce mindfulness of seeing/hearing exercise.
    1. ***Now we are going to focus our awareness on sensations outside of the body and to other things occurring in the environment.***
    2. ***First, practice mindfulness of your breath and body for 1-2 minutes, as we have done earlier.***
    3. ***Then allow the focus of your awareness to shift from sensations in the body to hearing. Try to have receptiveness to sounds as they arise, wherever they arise.***
    4. ***There is no need to go searching for sounds or listening for particular sounds. Instead, as best you can, simply notice sounds around you—sounds that are close, sounds that are far away, sounds that are in front, behind, to the side, above, or below. Be aware of obvious sounds and more subtle sounds, aware of the space between sounds, aware of silence.***
    5. ***As best you can, be aware of sounds simply as sensations. Try to notice pitch, timbre, loudness, and duration instead of the sounds' meaning.***
    6. ***Whenever you notice that your awareness is no longer focused on sounds in the moment, gently acknowledge where the mind had moved to, and then bring the awareness back to sounds as they arise and pass from one moment to the next.***
    7. ***Mindfulness of sound can be a valuable practice on its own, as a way of expanding awareness and giving it a more open, spacious quality, whether or not the practice is preceded by awareness of body sensations or followed, as here, by awareness of thoughts.***
    8. ***When you are ready, let go of awareness of sounds and refocus your attention, so that your objects of awareness are now thoughts as events in the mind. Just as, with sounds, you focused awareness on whatever sounds arose, noticing them arise, develop, and pass away, so now, as best you can, bring awareness to thoughts that arise in the mind in just the same way—noticing when thoughts arise, focusing awareness on them as they pass through the space of the mind and eventually disappear. There is no need to try to make thoughts come or go. Just let them arise naturally, in the same way that you related to sounds arising and passing away.***
    9. ***Some people find it helpful to bring awareness to thoughts in the mind in the same way that they might if the thoughts were projected on the screen at the movie theater. You sit, watching the screen, waiting for a thought or image to arise. When it does, you pay attention to it so long as it is there "on the screen," and then you let it go as it passes away. Alternatively you might find it helpful to see thoughts as clouds moving across a vast, spacious sky or as leaves moving on a stream, carried by the current.***
    10. ***If any thoughts bring with them intense feelings or emotions, pleasant or unpleasant, as best you can, note their "emotional charge" and intensity, and let them be as they already are.***
    11. ***If at any time you feel that your mind has become unfocused and scattered, or if it keeps getting repeatedly drawn into the drama of your thinking and imaginings, you may like to notice where this is affecting your body. Often, when we don't like***

what is happening, we feel a sense of contraction or tightness in the face, shoulders, or torso, and a sense of wanting to "push away" our thoughts and feelings. See if you notice any of this going on for you when some intense feelings arise. Then, once you have noticed this, see if it is possible to come back to the breath and a sense of the body as a whole, sitting and breathing, and use this focus to anchor and stabilize your awareness.

12. ***At a certain point, you might like to explore the possibility of letting go of any particular object of attention, like the breath, or class of objects of attention, like sounds or thoughts, and let the field of awareness be open to whatever arises in the landscape of the mind and the body and the world. See if it is possible to simply rest in awareness itself, effortlessly knowing whatever arises from moment to moment. That might include the breath, sensations from the body, sounds, thoughts, or feelings. As best you can, just sit, completely awake, not holding on to anything, not looking for anything, having no agenda what so ever other than embodied wakefulness.***
13. ***And when you are ready, bring the sitting to a close, perhaps returning for a few minutes to the simple practice of mindful awareness of the breath.***

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- Review the practice.

4. Review the homework practices for the week.
   - Practice situations where to use the adaptive ER strategy that was discussed.
   - Practice the 5 minute breathing space daily
   - Practice mindful seeing/hearing for 5 minutes daily.

Session 5—Mindfulness and ER in action

The purpose of this session is to continue to instruct the client on mindful awareness exercises and explore the client's mastery and pleasure activities.

Objectives:

1. Introduce mindful stretching/walking exercise
2. Continue discussion of adaptive ER strategies
3. Develop mastery/pleasure activities list with the client to be used when upset or depleted

Materials/Set-up:

- Write schedule on the board
- Pens/dry erase markers
- Handouts:
    - ER strategy handouts
    - Mastery/pleasure activities
    - How Can I best take care of myself?
    - Home Practice Record form
    - HW handout

1. Begin the session with the 5min mindfulness of seeing/hearing exercise.

    1. ***Now we are going to focus our attention on sensations outside of the body and to other things occurring in the environment.***
    2. ***First, practice mindfulness of your breath and body, as we have done earlier, until you feel reasonably settled.***
    3. ***Then allow the focus of your attention to shift from sensations in the body to hearing. Bring your attention to the ears and then allow the awareness to open and expand, so that there is receptiveness to sounds as they happen, wherever they happen.***
    4. ***There is no need to go searching for sounds or listening for particular sounds. Instead, as best you can, simply pay attention so that it is receptive to sounds from all directions as they arise—sounds that are close, sounds that are far away, sounds that are in front, behind, to the side, above, or below you. Open to a whole space of sounds around you. Be aware of obvious sounds and more subtle sounds, aware of the space between sounds, aware of silence.***
    5. ***As best you can, be aware of sounds simply as sensations. When you find that you are thinking <u>about</u> the sounds or what they are, reconnect, as best you can, with direct attention to their sensory qualities (patterns of pitch, timbre, loudness, and duration) rather than their meanings or implications.***
    6. ***Whenever you notice that your attention is no longer focused on sounds in the moment, gently acknowledge where the mind had moved to, and then bring the awareness back to sounds as they arise and pass from one moment to the next.***
    7. ***Mindfulness of sound can be a very valuable practice on its own, as a way of expanding awareness and giving it a more open, spacious quality, whether or not the practice is preceded by awareness of body sensations or followed, as here, by awareness of thoughts.***

8. ***When you are ready, let go of awareness of sounds and refocus your attention, so that your objects of awareness are now thoughts as events in the mind. Just as, with sounds, you focused attention on whatever sounds arose, noticing them come up, develop, and pass away, so now, as best you can, bring focus to thoughts that come up in the mind in just the same way—noticing when thoughts come up, focusing awareness on them as they pass through the space of the mind and eventually disappear. There is no need to try to make thoughts come or go. Just let them come up naturally, in the same way that you related to sounds coming up and passing away.***
9. ***Some people find it helpful to bring attention to thoughts in the mind in the same way that they might if the thoughts were projected on the screen at the movie theater. You sit, watching the screen, waiting for a thought or image to arise. When it does, you pay attention to it so long as it is there "on the screen," and then you let it go as it passes away. Alternatively, you might find it helpful to see thoughts as clouds moving across a vast, spacious sky or as leaves moving on a stream, carried by the current.***
10. ***If any thoughts bring with them intense feelings or emotions, pleasant or unpleasant, as best you can, note that and their intensity, and let them be as they already are.***
11. ***If at any time you feel that your mind has become unfocused and scattered, or if it keeps getting repeatedly drawn into the drama of your thinking and imaginings, you may like to notice where this is affecting your body. Often, when we don't like what is happening, we feel a sense of contraction or tightness in the face, shoulders, or torso, and a sense of wanting to "push away" our thoughts and feelings. See if you notice any of this going on for you when some intense feelings come up. Then, once you have noticed this, see if it is possible to come back to the breath and a sense of the body as a whole, sitting and breathing, and use this focus to anchor and stabilize your awareness.***
12. ***At a certain point, you might like to explore the possibility of letting go of any particular object of attention, like the breath, or class of objects of attention, like sounds or thoughts, and let the field of awareness be open to whatever arises in the landscape of the mind and the body and the world. See if it is possible to simply rest in awareness itself, noticing whatever arises from moment to moment. That might include the breath, sensations from the body, sounds, thoughts, or feelings. As best you can, just sit, completely awake, not holding on to anything, not looking for anything, having no agenda other than embodied wakefulness.***
13. ***And when you are ready, bring the sitting to a close, perhaps returning for a few minutes to the simple practice of mindful awareness of the breath.***

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- Review the practice.
- Review hw practice from the previous week.

2. Complete ER strategy session #5; likely use acceptance lesson.

3. Discuss the links between activities and mood with the client.
   - *A lot of times, the activities and behaviors that we do every day affect our mood and energy level. For example, when some people don't get enough sleep, their emotions*

can be harder for them to regulate and they may be more likely to become angry or irritated as a result.

- *Are there any events or activities that tire you out or seem to give you more energy and happiness?*
    - Ask for examples, and supply some examples as needed. For example, does being in a crowd or people, or having to meet new people, tire them out? Do playing video games or reading a good book make them feel better? Does having a set schedule, or at least some down times, help them?
- Make a list of activities that nourish the client, and those that take away their energy or their defenses.
    - Note: With individuals with ASD, be mindful that some activities, especially related to restricted interests, could be potentially unproductive (e.g., non-social activities like video games or reading unrelated to school). Make sure to emphasize that the activities should be time-limited and to balance them with other activities.
- Discuss how planning activities and 'balancing' between energy-giving or energy-depleting activities can be helpful. Ask the client about an upcoming difficult task, and how to plan out downtime before and after it in order to conserve energy and mood.
- Lastly, make a list of pleasure/mastery activities that build up the client's energy and mood, including small/short activities that she/he can do anywhere and activities to plan in advance or to do only at home.

4. Introduce mindful stretching/walking to the client.
    1. **Find a place where you can walk up and down, without feeling concerned about whether people can see you. It can be inside or outside—and the length of your "walk" may vary perhaps between 7 and 10 paces.**
    2. **Stand at one end of your walk, with your feet parallel to each other, about 4 to 6 inches apart, and your knees "unlocked," so that they can gently flex. Allow your arms to hang loosely by your sides, or hold your hands loosely together in front of your body. Look softly, straight ahead.**
    3. **Bring the focus of your attention to the bottoms of your feet, the physical sensations of the contact of the feet with the ground and the weight of your body through your legs and feet to the ground. You may find it helpful to bend your knees slightly a few times to get a clearer sense of the sensations in the feet and legs.**
    4. **When you are ready, s the weight of the body into the right leg, noticing the changing pattern of physical sensations in the legs and feet as the left leg "empties" and the right leg takes over the support of the rest of the body.**
    5. **With the left leg "empty," allow the left heel to rise slowly from the floor, noticing the sensations in the calf muscles as you do so, and continue, allowing the whole of the left foot to lift gently until only the toes are in contact with the floor. Aware of the physical sensations in the feet and legs, slowly lift the left foot, carefully move it forward, feeling the foot and leg as they move through the air, and place the heel on the floor. Allow the rest of the bottom of the left foot to make contact with the floor as you transfer the weight of the body into the left**

leg and foot, aware of the increasing physical sensations in the left leg and foot, and of the "emptying" of the right leg and the right heel leaving the floor.

6. **With the weight fully transferred to the left leg, allow the rest of the right foot to lift and move it slowly forward, aware of the changing patterns of physical sensations in the foot and leg as you do so. Focusing your attention on the right heel as it makes contact with the ground, transfer the weight of the body into the right foot as it is placed gently on the ground, aware of the shifting pattern of physical sensations in the two legs and feet.**
7. **In this way, slowly move from one end of your walk to the other, aware particularly of the sensations in the bottoms of the feet and heels as they make contact with the floor, and of the sensations in the muscles of the legs as they swing forward.**
8. **At the end of your walk, stop for a few moments, then turn slowly around, aware of and appreciating the complex pattern of movements through which the body changes direction, and continue walking.**
9. **Walk up and down in this way, being aware, as best you can, of physical sensations in the feet and legs, and of the contact of the feet with the floor. Keep your gaze directed softly ahead.**
10. **When you notice that the mind has wandered away from awareness of the sensations of walking, gently escort the focus of attention back to the sensations in the feet and legs, using the sensations as the feet contact the floor, in particular, as an "anchor" to reconnect with the present moment, just as you used the breath in the sitting meditation. If you find your mind has wandered, you might find it helpful to stand still for a few moments, gathering the focus of attention before resuming your walking.**
11. **Continue to walk for 10 to 15 minutes, or longer, if you wish.**
12. **To begin with, walk at a pace that is slower than usual, to give yourself a better chance to be fully aware of the sensations of walking. Once you feel comfortable walking slowly with awareness, you can experiment as well with walking at faster speeds, up to and beyond normal walking speed. If you are feeling particularly agitated, it may be helpful to begin walking fast, with awareness, and to slow down naturally as you settle.**
13. **As often as you can, bring the same kind of awareness that you cultivate in walking meditation to your normal, everyday experiences of walking.**

From Segal, Williams, and Teasdale (2013). p. 244-245 Copyright by the Guilford Press.

a. Review the practice.

5. Go over homework practices for the week.
   - Practice situations where to use the adaptive ER strategy that was discussed.
   - Practice the 5 minute breathing space daily
   - Practice 10 minute sitting meditation daily
   - Decide on which mindfulness techniques and mastery activities they will use after the intervention—fill out Action Plan sheet.

Session 6—Maintaining and Extending New Learning

The purpose of this session is to review the topics learned in the intervention and discuss future application of them after treatment ends.

Objectives:

1. Summarize concepts and practices learned in the intervention
2. Discuss which practices the client will use after the intervention

Materials/Set-up:

- Write schedule on the board
- Pens/dry erase markers
- Handouts:
  - Summary of Treatment (adapted MBCT session 8, handout 1)
  - Daily mindfulness (MBCT session 8, handout 2)

1. Practice/review the 5min sitting mindfulness
   1. ***Settle into a comfortable sitting position, either in a straight-backed chair or a soft surface on the floor, with your buttocks supported by cushions or a low stool. If you use a chair, it is very helpful to sit away from the back of the chair, so that your spine is self-supporting. If you sit on the floor, it is helpful if your knees actually touch the floor; experiment with the height of the cushions or stool until you feel comfortable and firmly supported. Whatever you sit on, arrange things so that your knees are lower than your hips.***
   2. ***Allow your back to adopt an erect, dignified, and comfortable posture. If sitting on a chair, place your feet flat on the floor, with your legs uncrossed. Gently close your eyes.***
   3. ***Bring your awareness to the level of physical sensations by focusing your attention on the sensations of touch and pressure in your body where it makes contact with the floor and whatever you are sitting on. Spend a minute or two exploring these sensations, just as in the body scan.***
   4. ***Now bring your awareness to the changing patterns of physical sensations in the lower stomach/abdomen as the breath moves in and out of your body. (When you first try this practice, it may be helpful to place your hand on your lower stomach/abdomen and become aware of the changing pattern of sensations where your hand makes contact with your stomach/abdomen. Having "tuned in" to the physical sensations in this area in this way, you can remove your hand and continue to focus on the sensations in the abdominal wall).***
   5. ***Focus your awareness on the sensations of slight stretching as the abdominal wall rises with each breath in, and of gentle deflation as it falls with each breath out. As best you can, follow with your awareness the changing physical sensations in the lower stomach/abdomen all the way through as the breath enters your body on the breath out, perhaps noticing the slight pauses between one breath in and the following breath out, and between one breath out and the following breath in.***

6. ***There is no need to try to control the breathing in any way—simply let the breath breathe itself. As best you can, also bring this attitude of allowing to the rest of your experience. There is nothing to be fixed, no particular state to be achieved. As best you can simply allow your experience to be your experience, without needing it to be other than it is.***
7. ***Sooner or later (usually sooner), your mind will wander away from the focus on the breath in the lower stomach/abdomen to thoughts, planning, daydreams, drifting along—whatever. This is perfectly OK—it is simply what minds do. It is not a mistake or a failure. When you notice that your awareness is no longer on the breath, gently congratulate yourself—you have come back and are once more aware of your experience! You may want to acknowledge briefly where the mind has been ("ah, there's thinking"). Then, gently escort the awareness back to a focus on the changing pattern of physical sensations in the lower stomach/abdomen, renewing the intention to pay attention to the ongoing breath in or breath out, whichever you find.***
8. ***However often you notice that the mind has wandered (and this will quite likely happen over and over and over again), as best you can, congratulate yourself each time on reconnecting with your experience in the moment, gently escorting the attention back to the breath, and simply resume following in awareness the changing pattern of physical sensations that come with each breath in and breath out.***
9. ***As best you can, bring a quality of kindliness to your awareness, perhaps seeing the repeated wanderings of the mind as opportunities to bring patience and gentle curiosity to your experience.***
10. ***Continue with the practice for 5-10 minutes, or longer if you wish, perhaps reminding yourself from time to time that the intention is simply to be aware of your experience in each moment, as best you can, using the breath as an anchor to gently reconnect with the here and now each time you notice that your mind has wandered and is no longer down in the stomach/abdomen, following the breath.***

   i. Review practice
   ii. Review homework from previous week

2. Using the homework that the client completed, make a game plan for following therapy.
   - Which of the mindfulness techniques is the client going to use?
   - How are these techniques going to be applied in the future?
3. Summarize what was learned during the sessions.
   - When going back to session 1, how does acceptance apply to the strengths and difficulties of ASD?

Flexible modules (can use up to 5, time permitting, for each client)

1. Adaptive module #1—Problem Solving
2. Adaptive module #2—Reappraisal
3. Adaptive module #3—Acceptance
4. Aversion—avoidance, distraction, shutting down
5. Rumination/perseveration
6. Explosions

I. Problem Solving module

- Is this even a decision to problem solve? Some situations are outside of our control.
  - When is a situation good for problem solving? Brainstorm examples together of situations that are good for problem solving, and for those that aren't (e.g., having 2 events on the same day that you want to attend).
- Make an example out of a recent decision of the participant's (have several general examples on hand to use too).
  - What are the alternatives in this situation? Alternative thoughts, behaviors, solutions?
    - E.g., can I do something to tell myself it will be okay, or seek out an adaptive way to handle the situation?
- Discuss problem-solving methods:
  - Ask others for help/advice
  - Brainstorm ideas myself
  - Do something calming/relaxing to help me through the situation
  - Find humor in the situation

II. Reappraisal module

- Talk about thoughts-feelings connection and how thoughts aren't the same as situations—we can be accidentally ignoring, magnifying, or predicting something based on our thoughts and emotions, which leads to changes in how we'd react.
- we appraise the value of things, just in the same way we can reappraise our own views and emotions we feel in particular situations
  - For example: Say that I did badly on a test I got back. While at first I am angry and upset with myself for not doing well despite spending a lot of time studying, if I remind myself that the test was only worth 12% of my total grade in the class, and that I can drop my lowest test grade in the class for the semester, then the situation does not upset me as much.
- Talk about the different methods to reappraise a situation
  - Take a different <u>perspective</u>, often a wider perspective—if I were someone else, how would I react? If I imagine how I will feel in 1 week, 1 month, 1 year from now?
    - Look at changes in self, time, distance, etc.
  - <u>Alternate reasons</u>-- Does the situation reflect on me? Or are there other explanations for why it occurred, like chance?
  - <u>Hypothesize</u>--What else may happen? Has this happened before- if so, how did it end up for you?
- Talk about how it is very hard to reappraise a situation right away. Distance from an event is often like another way to get a wider perspective on it

III. Acceptance module

- Define acceptance — allowing yourself to have a negative thought or feeling and being okay with that. Some situations are simply beyond our control.
- Talk to someone about their goals in life. Is there a person they really admire and would like to be? Discuss whether they or other people feel all positive emotions all the time. Relate this to exposure and avoidance—have you ever had a situation you were afraid of or thought would be bad, only to finally do it and see that it wasn't?
- Use a troubling thought/feeling/upcoming situation as an example—how could you look at it in an accepting way?
- Use Chinese finger trap as example of pulling away from uncomfortable feelings
    - Pulling away or avoiding certain thoughts or feelings is a typical way of responding—people try their best to avoid pain or unhappiness. But humans are also very strong and can endure hardships (relate back to their strengths).

IV. Aversion/Avoidance module

- Use example of avoiding things in the environment. However, this same ability to avoid is not helpful with avoiding thoughts or feelings. (Use MBCT Session 4, Handout 1)
    - In general, we react to experience in one of three ways:
        1. With spacing out, or boredom, so that we switch away from the present moment and go off somewhere else "in our heads."
        2. With wanting to hold on to things — not allowing ourselves to let go of experiences we are having right now, or wishing we were having experiences that we are not having right now.
        3. With wanting it to go away, being angry with it—wanting to get rid of experiences we are having right now, or avoiding future experiences that we do not want.
- White elephants — what happens when I tell you that you can't think of them? Think of anything other than one — keep thinking of anything but a white elephant….
- Tie to the sitting mindfulness exercises — how often does your mind try to leave focusing on your breath? Use leaves on a stream or movie screen metaphor — let your mind dictate the images on the screen, then let them pass off screen
    - Tie how past, future, memories, and emotions quickly tie in to thoughts
    - See the tension or anger that comes up? This is aversion — body tries to rid us of uncomfortable things, which then leads to more tension if it doesn't work
- Avoidance box? Write down all thoughts or situations that you are currently avoiding, see how they start to pile up.

V. Rumination/Perseveration module

- Perseveration as too much focus on a bad thing—ASD's ability to focus on things they like as a strength
- 'Sticky' thoughts and emotions
    - Write 'sticky' thoughts on post-its. Throwing them in the trash as opposed to having them stick on you.
- Difference between reappraisal, problem solving vs. rumination
    - Changing thoughts/feelings, instead of repeating them over and over

VI. Explosions module

- Talk to client about times that they 'shut down' or 'explode.' Discuss how emotions, when not noted, can build up and become unwieldy, and how mindfulness of those first signs can help. Is there a particular area or situation in which these reactions occur for the person? Have them plan how to best remember to track these emotions in the situations where they are most likely to occur.
- What times is it better to 'shut down' your emotions?
    - It will hurt someone else's feelings or make them uncomfortable
    - Unsafe to express them—e.g., bullies, dealing with a crush on someone who doesn't know you well, etc.
- Which feelings should you share? When? To whom? (based on Southam-Gerow)
    - Has the feeling already been shared?
    - Can the feeling wait to be shared?
    - Does the feeling need to be shared?
    - Will sharing the feeling help the situation?
- "Changing the 'emotional channel?'
    - Do something active to distract you
    - Do something helpful or constructive to distract you
    - Do something creative

Appendix B: Recruitment Flyer

Mindfulness Intervention for Adults with ASD

Who:

- Adults age 18-25 years old with an Autism Spectrum Disorder/ Asperger's diagnosis

What:

- Participate in 6 weekly mindfulness-based sessions targeting emotional difficulties
- You will be compensated for assessment sessions

Where:

- Virginia Tech

(sessions available in Roanoke)

Contact: Psychosocial Interventions Lab

cconner4@vt.edu
540-231-6744
http://www.psyc.vt.edu/labs/pi

Virginia Tech

Mindfulness in ASD 540-231-6744 cconner4@vt.edu

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Appendix C: IRB Approval Letter

VirginiaTech

Office of Research Compliance
Institutional Review Board
North End Center, Suite 4120, Virginia Tech
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-4606 Fax 540/231-0959
email irb@vt.edu
website http://www.irb.vt.edu

MEMORANDUM

DATE: August 14, 2014

TO: Susan Williams White, Caitlin Mary Conner

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires April 25, 2018)

PROTOCOL TITLE: A Pilot Study of a Mindfulness- and Acceptance-Based Intervention Targeting Emotion Dysregulation among Adults with Autism Spectrum Disorder

IRB NUMBER: **14-200**

Effective August 11, 2014, the Virginia Tech Institution Review Board (IRB), at a convened meeting, approved the New Application request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

http://www.irb.vt.edu/pages/responsibilities.htm

(Please review responsibilities before the commencement of your research.)

PROTOCOL INFORMATION:

Approved As:	**Full Review**
Protocol Approval Date:	**August 11, 2014**
Protocol Expiration Date:	**August 10, 2015**
Continuing Review Due Date*:	**July 27, 2015**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Appendix D: Phone Screen

PHONE SCREEN SCRIPT FOR POTENTIAL PARTICIPANTS

Phone Screening Script
Date _____

ID #: _____

NOTE: This phone script will be used for either lab-initiated phone calls (e.g., when a potential participant has emailed our lab indicating an interest), as well as participant-initiated calls (when a participant telephones our lab directly, in response to a community or campus advertisement).

Lab initiated call:

Hello, my name is _____, and I am calling about the mindfulness therapy study you recently indicated interested in.

Participant initiated call:

Thank you for your interest in our study. My name is _____.

Introduction to study:
What I would like to do is first tell you about our research study, and then later ask some questions to help us determine if you qualify to participate. These questions will involve some basic information about your age and diagnoses. Answering these questions is voluntary. You do not have to answer them. However, not answering the questions means that you will not be able to participate in this research study. You are also free to stop answering questions at any time.

The phone call today should take less than 10 minutes. Is this ok?

If yes: Continue
If no: Reschedule phone call if time is inconvenient, or if participant declines, thank participant for his/her time, indicate that if they change their mind they are free to re-contact us and politely hang up.

Dr. Susan White, a faculty member in the VT Department of Psychology, is the principal investigator of this study, and the purpose of this research study is to assess the usefulness of a six week mindfulness therapy focused on managing feelings among adults with ASD, and measure the potential changes their feelings during mindfulness. Mindfulness tasks are used to help people think about things in an open way. We hope to enroll between 5 and 12 adults ages 18-25 years old.

If you are interested in this study after our phone call and eligible to participate, then the next step will be for you to attend the initial session, where you will complete several computer tasks, some questionnaires, and interviews with the researcher. The first session will take approximately 4 hours to complete and will be compensated $35. If you are found to be eligible

to complete the study, you will then attend 6 weekly therapy sessions with the researcher, in addition to several other assessment appointments. We do not offer payments for the therapy, but you will be compensated $15 for each assessment session. That means you could be compensated up to $80 in total for full participation in the study if you attend the scheduled assessment sessions.

Here is some information about the confidentiality of the information I collect today. If you do not qualify for the study or decide not to participate, we will not keep the information we collect today. If you do qualify for the study and decide to participate, we will ask you to sign a consent form at the study appointment. The personal information, like your age and diagnosis, that you give me today will become part of your research record and will be reviewed by Dr. White and the research staff. Your name will **not** appear on this screening information. We will assign a code number and the key to the code will be kept in a locked file separate from the other information I collect today. If you change your mind at any time and decide that you do not want to participate, you can call us and we will immediately destroy the private information that we collect today.

Would you like to continue to learn some more information about the study?

If yes: Continue
If no: Ask participant if they would like to reschedule the Phone Screen, or if participant declines, thank participant for his/her time, indicate that if they change their mind they are free to re-contact us and politely hang up.

Description of Study:
Before I ask you the screening questions, let me tell you some more information about the study session. If you choose to participate, you will be asked to come to our office at one of these locations- the Child Study Center, VT Autism Clinic, or Roanoke Higher Education Center, for your initial appointment. At the appointment, you will first meet with a study investigator to further talk about the consent form and address any questions you may have. Once you have all your questions answered, you will sign the consent form if you wish to continue with the research study. You will then be asked questions and fill out questionnaires. You will receive $35 for the appointment, which will last for approximately 3-4 hours.

If you are eligible and decide to continue to the study, you will be randomized to either a three- or four-week baseline period, after which time you will begin the intervention. You will attend 6 weekly individual therapy sessions held at the VT Child Study Center, Psychological Services Center (PSC), VT Autism Clinic (VTAC), or Roanoke Higher Education Center (depending on your preference) with the therapist, where you will learn mindfulness-based techniques to help manage difficult emotions or stress. In between sessions, the participants will be randomly contacted in order to complete questions regarding their emotional functioning. Data will also be collected at the midpoint, endpoint, and three week follow-up timepoints. You will be compensated $35 for completion of the intake and $15 for each subsequent data timepoint completed, for a maximum total of $80 for completion of assessment at all scheduled assessments.

If the participant has not yet indicated how they heard about the study:
May I also ask how you heard about our study?
_____

Phone: _____ Email: _____

What is the best way to contact you? _____

Screening Questions:

Would you like to continue now with the screening questions?

If yes: Continue
If no: Ask participant if they would like to reschedule the Phone Screen, or if participant declines, thank participant for his/her time, indicate that if they change their mind they are free to re-contact us and politely hang up.

1. What is your age? _____
□ If not between 18-25 years old, say "We are currently only recruiting individuals 18-25 years old, so you are not eligible to participate in this study."

2. Do you currently have a diagnosis of Autism Spectrum Disorder, such as Asperger's?
□ YES
□ NO (If not, say "We are currently only recruiting individuals with a prior diagnosis of ASD, so you are not eligible to participate in this study.")

3. IF YES, who was the person who diagnosed you?
_____ (get occupation, e.g., school psychologist, psychiatrist, clinical psychologist, etc.)

4. IF YES, at what age were you diagnosed?
_____

5. Have you ever been diagnosed with an intellectual disability or mental retardation?
□ YES (if yes, the participant is not eligible for the study)
□ NO

Those are all the questions I have for you now. What questions do you have for me?

IF QUALIFIED:
You are eligible for the initial session. As a reminder, that appointment lasts between 3-4 hours. What days and times are convenient for you? Which location? [Schedule appointment.] When you come in for the study, you will review a consent document with further details of the study, which, if you decide to participate, you will sign. For your convenience, we will email you the consent document so you can review it prior to coming to our lab.

IF NOT QUALIFIED:
Thank you for providing this information. Based on this information, I find that you don't qualify to participate in this study. All the information I collected for this screening will be erased. Thank you for your time.

Appendix E: Demographics Questionnaire

ID: _____

Date: _____

Demographic Questionnaire

1. **Your gender:** ☐ Man ☐ Woman ☐ Other- please specify: _____

2. **Your age in years and months:** _____

3. **Your racial background:**
   - ☐ White/Caucasian
   - ☐ Latino/Hispanic
   - ☐ Black/African American
   - ☐ Asian/ Asian-American
   - ☐ Native American
   - ☐ Middle-Eastern
   - ☐ Biracial/more than one race
   - ☐ Other (specify): _____

4. **Are you currently in school?**
   ☐ Yes ☐ No
   If so, what year in school? _____

   If in college, what is your major? _____

5. **Your education:** Please check the highest level of education you have completed.

   - ☐ Some High School
   - ☐ High School Diploma or GED
   - ☐ Some College/vocational training program
   - ☐ Completed vocational training program
   - ☐ College Diploma (4 year degree)
   - ☐ Graduate School

6. **Are you currently employed?**
   ☐ Yes ☐ No
   If yes, what is your job position? _____

7. **Your Marital Status**
   - ☐ Single

- ☐ Divorced
- ☐ Married
- ☐ Remarried
- ☐ Separated
- ☐ Unmarried and in a relationship

8. **What type of housing do you reside in?**
   - ☐ Apartment
   - ☐ Townhouse/duplex
   - ☐ Mobile home
   - ☐ Detached single family home (house)
   - ☐ Other

9. **Do you live with your parents?**

   ☐ Yes ☐ No

   If YES, have you ever lived away from them?

   ☐ Yes ☐ No

10. **Are you currently in counseling or therapy?**

    ☐ Yes ☐ No

    If YES, please indicate for how long: _____

11. **Do you currently take any psychiatric medications?**

    ☐ Yes ☐ No

    If YES, please indicate which medication(s) you take:

    _____

    _____

    _____

    _____

12. **Do you currently have any psychiatric diagnoses or symptoms? Please indicate any you struggle with by marking the appropriate boxes below.**
    - ☐ Depression
    - ☐ Anxiety (Social Anxiety, OCD, Generalized Anxiety Disorder, Panic Disorder, Specific Phobia)
    - ☐ Learning disorder
    - ☐ Attention Deficit Hyperactivity Disorder (ADHD)
    - ☐ Autism spectrum disorder
    - ☐ Eating disorder (Anorexia, Bulimia)
    - ☐ Schizophrenia

- ☐ Other: _____

13. Have you ever sought counseling or therapy?

- ☐ Yes
- ☐ No
- ☐ If so, for what:_____
- ☐ If so, how old were you: _____

14. Have you ever taken psychiatric medications?

- ☐ Yes
- ☐ No
- ☐ If so, which medication(s) did you take:_____
- ☐ If so, how old were you:_____

15. Have you experienced any of these experiences over the previous year? (Check all that apply)

- ☐ Separation or Divorce
- ☐ Marriage
- ☐ Change in individuals in household
- ☐ Financial changes (significant increase or decrease in income)
- ☐ Moved
- ☐ Started a new job or changed position at job
- ☐ Death of family member
- ☐ Death of close friend

Appendix F: WCST: LP Instructions

From Wiedl and Wiënobst (1999). Translation by Saray Bonete (and further revisions by Caitlin Conner).

WCST-LP: instructions

First thing we do is ask the client if s/he knows the task.

STANDARD ASSESSMENT (1st administration)

- *"Let's do a task. You will be asked to match each of these cards in these decks to one of these four key cards.*
- *You must always take the top card from the deck and place it below the key card you think it matches.* (Point to the key cards and where to place the other cards)
- *If you are incorrect, simply leave the card where you have placed it and try to get the next card correct.*
- *The first time it may seem a bit difficult because I cannot explain to you how to match the cards. I can only tell you if you are correct or incorrect.*
- *The second time, I am going to explain to you whenever you make a mistake.*
- *The third time, you will not receive any help—we will test to see if the clues I gave to you before are useful for your guesses.*
- *Between each of the three trials there will be a short break.*
- *There is no time limit on the test. Are you ready? Let's begin.*

DYNAMIC ASSESSMENT (2nd administration)

Feedback is given after each matched card. The instructions below explains each of the possible interactions after a matched card, distinguishing between unambiguous cards, or ambiguous (two possible matched would be apparently correct). In each case, different responses are given.

INSTRUCTIONS FOR THE DYNAMIC APPLICATION

- *Now, we are going to repeat the task.*
- *However, this time I will help you a little bit.*
- *You have to place these cards one after the other matching each to one of the four model cards* (the instructor place the four model cards again*). You always have to pick the card at the top and place it under the model card which you think it may be related to* (point at the different positions).
- *As you have seen, cards have different colors: red, green, yellow, blue (say it in the order they are placed), different number (1-2-3-4) and different shape: triangles, stars, crosses and circles* (again say it in the order they are placed). (While saying this information you should point at each model card.).
- *Therefore, the cards can be sorted by color, form or number. When you get a card you should look at each of them: color, shape, number and, looking at these characteristics, decide which is the rule I am using to match it.*

- *I will tell you if you are correct or incorrect and why. After a while I will change my mind. Pay attention, and do your best."*

Feedback

WHEN COLOR IS THE CORRECT CATEGORY AND CLIENT IS CORRECT:
Client only gets feedback after a card is placed correctly at the beginning of each series. After that, instructor only confirms that the classification is correct.

- Unequivocal and correct card: *"Correct, these two cards are the same color."*

- Ambiguous and correct card: *"Correct, this card matches this one because of the color but would also match that one because of the shape. Now we are thinking about the color".*

WHEN COLOR IS THE CORRECT CATEGORY BUT CLIENT IS INCORRECT:

Client matches by no sorting rule: Instructor needs to repeat instructions:
- *Watch it carefully. These cards are different because of color, number or shape. You have to guess which criteria I am thinking about and you place the card under the one you think that matches"*

1st time client matches by **shape**: *"Incorrect. Do not look at the shape because now, I am thinking about color or number. One of these categories is the correct one."*

2nd time client matches by **number**: *"Incorrect. It is not the number either."*

3rd time client matches by shape or number again: *"Incorrect, you do not have to think about the shape but the color by now." (Now, instructor says the correct category. If client doesn't put the card under the correct one, instructor gets it and brings it to the correct place).* So it is not until the 3rd incorrect try that instructor says the correct category.

After a set of 10 correct cards, instructor says a new rule:
"Very well, until now you have placed cards thinking about color. As you have done 10 correct, now it changes and shape or number will be the correct category but not color. So, now you may watch the shape or the number. When you have 10 more correct cards I will shift to another category. Do you understand? Let's go."

CODING:
During the application, sorting rule must be annotated by the side of the sheet, the number order of the answer in case it is correct and a circle mark around the letter that describes the sorting rule the client used, whatever it is correct or incorrect.

INSTRUCTIONS FOR THE THIRD TIME (POSTTEST)

- *Now, we are going to do it again one last time, and see how much you learned.*
- *We will do the task same as the first time. I will not give you any help.*
- *You should place each card under one of the four model cards* (instructor place the four model cards and points at them).
- *I will only tell you if it is correct or incorrect. If I say it is incorrect, leave it where you placed it and try the next one.*
- *Keep in mind that I change my criterion after a while. Pay attention and do the best you can.*

Scoring is done as the first application. One column of the answer sheet is completed for each one of the three trials.

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Appendix G: Line Tracing Coding

Emotional reactivity rating scale (from Melnick & Hinshaw, 2000)

1. Mild emotion ventilation: Number of times that the participant displays emotion through facial, vocal, or gestural medium (e.g., grunts, grimaces, makes a gesture of disappointment, or verbally acknowledges his/her frustration, furrowed brow, frowns, etc.).
   Number of times occurred:

2. Intense emotion ventilation: Number of times that participant strongly displays emotion (e.g., slams fist, whines or raises voice about his/her frustration, etc.).
   Number of times occurred:

3. Problem-solving: Participant states or demonstrates a plan to solve the task within existing conditions or has an alternative idea about how to achieve the goal of completing task instructions.

1	2	3	4
Not at all	somewhat	most of the time	all of the time

4. Seeks help: Participant requests information or looks to researcher for help.

1	2	3	4
Not at all	seems to once	two times	< 2 times

5. Accommodates: Participant cognitively reinterprets the situation to find a tenable way, or sees a bright side (e.g., "even though I can't finish the task, I can still have fun"). OR makes verbal statements or behaves in a way that indicates acceptance of the given conditions of the task (e.g., shrugs shoulders and says "it's okay").

1	2	3	4
Not at all	seems to once	two times	< 2 times

6. Negative responses/focuses on the negative: Number of times that the participant makes statements or expressions focusing on the negative, threatening, or uncontrollable aspects of the task (e.g., blames others or complains he/she won't solve the problem)
   Number of times occurred:

7. Shuts down: Number of times that the participant is temporarily immobilized and backs off from the task demands (e.g., collapses head/arms on the table, or crosses arms and refuses to continue).
   Number of times occurred:

Appendix H: Treatment Fidelity Coding

MBI Session Fidelity Rating

ID #: _____ Session #: _____ Date: _____

1. Length of session: _____ minutes
2. Were the stated objectives of the session accomplished? (circle one)
    1 = did not accomplish any of the stated objectives of this module
    2 = accomplished fewer than half of the objectives
    3 = accomplished about half of the objectives
    4 = accomplished more than half but not all of the objectives
    5 = accomplished all of the objectives of this module

# of objectives met / # of objectives stated for this module = _____/_____

3. Was the homework from the previous session reviewed?
    0= no
    1= yes, but only some of the homework
    2= yes, completely
    999= not applicable (no homework or 1st session)
4. Was the homework assigned in this session?
    0= no
    1= yes, but not all of the homework
    2= yes, what was in the manual
    999= not applicable (no homework or last session)
5. How would you describe the therapeutic relationship (interactions between client and clinician, client's willingness to discuss skills) during the session?
    1 = very poor
    2 = less than ideal
    3 = average
    4 = good
    5 = excellent
6. How involved was the participant in today's session?
    1 = very uninvolved
    2 = minimally involved
    3 = average/somewhat involved
    4 = quite involved
    5 = actively involved

7. Number of cancellations: _____
8. Number of times session was rescheduled: _____
9. Number of minutes late to session: _____

Notes (any concerns or problems with session, module, or members):

_____

_____