THE PRELIMINARY FEASIBILITY AND EFFICACY OF A MODIFIED DIALECTICAL BEHAVIOR THERAPY SKILLS TRAINING ON EMOTION REGULATION FOR YOUNG ADULTS WITH AUTISM SPECTRUM DISORDER

By

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ABSTRACT

THE PRELIMINARY FEASIBILITY AND EFFICACY OF A MODIFIED DIALECTICAL BEHAVIOR THERAPY SKILLS TRAINING ON EMOTION REGULATION FOR YOUNG ADULTS WITH AUTISM SPECTRUM DISORDER

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This research was conducted to evaluate the feasibility and efficacy of modified Dialectical Behavior Therapy (DBT) skills training on emotion regulation, Skills Improvement on Emotion Regulation for Adults (SIERA), for young adults with autism spectrum disorder (ASD). A total of 18 young adults with ASD (M_{age} = 21.1, SD = 2.47) completed a 90-minute weekly group intervention for a total of eight weeks. SIERA was a single group, pre- and post-test comparison of an intervention with the use of a mixed method research design.

Results suggested preliminary evidence for significant improvement in psychological flexibility, adaptive emotion regulation strategies, and reduction in emotion dysregulation upon completion of the intervention. Specifically, participants showed a statistically significant decrease in psychological inflexibility/experiential avoidance (M = 30.88 to 25.47; d = .68), a statistically significant increase in DBT skills use (M = 1.55 to 1.98; d = .90), a statistically significant increase in cognitive reappraisal (M = 4.06 to 4.91; d = .89), and a statistically significant decrease in emotion dysregulation such as reactivity (M = 13.69 to 5.00; d = 2.12) and dysphoria (M = 8.54 to 4.62; d = .63). Although participants also showed decrease in dysfunctional coping skills (M = 1.54 to 1.52; d = .05) and expressive suppression (M = 4.13 to 3.71; d = .31), the changes were not statistically significant. In addition, young adults with ASD also found the SIERA intervention was feasible to enhance their emotion regulation skills by presenting their satisfaction of the intervention with positive feedback. The participants showed

100% of completion rate, with a mean attendance of 97.8% across all sessions. The fidelity of this intervention study was 99% across all the groups.

The SIERA intervention incudes several implications in practice, education, and research in rehabilitation counseling. In practice, SIERA can be a new type of service for young adults with ASD in terms of facilitating a smooth transition to adulthood by emphasizing a psychosocial aspect of rehabilitation services and informing rehabilitation practitioners about the importance of teaching positive skills. In education, SIERA can contribute to curriculum development of rehabilitation counseling programs and add value to teaching evidence-based practices in pre-service education. In research, SIERA can strengthen the empirical support for stand-alone DBT skills training and suggest a new paradigm in ASD research. Future research is recommended to add more participants and increase research rigor, to generalize the SIERA intervention to heterogeneous groups of individuals with ASD, and to replicate other disability groups.

Keywords: Autism, young adults, emotion regulation, intervention

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CHAPTER 1: INTRODUCTION

Everyone feels and experiences both pleasant and unpleasant emotions each and every day. Emotions are a normal part of life regardless of age, gender, ethnicity/race, religion, sexual orientation, or any other social or personal characteristics. For some people, feeling and managing emotions would be ordinary, while for some people feeling and dealing with their emotions might be an overwhelming task. The difference between these two groups of people is not the actual emotions that they are experiencing but how these people cope with their emotions, whether through effective and functional or ineffective and dysfunctional ways. In other words, it is our ability to recognize the emotions, accept the emotions, and continue to function despite the emotions. In reality, there are many people who often feel overwhelmed by their emotions, are afraid of their emotions, and have difficulty coping with their emotions; this eventually yields dysfunctional behaviors. For young adults with autism spectrum disorder (ASD), emotion regulation has been identified as one of the challenges that they experience in daily living. Nevertheless, little research and service have attended to emotion regulation. Thus, this intervention study aims to evaluate the feasibility and efficacy of a modified Dialectical Behavior Therapy (DBT) skills training on emotion regulation for young adults with ASD to bridge the gap in research and service.

Background of the Problem

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that is characterized by two core symptoms: (a) deficits in social communication and interactions and (b) restricted and repetitive behaviors, interests, and activities (American Psychiatric Association [APA], 2013). This means that individuals with ASD often experience challenges in social emotional reciprocal action, nonverbal communication, and daily movements as well as having limited

interests. In addition to these two core characteristics, individuals with ASD often experience additional challenges including, but not limited to, difficulties in changing routine (Ludlow et al., 2012), establishment of relationships (Sedgewick et al., 2019), poor academic and employment outcomes (Shattuck et al., 2012), social stigma (Alsehemi et al., 2017), and dealing with emotional distress (Mazefsky et al., 2013; Miller et al., 2016). Despite an increase in diagnosis and prevalence of ASD, the focus of existing research has mainly been on services for younger children with ASD; and interventions for young adults with ASD are sparse (Young et al., 2010). After high school, individuals with ASD experience not only service discrepancy but also service disconnection, which impacts their ability to seek necessary services and accommodations during adulthood (Scott, 2019). Considering the challenges that these young adults with ASD face, it is pivotal to provide services to address these barriers so that they can meet their own needs in achieving their life goals.

Common Challenges in Young Adults with ASD

Emerging adulthood is a developmental stage (ages 18 to 26) in which an individual transitions to either post-secondary education or employment settings. Emerging adulthood is a pivotal time for individuals because their successes or failures during this period could strongly affect them later in life (Institute of Medicine and National Research Council [IOM&NRC], 2015). For young adults with ASD, this period is especially challenging due to systematic barriers and individual reasons.

Systematically, after high school, there is no federal mandatory service for young adults with ASD (Shattuck et al., 2011). Thus, transition from school to adulthood can be particularly difficult for many of them (Hendricks & Wehman, 2009), considering ASD is a pervasive disorder that needs continuous supports even after secondary education. In addition, young adults

with ASD experience diverse challenges owing to the characteristics of the disability, which can be largely categorized into the three areas: (a) setting specific challenges (e.g., post-secondary education settings and workplaces); (b) social challenges; and (c) mental health challenges.

After exiting high school, most young adults with ASD transition to either post-secondary education settings, employment settings, or community. Research found young adults with ASD who are in postsecondary education settings often experience unique challenges, which include identifying important content in class, academic performance, group projects, problems with handling less structured college life, struggles with unexpected life changes, time management, and disability disclosure (Cai & Richdale, 2016; Jensen et al., 2017; Van Hees et al., 2015). Young adults with ASD who are in employment settings often experience difficulties with the job tasks and the work environment (Stankova & Trajkovski, 2010), relationship with colleagues (Baldwin et al., 2014), and lack of reasonable accommodations (Waisman-Nitzan et al., 2019). In addition, ample research reported young adults with ASD frequently face social challenges such as difficulties in establishing friendships, romantic relationships, non-verbal communication, as well as mental health challenges such as comorbid of depression, anxiety, and obsessive-compulsive disorder (Elias & White, 2018; Demopoulos et al., 2015; Gelbar et al., 2014; Gurbuz et al., 2019; Schreiber, 2011).

As plenty of research has indicated, young adults with ASD experience unique challenges that may not be well understood by others. Thus, further efforts such as providing necessary services and supports are needed to address the unique challenges which ultimately yield a successful transition to adulthood and bring positive outcomes in the lives of young individuals with ASD.

Challenges in Emotion Regulation of Young Adults with ASD

Young adults with ASD often experience poor emotional control and mental health issues such as depression and anxiety (Mazefsky et al., 2014). Research found that individuals with ASD utilize mental health services 12 times more than individuals with non-ASD due to their depression, anxiety, and behavioral issues. Nearly 60% of them have been prescribed psychiatric medications (Croen et al., 2006; Siegel & Beaulieu, 2012). In addition, individuals with ASD are four times more likely to have clinically elevated emotion regulation impairment compared to the general population; and this leads to increased hospitalization, emergency room visits, in-home crisis management, and police contact (Conner et al., 2020). They also need more time returning to baseline emotional state once they reach "meltdown" moments, which often interfere with their daily functioning (Baker et al., 2008; Laurent & Rubin, 2004; Mazefsky, 2015). Considering emotion regulation as a critical mechanism that enables individuals to reconstruct cognition; modify problematic behaviors; and maintain positive wellness, these issues can be alleviated if individuals with ASD receive services that help them learn adaptive ways to manage their emotions (Leahy et al., 2011).

Current Research on Emotion Regulation for Young Adults with ASD

Research on emotion regulation for young adults with ASD is scarce. This might be because emotion regulation is not a core characteristic of ASD which may make it less appealing to researchers and practitioners. So far, most prevailing research (e.g., Berry et al., 2018; Clarke et al., 2016; Karalunas et al., 2018; Laugeson et al., 2015; Leekam et al., 2011; Mandelberg et al., 2014; Rommelse et al 2017; Solomon et al., 2004) has addressed social skills deficits, cognitive deficits, and behavioral issues of young adults with ASD. Research on emotion regulation was mainly conducted for non-ASD populations such as individuals with attention-

deficit/hyperactivity disorder (ADHD), borderline personality disorder (BPD), mood disorders, and eating disorders (McNair et al., 2016; Valentine et al., 2015; Bankoff et al. 2012; Bloom et al., 2012; Brazier et al., 2006, Visted et al., 2018). It was not until recently that some ASD literature (e.g., Connor et al., 2020; Santomauro et al., 2016; White et al., 2016, 2020) began identifying emotion regulation as one of the main struggles among young adults with ASD. Thus, further empirical research needs to be conducted to provide evidence that can bring overall improvement in the lives of young adults with ASD.

Despite little research has been conducted in emotion regulation for young adults with ASD, dialectical behavior therapy (DBT) can be used as one approach that improves the emotion regulation of young adults with ASD. Linehan (2015) asserted that emotion regulation skills can be learned through acceptance and change. This makes DBT skills training a promising approach that can be used to improve the emotion regulation of individuals with ASD. Though BPD has been considered an "untreatable" clinical population due to their severe emotion dysregulation and parasuicidal behavior that impacts daily living, a myriad of research has found that DBT is very effective in this population (Linehan et al., 1991; Linehan et al., 2015; McMain et al., 2017). Similarly, individuals with ASD also present with emotion dysregulation (Hartmann et al., 2012) though they do not typically show suicidal behavior the way that individuals with BPD present (Hill et al., 2004). Consequently, DBT skills training (Hartmann et al., 2012) may be more likely to bring clinical benefits and to provide an opportunity of interaction for individuals with ASD.

Theoretical Framework

Dialectical behavior therapy is a mindfulness-based cognitive behavior treatment that harmonizes with the use of acceptance and change techniques (Leahy et al., 2011). It was

developed based on the pros and cons of cognitive behavior therapy (CBT) and acceptance and commitment therapy (ACT). Dialectical behavior therapy was originally developed for individuals with borderline personality disorder (BPD) who chronically present suicidal ideation. It was the first psychotherapy to be clinically effective with individuals with BPD and has been implemented across diverse disability groups (Linehan & Wilks, 2015). Linehan (2015) described that "DBT, including DBT skills training, is based on a dialectical and biosocial theory of psychological disorder that emphasizes the role of difficulties in regulating emotions, both under and over control, and behavior (p. 3)." DBT skills training is didactically focused, with emphasis on actual skills training procedures such as direct instructions, coaching, behavioral rehearsal, modeling, and homework assignments (Linehan & Wilks, 2015). The ultimate goal of DBT skills training is to help individuals change dysfunctional thoughts, behaviors, and emotions that are associated with everyday life problems (Linehan, 2015). Considering these, DBT skills training on emotion regulation for young adults with ASD seems promising in terms of compensating common characteristics of the disability and further strengthening the current skills and abilities that they possess.

Purpose of the Study

The purpose of this proposed study is to evaluate the feasibility and efficacy of a modified DBT skills training on emotion regulation for young adults with ASD. Although emotion dysregulation is not the core characteristic of ASD, emotional difficulties often cause challenges in young adults with ASD that are related to their social and behavioral issues along with comorbid disorders. This is because emotion related problems are not only the product of social skills deficits but also of co-occurring disorders with which many individuals with ASD struggle (Weiss, 2014). Indeed, a growing body of research proved that impaired emotion

regulation has been associated with individuals' psychopathology and behavioral difficulties including aggression (Compas et al., 2017; Gumora & Arsenio, 2002; Hubbard, 2001).

Although standard DBT requires various treatment modalities including individual therapy, group skills training, as-needed phone coaching, and consultation team meeting, these resources are not sufficient in many clinical settings (Swenson, 2000). Ample research supports the clinical effectiveness of stand-alone DBT skills training for various populations. For example, Valentine et al. (2015)'s systemic review found that individuals who received stand-alone DBT skills training all presented positive changes including decrease in problematic behaviors, decrease in depressive symptoms, improvement in coping strategy, increase in emotional well-being, and greater life satisfaction. Thus, this present study will also provide empirical support for a decrease in emotional distress and an increase in functional coping strategy, which have been identified as severe challenges for young adults with ASD. Ultimately, an intention of this study is for the results to generate evidence to support strategies that can improve the overall quality of life of young adults with ASD as well as strengthen resilience and decrease emotional vulnerability to overcome challenges in their adulthood.

Research Questions and Hypotheses

The research questions and hypotheses of interest in the proposed study are as follows:

Research Question1. Does the modified DBT skills training help emotion regulation of young adults with ASD?

Research Hypothesis 1a. Young adults with ASD will show a statistically significant decrease in psychological inflexibility/experiential avoidance by increasing scores in the AAQ-II after the intervention.

Research Hypothesis 1b. Young adults with ASD will show a statistically significant increase in positive coping skills by increasing scores in the DBT Skills Subscale (DSS) of DBT-WCCL after the intervention.

Research Hypothesis 1c. Young adults with ASD will show a statistically significant decrease in dysfunctional coping skills by decreasing scores in the Dysfunctional Coping Subscales (DCS 1 & DCS 2) of DBT-WCCL after the intervention.

Research Hypothesis 1d. Young adults with ASD will show a statistically significant increase in adaptive emotion regulation strategy by increasing scores in the cognitive reappraisal of ERQ after the intervention.

Research Hypothesis 1e. Young adults with ASD will show a statistically significant decrease in maladaptive emotion regulation strategy by decreasing scores in the expressive suppression of ERQ after the intervention.

Research Hypothesis 1f. Young adults with ASD will show a statistically significant decrease in emotion dysregulation by decreasing scores in the reactivity of EDI-13 after the intervention, rated by a primary caregiver.

Research Hypothesis 1g. Young adults with ASD will show a statistically significant decrease in emotion dysregulation by decreasing scores in the dysphoria of EDI-13 after the intervention, rated by a primary caregiver.

Research Question 2. What is the experience of young adults with ASD in the SIERA intervention?

Brief Summary of Study Methodology

To address the research questions, participants were presented with a 76-item pre-survey and a 102-item post-survey with sections on demographic information, distress level, functional

and dysfunctional coping strategies, and perceived emotion regulation ability. Also, some parents of the participants were presented with a 13-item pre and post survey that reported their adult child's emotion dysregulation. Meanwhile, participants were involved in eight weeks of group emotion regulation intervention based on *DBT® Skills Training Manual* (2nd ed), called Skills Improvement on Emotion Regulation for Adults (SIERA). After each session, participants also completed a 5-item weekly progress checklist. Participants were recruited from the Resource Center for Persons with Disabilities (RCPD) at Michigan State University, community agencies in Michigan, and university affiliated autism centers in Michigan and Virginia that serve people with ASD. Following approval by the Institutional Review Board (IRB), this researcher sent emails with the official invitation letters to directors and appointed staff members. These letters included information about the purpose of the study, inclusion criteria, the research method, and web-based surveys. Data were analyzed using descriptive statistics and thematic analysis.

Definition of Terms

The following terms are defined for clarification:

DBT skills training on emotion regulation — DBT skills training on emotion regulation is one component of DBT skills training that is identified as change skills (Linehan, 2015). It is focused on learning to identify emotions, labeling and describing emotions, changing unwanted emotions, and reducing emotion vulnerability and increasing emotional resiliency (Soler et al., 2009).

Emotions — Emotion is a "complex reaction pattern, involving experiential, behavioral, and physiological elements, by which an individual attempts to deal with a personally significant matter or event. (APA, 2015, p. 362)." Emotion is distinguished from feelings, affect, and mood. Feelings arise from an emotional experience, which is the result of emotions that are influenced

by memories, imaginings, or other factors (Barret et al., 2007); affect refers to a neurophysiological state that is always available to the conscious mind and occurs in a pure or isolated form; and mood represents the appropriate designation for affective states that typically last longer than emotions (Ekkekakis, 2012).

Emotion dysregulation — Emotion dysregulation is defined as the lack, or non-use, of adaptive skills or the overuse of maladaptive strategies to modify emotional responses (Kring & Sloan, 2010). It also refers to the predisposition to use maladaptive strategies to moderate unwanted emotional intensity (Gratz & Roemer, 2004; Linehan, 1993).

Emotion regulation — Emotion regulation refers to the ability of an individual to modulate an emotion or set of emotions (APA, 2015, p. 365). Emotion regulation is often considered within the framework of coping that allows individuals to modulate and maintain emotional experiences or responses to meet personal and social goals (Chambers et al., 2009; Mazefsky et al., 2014). Emotion regulation is considered as "the process of initiating, avoiding, inhibiting, maintaining, or modulating the occurrence, form, intensity, or duration of internal feeling states and emotion-related physiological, attentional processes, motivational states, and/or the behavioral concomitants (Eisenberg & Spinrad, 2004, p. 338)."

Experiential avoidance — Experiential avoidance is an attempt to avoid or neglect unpleasant thoughts, unpleasant feelings, bitter memories, and uncomfortable physical sensations which eventually lead to an action that is against one's values and cause long-term harm to oneself (Hayes et al., 1999).

Cognitive reappraisal — Cognitive reappraisal is one of the adaptive emotion regulation strategies that refers to thinking about a situation in a manner that can change its emotional response (Gross, 1998).

Expressive suppression — Expressive suppression is a less adaptive emotion regulation strategy that refers to changing the way individuals behaviorally responds to emotion-eliciting events (Gross, 1998).

Dysphoria — Dysphoria is a psychological state of generalized unhappiness, sadness, worry, and unease that can be a symptom of several mental health conditions (APA, 2015; Mazefsky et al., 2018).

Reactivity — Emotional reactivity refers to the tendency to experience frequent and intense emotional arousals such as tantrums and outbursts (Mazefsky et al., 2018).

Mindfulness — Mindfulness is an awareness of one's internal state and surroundings (APA, 2015). Mindfulness is a state where an individual pays purposeful attention to the present moment nonjudgmentally (Kabat-Zinn, 2005).

Wise mind — Wise mind is the core skill in DBT skills training. Wise mind is the middle place where the reasonable mind and the emotion mind integrate. Wise mind is the state in which individuals can make the wisest decisions, seeing the value of both reason and emotion (Linehan, 2015).

Reasonable mind — Reasonable mind is the state where a person is governed by facts, reason, logic, and pragmatics that is considered as cool and rational (Linehan, 2015).

Emotion mind — Emotion mind is the state where a person is ruled by one's moods, feelings, and urges to behave and to talk. Emotion mind is hot, mood-dependent, and focuses on one's emotion instead of task (Linehan, 2015).

CHAPTER 2: LITERATURE REVIEW

To address the previously stated research questions, it is necessary to provide a comprehensive literature review that addresses the concepts and constructs of the current study. This literature review begins by introducing what ASD is, including prevalence and characteristics of ASD. Literature related to the challenges and problems that young adults with ASD have experienced, as well as gaps to research will be highlighted to understand why this study needs to be implemented. Finally, dialectical behavior therapy (DBT), which is the theoretical framework/concept of the current study, will be described along with an in-depth explanation of emotion regulation.

Individuals with Autism Spectrum Disorder

Autism Spectrum Disorder (ASD)

The concept of autism was introduced in 1911 by the German psychiatrist Eugen Bleuler to describe a symptom of the most severe cases of adults with schizophrenia. According to Bleuler, autistic thinking was characterized by infantile wishes to avoid unsatisfying realities and replace them with fantasies and hallucinations (Evans, 2013). Autism spectrum disorder (ASD) is a neurodevelopmental disability defined by diagnostic criteria that include deficits in social communication and interaction, and the presence of restricted, repetitive patterns of behavior, interests, or activities which first appear in early childhood and last throughout a person's life (American Psychiatric Association [APA], 2013). Autism can cause clinically significant impairment in social, occupational, or other important areas of functioning along with co-occurring conditions such as other developmental disabilities, and psychiatric and neurological disorders (APA, 2013; Levy et al., 2010).

Prevalence of ASD

There is little variation in the estimate of prevalence rates of ASD by sex and race/ethnicity. Autism occurs in all racial, ethnic, and socioeconomic groups. According to the Center for Disease Control (CDC), approximately 1 in 54 youth has some form of ASD (Baio et al., 2018). The prevalence rate of ASD has increased drastically between 2002 and 2014 in the United States. Specifically, during 2000 to 2002, it is reported that approximately 1 in 150 children had some form of ASD; this estimate doubled in the years 2010 to 2014. Currently, about 1.5 million children aged 3 to 17 years, which is 2.5% of the population in the same age group, have ever received an ASD diagnosis and/or have the conditions of ASD. Among the population, there are about 235,000 children aged 3 to 5 years; 641,000 children aged 6 to 11 years; and 653,000 children aged 12 to 17 years that have some type of ASD condition (Kogan et al., 2018). In addition, there are about 450,000 youth with ASD aged 16 to 24 years in the United States (Roux et al, 2017). Each year, approximately 50,000 youth with ASD turn 18, and 47% of young adults with ASD have enrolled in some form of postsecondary education setting after graduating from high school (Roux et al, 2015). By 2020, there will be an estimated 433,000 individuals with ASD in postsecondary education settings (Cox, 2017).

Characteristics of ASD

Currently, the D*iagnostic and Statistical Manual of Mental Disorders* (5th ed., DSM-5; APA, 2013) is the most commonly used diagnostic criteria. DSM-5 defines ASD as a pervasive neurodevelopmental disability that is characterized by two core symptoms: (a) deficits in social communication and interactions and (b) restricted and repetitive behaviors, interests, and activities. To be more specific, deficits in social communication and interactions include, but are not limited to, inappropriate use of spoken language, eye contact, facial expressions, and tone of

voice while communicating; limited understanding of expressions literally; and feeling overwhelmed in social situations. Further included in the criteria are repetitive and inflexible behaviors demonstrated in repetitive body movements (e.g., rocking, flapping, spinning, running back and forth); repetitive motions with objects (e.g., spinning wheels, shaking sticks, flipping levers); ritualistic behaviors (e.g., lining up objects, repeatedly touching objects in a set order); narrow or extreme interests in specific topics; and the need for a routine that does not vary such as preference of the same daily schedule, meal menu, clothing, and route to school (APA, 2013).

Autism is a heterogeneous disorder that often accompanies many associated comorbid disabilities (Frye, 2018). Individuals with ASD differ greatly in their clinical and functional presentation due to substantial differences in exposure of treatment, care, and support (Buescher et al., 2014). It would not be an exaggeration to state that there is neither a specific phenotype nor a consistent genotype that firmly defines ASD. Yet, prevailing research (e.g., Clarke et al., 2016; Karalunas et al., 2018; Laugeson et al., 2015; Mandelberg et al., 2014; Rommelse et al 2017; Solomon et al., 2004) has addressed social skills deficits and behavioral issues as the main phenotypes of determining ASD. Therefore, these two components (i.e., social skills deficits and restricted and repetitive behaviors) will be further described to elucidate on the characteristics of ASD in this section.

Social Skills Deficits. Along with the description in DSM-5, a plethora of research discussed social communication and social skills deficits as a central feature for individuals with ASD. Social communication deficits are characterized by poor eye contact, lack of joint attention, pedantic or odd speech patterns, difficulty both initiating and maintaining conversations, lack of social problem-solving ability, lack of empathy, and difficulties interpreting body language; many individuals with ASD struggle with these social skills in their

lives (Schreiber, 2011). These deficits of social communication tend to relate to individuals' difficulties in reading facial expressions, facial coding/decoding, and non-verbal gestures (Grossman & Tager-Flusberg, 2008) which further leads to difficulties in social and interpersonal relationships. Even though some literature (e.g., Howlin, 2000; Orsmond et al., 2004) asserted that individuals with ASD increase their social skills as they enter adolescence and adulthood, the deficits in social skills do not disappear. Rather, these symptoms continue and manifest throughout their lifespan (Shattuck et al., 2007). For example, research reported that many individuals with ASD often have less access to their peers and limited social interactions. Adolescents and adults with ASD present less frequent engagement in acceptable behaviors and more engagement in inappropriate behaviors in a public setting (Stokes & Kaur, 2005; Stokes et al., 2007). Also, many of them show challenges in interpersonal interaction and communication in a real-world social situation (Morrison et al., 2017).

These struggles in social skills especially stand out for young adults with ASD as they transition to adulthood. Emerging adulthood is one of the critical developmental stages as it links childhood to adulthood. During this period, individuals execute important developmental life tasks to become independent adults who can carry out adult roles (Kipke, 1999). In order to play an independent role in life, it is inevitable that individuals will interact with others who are not always familiar to them. Also, individuals need to communicate verbally and non-verbally with unfamiliar people. In other words, social interaction is one of the key areas of adult life. However, considerable research has found that individuals with ASD experience additional challenges in social areas despite their need for social connection. For example, Kasari & Sterling (2014) described that as individuals with ASD get older, they develop social comparison, have deeper knowledge of friendships, and understand one's social milieu. With

increased awareness of social aspects, young adults with ASD recognize their unique challenges in socialization and realize that they are different from typically developing peers (Wing, 1992). Bauminger and Kasari (2000) also presented that individuals with ASD often report a desire for more peer social interaction, but due to their different concept of friends, they express poor quality of friendships, social support, and frequent feelings of loneliness than their typically developing peers. Accordingly, many young adults with ASD intentionally limit their social opportunities by making few social initiations or withdrawing themselves from social interactions (Shtayermman, 2007). As such studies have indicated, social skills deficits are surely some of the most significant features in young adults with ASD.

Restricted and Repetitive Behaviors. Restricted and Repetitive Behaviors (RRBs) are the other core symptoms of ASD. These core symptoms often refer to ritualistic behaviors that individuals present, which is more commonly observed in younger individuals with ASD (Ventola et al., 2016). Restricted and repetitive behaviors form a class of behaviors characterized by repetition, high frequency, and a desire for consistency in the environment. Specifically, individuals who meet criteria of ASD present behaviors that fall into two or more of the four RRB domains: (a) stereotyped or repetitive motor movements, speech, or use of objects; (b) excessive adherence to routines, ritualized patterns of verbal or non-verbal behavior, or insistence on sameness; (c) highly restricted, fixated interests that are abnormal in intensity or focus; and (d) hyperreactivity or hyporeactivity to sensory input or unusual interest in sensory aspects of their surroundings (APA, 2013).

Although research on causal factors of RRBs in ASD is scarce, different theories have identified the causes of RRBs. Leekam et al. (2011) posited that that RRBs are the effects of genetic vulnerability and social isolation. They specifically described that RRBs are the

consequences of dysfunction in executive processes. Iversen and Lewis (2021) also viewed RRBs as the immature behavioral responses that have been maintained beyond the typical period of development.

As Berry et al. (2018) indicated, RRBs are an important aspect that researchers and practitioners need to take into consideration because these behaviors often create barriers to social engagement and learning opportunities. For instance, an individual flicks his/her hands to the extent that he/she will not be able to attend to the situation/environment around him/her or participate in the activities. The lack of attentiveness to the environment may prevent the individual from receiving environmental input, which is necessary for their neural development (Lewis, 2004). An early study by Koegel and Covert (1972) presented that RRBs decrease individuals' opportunities to learn in a classroom setting. In addition, RRBs are correlated with less access to education and less community involvement (Matson & Wilkins, 2007) as well as less interaction with peers (Matson et al., 2010). Recent research by Manor-Binyamini and Schreiber-Divon (2019) also presented that RRBs decrease opportunities for social interaction and communication with other individuals.

As previous research has been examined, RRBs exist across a large group of children, adolescents, and adults with ASD. However, compelling research findings have asserted that there is a tendency of decreasing RRBs across time. For example, RRBs such as abnormal motor behaviors and responses to sensory stimulation often decline as individuals get older (Murphy et al., 2005). Additionally, individuals' repetitive use of objects, which is one form of RRBs, decreases as children with ASD reach the stage of emerging into adulthood (Fecteau et al., 2003). Esbensen et al. (2010) found that RRBs were less frequent and less severe among older individuals than younger individuals, which supports the idea that symptoms abate with age.

Furthermore, Anderson et al. (2014) found that RRBs of children with ASD were significantly higher than young adults with ASD. Although research has focused less on RRBs in young adults with ASD, RRBs are a core feature of autism that could preclude individuals from socialization and further learning.

Rationale for Autism Deficits

There is some evidence indicating impairment in theory of mind (ToM) and executive functioning (EF) in individuals as contributing factors to the fundamental deficits in autism. Thus, theory of mind (ToM) and executive functioning (EF) are further explained to understand ASD.

Theory of Mind. Theory of mind (ToM) refers to the ability to impute mental states to oneself and to others. It is further defined as the ability to make inferences about what other people believe to be the case in a given situation which allows one to predict what they will do (Premack & Woodruff, 1978). In other words, ToM is the ability to understand and interpret other's beliefs, intentions, and emotions, which plays a significant role in social interaction (Baron-Cohen et al., 1985). Research supports that ToM is one of the core constructs that impact an individual's social skills and social competence. Research has further found deficits of ToM exist in a majority of individuals with ASD (Baron-Cohen et al., 2001; Stichter et al., 2010).

The importance of ToM in understanding and supporting ASD has been demonstrated through many experimental studies. For instance, research has proven that better ToM is associated with improved behavior towards social rules (Thirion-Marissiaux & Nader-Grosbois, 2008), better social interaction skills (Bosacki & Astington, 2001), as well as increased verbal language use (Charman et al., 2000; Happé, 1993). However, most ToM research findings have consistently shown that individuals with ASD represent poor ToM compared to their

counterparts (e.g., Beaumont & Newcombe, 2006; Mathersul et al., 2013; Peterson et al., 2012; Schuwerk et al., 2015; Spek et al., 2009). Likewise, research proved that the lack of ToM in individuals with ASD and the impact of ToM in social skills deficits within this population.

Executive Functioning. Executive functioning (EF) refers to the cognitive construct used to describe goal-directed, future-oriented behaviors thought to be mediated by the frontal lobes (Duncan, 1986; Ozonoff et al., 2005). It indicates a family of top-down mental processes needed when one needs to concentrate and pay attention when going on automatic or relying on instinct or intuition would be ill-advised, insufficient, or impossible (Burgess & Simons, 2005; Espy, 2004; Miller & Cohen, 2001). There are three core areas in EF: inhibition and interference control, working memory, and cognitive flexibility (Lehto et al., 2003; Miyake et al., 2000). Inhibition and interference control mean an ability that involves being able to control one's attention, behavior, thoughts, and/or emotions in order to perform more appropriately in a situation. Working memory is another core ability in EF, which involves holding information in the mind and mentally manipulating it. Cognitive flexibility refers to the ability to change perspective spatially and interpersonally (Diamond, 2013).

Executive functioning is a necessary skill to succeed in school and life; in cognitive, social, and psychological development; and essential for physical and mental well-being. However, through broad research, it has been discovered that individuals with ASD have deficits in EF. For example, one of the initial studies by Ozonoff et al. (1991) found that individuals with ASD have difficulties in areas related to mental flexibility, including conceptual shifting, and attention shifting, so that they have a hard time to notice when the main idea has changed in a situation. Moreover, a study by Fleury et al. (2014) described individuals with ASD have poor academic performance and difficulty in social communication with others, which are common

obstacles in educational settings and daily life owing to deficits in EF. In addition, Johnson et al. (2019) found that individuals with ASD showed difficulties in planning and verbal inhibition, slower processing on cognitive task, and high levels of dysexecutive difficulties.

As the research on EF in ASD has continued, several new issues have arisen and findings of deficits in executive functioning are not as simple as it used to be (e.g., found executive functioning deficits in individuals with ASD per se). Nevertheless, it is commonly observed across the EF research that deficits of EF in individuals with ASD is a core phenotype of ASD. Thus, the difficulties from EF deficits need to be scrutinized to support individuals with ASD in holistic ways.

Challenges of Young Adults with ASD

Young adulthood, approximately ages of 18 to 26, is a critical period in one's life in terms of making a smooth transition to adulthood. Young adulthood is also a pivotal developmental stage for individuals because their successes or failures during this time could strongly affect the path for their future (IOM&NRC, 2015). In other words, individuals' successful transition experiences during young adulthood can be a strong determining factor for future quality of life. Wehman et al. (2020) identified transition as completing secondary school, gaining employment, participating in postsecondary education, contributing to a household, participating in the community, and experiencing satisfactory interpersonal relationships. The outcome of transition is often determined by a person's past behaviors, experiences, and societal factors. A positive transition creates a solid foundation for one's life, whereas a negative transition creates challenges in one's life (Rutter, 1989).

For young adults with ASD, the transition process might be more challenging than those without ASD due to the core characteristics of ASD (Stoner et al., 2007). Considering social

skills deficits as one of the core symptoms of ASD, new experiences in new social environments (e.g., college, workplace, and community) could cause them to have more salient issues such as interpersonal relationship troubles, daily living struggles, and work life difficulties (Barnhill, 2007). In addition, comorbidity of mental disorders among young adults with ASD should not be overlooked. Considering young adults with ASD are at a crossroad of the time where they largely decide whether to pursue a postsecondary education or career path, they may face different types of challenges and unique experiences at this stage of life. In this section, further challenges that have been faced by young adults with ASD will be discussed in three areas: (a) setting specific challenges (e.g., at college and workplace), (b) social challenges, and (c) mental health challenges.

Setting Specific Challenges

After high school, a majority of young adults with ASD transition to postsecondary education settings or employment settings. Approximately, 70% of young adults with ASD engage in education, employment, and training for employment. To be more specific, about 43% of young adults with ASD transit to postsecondary education settings and 37% of young adults are engaged in employment and job training settings (Newman et al., 2011). Compared to other disability groups, engagement in postsecondary education and employment of the ASD population is lower due to the distinct barriers that they experience in these settings.

School. Successful completion of a postsecondary education program is strongly correlated with positive adult outcomes such as employment, community engagement, and independent living (Newman et al., 2011). According to the findings from White et al. (2011), the current numbers of students with ASD in college is between 0.7 to 1.9% out of the entire number of enrolled students. By 2020, it is expected that there will be around 433,000 young

adults with ASD in postsecondary education settings (Cox, 2017). Volkmar et al. (2017) also predicted that the number of college students with ASD would continuously increase. As the estimation and statistics indicated, more and more young adults with ASD transit to postsecondary education settings after high school.

Transition to college can be an onerous task for young adults with ASD because they have to build and manage new identities as adults by themselves (Drake et al., 2016). Usually, a goal of postsecondary education is to acquire skills that increase personal independence and social responsibilities, which includes acquisition of academic skills, socialization, communication skills, self-management, self-determination, and employment. Increasing one's independence and social responsibilities has already been discussed and identified as one of the major areas of difficulty that young adults with ASD face in their lives (Kavale & Forness, 1999). Moreover, adjustment to new academic demands, new campus life, and changes in their daily living further adds to the difficulties of those young adults.

As more young adults with ASD enter college, various challenges that they have experienced in this specific setting have become more noticeable. For example, in McKeon et al. (2013)'s study, college professors reported that students with ASD were struggling in class due to difficulties with asking and answering questions, going off topic in discussion, poor time management in class, and lack of organization and comprehension despite multiple instructions. Gobbo and Shmulsky (2014) also presented that faculty members in college who have taught students with ASD observed that students' academic challenges in class were due to difficulties with dealing with ambiguity and change, elaborating ideas, lack of understanding in audience recognition when writing papers, and challenges in conceptual transitions and shifting their attention in class.

Related to these academic challenges that college students with ASD have experienced, research further found that they often expressed difficulties in information processing, time management, and frequent thoughts of withdrawal due to the academic burden (Gurbuz et al., 2019; Van Hees et al., 2015). To be more specific, Cai and Richdale (2016) reported that students' challenges include organization skills in college such as handling less structured college life and motivation to study. Jansen et al. (2017, 2018) further described that students' academic difficulties included identifying important content in class, applying learning strategies, processing global information, directing/shifting attention, maintaining attention during the entire lecture, and planning and organizing for class. Anderson and the researchers (2018) also reported that students with ASD are not comfortable asking and/or answering questions in class when they need academic help.

Many college students with ASD expressed certain academic challenges in postsecondary education institutions despite their cognitive competency. These academic difficulties need to be further explored because college has been considered as a viable option after high school and individuals with ASD are increasingly attending college (Hillier et al., 2018; Volkmar et al., 2017), but most institutions are not well prepared to accommodate these students (Brown et al., 2014). In addition, academic challenges that college students with ASD have experienced are one of the important components to keep in mind for their emotion regulation because academic success predicts positive adult outcomes (Newman et al., 2011), which further relates to individuals' emotional control (Shmulsky et al., 2017).

Workplace. Being employed is a form of social inclusion. Employment provides not only an income but also social contacts, support, and personal achievement to individuals (Perkins & Rinaldi, 2002). Thus, employment is often considered as a fundamental aspect of

individuals' lives. Especially for young adults with ASD, employment can be an enormous benefit in both the personal and social levels because having a job can provide opportunities to interact with others and improve a sense of self-confidence, self-worth, independence, and autonomy (Ridley & Hunter, 2006). However, transition to employment settings is another tremendous challenge for young adults with ASD. Employment of young adults with ASD is the lowest across the various disability groups. For example, while over 90% of individuals with disabilities have work experience during the young adulthood years, only 58% of young adults with ASD have worked at some point of their lives (Roux et al., 2015). After high school, less than 25% have a full-time paid job (Levy & Perry, 2011) and only 6% hold competitive jobs (Shattuck et al., 2011).

Although there are various reasons for lower work participation among young adults with ASD, recent research has explained that this phenomenon is largely due to systematic barriers (Scott et al., 2019) along with personal barriers (Holwerda et al., 2012). Systematic barriers in lower employment of young adults with ASD can be understood as unsupportive environmental factors such as few resources and employers' attitudes and concerns. For instance, Muller et al. (2003) found that many young adults with ASD expressed difficulties in looking for jobs, creating resumes, initiating job contacts, and following-up after the contacts due to little support in job preparedness. Also, many employers still have misperceptions and reservations in hiring individuals with ASD due to concerns of providing accommodation, additional costs, and employee productivity (Hernandez et al., 2009; Ju et al., 2013). In addition, young adults with ASD have reported that being perceived as "socially awkward" by coworkers and employers is a significant workplace obstacle (Giarelli et al., 2013).

In addition to these systematic barriers, individuals' personal barriers significantly

influence on lower employment rates for young adults with ASD (Holwerda et al., 2012). Research found that social communication and interaction at work is one of the main personal barriers that young adults with ASD have. For instance, Hurlburt and Chalmers (2004) described that young adults with ASD often feel overwhelmed during job interviews because it requires not only previous work experience to support one's qualification but also social communication skills. These challenges in social communication further cause struggles to young adults with ASD at work because they often do not know how to interact with their coworkers and boss. Baldwin et al. (2014) also supported that young adults with ASD often experience challenges at work because of misunderstanding in communication and social exclusion by their coworkers. Furthermore, due to individuals' sensory sensitivity issues, many young adults with ASD have difficulties in busy or noisy work environments (e.g., restaurants and manufacture factories). In addition, they often have difficulties with jobs that require immediate and rapid processing of requests or demands (e.g., cashier, cook, waiter or receptionist) that require higher executive functioning skills (Stankova & Trajkovski, 2010).

Even though the social problems that young adults with ASD have experienced at work are not new because workplaces are not designed only for individuals with ASD, workplace challenges need to be thoroughly scrutinized. As previously mentioned, work is particularly important for individuals with ASD because it encourages them to have more meaning in life (Hendricks & Wehman, 2009) such as promoting personal dignity and improving quality of life (Fleming et al., 2013; Roux et al., 2013) as well as increasing cognitive performance (Garcia-Villamisar & Hughes, 2007). Considering these benefits of employment, such workplace challenges discourage young adults with ASD to maintain their employment. Also, more public

awareness and attention related to employment for young adults with ASD is needed to support them in these settings.

Social Challenges

Reciprocal social interaction is one of the central features that individuals with ASD manifest (APA, 2013). Social skills deficits present such characteristics, including but not limited to, poor eye contact, lack of joint attention, odd speech patterns, problems in initiating and maintaining conversations, lack of empathy, difficulty in interpreting body language and non-verbal communication (Schreiber, 2011). These deficits in social skills last throughout the lifespan (Shattuck et al., 2007), but individuals with ASD can present less severity in their behaviors as they become older through the continuous treatments and interventions. Nevertheless, social skills and communication issues are still one of the most significant challenges that young adults with ASD experience in their daily lives.

As young adults with ASD transition to the new phase of life such as going to college, getting a job, or being more involved in the community, they encounter more unexpected or new social situations that require additional attention. In addition, as individuals get older, many young adults with ASD become aware of the concept of social acceptance/integration and gain interest in socialization and building relationships. However, they tend to isolate themselves more in social settings due to paucity of social skills (Attwood, 2000; Klin et al., 2005; Orsmond et al., 2013). This social isolation may contribute to further problems in young adults with ASD such as feeling of loneliness in life, having mental health problems and aggressive behaviors, and resulting in academic failure or drop-out (Cai & Richdale, 2016; Gelbar et al., 2014; Jansen et al., 2017; White et al., 2011).

Several research findings indicated that social interaction is a main struggle for young adults with ASD. To be more specific, Ward and Webster (2018) stated that young adults with autism expressed social relationship challenges as their pressing issue during the college. Young adults with ASD also reported that they continued to experience the lack of companionship even though they participated in socialization programs, which further lead them to experience feelings of loneliness, isolation, and exclusion (Alverson et al., 2019; Jackson et al., 2018). In Cullen (2015), young adults on the spectrum who are in college presented difficulties in working on group assignments in class and building social relationships with their peers due to their social barriers. Gurbuz et al. (2019) also reported that young adults with ASD in postsecondary education settings experienced frequent socialization issues such as difficulties in making friends, initiating and participating in conversation, and finding peers who have similar interests as them.

Furthermore, along with social interaction, literature has supported that communication is another pressing concern of young adults with ASD. For example, in Muller et al. (2008), young adults with ASD identified communication challenges such as initiating conversation, understanding abstract language, and reading body language as their major daily life difficulty. In Jansen et al. (2018)'s study, young adults with ASD reported that they have a fear of initiating and participating in communication because of frequent experiences in misinterpretation of information that further discouraged them from having conversations with other people in various settings and eventually led them to choose social isolation. Social communication issues further cause young adults with ASD to select email communication with their teachers and peers (Alverson et al., 2019) which prevents them from having in-person communication opportunities.

As discussed, a deficit in social skills is one of the core characteristics that is pervasive throughout the lifespan of individuals with ASD (APA, 2013). Ample literature has supported that social interaction is one of the major challenges that young adults with ASD have experienced. Social skills deficits are especially important for young adults with ASD because it impacts not only individuals' social and interpersonal relationships but also their mental health status (Alverson et al., 2019; Cullen, 2015; Gurbuz et al., 2019; Jackson et al., 2018). Seemingly, most young adults with ASD have a desire to engage in social activities, but social skills deficits prevent them from engaging in social interactions (Bauminger & Kasari, 2000); thoughtful consideration is needed.

Mental Health Challenges

Co-occurring mental health challenges in individuals with ASD is another pivotal area that researchers and practitioners need to keep in mind. Mental health issues are more prevalent in the ASD population than in the neurotypical population (Lai et al., 2019). To be specific, individuals with ASD utilize mental health services 12 times more than individuals with non-ASD due to their depression, anxiety, and behavioral issues. Nearly 60% of individuals with ASD have been prescribed psychiatric medications (Croen et al., 2006; Siegel & Beaulieu, 2012). Gelbar et al. (2014) further described that approximately 71% of individuals with ASD reported having anxiety, 53% reported experiencing feeling of loneliness, and 47% also reported having depression. Especially for young adults with ASD, mental health challenges concern their well-being. Research found that there is an association between mental health and increased risk of depression and suicidality among adults with ASD (Cassidy et al., 2018; Hedley et al., 2017). Young adults with ASD who have co-occurring mental health issues presented hardships in life (Camm-Crosbie et al., 2019). Particularly, college students with ASD who were also diagnosed

with co-occurring mental health further reported additional social and academic challenges as by-products of their mental health (Gurbuz et al., 2019). As literature indicated, the challenges that young adults with ASD have experienced owing to co-occurring mental health are very serious.

Although little empirical research has been conducted to find the relationship between ASD and co-occurring mental health, there is a growing consensus that the high rates of mental health comorbidity reported among individuals with ASD may stem from emotion dysregulation (Compas et al., 2017; Mazefsky et al., 2013). For instance, individuals with ASD are four times more likely to have clinically elevated emotion regulation impairment compared to the general population. These also lead to increased hospitalization, emergency room visits, in-home crisis management, and police contact (Conner et al., 2020). Moreover, individuals with ASD tend to reach "meltdown" points quickly due to the lack of awareness of their emotion build-up and lack of skills to manage them (Baker et al., 2008). Also, they need more time returning to their baseline emotional state once they experienced tantrum (Mazefsky, 2015). Accordingly, their daily life is easily interfered by these unregulated negative emotions (Laurent & Rubin, 2004), which further deteriorate their opportunity to re-orient themselves (Jahromi et al., 2012).

Many young adults with ASD are living with feelings of loneliness, depression, and anxiety (Gelbar et al., 2014). These mental health problems would be challenging for any individual, especially for young adults with ASD (Cassidy et al., 2018). These psychological distress and frequent emotion dysregulation may cause additional barriers in their adult life such as failure in school, employment, and life (Camm-Crosbie et al., 2019; Hedley et al., 2018; Gurbuz et al., 2019). As research found (Compas et al., 2017; Mazefsky et al., 2013), mental health problems that individuals with ASD reported might derive from their limited ability in

emotion regulation as well as the nature of mental health disorders itself. However, researchers and practitioners also should be mindful of additional possible factors (e.g., combinations of individuals' negative experience in social/interpersonal relationships, adjustment in new social settings, and little adult disability services) that may cause such difficulties in individuals.

As the above literature supported, young adults with ASD experience various challenges that may not be easily understood due to both systematic barriers and individual characteristics. While social skills intervention research has widely studied through teaching social and communication skills to individuals with ASD, emotion regulation has been less addressed for them. Regardless of the root of the problems, these challenges yield emotional distress to many young adults with ASD, which needs to be resolved for individuals' psychological well-being and smooth transition to adulthood. These can be started by teaching adaptive emotion regulation skills to young adults with ASD. By learning how to monitor and modulate one's emotions, young adults with ASD can maneuver the situations that they are in, which may further help them decrease interpersonal conflicts and increase confidence in a new social situation. In approaching emotion regulation skills, the selection of evidence-based program is pivotal to address the specific clinical issues and challenges that individuals have. Among the existing therapeutic approaches, dialectical behavior therapy (DBT) is a viable option to address emotion regulation that also has ample evidence to support its efficacy.

Dialectical Behavior Therapy (DBT)

Dialectical behavior therapy (DBT) is an evidence-based therapy originally developed for suicidal individuals who are diagnosed with borderline personality disorder (BPD) (Linehan, 2015). It was the first psychotherapy that showed effectiveness with individuals with BPD in reducing incidence of suicidal attempts and inpatient psychiatric treatment (Linehan et al., 1991).

Dialectical behavior therapy is based on a dialectical and biosocial theory of psychological disorder that emphasizes the role of regulating emotions and behavior. Accordingly, DBT views problems that individuals with BPD have as coming from a dysfunction of emotion regulation system (Shearin & Linehan, 1994).

Dialectical behavior therapy is typically delivered as standard DBT format in outpatient clinical settings that provide individual therapy, group skills training, therapist consultation team, and as-needed phone coaching for about a 48-week-long period (Linehan, 2015). Standard DBT has been proved its efficacy in practice and research in the high-risk suicidal population (e.g., Carter et al., 2010; Linehan et al., 2015; McCauley et al., 2018). More recently, a plethora of research has also proved the effectiveness of stand-alone DBT skills training in diverse populations including individuals with attention-deficit/hyperactivity disorder (ADHD), post-traumatic stress disorder (PTSD), mood disorders, eating disorders, substance use disorders, and intellectual disabilities (e.g., Courbasson et al., 2012; Fleming et al., 2015; Harned et al, 2014; McNair et al., 2016; Safer et al., 2011; Van Dijk et al., 2013).

Dialectical behavior therapy focuses on building a "life worth living" in individuals with diverse conditions (Linehan & Wilks, 2015). Linehan (2015) described that "the overall goal of DBT skills training is to help individuals change behavioral, emotional, thinking, and interpersonal patterns associated with problems in living (p.3)." In the following section, further detailed information about the evolution of DBT, the framework of DBT, and the effectiveness of DBT skills training will be discussed.

Evolution of DBT

Dialectical behavior therapy has an evolution that continues to expand its utility based on on-going evidence-based research. Initially, DBT was developed for individuals with BPD who

have suicidal behavior issues (Linehan, 2015). Thus, in the beginning, DBT treatment focused on teaching problem-solving skills to clients to make changes in their problematic behaviors. However, clients responded to this focus on problem solving with hostility by criticizing their therapist or dropping out of treatment. In response to this, DBT treatment shifted drastically to focus on acceptance and warmth. However, clients were still frustrated by the treatment as the therapist was not doing anything to solve their problems. Theses reactions toward the treatment led to the conclusion that both acceptance and change strategies are needed in therapy. Yet, this synthesis of acceptance and change became troubling for clients again. Considering the complexity of the clients' high-risk problems, the pain from the past was intolerable so that tolerate distressing experience as treatment modality was not feasible with these clients (Linehan & Wilks, 2015).

As a result, a new set of skills were needed in DBT, which are: (a) radical acceptance of what we have to accept – Eastern (Zen) and Western contemplative practices; and (b) skills to tolerate distress without impulsively or destructively reducing them. Although the current DBT practice can be understood as the combination of these two, integrating Zen and Western contemplative practices also created another issue. To begin with, both Zen and Western contemplative practices needed spiritual practices, but clients often presented a wide range of spirituality and religious convictions which was not always feasible to find the point of intersection. Also, meditation was not widely accepted nor used in psychotherapy. Thus, the idea of meditation in DBT was viewed as deviant and out of reach of individuals. Eventually, the aspect of Zen and Western contemplative practices were translated into a set of behavioral skills and DBT chose to use the term "mindfulness" to describe the skills from Zen (Linehan & Wilks, 2015).

Framework of DBT

Dialectical behavior therapy is a cognitive behavioral psychotherapy based on a dialectical philosophy and biosocial theory of psychological disorder, that emphasizes the role of regulating emotions and behavior (Linehan, 2015). The goal of this current research is to evaluate feasibility and efficacy of a modified DBT skills training on emotion regulation for young adults with ASD. Since DBT has not been widely studied with the ASD population, examining theoretical framework of DBT is essential for a basic understanding of this approach. Below, dialectical philosophy and biosocial theory will be scrutinized.

Dialectical Philosophy. Dialectical behavior therapy is based on a dialectical worldview as the name indicates. Dialectical philosophy originates from ancient Greek philosophers (e.g., Plato and Socrates) who used dialectical persuasion to resolve conflicting perspectives. Considering the goal of DBT is to understand and validate clients to make behavioral changes in their lives, the use of dialectical philosophy in DBT helps clients to recognize personal truths that can be understood in an internal frame of reference (Pederson, 2015). In DBT, dialectics has two meanings when it applies to therapy: (a) persuasive dialogue and relationship and (b) the fundamental nature of reality. First, as a philosophical position, dialogue and relationship form the basis of DBT. Specifically, dialectics refers to the treatment approach and strategies that are used by the therapist to encourage clients' behavioral change. Second, dialectics stresses the fundamental interrelatedness or wholeness of reality. This means that a dialectical approach in therapy views not only the individual system (e.g., one specific behavior) but also other interrelated systems (e.g., other behaviors, environmental context, the cultures and the state of the world) (Linehan, 2015).

According to Linehan (2015), dichotomous and extreme thinking, behavior, and emotions are viewed as dialectical failures. If an individual is stuck in the polarity, he or she may not be able to move to the synthesis. In DBT, both therapist and client apply dialectical philosophy to bring balance, therapeutic alliance, treatment outcome, and guidance to the client's life. To be specific, in therapy, dialectics help clients recognize the relativity of thoughts and perceptions (Pederson, 2015). In other words, through dialectics, clients can move from polarity thinking and arrive to the mutual goal search process, which allow them to evolve and make changes though therapy.

Biosocial Theory. As previously mentioned, DBT was developed for individuals who are highly suicidal and diagnosed with or meet the criteria of BPD. Biosocial theory was developed by Linehan (1993) and based on the premise that both suicide and BPD are by-products of emotion dysregulation and arise from transactions between individuals' biological vulnerabilities and environmental influences (Crowell et al., 2009). To be more specific, Linehan (1993) proposed that individuals with BPD often end up experiencing emotional dysregulation situations due to their innate biological vulnerabilities and invalidating environments. These biological vulnerabilities and invalidating environments are not simply summed up, but rather they are transacted (i.e., biological vulnerabilities deteriorate environmental vulnerabilities) and environmental vulnerabilities strengthen individuals' biological vulnerabilities. Linehan (2015) further described that suicidal behavior is a reaction to intolerable emotional suffering, and BPD is a severe mental disorder resulting from serious dysregulation across all aspects of the emotional responses. Likewise, emotion dysregulation as well as transactions between individuals' biological vulnerabilities and specific environmental influences are the key characteristics of understanding BPD and biosocial theory.

According to Linehan (2015), biosocial theory consists of "bio" part (biological vulnerabilities) and "social" part (the invalidating environment). To be more specific, biological vulnerabilities indicate such as abnormalities of neurochemical (e.g., serotonin, dopamine, gamma-aminobutyric acid, etc.), genetic vulnerabilities (i.e., heritable component of BPD), and fronto-limbic dysfunction of individuals. An invalidating environment is characterized by intolerance toward the expression of private emotional experiences, particularly, emotions that are not supported by observable events (Crowell et al., 2009). In other words, an invalidating environment is where public validation of a private experience is not given appropriately to the individual (Linehan, 2015). In short, when an individual who is emotionally vulnerable is exposed to such an invalidating environment, he/she would not have opportunities to understand and recognize their own emotions as well as not trust their own reactions towards the surroundings. Eventually, the transaction between biological vulnerabilities and an invalidating environment leads to phenotype of BPD (Linehan, 1993).

Standard DBT

As a comprehensive treatment, DBT is originally designed to: (a) enhance an individual's behavioral capabilities, (b) improve and maintain the client's motivation to change, (c) assure generalization through treatment, (d) enhance therapist's capabilities and motivation to deliver effective treatment, and (e) assist the client in changing his/her environment in a way that supports and maintain progress toward goals. To accomplish these core treatment goals, standard DBT consists of four primary modes: individual psychotherapy, skills training, as-needed telephone coaching, and a therapist consultation team, and provides all four modalities to individuals in both in-patient and out-patient settings (Linehan, 2015).

Individual psychotherapy is a treatment modality that is provided to enhance clients' motivation and to help clients apply the specific skills toward their challenges that they face in their lives. It encourages clients to manage their own lives by learning dialectical, validation, and problem-solving strategies that the therapist demonstrate in sessions. Group skills training is another treatment modality that serves to enhance clients' behavioral capabilities through learning specific skills. Dialectical behavior therapy assumes that problems are caused by skills deficits. For example, as Linehan (2015) stated, deficits in emotion regulation skills in individuals with BPD cause maladaptive behaviors such as suicide attempts and non-suicidal self-injury. In this sense, DBT has a strong emphasis on skill building and acquiring adaptive behaviors from the training. Skills training often provides in a classroom like group setting rather than process group therapy. Considering group members can learn from each other, group skills training can be more inspirational and beneficial for clients' behavioral change. Telephone coaching, the third component, is designed to provide in-the-moment support for clients to instruct how to use DBT skills more effectively to cope with their everyday difficulties. Between sessions, clients can call their individual therapist to receive coaching when they need help the most. Lastly, therapist consultation team is a mode to support therapists in standard DBT. The DBT consultation team is essential to help therapists monitor their treatment fidelity, develop and increase their skills, and sustain their motivation to work with high-risk clients (Linehan, 2015).

Although standard DBT treatment is required intensive resources such as time and cost, empirical research continues to accumulate the efficacy of standard DBT for suicidal individuals with BPD (e.g., Carter et al., 2010; Linehan et al., 2015; McMain et al., 2009), individuals with

eating disorders (e.g., Courbasson et al., 2012; Linehan et al., 1999), individuals with PTSD (e.g., Bohus et al., 2013), and college students with suicidal ideation (e.g., Pistorello et al., 2012).

Stand-alone DBT Skills Training

Skills training is part of standard DBT treatment, which is often provided in a classroom like group format. Skills training is run by a group leader who teaches specific DBT skills and assigns homework to clients to practice the skills in their daily lives. Skills training groups meet on a weekly basis for approximately 2.5 hours and have a 15-minute break in the middle. Usually, DBT skills training takes a total of 24 weeks to get through the four skills modules: mindfulness skills, interpersonal effectiveness skills, emotion regulation skills, and distress tolerance skills (Linehan, 2015).

Although a group setting is a common delivery format for skills training, it can also be delivered in an individual format if needed. For instance, when the client is not appropriate for groups because of aggressive behavioral issues toward other group members or severe social anxiety, individual skills training is preferred. Also, in primary care settings, an individual format of skills training is possible. At last, when the client needs further focused attention to practice specific skills set after one year of full participation, individual skills training can be applicable (Linehan, 2015).

Notwithstanding the efficacy of the full standard DBT as discussed in the previous section, standard DBT is not easily implemented in many clinical settings due to limited resources (Swenson, 2000). For instance, in private practice and community mental health settings, DBT skills training group is frequently offered as a stand-alone treatment or DBT individual therapy is offered without skills training (Linehan et al. 2015). Furthermore, much research has also proved that stand-alone DBT skills training is effective for diverse disability

populations (e.g., ADHD, ASD, eating disorders, and mood disorders) including BPD populations that already showed clinical efficacy from standard DBT treatment. For example, stand-alone DBT skills training showed improvement in emotion regulation in individuals with BPD, which often considered as "untreatable" population. To be more specific, Soler et al. (2009) implemented 13 weeks of DBT skills training treatment for adults with BPD and they showed improved BPD symptoms including anger and affect instability. McMain and the researchers (2017) also found that high suicide risk individuals with BPD improved in the reduction of self-destructive behaviors (e.g., suicidal and self-harm), aggressive behavior (e.g., anger) and coping skills (e.g., distress tolerance and emotion regulation) with the maintenance of skills for at least three months after 20 weeks of DBT skills training.

In addition, stand-alone DBT skills training also showed improvement in emotion regulation in individuals with diverse disabilities. For instance, Safer et al. (2011) found that individuals with binge eating disorder who had 20 sessions of DBT skills training on adaptive emotion regulation skills showed significant lower treatment dropout and reduction in binge eating behavior. Neacsiu et al. (2014) found that individuals who were anxious and/or depressed with high emotion dysregulation presented a decrease in emotion dysregulation, decrease in anxiety severity, and increase in DBT skills use after 16 weeks of DBT skills training. Research done by Van Dijk et al. (2013) also showed that individuals with bipolar disorder who had 12 weeks of DBT skills training reduced depressive symptoms, increased emotional control, and increased self-efficacy. Fleming et al. (2015) reported college students with ADHD who received nine sessions of DBT skills training presented lower ADHD inattentive symptoms, greater executive function improvement, and improvement of overall mindfulness and quality of life. Although there is little empirical research on stand-alone DBT skills training for individuals with

ASD, unpublished Haney (2017)'s dissertation presented adolescents with ASD who received modified DBT skills training and had improvement in emotion dysregulation and social skills. Also, Hartmann et al. (2019) reported young adults with ASD who had modified DBT emotion regulation group intervention showed an increase in cognitive reappraisal that further improved social interactions.

These research findings proved that stand-alone DBT skills training is as clinically effective as the standard DBT treatment that often requires intensive resources. Furthermore, these research results implied that DBT skills training is not only clinically effective but also efficient. Thus, considering public health care systems often lack the resources to develop and sustain DBT programs (Carmel et al., 2014), stand-alone DBT skills training can be implemented and adapted to diverse clinical settings that have limited time and resources to serve individuals in need.

Emotion Regulation

Emotions

Emotion is defined as a "complex reaction pattern, involving experiential, behavioral, and physiological elements, by which an individual attempts to deal with a personally significant matter or event (APA, 2015 p. 362)." Emotion is often confused with feelings, affect, and mood. However, each term represents slightly different meaning. To be more specific, feelings arise from an emotional experience, which is the results of emotions that are influenced by memories, imaginings, or other factors (Barret et al. 2007). Affect means more neurophysiological state that always available to consciousness with occurring in pure or isolated form. Mood represents the appropriate designation for affective states that typically last longer than emotions (Ekkekakis, 2012).

Mennin and Fresco (2015) defined emotions as part of a larger self-regulation system that allows people to respond flexibly to events in their lives in accordance with personal goals, values, and contexts. Emotions are a group of responses that all individuals feel and experience, from the mild to the intense, the brief to the extended, the simple to the complex, and the private to the public (Gross, 2014). Emotions arise when something important happens to us. Sometimes, emotions are triggered automatically. At other times, emotions arise only after considerable analysis. In either case, emotions are one of the central features in the human mind. Particularly, emotions function as a collection of psychological states including subjective experience, expressive behavior (e.g., facial, bodily, verbal) and physiological responses (e.g., heart rate and respiration) (Gross & Barrett, 2011). Considering emotions as one's self-regulation system, it is not surprising that individuals have different ranges of emotional responses even if they experience the same affectivity.

Emotion Regulation

Emotion regulation is different from the experience of emotion. Gross (2013) described that emotion regulation is shaping one's emotions, capacity to monitor, evaluating and modifying one's emotional state in order to achieve a goal. Emotion regulation is often considered within the framework of coping that allows individuals to modulate and maintain emotional experience or response to meet personal and social goals (Chambers et al., 2009; Mazefsky et al., 2014). Eisenberg and Spinrad (2004) also defined emotion regulation as a complex construct by describing it as:

> The process of initiating, avoiding, inhibiting, maintaining or modulating the occurrence, form, intensity, or duration of internal feeling states, emotion-related physiological, attentional processes, motivational states, and/ or the behavioral concomitants of emotion in the service of accomplishing affect-related biological or social adaptation or achieving individual goals. (p. 338)

Simply, emotion regulation is the ability to monitor and modify the experience and expression of emotions (Gross & Thompson, 2007). In Linehan (2015), emotion regulation is defined as the ability to (a) inhibit impulsive and inappropriate behavior related to strong negative or positive emotions; (b) organize oneself for coordinated action in the service of an external goal; (c) self-soothe any physiological arousal that the strong emotion has induced; and (d) refocus attention in the presence of strong emotion. In short, emotion regulation means one's ability to manage their emotions.

While there are many forms of emotion regulation and whether emotion regulation is adaptive for the individual is dependent upon situations, adaptive emotion regulation strategies and maladaptive emotion regulation strategies are widely studied in the affect research. For instance, Lennarz et al. (2019) explained that there are eight emotion regulation strategies (e.g., avoidance, rumination, suppression, problem solving, reappraisal, acceptance, social support, and distraction). They further identified rumination, avoidance, suppression, and distraction as maladaptive emotion regulation strategies, whereas acceptance, problem solving, reappraisal, and social support were identified as adaptive emotion regulation strategies. In the next section, emotion regulation and emotion dysregulation will be further described as it relates to (a) young adults with ASD and (b) dialectical behavior therapy.

Emotion Regulation and Young Adults with ASD

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that is characterized by social communication deficits and restricted and repetitive behaviors (APA, 2013). According to this description of ASD, emotion dysregulation is not considered as a core characteristic or deficit in ASD. Subsequently, a vast majority of ASD research has been focused on improvement in individuals' language use, socialization, and adaptive behaviors. Thus, most ASD intervention

studies are focused on social skills training. Accordingly, research and service on emotions in young adults with ASD has been less explored even though stakeholders (e.g., parents and practitioners) and individuals with ASD have expressed the need for emotion regulation services. For example, Geller (2005) indicated that both parents of youth with ASD and practitioners have emphasized the issue of maladaptive emotional responses in individuals with ASD, which might come from their dysregulated emotions. White et al. (2016) also found stakeholders' service needs in emotion regulation to better support young adults with ASD. Young adults with ASD also reported their needs of emotion regulation service for a better quality of life (Lee et al., 2020).

As the above research suggested, the need for emotion regulation service for young adults with ASD is high and research on emotion regulation intervention would be pivotal in individuals' lives. However, emotion regulation research for young adults with ASD is still in its infancy so that further research would bring advancement of disability studies in ASD (Mazefsky et al. 2013). For young adults with ASD, emotion regulation research would enhance their ability to cope with challenging situations and help them prepare for further developmental achievements that are associated to emotion regulation (Gross, 1998, 2007; Silk et al., 2003) if the research is shown to be effective. Eventually, emotion regulation research would alleviate mental health issues in young adults with ASD as this has an impact on many aspects of their quality of life (Morie et al., 2019).

Emotion Dysregulation in Young Adults with ASD

Emotion dysregulation refers to the inability to change emotional cues, experiences, actions, and verbal and nonverbal responses even when one's efforts are implied (Neacsiu et al., 2014). Related to this, a few researchers described two possible reasons why individuals with

ASD present emotion dysregulation: (a) “other common” characteristics of ASD and (b) psychiatric comorbidity along with ASD (Baron-Cohen et al., 1985; Mazefsky et al., 2011; Samson et al., 2015). First, research explained “other common” characteristics of ASD such as alexithymia and lower inhibition of emotions may contribute to individuals’ emotion dysregulation (Mazefsky, 2011; Mazefsky et al., 2013). Alexithymia refers to a specific disturbance in psychic functioning characterized by difficulties in the capacity to verbalize emotions (Taylor, 1984). Emotional inhibition refers to the tendency to suppress the expression of one’s own feelings to avoid disapproval by others, feelings of shame, or losing control of one’s impulses. (Young et al., 2003). While labeling one’s own emotions and express them has been considered as one of the key aspects that leads to successful emotion regulation (Barrett et al., 2001; Linehan, 2015), a handful of research asserted such characteristics has often been observed among a specific subgroup of individuals with ASD (Kinnaird et al., 2019).

Second, individuals with ASD’s psychiatric co-comorbid disorders disrupted effective emotion regulation. Although having mental health conditions in ASD is common across all age groups (Lever & Geurts, 2016), studies on psychiatric comorbid disorders on adults have not been intensely explored until recently. Lugnegard et al. (2011) found 70% of young adults with ASD had experienced at least one episode of major depression and 50% of young adults had suffered from anxiety disorders. A recent meta-analysis study by Lugo-Marin et al. (2019) presented mood and anxiety disorders among adults with ASD are the second frequent psychiatric disorders followed by ADHD. Poor emotion regulation is a common mechanism across mental disorders (Aldao et al., 2010; Berking & Wupperman, 2012). Especially for individuals with ASD, research found that there is a relationship between emotion dysregulation and psychiatric conditions (Samson et al., 2015; van Steensel et al., 2013). To be more specific,

Schneider et al. (2018) found that youth with ASD who have comorbid of anxiety showed poor emotion awareness, greater nonacceptance of emotions, and difficulties with goal-directed behaviors. Research done by Cassidy et al. (2014) and Hedley et al. (2018) also found that depression was recognized as a contributor to the high-risk factor of suicidal ideation in young adults with ASD, which is a manifestation of emotion dysregulation.

Other than the above two characteristics that individuals with ASD manifested, many of the individuals also show considerable difficulties in identifying and conceptualizing the thoughts and feelings of themselves as well as others. Particularly, individuals with ASD have difficulty labeling or expressing their feelings in words (Hill et al., 2004). Under emotion distress, individuals with ASD may fail to use adaptive emotion regulation strategies and rather present tantrums, aggression, or self-injury (Sofronoff et al., 2007). Also, individuals with ASD easily reach "meltdown" moments (Baker et al., 2008) and need more time to return to baseline emotions once they experienced emotional breakdown (Mazefsky, 2013).

When it comes to understanding the relationship between maladaptive behaviors (e.g., tantrums, aggression, or self-injury), emotion dysregulation, and mental health conditions in individuals with ASD, research has not been extensively conducted (Cassidy & Rodgers, 2017). However, it is clear that the absence or the impairment of emotion regulation causes serious disturbances in the daily lives of individuals with ASD (Mazefsky et al., 2014). A plethora of research has supported the presence of emotion dysregulation and inadequate emotion regulation strategies in individuals with ASD. For example, in Samson et al. (2014)'s study, individuals with ASD showed more emotion dysregulation compared to typically developing individuals. Specifically, within the ASD group, the researchers found that emotion dysregulation was significantly correlated to the individuals' social response (e.g., social and communication

deficits), repetitive and restricted behaviors, and sensory profile (e.g., reflecting atypical sensory processing), which are the indicators of core ASD symptoms. Also, Samson et al. (2012) found that individuals with ASD reported higher levels of negative emotions, have more difficulty identifying and describing their emotions, and presented exceeding cutoff for alexithymia (i.e., difficulty identifying and describing emotions) compared with typically developing individuals. This study further implied less frequent use of cognitive reappraisal in individuals with ASD, which is also considered as not adaptive emotion regulation strategy. To be more specific, a handful of research found common emotion regulation strategies that individuals with ASD use. For instance, avoidance, victimization (Cervantes & Matson, 2015; Pouw et al., 2013), rumination (Rieffe et al., 2014), and expressive suppression (Goldin et al., 2008; Roberts et al., 2008) were found as the most frequently used emotion regulation strategies by individuals with ASD. Moreover, many individuals with ASD have reported less use of cognitive reappraisal (e.g., an adaptive emotion regulation strategy involving cognitive change) and greater use of suppression (e.g., maladaptive emotion regulation strategy involving modulating the outward expression of the emotional response) than individuals without ASD (Jahromi et al., 2012, 2013; Samson et al., 2015).

As literature supported, emotion dysregulation is a concerning issue for individuals with ASD. Though emotion dysregulation stems from different reasons, it is clear that emotion dysregulation disturbs individuals' well-being and daily functioning, which must be addressed to improve the quality of life among individuals with ASD.

Emotion Regulation and DBT

Emotion dysregulation has been linked to a variety of mental health problems deriving from patterns of instability in emotion and behavioral regulation, interpersonal relationships, and

self-image (Kring & Sloan, 2010). Dialectical behavior therapy emphasizes the importance of the evolutionary adaptive value of emotions (Tooby & Cosmides, 1990) and skills training aimed at adjusting dysfunctional patterns. Linehan (2015) explained that individuals with mood disorders or psychiatric disorders often feel invalidated or worthless, disdain for self, and disconnected from others. Also, many of them have difficulties with emotion and behavioral regulation. Thus, for these individuals who have high emotion dysregulation, the ability to experience and observe oneself and one's surrounding without judgment, to see reality as it is, and to participate in the present moment are essential. Linehan (2015) further described that individuals with high emotion dysregulation may retrieve the patterns of dysfunction in their lives with emotion regulation skills and adaptive distress tolerance skills because they can learn and recognize their distorted perspectives through continuous acceptance and change of practice.

Emotion Regulation in DBT. As previously mentioned, emotion regulation is the ability to modify the experience of emotions and expression of emotions, as well as the ability to organize one's action/behaviors and attention (Gross & Thompson, 2007; Linehan, 2015). In DBT skills training on emotion regulation, much emphasis is focused on regulating difficulties after emotional responses, as well as addressing emotion vulnerability factors in the process of emotion regulation. Thus, emotional response is further broken into experiential responses and expressive responses in DBT (Neacsiu et al., 2014). Also, emotion vulnerability factors are characterized as (a) very high negative affectivity as a baseline; (b) sensitivity to emotional stimuli; (c) intense response to emotional stimuli; and (d) slow return to emotional baseline once emotional arousal has occurred. Regarding the emotion regulation process, DBT further elaborates that there are (a) management of emotion vulnerability factors; (b) biological change;

(c) expression and action change; and (d) emotional processing at the point of emotional aftereffects (Linehan, 2015).

To be more specific, DBT teaches individuals to decrease emotion vulnerability factors by increasing happiness and resilience. Dialectical behavior therapy believes that individuals can promote resilience through increasing numbers of pleasant events in one's life by increasing positive emotions. By doing so, individuals can manage emotion vulnerability. Biological change is one of the key distinguished aspects in DBT emotion regulation process. When emotions fire, individuals experience complex biological changes simultaneously. This is because emotions involve neurochemical changes in the brain and nervous system. This also means that if individuals try to alter nervous system (e.g., breathing, temperature change, heart rate change from intense exercise), the fired-up emotion will eventually return to the baseline. Therefore, changing expression and action components is essential in reducing emotional disorders and changing unwanted emotions. In other words, "opposite action" can yield individuals emotional balance by changing emotional responses. This also corresponds to the literature stating that modulating one's physical state alters one's emotional state (e.g., Philippot et al., 2004). Aftereffects of emotion refers to changes in attention, memory, and reasoning. These aftereffects can increase the probability of emotional recurrence. Thus, when the vicious cycle of aftereffects is broken, individuals may not experience the recurrence of unpleasant emotions anymore because DBT believes that interrupting the cycle can be enhanced when the individuals notice and identify the current and ongoing emotions (Neacsiu et al., 2014).

DBT Emotion Regulation Skills Training. Dialectical behavior therapy is developed to increase skills that leads to improvement of emotion regulation. Therefore, skills training is a pivotal component to be implemented in treatment to bring about positive outcomes (Linehan,

2015; Neacsiu et al., 2014). Emotion regulation is one of the four DBT skills training modules, which is designed to help individuals observe and describe what they feel in order to regulate emotional arousal and understand why they feel the way they feel. To meet these goals, Linehan (2015) further categorized emotion regulation into four components (a) understanding and naming emotions; (b) changing unwanted emotions; (c) reducing vulnerability to emotion mind; and (d) managing extreme emotions.

Understanding and naming emotions is the first segment of emotion regulation skills training. This segment identifies the functions of emotions and their relationship to difficulties in changing emotions, understanding the nature of emotions, and teaching individuals how to identify and label emotions. Changing unwanted emotions focuses on altering emotional responses by learning skills such as check the facts, take opposite action, and engage in problem solving skills, and applying these skill sets to applicable situations. Reducing vulnerability to emotion mind focuses on decreasing negative emotions by accumulating positive events and emotions, setting up the appropriate mastery levels in one's life, and learning how to "cope ahead" those difficult situations, as well as taking care of one's physical well-being. At last, managing extreme emotions encompasses how to manage one's difficult emotions. Dialectical behavior therapy believes that through the continuous mindfulness to the present emotion along with applying distress tolerance skills, emotional suffering can be decreased (Linehan, 2015).

DBT Emotion Regulation Skills Training and ASD. Although many individuals with ASD may not indicate severe suicidal threats and/or attempts like individuals with BPD, they present frequent emotion dysregulation in everyday life. Specifically, individuals with ASD tend to become more out of control in specific situations when they are emotionally overwhelmed (Hill et al., 2004). They lack such abilities including, alexithymia, cognitive flexibility, problem

solving, and identifying emotional cues (Mazefsky et al., 2013). Also, they frequently present difficulties with the cognitive processing of emotion and identifying and describing feelings that increase the rates of depression (Honkalampi et al., 2000). Considering these characteristics of emotion dysregulation in the ASD population, DBT emotion regulation skills training would be very efficient and applicable.

DBT emotion regulation skills training is designed to help individuals who have high emotion dysregulation through acceptance and change. Particularly, emotion regulation skills training addresses the ability to (a) recognize and understand emotions by naming and describing the feelings and (b) regulate their emotional arousal by using acceptance and cognitive changing skills (Linehan, 2015). Therefore, DBT emotion regulation skills training can bring increased capacity to identify and describe emotions and positive coping skill sets to individuals (i.e., increase in problem solving skills, recognizing one's emotional cues, etc.). To be more specific, by understanding and naming the emotions segment, individuals with ASD can work on their alexithymia issues. Through learning about the "check the facts" and "problem-solving" segments in the skills training, individuals with ASD can be more cognitively flexible in emotion regulation. Moreover, by changing expression and action components of emotions (e.g., opposite action strategy), individuals with ASD can adjust their intense baseline of negative affect in healthy ways (Neacsiu et al., 2014). In addition to these mechanical aspects in the emotion regulation module, individuals with ASD have opportunities to practice self-care (e.g., PLEASE skills) as a means of reducing one's vulnerability to negative emotions by applying healthy eating, sufficient sleeping, and exercising. These practices are particularly important for young adults with ASD to increase their overall functioning levels including self-esteem, social engagement, and adaptive behaviors (Hartmann et al., 2012).

In addition to the above core benefits, DBT emotion skills training can bring other positive outcomes to young adults with ASD such as improvement in social skills (Hanley, 2017; Hartman et al., 2019). Hartmann et al. (2012) reported that since young adults with ASD often do not present frequent suicidal episodes, stand-alone group skills training is likely to be exceptionally beneficial for them. To be specific, in a group setting, young adults with ASD can have more opportunities to interact with peers, particularly those who may have similar difficulties as them. Accordingly, the round table type of discussion in skills training groups can help young adults with ASD learn how to work cooperatively on a team, including how to communicate appropriately with others. Moreover, the skills training group can be a pathway to place of social interaction where young adults with ASD learn, think, and practice emotion regulation strategies together (Hartman et al., 2019). In short, DBT emotion regulation skills training can have a broad impact on the lives of young adults with ASD in terms of improving effective emotion regulation strategies, increasing in well-being, and equipping them with healthy and positive coping skills in stressful situations.

CHAPTER 3: METHODOLOGY

This section describes the details of the research design, research questions and hypotheses, development and field-testing of intervention, participants, description of measures, as well as data collection and analysis procedures.

COVID-19 Disclaimer

When the current study was at the beginning of the data collection stage, the World Health Organization (WHO) declared the novel coronavirus (COVID-19) outbreak a global pandemic. Accordingly, in-person interaction with research participants was suspended and human research projects were modified to reduce the potential impact and risk of COVID-19. In compliance with the restrictions on human research activities at Michigan State University, the current study made modifications in data collection methods and delivery formats. After COVID-19, research data (e.g., informed consent, demographic information, pre-and post-intervention surveys) were collected via a fillable PDF format instead of the previous paper and pencil format. In addition, the current study was delivered via synchronous online format using HIPPA compliant Zoom. Participants were provided a digital manual instead of a hard copy manual. PowerPoint slides, based on the manual, were also created with changes to the delivery format and used as the primary visual learning material during the intervention.

Research Design

The aim of this study was to test the feasibility and efficacy of a modified DBT emotion regulation skills training for young adults with ASD, titled as Skills Improvement of Emotion Regulation for Adults (SIERA). This study employed a single group, pre- and post-test comparison of an intervention, using mixed methods research design (Creswell & Creswell, 2018; Marsden & Torgerson, 2012), which involves corroborating qualitative and quantitative

research and data in one study (Creswell & Creswell, 2018). The current study identified changes of emotion regulation ability by teaching DBT emotion regulation skills to young adults with ASD and by tracking their changes of emotional acceptance, emotional distress, and DBT skills use before and after the SIERA intervention. Thus, quantitative data were essential to measure the level of changes in emotional acceptance and distress of participants and their current coping skills on emotion regulation. In addition, considering this intervention was a pilot study of emotion regulation intervention for young adults with ASD, in-depth input from the participants was also pivotal to be investigated. This was achieved by using qualitative focus group interviews from the participants.

Specifically, an explanatory sequential mixed methods design (Figure 3.1) was used in this study that involved collecting quantitative data first and then explaining the quantitative results with in-depth qualitative data (Creswell & Clark, 2018). Accordingly, in the first phase, this researcher collected and analyzed the quantitative data. Particularly in the first phase, this researcher administered pre-intervention surveys (i.e., Acceptance and Action Questionnaire-II, DBT-Ways of Coping Checklist, Emotion Regulation Questionnaire, and Emotion Dysregulation Inventory-Reactivity Short Form and Dysphoria) to measure and analyze the participants' current psychological inflexibility/experiential avoidance, emotion dysregulation level, and functional and dysfunctional coping skills. Then, an eight-week of emotion regulation intervention, SIERA, was implemented. After completing the eight-week intervention, in the second phase, the qualitative data were collected and analyzed to elaborate on the quantitative data that were obtained in both pre- and post-intervention that helped explain changes in participants' emotion regulation. The focus group interview was conducted in the second phase by asking participants any noticed changes after the eight weeks of intervention such as their

attitudes toward emotions, understanding and awareness of their emotions, and their coping strategies, as well as their satisfaction and suggestions for the intervention.

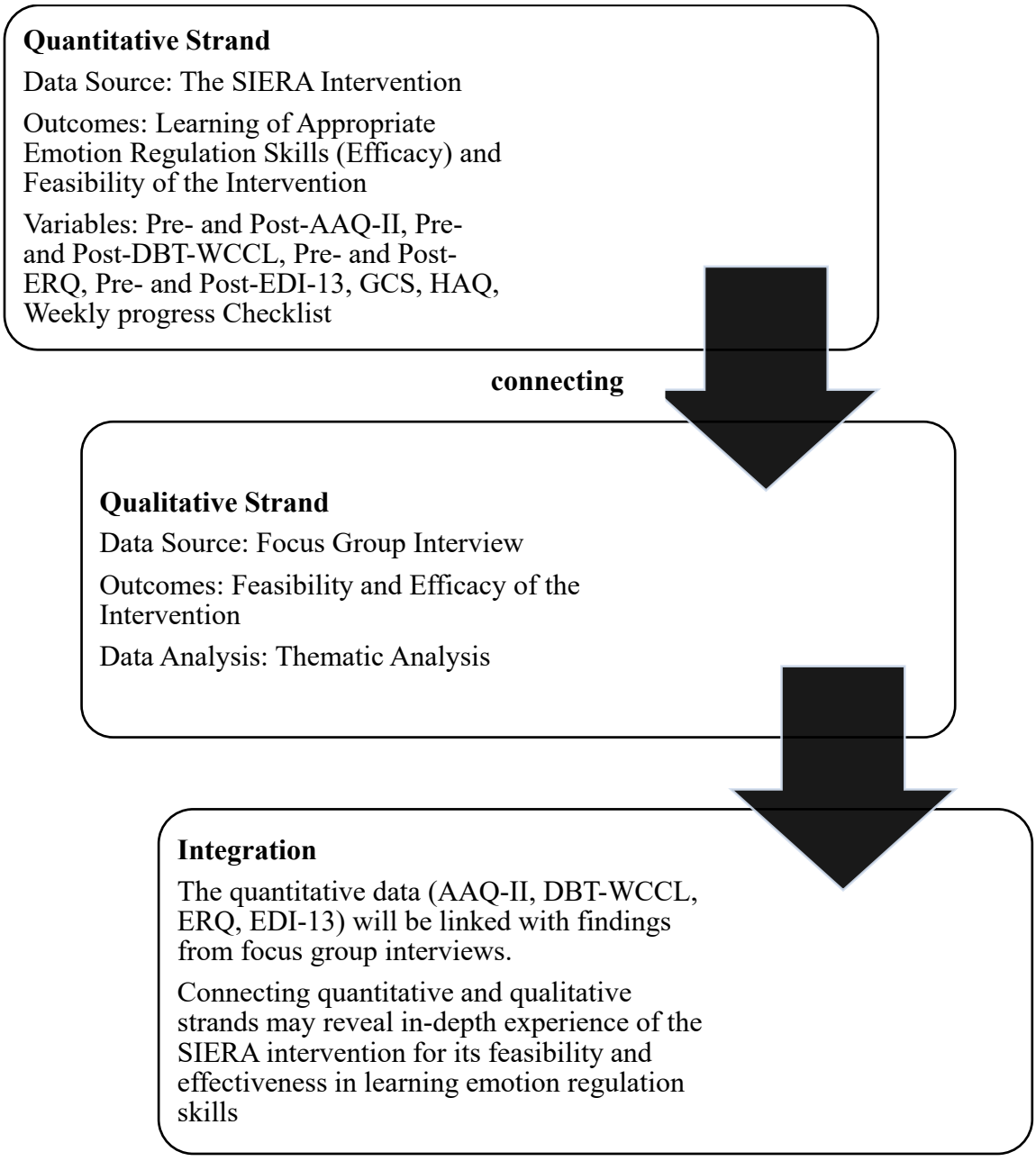


Figure 3.1. A Mixed Method Explanatory Sequential Design

Research Questions and Hypotheses

The research questions and hypotheses are as follows:

Research Question 1. Does the modified DBT skills training help emotion regulation of young adults with ASD?

Research Hypothesis 1a. Young adults with ASD will show a statistically significant decrease in psychological inflexibility/experiential avoidance by increasing scores in the AAQ-II after the intervention.

Research Hypothesis 1b. Young adults with ASD will show a statistically significant increase in positive coping skills by increasing scores in the DBT Skills Subscale (DSS) of DBT-WCCL after the intervention.

Research Hypothesis 1c. Young adults with ASD will show a statistically significant decrease in dysfunctional coping skills by decreasing scores in the Dysfunctional Coping Subscales (DCS 1 & DCS 2) of DBT-WCCL after the intervention.

Research Hypothesis 1d. Young adults with ASD will show a statistically significant increase in adaptive emotion regulation strategy by increasing scores in the cognitive reappraisal of ERQ after the intervention.

Research Hypothesis 1e. Young adults with ASD will show a statistically significant decrease in maladaptive emotion regulation strategy by decreasing scores in the expressive suppression of ERQ after the intervention.

Research Hypothesis 1f. Young adults with ASD will show a statistically significant decrease in emotion dysregulation by decreasing scores in the reactivity of EDI-13 after the intervention, rated by a primary caregiver.

Research Hypothesis 1g. Young adults with ASD will show a statistically significant decrease in emotion dysregulation by decreasing scores in the dysphoria of EDI-13 after the intervention, rated by a primary caregiver.

Research Question 2. What is the experience of young adults with ASD in the SIERA intervention?

Development of Skills Improvement on Emotion Regulation for Adults

The tile of this intervention is Skills Improvement on Emotion Regulation for Adults (SIERA), which is designed to exert changes in emotion regulation of young adults with ASD by teaching adaptive emotion regulation skills. Development of SIERA was a pre-dissertation project conducted by this researcher to adapt DBT skills training for young adults with ASD, one of the disability populations that little research on emotion has been done. SIERA is a group emotion regulation intervention that was modified based on *DBT® Skills Training Manual* (2nd ed). The reading level of the SIERA manual was 6th grade level. In order to adapt the DBT skills training, this researcher completed a six-week of intense online DBT skills training in 2018. After the training, the initial SIERA manual was developed by this researcher with the feedback from her advisor's research lab members. Then, two focus groups (n = 2, 3) and four individual interviews (n = 4) were conducted with diverse stakeholders (e.g., caregivers of a child with ASD, researcher, and practitioners) and individuals with ASD for further revision. The interview participants in Lee et al. (2020) presented that the SIERA intervention needs to be conducted in a small group format with three to six participants in one group, which is applicable for young adults with ASD. Also, the interviewees reported the initial SIERA manual includes feasible contents to develop individuals' understanding of emotion and emotion regulation, to increase positive coping skills on emotion regulation, and to practice self-care. However, the manual

needs some minor modifications such as adding more visual learning materials, deleting some jargons, and explaining abstract concepts in concrete description for participants' understanding of the intervention contents. Based on the interview results, this researcher made additional revisions in the SIERA manual to increase participants' comprehension of the intervention (see Table 3.1).

Table 3.1. Differences between Linehan's DBT Skills Training and SIERA Schedule

	Linehan's DBT Emotion Regulation Skills Module	SIERA Module
Week1	Orientation; Goals and Guidelines; Wise Mind; Mindfulness ("What" skills)	Orientation; Goals and Guidelines; Wise Mind; Introduction to Emotion Regulation
Week2	Mindfulness ("How" skills)	Understanding and Naming Emotions I
Week3	Understanding and Labeling Emotions	Understanding and Naming Emotions II
Week4	Checking the Facts	TIP skills; Checking the Facts
Week5	Opposite Action	Opposite Action
Week6	Problem Solving	Problem Solving
Week7	A skill I	ABC skills
Week8	A skill II	PLEASE; DEAR MAN
Week9	B & C skills; PLEASE; Mindfulness of Emotions	Focus group interview

Note. Linehan's DBT skills training schedule includes two weeks of orientation and mindfulness skills before starting the new skills training module.

SIERA Manual Development

SIERA was developed to improve appropriate emotion regulation skills for young adults with ASD. It is an eight-week of small group intervention with one main facilitator and one co-facilitator. Each session is 90-minutes in duration that includes a 10-minute break in the middle of the session. As Linehan (2015) described, the ultimate goals of emotion regulation are: (a) to understand one's emotion, (b) to reduce emotion vulnerability/increase emotional resilience, and (c) to decrease emotional distress. With these goals, there are four topic areas that need to be addressed: (a) understanding and naming emotions, (b) changing unwanted emotions, (c) reducing vulnerability, and (d) managing extreme emotions. These concepts guided the production of SIERA which led to the creation of eight modules that focus on the aforementioned four topic areas of emotion regulation skills. The eight weeks contents in SIERA are: (1) Introduction to Emotion Regulation, (2) Understanding and Naming Emotions I, (3) Understanding and Naming Emotions II, (4) Decreasing Emotional Suffering and Changing Unwanted Emotions, (5) Changing Unwanted Emotions I, (6) Changing Unwanted Emotions II, (7) Increasing Resiliency and Decreasing Emotional Vulnerability I, and (8) Increasing Resiliency and Decreasing Emotional Vulnerability II.

Introduction to Emotion Regulation. The first week is an introduction to emotion regulation. Participants have a short orientation about the SIERA intervention and are informed that their participation is voluntary. During the orientation, the goals of SIERA and their role as a member of the group are explained. Participants make and agree to their own group rules that they will follow for the rest of weeks. The basic concepts of mindfulness and wise mind are explained. Participants practice paced breathing, mindfulness, and various ways to find the wise mind.

Understanding and Naming Emotions I. The second week focuses on the overview of understanding and naming emotions. Participants are taught to understand how emotion works biologically and psychologically to help increase awareness of the emotions that they experience. Specifically, the second week helps participants learn various names of emotions and learn to identify and describe their own emotions. Also, they learn that emotion dysregulation is not inferiority, and emotion regulation can be learned from awareness and practice.

Understanding and Naming Emotions II. The third week focuses on functions of emotions and myths of emotions. Participants understand that emotions have various functions that they have not closely paid attention to before. Based on the new knowledge that participants gained on the second week's lesson, participants understand what makes emotion regulation difficult to them. Also, by discussing myths of emotions, participants can correct their misconceptions about emotions.

Decreasing Emotional Suffering and Changing Unwanted Emotions. From week four, participants learn specific DBT emotion regulation skills. The fourth week specifically covers how to manage extreme emotions by using "TIP" skills and how to change unwanted emotions by using "check the facts" skills. "TIP" stands for *T*ip the temperature, *I*ntense exercise, and *P*aced breathing and muscle relaxation. Through the "TIP" skills, participants can activate the parasympathetic nervous system when they are under extreme emotional situations. In addition, with the use of "check the facts" skills, participants can start evaluating their own thought/interpretation of the situation by checking whether their emotion "fit the facts" or not.

Changing Unwanted Emotions I. On week five, participants continue to work on how to change unwanted emotions by learning and practicing "opposite action" skills, which individuals act opposite of their emotion urge. Act opposite does not mean that participants act

like they are happy when they are sad. It means participants recognize their behavior patterns such as they tend to isolate themselves when they are sad, engage in self-harm behaviors when they are anxious, and scream when they are upset. Then, participants act opposite of such behaviors. For example, instead of isolating, participants can reach out to their family members and friends. Instead of engaging in self-harm behaviors, participants can take a bath or go outside for a walk, etc.

Changing Unwanted Emotions II. On week six, participants continue to work on how to change unwanted emotions by utilizing "7 steps of problem solving" skills. These series of how to change unwanted emotion skills (e.g., check the fact, opposite action, problem solving) encourage participants to evaluate their interpretation first, then to decide specific emotion regulation skills depending on the goals that they want to achieve in the situation. Eventually, participants both regulate emotions and achieve desired goals in the situation.

Increasing Resiliency and Decreasing Emotional Vulnerability I. After learning the series of emotion regulation skills, on week seven, participants focus on increasing resiliency and decreasing vulnerability in terms of building a "life worth living" through better emotion regulation. Specifically, on week seven, "ABC" skills are taught, which stands for *A*ccumulate positive, *B*uild mastery, and *C*ope ahead. Through the "ABC" skills, participants start planning their life goals and apply emotion regulation skills when they face challenging situations in life.

Increasing Resiliency and Decreasing Emotional Vulnerability II. The last week's session focuses on "PLEASE" skills and "DEAR MAN" skills. "PLEASE" skills stand for treat *P*hysica*L* illness, balance *E*ating, *A*void substances, *S*leep well, and regular *E*xercise that can increase well-being of participants' daily life. "DEAR MAN" skills are derived from interpersonal effectiveness modules that address effective communication with an interlocutor.

"DEAR" skills remind participants what to say and "MAN" skills remind participants how to say it when they are in a problematic situation. Considering effective communication skills is also needed to solve participants' emotion dysregulation, "DEAR MAN" skills is also taught, and participants will practice them in the session.

Participants

The target sample for this study was young adults, age of 18 to 26, who are primarily diagnosed with ASD. Accordingly, inclusion criteria for this study were: (a) individuals with age of 18 to 26, diagnosed with ASD and (b) not diagnosed with comorbidity of intellectual disability. Exclusion criteria for this study were: (a) young adults with ASD who have severe behavioral problems that may interrupt the group learning and/or have psychiatric symptoms (e.g., frequent life threatening self-injurious/suicidal behaviors, clinically diagnosed psychotic depression, schizophrenia, etc.) and (b) young adults who are below or above the age range of 18 to 26. A total of 19 participants were recruited for this intervention study, using identical samples for both qualitative and quantitative components of the study (Onwuegbuzie & Collins, 2007). Of 19 participants, one participant just turned 27 and another participant was 35 when they were participated in this research. According to Levinson (1996), entry life structure for early adulthood extends to age of 28. Although all 19 individuals with ASD participated in the eight-week of SIERA intervention, the participant who just turned 27 was included in data analysis based on Levinson (1996) and the other participant was excluded from the data analysis.

Of the 18 participants (M_{age} = 21.1, SD = 2.47), 50% (n = 9) were male and 50% were female (n = 9). In this current study, the number of male participants and female participants were same, which was not congruent with meta-analysis research of Loomes et al. (2017) stating male-to-female ratio of ASD is three to one. However, in gender-neutral intervention studies,

particularly in young adults, more female (i.e., 65%) tended to participate in interventions than male (Sharkey et al., 2020). All the participants reported having no comorbidity of intellectual disability. Of the 18 participants, one person was Asian, 11.1 % were Black (n = 2), and 83.3% were White (n = 15). 16.7% (n = 3) were high schoolers/post high school students, 61.1% (n = 11) were college students, and 22.2% (n = 4) were employed. Table 3.2 presents the summary of the study participants' demographic information.

Table 3.2. Demographic Characteristics of SIERA Participants

Demographic Characteristics	Young adults with ASD (n = 18)	
	%	*n*
Gender		
Female	50	9
Male	50	9
Race		
Asian	5.6	1
Black	11.1	2
White	83.3	15
Occupation		
High school and Post high school	16.7	3
College student	61.1	11
Employed	22.2	4
Professional who diagnosed		
Clinical Psychologist	33.3	6
Medical Doctor	38.9	7
Other (Neuropsychologist)	11.1	2
Other (Psychologist)	5.6	1
Other (Preschool Teacher Assessment)	5.6	1
Other (Don't remember)	5.6	1
Comorbidity		
No	38.9	7
ADHD	22.2	4
Anxiety/General Anxiety Disorder	16.7	3
Depression	27.8	5
Blind	5.6	1
Cerebral Palsy	11.1	2
Developmental Delays	5.6	1
Myopia	5.6	1
PTSD	11.1	2
Learning Disability	5.6	1
Living Arrangement		
Living with family members	83.3	15
Own apartment	16.7	3

Note. Participants reported one or more co-occurring conditions.

Procedures

This research was approved by the Michigan State University (MSU)'s Institutional Review Board (IRB). The procedure for the study began with recruitment effort for potential participants of the study. This study used snowball sampling, a non-probability sampling that relies on interpersonal relations to recruit participants (Cohen et al., 2011). This researcher reached out to college disability resource centers in Michigan, college affiliated autism centers in Michigan and Virginia, and community disability service organizations in Michigan. Official invitation letters, flyers, and IRB approval letter were sent via email to potential organizations to request for research collaboration. Participants contacted this researcher via email, phone call, and text messages.

After participants were recruited and screened for enrollment in the study, informed consent, demographic information, and quantitative data (e.g., pre-intervention surveys) were collected. Before COVID-19, these were collected via a paper and pencil format; and after COVID-19, these were sent and collected via email as a fillable PDF document format. A total of four groups (n = 3, 5, 6, 4) of the SIERA intervention was implemented. The first group was conducted in face-to-face format and the rest of the three groups were conducted in synchronous online by using a HIPPA compliant Zoom due to COVID-19. Each group was conducted consecutively. After completion of the intervention, participants filled out post-intervention surveys. One week after, this researcher conducted a focus group interview with the participants.

Quantitative Data Collection

Quantitative data were collected via a pencil and paper format before COVID-19 and a fillable PDF document format after COVID-19. Study participants were informed that their participation is voluntary that the data collected would remain anonymous and confidential.

Also, participants were informed of the opportunity to obtain a $100 Amazon online gift card after completing the eight weeks of intervention with providing pre- and post-intervention surveys and focus group interview. Informed consent procedures were followed in a written document before filling the pre-surveys. Participants were able to complete the surveys in a location of their choosing. Participants provided their initials at the end of the surveys, so that this researcher can link the individuals to match the pre- and post-measures.

A total of 18 participants and 13 caregivers provided informed consent. Caregivers' informed consent was also collected to agree with providing observation on their child's changes in daily emotion regulation before and after SIERA (i.e., EDI-13). Of the 18 participants, all of them provided demographic information and 17 of them provided the entire pre- and post-intervention surveys. One participant only provided weekly progress checklist, Group Cohesiveness Scale, Helping Alliance Questionnaire-II, and SIERA focus group interview (see Appendix K.); but did not complete the pre-and post-intervention clinical surveys.

Implementation of SIERA

The SIERA intervention was initiated after receiving informed consent from the participants. The first group was conducted in a face-to-face format in a private conference room at MSU. A total of three participants were participated in the first group with a main facilitator (this researcher) and a co-facilitator (psychology major senior student at MSU). The second, third, and fourth group were conducted in a synchronous online format by using HIPPA compliant Zoom. A total of 15 participants were participated in synchronous online SIERA (n = 5, 6, 4).

The main facilitator ran the group and the co-facilitator observed the group dynamics, recorded fidelity check, and helped participants individually if additional support is needed. The

SIERA intervention consists of eight weekly 90-minute sessions including a 10-minute break in the middle of the session covering the following topics: (1) Introduction to Emotion Regulation, (2) Understanding and Naming Emotions I, (3) Understanding and Naming Emotions II, (4) Decreasing Emotional Suffering and Changing Unwanted Emotions, (5) Changing Unwanted Emotions I, (6) Changing Unwanted Emotions II, (7) Increasing Resiliency and Decreasing Emotional Vulnerability I, and (8) Increasing Resiliency and Decreasing Emotional Vulnerability II.

The session starts with three minutes of mindfulness practice with calming music. After the mindfulness practice, homework is reviewed while the main facilitator checks on each participant. Then, the main concept of the module is explained by the main facilitator in a lecture format with PowerPoint slides. While the main concept is being explained, participants can freely ask questions if the content is not clearly understood. After the lecture, a 10-minute break is provided, and participants are encouraged to stand up and move around. After the break is over, the group is resumed and the main concept for the session is shortly reviewed one more time. Then, participants engage in hands-on activities (e.g., role play, simulation, group discussion) on the topic that they just learned. The session ends with an explanation of homework for next week to practice the learned skills on their own; and participants complete a weekly progress checklist. Each week, this researcher also had a supervision meeting with her advisor to review the session and discuss any incidents/challenges happened in the group.

Qualitative Data Collection

After completing the eight-week of SIERA intervention, a focus group interview was conducted with each group in the following week. Focus group interview is a technique where a researcher forms a group of individuals to discuss a specific topic, aiming to draw from the

complex personal experiences, beliefs, perceptions and attitudes of the participants through a moderated interaction (Krueger & Casey, 2015; Morgan, 1996). Focus group interview serves as a research technique that the primary means of collecting qualitative data, just as an observation or individual interview can serve as a primary means of gathering qualitative data (Morgan, 1996, 1997). The participants were particularly asked: (a) thoughts on any benefits that participants gained from the eight weeks of intervention related to their emotion regulation; (b) thoughts on any challenges or difficulties of the intervention; (c) any suggestions to make the intervention better; and (d) overall reflection and satisfaction of the intervention (See Appendix K.).

Due to COVID-19, the first group could not provide an in-person focus group interview. Also, due to participants' technical difficulties and/or time conflict, individual interviews were conducted instead. As a result, three individual interviews were conducted with each of the members from the first group; and a total of four focus group interviews from the second, third, and fourth group were conducted via Zoom. The interview was provided as a semi-structured format with open-ended questions. An individual interview was conducted by this researcher alone while each focus group interview was conducted by this researcher and the co-facilitator of the intervention. The individual interview was between 4 to 19 minutes long (M = 9.5, SD = 8.49); and the group interview (n = 3, 2, 6, 4) was between 35 to 84 minutes long (M = 54.8 SD = 23.58). All the interviews were audio-taped and transcribed verbatim by this researcher.

Mixed Method Data Collection

This researcher combined the quantitative and qualitative data by connecting the quantitative results to the qualitative data collection (Creswell & Creswell, 2018).

Measures

In this current study, five psychometric instruments (Acceptance and Action Questionnaire-II, DBT-Ways of Coping Checklist, Emotion Regulation Questionnaire, Group Cohesiveness Scale, and Helping Alliance Questionnaire) were used to measure participants' changes in emotion regulation profiles and skills before and after SIERA. Also, one additional caregiver rated psychometric instrument (e.g., Emotion Dysregulation Inventory – Reactivity Short Form and Dysphoria; EDI-13) was used to include a parent's observation in the participant's change in emotion regulation pre- and post-intervention. In addition, Weekly Progress Checklist was used after completing each session to monitor participants' engagement and understanding of the intervention. Fidelity check was also conducted each week for the facilitator by the co-facilitator of SIERA.

Acceptance and Action Questionnaire-II

Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) is designed to measure subjective emotion ability such as acceptance, experiential avoidance, and psychological inflexibility. The AAQ-II consists of seven items, using a 7-point-Likert type rating scale (1 = never true; 2 = very seldom true; 3 = seldom true; 4 = sometimes true; 5 = frequently true; 6 = almost always true; 7 = always true). Average mean score in a clinical population was 28.30 (*SD* = 9.90), while in a nonclinical population it was 18.51 (*SD* = 7.05). Scores above a range of 24 to 28 present individuals' current clinically relevant distress, meaning greater levels of psychological inflexibility (Bond et al., 2011). The AAQ-II has demonstrated good validity and reliability. The mean Cronbach's alpha of the AAQ-II was .84, ranging from .78 to .88 (Bond et al., 2011). In this current study, Cronbach's alpha at pre-survey was .82 and post-survey was .88.

DBT Ways of Coping Checklist

DBT Ways of Coping Checklist (DBT-WCCL; Neacsiu et al., 2010) measures the full array of DBT skills from each of the four modules of skills training: mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness. The DBT-WCCL measures the ways that individuals may have coped with stressful events in their lives. The DBT-WCCL has 59 items, using a 4-point-Likert rating scale (0 = never use; 1 = rarely used; 2 = sometimes used; 3 = always use). The DBT-WCCL comprises two subscales: the DBT Skills Subscales (DSS) and the Dysfunctional Coping subscale (DCS). The DSS consists of 38 items, measuring positive skills by utilizing skills learned in DBT skills group. The DCS consists of 21 items, measuring dysfunctional coping skills such as general dysfunctional coping factors (15 items) and blaming others factors (6 items). High scores on the DSS indicates significant use of DBT skill sets and high scores on the DCS indicates significant amounts of dysfunctional coping skills use, but there is no clinical cut-off score. The DSS has demonstrated strong internal consistency, with Cronbach's alpha ranging from .91 to .96 in a sample of 316 participants; and the internal consistency of DCS ranged from .87 to .93 (Neacsiu et al., 2010). In this present study, the internal consistency for DSS was $\alpha = .91$ to .92 and DCS ranged from $\alpha = .79$ to .82.

Emotion Regulation Questionnaire

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) is designed to measure respondents' tendency to regulate their emotions in two ways: (a) cognitive reappraisal and (b) expressive suppression. Cognitive reappraisal involves thinking differently about a situation in order to alter its meaning to change one's emotional experience. Expressive suppression involves decreasing the outward expression of emotion. The ERQ consists of 10 items and uses a 7-point-Likert type rate scale (1 = strongly disagree to 7 = strongly agree). High scores on each subscale

indicate individuals' frequent use of the specific emotion regulation skill, but there is no clinical cut-off score. The ERQ is with Cronbach's alpha ranging from .75 to .82 in cognitive reappraisal and from .68 to .76 in expressive suppression in a sample of 1,483 typical developing young adults (Gross & John, 1998). In this current study, internal consistency for cognitive reappraisal was from α = .64 to .68 and for expressive suppression was from α = .63 to .73.

Emotion Dysregulation Inventory – Reactivity Short Form and Dysphoria

Emotion Dysregulation Inventory (EDI; Mazefsky et al., 2018) is a caregiver-report questionnaire designed to capture emotional distress and problems with emotion regulation of the person she/he is rating. Emotion Dysregulation Inventory – Reactivity Short Form and Dysphoria (EDI-13; Mazefsky et al., 2018) is a shorter version of the EDI that includes a total of 13 items (reactivity – 7 items; dysphoria – 6 items). In the EDI-13, reactivity is characterized by intense, rapidly escalating, sustained, and poorly regulated negative emotional reactions; and dysphoria is characterized by anhedonia, sadness, and nervousness. The EDI-13 uses a 5-point-Likert scale (Not at all = 0; mild = 1; moderate = 2; severe = 3; very severe = 4). High scores on each subscale indicate individuals' tendency of presenting the specific emotion dysregulation, but there is no clinical cut-off score. Cronbach's alpha internal consistency was .92 for the reactivity and .90 for dysphoria (Mazefsky et al., 2018). In this study, the overall internal consistency ranged from α = .69 to .74. Particularly, internal consistency for reactivity ranged from α = .79 to .82 and α = .93 for dysphoria.

Group Cohesiveness Scale

Group Cohesiveness Scale (GCS; Wongpakaran et al., 2013) measures the degree of group bonding among participants and how they predict the group outcomes in two subscales: (a) cohesiveness and (b) engaged. The GCS consists of 7 items and using a 5-point-Likert type

rating scale (1 = strongly disagree to 5 = strongly agree). The higher score means the greater bonding with other participants in the group, but there is no clinical cut-off score. Cronbach alpha of the GCS was .87 among the sample of 96 individuals in Wongpakaran et al. (2013) and the current study's Cronbach alpha was .85.

Helping Alliance Questionnaire-II

Helping Alliance Questionnaire-II (HAQ-II; Luborsky et al., 1996) measures participant's experience of the treatment or relationship with a therapist (facilitator). The HAQ-II consists of 19 items, using a 6-point-Likert scale (1 = strongly disagree; 2 = disagree; 3 = slightly disagree; 4 = slightly agree; 5 = agree; 6 = strongly agree). Luborsky et al. (1996) described that the sum scores above 86 presents good working alliance and below as poor working alliance. The HAQ-II demonstrated reliability was .78. with a sample of 246 individuals diagnosed with cocaine dependency (Luborsky et al., 1996). Cronbach alpha in this current study was .90.

Weekly Progress Checklist

Weekly Progress Checklist was created by this researcher and reviewed by her advisor to track participants' progress after completing each session during the eight-week of intervention. The weekly progress checklist consists of 5 items that asked each participant's (a) session engagement, (b) content understanding, (c) practical utilization of learned skills, (d) mood before the today's session, and (e) mood after the today's session. The weekly progress checklist uses a 5-point-Likert type rating scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

SIERA Fidelity Checklist

SIERA fidelity checklist was created by this researcher and reviewed by this researcher's advisor to monitor whether the intervention was delivered as intended and planned. The fidelity

checklist consists of four areas: (a) structure and setting, (b) dialectical instruction, (c) experiential activity, and (d) intervention content. Each week's fidelity checklist is slightly different due to including different contents in each session. The fidelity checklist was measured by the same co-facilitator through the entire this research and uses a 4-point-Likert type rating scale (NA = not applicable; 0 = did not implemented; 1 = partially implemented; 2 = implemented).

Data Management

Quantitative Data Management

After collecting pre-surveys from each group, the data were directly entered in a password protected spreadsheet and stored in a password protected folder, which only the researcher has access to. After collecting post-surveys, they were also entered in the same password protected spreadsheet. Every week after completing the session, weekly progress checklist was collected, and this was also entered in a password protected spreadsheet. The paper surveys from the first group were scanned and saved as a PDF file. The PDF surveys from second, third, and fourth group were then downloaded and stored in a password protected folder. Collected data were expected to be kept for a minimum of three years after closing the study.

Qualitative Data Management

Individual and focus group interviews were audio-recorded and transcribed verbatim by this researcher in a password protected Microsoft Word office 365 and saved in the password protected folder. After having all the transcripts, participants' names were removed from the transcripts before coding and replaced with pseudonyms. The updated transcripts were transferred to HyperResearch 4.0.3.

Data Analysis

Quantitative Data Analysis

The quantitative data was entered by this researcher into Statistical Package for Social Science 25.0 (SPSS). First, descriptive statistics were computed on the sample demographic characteristics for the following variables: (a) age; (b) gender; (c) race/ethnicity; (d) occupation; (e) age at first diagnosis; (f) professional who diagnosed; (g) comorbidity; and (h) living arrangement. Second, using the SPSS 25.0, means, standard deviations, and effect sizes of each measure were calculated. To be more specific, all Cohen's *d* values were calculated by subtracting the mean of pre-measures from the mean of post-measures, with the result divided by the pooled standard deviation. Cohen's *d* values of at least .2 are considered small, .5 and considered medium, and those with values of .8 and up are considered large (Cohen, 1988). Hedges' *g* is an additional reporting of effect size when sample sizes are below 20. All Hedges *g* values were calculated by subtracting the mean of pre-measures from the mean of post-measures, with the result divided by the pooled weighted standard deviation multiplied by Hedges' correction (Hedges & Olkin, 1985). In this current study, both Hedges' *g* and Cohen's *d* are reported as sample size was less than 20. In multiple hypothesis testing, the Bonferroni correction is typically used to reduce false positives (type I error) by lowering the significance level by dividing the alpha level by the number of comparisons (Armstrong, 2014; Dunn, 1961). However, in this present study, the Bonferroni correction was not used because SIERA was a preliminary intervention study to evaluate the feasibility and efficacy for young adults with ASD, and little research has been conducted related to this topic. Also, paired *t*-test was calculated in the SPSS 25.0 to detect the changes between the pre- and post-intervention.

Qualitative Data Analysis

The focus group transcripts were typed verbatim by this researcher into Microsoft Word office 365, and the transcripts were imported to the qualitative research tool, HyperRESEARCH 4.0.3. Data was analyzed using structural coding (Saldaña, 2013) and thematic analysis (Braun, Clarke, Hayfield, & Terry, 2019). Structural coding was the first-round coding that applies to a content-based or conceptual phrase representing a topic of inquiry that relates to a specific research question (MacQueen et al., 2008). Then, thematic analysis was used to identify patterns in meaning across the data (Braun et al., 2019). For each focus group transcript, this researcher read and re-read the transcripts in its entirety and highlighted prominent passages and a processing memo was written. Then, a quotation inventory and a codebook were created by this researcher and reviewed by her advisor and the co-facilitator to highlight emerged themes, definitions, and examples.

Credibility and Trustworthiness. Strengthening the trustworthiness and the credibility in this study was essential to support the argument that the inquiry's findings are "worth paying attention to" (Lincoln & Guba, 1985). In order to establish the trustworthiness of study findings and increase the accuracy of the study findings, this researcher utilized three strategies: (a) triangulation, (b) member checking, and (c) thick description (Creswell, 2018).

Triangulation. Triangulation refers to the use of multiple methods or varied data sources to develop a comprehensive understanding of phenomena (Patton, 1999). Multiple coding practice to address inter-rater reliability was conducted between this researcher, this researcher's advisor (second coder), and the co-facilitator (third coder) who are trained and experienced qualitative researchers. This investigator triangulation confirms subjective influences of this research by reviewing and comparing data and checking the consistency of the findings (Denzin,

1978).

Member checking. Member checking is a mean of enhancing rigor in qualitative research that the validity procedure shifts from the researcher to study participants (Creswell & Miller, 2000). Member checking refers to having participants review and confirm the accuracy (or inaccuracy) of interview transcriptions or observational field notes (Brantlinger et al., 2005). After conducting focus group interviews and transcribing verbatim, this researcher returned the transcribed verbatim transcripts to participants to confirm the accuracy of the transcription of the interview (Forbat & Henderson, 2005).

Thick description. Thick description refers to a researcher's task of both describing and interpreting observed social action/behavior within the particular context (Ponterotto, 2006). This researcher reported sufficient quotes and descriptions in Chapter 4 (see Description of Qualitative Data) to provide the evidence for this researcher's interpretations and conclusions of participants' lived experience of the SIERA intervention.

Mixed Method Data Analysis and Integration

Integration in this phase of the study was done by using the qualitative data findings to explain previously gathered quantitative data findings. The quantitative and the qualitative data were analyzed independently in this explanatory sequential mixed methods approach study (Creswell, 2018).

CHAPTER 4: RESULTS

The purpose of this study was to evaluate the feasibility and efficacy of a modified DBT skills training on emotion regulation for young adults with ASD. This section describes the statistical analyses conducted to investigate the research questions and hypothesis. The SIERA intervention was first implemented in a face-to-face format; but it was changed in its delivery format to synchronous online due to COVID-19. As a result, one face-to-face group (n = 3) and three synchronous online groups (n = 15) were conducted. A total of 18 young adults with ASD and 13 caregivers were included for analysis in this current study. The following research questions and hypotheses were examined:

Research Question 1. Does the modified DBT skills training help emotion regulation of young adults with ASD?

1a. Young adults with ASD will show a statistically significant decrease in psychological inflexibility/experiential avoidance by increasing scores in the AAQ-II after the intervention.

1b. Young adults with ASD will show a statistically significant increase in positive coping skills by increasing scores in the DBT Skills Subscale (DSS) of DBT-WCCL after the intervention.

1c. Young adults with ASD will show a statistically significant decrease in dysfunctional coping skills by decreasing scores in the Dysfunctional Coping Subscales (DCS 1 & DCS 2) of DBT-WCCL after the intervention.

1d. Young adults with ASD will show a statistically significant increase in adaptive emotion regulation strategy by increasing scores in the cognitive reappraisal of ERQ after the intervention.

1e. Young adults with ASD will show a statistically significant decrease in maladaptive emotion regulation strategy by decreasing scores in the expressive suppression of ERQ after the intervention.

1f. Young adults with ASD will show a statistically significant decrease in emotion dysregulation by decreasing scores in the reactivity of EDI-13 after the intervention, rated by a primary caregiver.

1g. Young adults with ASD will show a statistically significant decrease in emotion dysregulation by decreasing scores in the dysphoria of EDI-13 after the intervention, rated by a primary caregiver.

Research Question 2. What is the experience of young adults with ASD in the SIERA intervention?

Comparability of SIERA Face-to-Face and Online Group Delivery Results

Due to the impact of COVID-19, the delivery format of the SIERA intervention had to be changed from face-to-face to synchronous online. Although Sutherland et al. (2018) found that telehealth services (e.g., diagnostic assessment, intervention, etc.) were equivalent to services delivered face to face, a non-parametric, independent samples *t*-test was conducted on all studied variables between the one face-to-face group ($n = 3$) and three synchronous online groups ($n = 15$) to compare the means of pre- and post-measures. Results showed that there were no significant differences between the face-to-face group and synchronous online groups in both pre- and post-measures (See Table 4.1) of AAQ-II, DBT-WCCL, ERQ, and EDI-13 ($p > .05$). Also, results showed that there were no significant differences between the face-to-face group and synchronous online groups in post-measures (See Table 4.2) of GCS and HAQ-II ($p > .05$).

Table 4.1. Results of Non-parametric Test Comparing Pre and Post Measures

Measures	Pre		Z-value	*p*-value	Post		Z-value	*p*-value
	Face to Face (*n* = 3)	Synchronous Online (*n* = 14)			Face to Face (*n* = 3)	Synchronous Online (*n* = 14)		
AAQ-II	24.00 (14.42)	32.35 (5.45)	-1.31	.22	23.67 (9.02)	25.27 (8.10)	-.72	.53
DBT-WCCL								
DSS	1.40 (.46)	1.57 (.53)	-.65	.58	1.72 (.36)	2.03 (.45)	-1.25	.24
DCS	1.22 (.41)	1.60 (.44)	-1.54	.13	1.25 (.10)	1.58 (.43)	-1.72	.09
ERQ								
Cognitive Reappraisal	3.94 (.67)	3.99 (1.09)	-1.01	.34	4.93 (.58)	4.97 (.92)	-.48	.67
Expressive Suppression	4.11 (.25)	4.17 (1.53)	-.48	.67	3.64 (1.32)	3.62 (1.33)	-.30	.81
	Face to Face (*n* = 3)	Synchronous Online (*n* = 10)			Face to Face (*n* = 3)	Synchronous Online (*n* = 10)		
EDI-13								
Reactivity	16.67 (4.73)	12.8 (4.94)	-1.19	.27	5.33 (1.53)	4.90 (3.35)	-.60	.60
Dysphoria	6.00 (3.00)	4.33 (2.08)	-.34	.78	4.33 (2.08)	4.70 (6.53)	-.60	.59

Table 4.2. Results of Non-parametric Test Comparing GCS and HAQ-II

Measures	Mean		Standard Deviation			
	Face to Face (n = 3)	Synchronous Online (n = 15)	Face to Face (n = 3)	Synchronous Online (n = 15)	Z-value	p-value
GCS	4.57	4.10	.37	.77	-.90	.44
Cohesiveness	5.00	4.27	.00	1.00	-1.42	.29
Engaged	4.40	4.03	.53	.75	-.54	.63
HAQ-II	99.67	93.47	8.08	11.32	-.83	.44

Description of Quantitative Results

Efficacy Outcomes Before and After SIERA

Research question 1: *Does the SIERA help emotion regulation of young adults with ASD?* addressed the efficacy of SIERA. To answer this research question and hypotheses, a two-tailed paired *t*-test was calculated comparing pre- and post-measures of AAQ-II, DBT-WCCL, and ERQ were run on a total of 17 young adults with ASD. Results of the means and standard deviation of these variables; the two-tailed *p*-value; and all effect size *d* values were calculated and reported in Table 4.3.

Table 4.3. Results of Paired Sample *t*-Test on Pre and Post SIERA

Measures	Pre		Post		*t*(16)	*p*	Hedges' *g*	Cohen's *d*
	M	*SD*	*M*	*SD*				
AAQ-II	30.88	7.81	25.47	8.02	2.350	.032*	.67	.68
DBT-WCCL								
DSS	1.55	.51	1.98	.44	-4.208	.001***	.88	.90
DCS	1.54	.45	1.52	.41	.151	.882	.05	.05
ERQ								
Cognitive Reappraisal	4.06	1.04	4.91	.86	-3.113	.007**	.87	.89
Expressive Suppression	4.13	1.38	3.71	1.29	1.550	.141	.30	.31

Note. * $p < .01$. ** $p < .01$. *** $p < .001$.

Research Hypothesis 1a. Young adults with ASD will show a statistically significant decrease in psychological inflexibility/experiential avoidance by increasing scores in the AAQ-II after the intervention.

To test this hypothesis, a two-tailed paired *t*-test was calculated comparing pre- and post-measures of AAQ-II. SIERA participants presented decrease in AAQ-II ($M = 30.88$, $SD = 7.81$ to $M = 25.47$, $SD = 8.02$) after completion of the intervention. A statistically significant difference was found between pre and post means of the SIERA intervention, $t(16) = 2.350$, $p = .032$, $d = .68$, indicating that a decrease in psychological inflexibility/experiential avoidance after the SIERA intervention was statistically significant. This also means that young adults with ASD improved psychological flexibility and emotional acceptance. Thus, hypothesis 1a was supported. In addition to showing statistically significant change in psychological

inflexibility/experiential avoidance, SIERA participants also manifested clinically meaningful change in acceptance upon completion of the intervention. According to Bond et al. (2011), individuals who present the scores above a range of 24 to 28 indicate having clinical distress. SIERA participants showed decrease in clinical distress ($\Delta M = 5.41$) before and after the intervention, from having clinically relevant distress ($M = 30.88$) to having borderline clinical distress ($M = 25.47$).

Research Hypothesis 1b. Young adults with ASD will show a statistically significant increase in positive coping skills by increasing scores in the DBT Skills Subscale (DSS) of DBT-WCCL after the intervention.

To test this hypothesis, a two-tailed paired t-test was calculated comparing pre- and post-measures of the DBT Skills Subscale (DSS) of DBT-WCCL. SIERA participants presented increase in DSS ($M = 1.55$, $SD = .51$ to $M = 1.98$, $SD = .44$) after completion of the intervention. A statistically significant difference was found between pre and post means of the SIERA intervention $t(16) = -4.208$, $p = .001$, $d = .90$, indicating that an increase in DBT skills use after the SIERA intervention was statistically significant. This also means that young adults with ASD learned and improved the use of appropriate emotion regulation skills by participating in the intervention. Thus, hypothesis 1b was supported.

Research Hypothesis 1c. Young adults with ASD will show a statistically significant decrease in dysfunctional coping skills by decreasing scores in the Dysfunctional Coping Subscales (DCS 1 & DCS 2) of DBT-WCCL after the intervention.

To test this hypothesis, a two-tailed paired *t*-test was calculated comparing pre- and post-measures of the Dysfunctional Coping Scale of DBT-WCCL. SIERA participants presented decrease in DCS ($M = 1.54$, $SD = .45$ to $M = 1.52$, $SD = .41$) after completion of the intervention.

However, no significant difference was found $t(16) = .151$, $p = .882$, $d = .05$. This means that young adults with ASD showed a decrease in the use of dysfunctional coping skills, but the changes in their dysfunctional coping skills were found to be not statistically significant. Thus, hypothesis 1c was not supported.

Research Hypothesis 1d. Young adults with ASD will show a statistically significant increase in adaptive emotion regulation strategy by increasing scores in the cognitive reappraisal of ERQ after the intervention.

To test this hypothesis, a two-tailed paired *t*-test was calculated comparing pre- and post-measures of the cognitive reappraisal of ERQ. SIERA participants presented increase in cognitive reappraisal of ERQ ($M = 4.06$, $SD = 1.04$ to $M = 4.91$, $SD = .86$) after completion of the intervention. A statistically significant difference was found $t(16) = -3.113$, $p = .007$, $d = .89$, indicating that an increase in adaptive emotion regulation strategy (i.e., cognitive reappraisal) after the SIERA intervention was statistically significant. This also means that young adults with ASD showed improvement in use of cognitive reappraisal, an adaptive emotion regulation strategy that involves change of the way individuals think about the meaning of an emotion-eliciting stimulus. Thus, hypothesis 1d was supported.

Research Hypothesis 1e. Young adults with ASD will show a statistically significant decrease in maladaptive emotion regulation strategy by decreasing scores in the expressive suppression of ERQ after the intervention.

To test this hypothesis, a two-tailed paired *t*-test was calculated comparing pre- and post-measures of the expressive suppression of ERQ. SIERA participants presented decrease in expressive suppression of ERQ ($M = 4.13$, $SD = 1.38$ to $M = 3.71$, $SD = 1.29$) after completion of the intervention. No significant difference was found $t(16) = 1.550$, $p = .141$, $d = .31$, indicating

that there was no statistically significant difference between pre and post in maladaptive emotion regulation strategy (i.e., expressive suppression) after the SIERA intervention. This means that young adults with ASD showed a decrease in the use of expressive suppression, which is a maladaptive emotion regulation strategy that involves changing of the way individuals behaviorally respond to emotion-eliciting events after the intervention. However, the changes in expressive suppression were found to be not statistically significant. Thus, hypothesis 1e was not supported.

In addition, in research question 1, caregivers reported the observed emotion dysregulation of their adult child who participated in SIERA before and after the intervention. This was done in order to capture study participants' emotional distress and problems with emotion regulation from a different perspective to complement the self-reported measures that were used in this current study. The pre- and post-measure of EDI-13 was reported by the same caregiver, either mother or father of the participants. A total of 13 caregivers were included for analysis in this current study. A two-tailed paired *t*-test was calculated comparing pre- and post-measure of EDI-13. Results of the means and standard deviation; the two-tailed *p*-value; and all effect size *d* values were calculated and reported in Table 4.4. The specific hypotheses are outlined as below with the results are presented.

Table 4.4. Results of Paired Sample *t*-Test on Pre and Post EDI-13

Measures	Pre		Post		*t*(12)	*p*	Hedges' *g*	Cohen's *d*
	M	*SD*	*M*	*SD*				
EDI-13								
Reactivity	13.69	4.99	5.00	2.97	7.587	.000***	2.06	2.12
Dysphoria	8.54	6.65	4.62	5.72	3.565	.004**	.61	.63

Note. * $p < .01$. ** $p < .01$. *** $p < .001$.

Research Hypothesis 1f. Young adults with ASD will show a statistically significant decrease in emotion dysregulation by decreasing scores in the reactivity of EDI-13 after the intervention, rated by a primary caregiver.

To test this hypothesis, a two-tailed paired t-test was calculated comparing pre- and post-measures of the reactivity in EDI-13. Caregivers of SIERA participants reported that their adult child who participated in the intervention presented decrease in reactivity of EDI-13 ($M = 13.69$, $SD = 4.99$ to $M = 5.00$, $SD = 2.97$) after completion of the intervention. A statistically significant difference was found $t(12) = 7.587$, $p = .000$, $d = 2.12$, indicating that there was a significant decrease in reactivity (e.g., intense, rapidly escalating, sustained, and poorly regulated negative emotional reactions) after the SIERA intervention. This also means that young adults with ASD showed decrease in showing strong negative emotions or negative reactions such as tantrum and anger in daily life after completion of the intervention. Thus, hypothesis 1f was supported.

Research Hypothesis 1g. Young adults with ASD will show a statistically significant decrease in emotion dysregulation by decreasing scores in the dysphoria of EDI-13 after the intervention, rated by a primary caregiver.

To test this hypothesis, a two-tailed paired t-test was calculated comparing pre- and post-measures of the dysphoria in EDI-13. Caregivers of SIERA participants reported that their adult child who participated in the intervention presented decrease in dysphoria of EDI-13 (M = 8.54, SD = 6.65 to M = 4.62, SD = 5.72) after completion of the intervention. A statistically significant difference was found $t(12) = 3.565$, $p = .004$, $d = .63$, indicating that there was a significant decrease in dysphoria (e.g., anhedonia, sadness, and nervousness) after the SIERA intervention. This means that young adults with ASD showed decrease in unpleasant emotions such as depressive emotions, worries, and low motivation in daily life after completion of the intervention. Thus, hypothesis 1g was supported.

Feasibility Outcomes

Feasibility is an important concept when studying how an intervention can be carried out appropriately with scientific rigor to establish evidence-based data. Bowen and researchers (2009) defined pertinent areas of focus in feasibility study on intervention which includes: (a) acceptability, (b) demand, (c) implementation, (d) practicality, (e) adaptation, (f) integration, (g) expansion, and (h) limited-efficacy testing. Although not all these feasibility concepts are applicable on this preliminary study, this researcher attempted to include those that were appropriate. For instance, completion rate, attendance rate, and participant satisfaction were indicators of whether participants found the intervention to be acceptable and whether they perceived the intervention to be useful. Implementation was measured by fidelity check in order to ensure that the intervention was executed systematically. Practicality was often measured in terms of efficiency or cost benefits analysis, though this was only partially studied in the current study. Adaptation was conceptualized as applying an existing intervention to a different population or changing procedures in a new situation to accommodate clear understanding (See

Chapter III. Development of Skills Improvement on Emotion Regulation for Adults). Although this study was an adaptation of an evidence-based intervention, it was at an early stage of development that there were no direct data to compare to similar study results to evaluate its degree of adaptation. The early stage of implementation of this current study also makes both expansion and integration not applicable. Finally, limited-efficacy testing was studied because relevant constructs captured by the psychometric measures and focus groups were monitored before and after the intervention. The various types of feasibility concepts defined by Bowen and researchers (2009) will be further explained below.

Data of these 18 participants were used to run the analysis. The completion rate of the intervention was 100%, with a mean attendance of 97.8% across all sessions. These descriptive data showed that SIERA was deemed acceptable and was worth attending (demand). The means and standard deviations of GCS and HAQ-II were measured after completion of the SIERA and are presented in Table 4.5. These data showed that participants perceived the intervention was acceptable as they reported positive bonding with other group members and facilitators. The total mean of GCS (M = 4.18, SD = .74) indicated that study participants had a strong group cohesion. Specifically, participants reported group cohesiveness (M = 4.39, SD = .95) and group engagement (M = 4.09, SD = .72). The mean of HAQ-II (M = 94.5, SD = 10.90) presented that study participants had a strong working alliance followed by Luborsky et al. (1996) that the mean score of above 86 indicates a good working alliance between the participant and the therapist. These scores also showed that participants were satisfied showing that they found the intervention acceptable.

As for implementation, the fidelity of the SIERA intervention was 99% across all the groups; thus, supporting that the intervention was implemented with consistency based on

Linehan's DBT guideline. Lastly, according to Bowen and researchers (2009), limited-efficacy testing is considered as part of feasibility. In this current study, limited-efficacy testing was demonstrated from research question 1 that SIERA will help young adults with ASD increase adaptive emotion regulation upon completion of the intervention.

Table 4.5. Descriptive Statistics of GCS and HAQ-II

Measures	SIERA participants (n = 18)			
	M	*SD*	Min.	Max.
GCS	4.18	.74	1	5
Cohesiveness	4.39	.95	2	5
Engaged	4.09	.72	1	5
HAQ-II	94.5	10.90	1	7

Note. GCS values were ranked on a Likert scale of 1 (min.) to 5 (max.). HAQ-II values were ranked on a Likert scale of 1(min.) to 7 (max.)

In order to closely monitor changes on a weekly basis, additional data were collected by the end of each session on the following items: engagement (acceptability), understanding (practicality), practical utilization (practicality), mood before, and mood after the session (limited-efficacy testing). The summary of the items of the weekly progress checklist for the SIERA participants is presented in Table 4.6. The average scores of weekly progresses are: Q1 (M = 4.25, SD = .21), Q2 (M = 4.42, SD = .11), Q3 (M = 4.31, SD = .14), Q4 (M = 3.38, SD = .20), and Q5 (M = 4.30, SD = .16).

Table 4.6. Descriptive Statistics of Weekly Progress

Weekly Progress Checklist	Participants (n=18)	
	M	*SD*
Q1. I felt engaged and was able to participate in today's session	4.25	.21
Q2. I could easily understand the content covered in today's session.	4.42	.11
Q3. I have learned something from today's session that I can apply to my emotion regulation.	4.31	.14
Q4. How was my mood before today's session?	3.38	.20
Q5. How was my mood after today's session?	4.30	.16

Note. Weekly progress checklist values were ranked on a Likert scale of 1 (min.) to 5 (max.).

Description of Qualitative Results

Research question 2: *What is the experience of young adults with ASD in the SIERA intervention?* addressed the *feasibility* and *efficacy* of SIERA. The study participants (n =18) were asked about their thoughts/feedback on topics that covered, feasibility of the intervention format, experienced benefits and challenges, suggestions for further implementation, and the overall reflection and satisfaction of the intervention.

The young adults with ASD indicated that their experience of the SIERA intervention was between satisfied and very satisfied (acceptability of SIERA). Also, they reported that the eight weeks of the SIERA intervention was beneficial and helpful because they learned adaptive emotion regulation skills that they could utilize in everyday life (limited-efficacy testing of SIERA). A total of four themes were identified in response to participants' experience of SIERA. The four themes are: (a) Impact of SIERA, (b) Experienced Challenges, (c) Suggestions for Future Implementation, and (d) Take-Home Messages. Each of these four themes will be described in more detail using direct quotes from pseudonymized participants as evidence.

Impact of SIERA

Participants presented positive changes that they experienced in their emotion regulation through the SIERA intervention. They indicated the SIERA intervention was beneficial for them in various ways: (a) learning of appropriate emotion regulation skills/strategies and (b) having emotion awareness and more pleasant emotions. Most participants described that through SIERA, they learned *appropriate emotion regulation skills/strategies* that they could apply in real life situations and get away from emotional distress. Megan shared her recent experience in which she indicated utilizing emotion regulation skills in her daily life. She mentioned that after taking the SIERA intervention, she became familiar with using emotion regulation skills to the situations that used to bother her. She said:

> "Oh, definitely, the 'Think before I act.' That has been the biggest noticeable change. So like the other day, I had a situation with my therapist where there is some miscommunication going on and like old me or me before the program, I would have flipped the lid. I would be really upset like 'You lied to me, how could you lie to me?' But instead of that, I kind of went to myself. I need to check the facts. I need to figure out what I'm feeling right now. And then kind of go from there. And it happened almost instantly and it was right after the incident, and I was like 'oh, hey, I used my wise mind there.' So it is becoming more and more natural. Yeah, it's great."

Shelby also shared her experience of using the learned emotion regulation skills in group when she had a rough day while she was participating in the SIERA intervention. Shelby stated that with the use of emotion regulation skills, she could actually manage her emotions and was able to save herself from not getting physically sick. She said:

> "Like the other day, I was having a panic attack all day. But I was able to better calm myself down by focusing on the positives like trying to work myself through it. I was able to calm myself down better. Because before when I would get upset, I would actually get sick. And I didn't. So. Yay!"

Hannah presented that the SIERA intervention made a significant change in her mental health. After participating in the intervention, she felt less unpleasant emotions and was able to not cry over small issues because she could regulate her own emotions by understanding the process of cognitive restricting in emotion regulation. She said:

> "I've been less sad. Because when bad things happened, that already makes me sad that it's happening. But by overreacting, that makes me even more sad. I had to be. You know what I'm saying? It is like you can't stop bad things from happening. But if you can regulate how you feel when that happen, then you won't be as sad, you won't be sadder."

In addition to having appropriate emotion regulation skills/strategies, the study participants also presented that they were able to be *aware of their own emotions and have more pleasant emotions in their daily life* through the experience of the SIERA intervention. Alex stated the SIERA intervention enabled him to be aware of his emotions, which helped him understand the emotional unclarity that he used to have before. He said, "I got a little bit more clarity on what my feelings like… Most of the time, I've become aware of why I felt the way I did and whether or not acting on that feeling is worth it." Brian also added that the SIERA intervention helped him to have insight in his emotion awareness, which would help him manage stressful situations. He mentioned, "Like I said, [my emotion regulation] has gotten better because if this is your pervasive recognition when I am stressed, then I am taking a break or whatever it cools me down."

Along with more emotion awareness, participants also reported experiencing more pleasant emotions upon completion of the SIERA intervention. Kathy presented she has experienced more pleasant emotions in her daily life since the SIERA participation, "I do feel more calm and I do feel more happier." Michelle stated, "I've definitely been happier, calmer, and a lot more rational. I don't think as impulsively anymore." Also, Amelia expressed that she has been in a more positive emotional status that she described as "Blue Zone" after taking the SIERA intervention, "Let me think. I am definitely more in 'Blue Zone' for sure!" Likewise, as study participants described, the SIERA intervention had a positive influence on their emotion regulation, and it supported them to have more pleasant emotions in everyday life.

Experienced Challenges

While the SIERA intervention was implemented, there were some challenges that participants experienced due to several reasons. These challenges are widely categorized into two areas: (a) contents related challenges and (b) delivery format related challenges. The topic of emotion regulation was not very familiar to many young adults with ASD. Thus, some of the participants expressed *comprehension challenges related to the contents* due to little exposure to such topics. In this regard, some of them presented confusion in certain topics. Eric addressed his confusion in certain topics. He said:

> "This was more on the neutral side, but like especially some of them were, I got more confused like the opposite action and [problem solving] were kinda confusing… Weeks like 4, 5 and 6 were a lot harder to focus on and then a lot harder to understand what was actually going on."

Tyler also added certain emotion regulation skills required more attention to understand the logistic details. He stated, "Again, some weeks are a little bit more challenging or difficult to

cover than and other weeks. But I feel like it's up to the individual's responsibility to, following them." Related to the content challenges, participants also expressed *issues with remembering homework*. Even though doing homework did not require participants' additional intellectual efforts, it still required participants to remember to do it. Including Alex, many of the SIERA group members stated, "The one thing about this program that I found the most challenging is the homework. Most of the time I forget slash neglect to do it a couple of days ahead of time."

Challenges related to delivery format were also addressed by SIERA participants. Originally, SIERA was developed to be implemented as a face-to-face group format. However, due to the impact of COVID-19, the format of SIERA was changed to a synchronous online format. With this format change, SIERA participants provided mixed opinions about *delivery format and running time*. While some participants think synchronous online format was not challenging, some participants expressed difficulties in having online format SIERA. Emily stated:

> "I think the biggest difficulty with this is not being in person. I don't know if this would have been in person otherwise. There's an additional degree of separation and zoom fatigue can kind of sudden, but I know there is something that can be done. So still beneficial, still worth it."

Similarly, while some participants think a 90 minute-session is feasible, some participants, especially those who had synchronous online SIERA, expressed that a 90 minute-session was somewhat long to maintain their full attention. Megan said, "The session was sort of little long, but that's just me personally. I can barely sit through a movie that you don't even let out emotions for 90 minutes. But I think it got easier as time went on." Likewise, the SIERA intervention has some challenges in content and delivery that need to be further examined and

modified for participants' better learning outcomes and participation.

As indicated in the previous section (see Chapter 3. Development of Skills Improvement on Emotion Regulation for Adults), SIERA was originally developed considering common characteristics of individuals with ASD and the contents were tailored particularly for the ASD population. Thus, the SIERA manual includes simple and concrete words, a lot of visuals such as pictures, tables, and charts. Although this particular challenge only applied to one participant, it still has significant implications in modifying SIERA to other disability populations to accommodate various needs. Amelia presented challenges in accessing the manual due to her other disability, visual impairment. She said:

> "Well, one of them could be if you have another blind person doing this program like me, you are gonna need to get a braille file machine and print out the manual in braille. I am just saying having the printed manual was nice, but somebody else had to read it for me… If you add up braille, I would've been fine, and I would have been able to read it."

Even though comorbidity of visual impairment among the ASD population is not as common as comorbidity of mental health, the presence of Amelia in the SIERA intervention informed further implication in preparing various accommodations for participants.

Suggestions for Future Implementation

As participants presented their challenges revolving around the SIERA intervention, they suggested alternative options for improvement, and these suggestions corresponded to their experienced challenges. To offset the content related challenges such as difficulty understanding certain modules, participants suggested *providing an extra week to check in on their understanding of the contents*. Michelle indicated a debriefing session would be effective in learning a series of emotion regulation skills. She said, "Maybe an extra week for the whole

checking in for week 4, 5, and 6. There is a lot could happen, if we had an extra week and debrief and chew on what we just learned, that might be helpful." Tyler also presented the same idea that a short additional session to check in the major emotion regulation skills would be helpful for group members. He stated:

> "I feel like maybe like a smaller extra session to recap like the week four to six. I don't feel like it needs a full 90-minute session to cover. But I feel like some review of 'checking the facts and problem solving and opposite actions' would be pretty nice. It would easy up a lot of confusion I would say."

Also, to increase group members' accountability for homework, participants mentioned that they would like to receive *a mid-week reminder email* from the facilitator. Shelby stated that she often forgets about doing the homework because it does not stay in her mind after the session. Thus, she would like to have a reminder a couple days before the group so that she can be cognizant of assigned homework. She mentioned:

> "I do agree about the homework thing. I guess for me it's just when I'm actually here for the meetings. I'm in the space of the meeting. And then when I once it's off, then it's like, whoop. But like I remember what it said, but I'm not in the headspace of thinking about what is the homework that we have to do? I think the idea of like a mid-week reminder because our meetings are on Wednesday. So maybe like an email on Saturday is a good idea to remind for the homework."

Although most participants were satisfied with either format of SIERA, they also provided additional feedback to modify the intervention delivery format to make it more adaptable for young adults with ASD. Specifically, participants articulated possible *revision for session format and running time*. The synchronous online SIERA intervention was implemented

during the time when in-person contact was prohibited due to COVID-19. Although most young adult participants were smoothly adapted to online platforms and found telehealth service was very efficient for them, some participants still wanted to have face-to-face intervention.

Kathy was one of the participants who values face-to-face interaction. Although she was okay with the online format that she participated in, she addressed that in-person sessions may have more benefits for participants due to the social interaction component. She said, "[SIERA] would be different for in-person but Corona messed everything up… [Online] wouldn't be like too good because we need that interactive piece of it."

In addition, participants discussed the possibility of shortening the 90 minutes of the synchronous online session due to Zoom fatigue. Michelle explained that 90 minutes of Zoom sessions was challenging compared to the same amount of time that happened in a face-to-face setting due to fatigue. She said, "Well 90 mins of in-person would be better. Zoom fatigue is real. I mean, that hasn't really happened to me yet though." Megan also described that the 90-minute Zoom session was challenging for her so that a shorter running time would help her and other group members' pay attention to the session. She stated:

> "I would say 60 or even 70 mins via Zoom. And you could have more than eight weekly sessions if you make the time shorter. It wasn't the amount of session time that bothered me. It was the actual time we spent in each section."

On the other hand, some participants suggested to maintain synchronous online format and to develop asynchronous online format due to its convenience. Eric was one of the participants who appreciated online intervention because he found advantages in online format services. He said:

> "I would rather be on the computer rather than [in-person]. Because technically, there are

some things that I can still do like I can eat and it doesn't bother you guys as long as my mute button is off or I can go like I can go to the bathroom or brush my teeth like that and still watch that kind of thing."

Similarly, Mike also preferred online formats to in-person intervention. He suggested that the SIERA can be transformed to an asynchronous format and still benefit participants. He mentioned, "I think asynchronous would be actually pretty good idea, especially during the academic year. Because then you have a lot more flexibility with classes."

Likewise, although there were mixed opinions on the SIERA delivery format, study participants provided thoughtful feedback to develop the SIERA intervention to be more beneficial and helpful for future participants.

Take-home Messages

Study participants articulated their overall reflection and satisfaction of the SIERA intervention. Participants reported that they enjoyed the SIERA group in various ways because SIERA played significant roles in (a) improving their well-being and (b) providing human interaction during the pandemic. First and foremost, participants found that the SIERA intervention was *very helpful for them in terms of improving the overall well-being*. For example, study participants presented that the SIERA lessons were very impactful for their well-being and daily life. Megan indicated the SIERA intervention was helpful for managing her everyday life in terms of emotion regulation. She said:

"This particular program has helped me come to get to know why I'm having certain emotions in certain situations and to be able to figure out, rather how to control my emotions in those situations, especially high-stress situations."

Hannah also shared that the SIERA intervention helped her to fill out the gap in her social

interaction that she has been experiencing because now she could understand functions of emotions in interpersonal relationships. She said:

> "Okay, I don't know if this makes any sense. Alright, I feel like for people who are neurotypical, the world has like everybody speaking French. Ok? So, they know stuff that I don't know. Like we both get presented with the same information. They understand that information plus extra information, often the same interaction. I only got what was covered in the interaction. They're like. 'You don't know about French?' I'm like, 'No.' So this class teaches me some of the French. Does that make any sense?"

Mike also shared that the SIERA intervention taught him useful skill sets that he can utilize in his life, which helped his psychological well-being during the pandemic. He said:

> "One specific thing that I think I learned that would be most helpful is I think more having sort of like a toolkit of different strategies. This is probably the most helpful thing I learned from the group."

Furthermore, participants also articulated their satisfaction of the SIERA intervention that they *enjoyed the group and appreciated the interaction with group members*. Diana mentioned, "I liked the group. I really enjoyed the snacks (in the face-to-face group). And I really enjoyed meeting the new peers a lot." Amelia stated her experience with SIERA was by saying, "I would say things went pretty well. So 4 [satisfied] maybe?" Mason stated his satisfaction of the intervention by saying, "Um, probably five and a half." when five meant very satisfied. Tyler also indicated that the SIERA was a nice experience for himself. He said, "And I felt like it was a pretty good experience. Everyone got along. And sometimes relatable. And I feel good." Shelby was also expressed her satisfaction with the SIERA group that she enjoyed working with other group members who she can relate to more and the quality intervention itself. She mentioned:

> "I just really like working with you guys because we're all kind of in the same boat or at least very similar ones. And then as I said before, [the facilitator] is a very good, humoured person. So, it made the group easier because you weren't like really cheap tricks. It is like we were all in this together. A lot more helpful. And more enjoyable."

Similarly, Michelle also expressed her satisfaction with the group that all the group members were nice to each other and that she found positivity during the pandemic. She said:

> "None of you are sour or mean. Like it was just genuinely a positive environment. And I liked that a lot. You guys are awesome. Really You are. And I hope that I can continue to talk to you guys. That I hope we can keep communicating like this. But seriously though, why not keep up communication? Pretty cool. I like you. You are decent people."

As reported by the participants, the eight weeks of SIERA intervention was beneficial for the young adults with ASD because it provided not only the knowledge about emotion regulation but also the opportunities to interact with others who they can relate and understand more, which also increased participants' satisfaction of the intervention.

Integration of Quantitative and Qualitative Results

The purpose of this study was to evaluate the feasibility and efficacy of SIERA, a group format of modified DBT emotion regulation skills training. The current study participants presented positive changes in emotion regulation skills after the SIERA intervention. Particularly, participants showed an increase in emotional acceptance by showing a decrease in psychological inflexibility/experiential avoidance (M = 30.88 to 25.47, d = .68); showed an increase in DBT skills use (DSS), which is appropriate coping strategies (M = 1.55 to 1.98, d = .90); showed an increase in cognitive reappraisal (M = 4.06 to 4.91, d = .89), which is considered as a positive emotion regulation strategy; and showed a decrease in expressive suppression (M =

4.13 to 3.71, d = .31), which is considered as a negative emotion regulation strategy. Also, some parents of participants reported a decrease in their child's emotion dysregulation such as reactivity (M = 13.69 to 5.00, d = 2.12) and dysphoria (M = 8.54 to 4.62, d = .63).

The focus group and individual interviews further strengthened the quantitative findings in an *increase of adaptive emotion regulation strategies* (e.g., DBT skills use and cognitive reappraisal) and a *decrease of maladaptive emotion regulation strategies* (e.g., expressive suppression). Furthermore, it proved *the feasibility of the intervention* by demonstrating their acceptability, practicality, and satisfaction of SIERA. Megan presented improvement in use of DBT emotion regulation skills in her daily life when she faces emotionally distressed situations. She stated:

> "Oh, definitely, the 'Think before I act.' That has been the biggest noticeable change… But instead of that [feeling upset], I kind of went to myself. I need to check the facts. I need to figure out what I'm feeling right now. And then kind of go from there. And it happened almost instantly and it was right after the incident, and I was like 'oh, hey, I used my wise mind there.' So it is becoming more and more natural. Yeah, it's great."

In addition to the improvement of DBT emotion regulation skills, participants also reported changes in emotion regulation strategies that they frequently used. To be more specific, Hannah described an increase in cognitive reappraisal, which is a positive emotion regulation strategy that helps individuals change emotional state through cognitive reconstruction and reinterpretation of situations. She stated:

> "I've been less sad. Because when bad things happened, that already makes me sad that it's happening. But by overreacting, that makes me even more sad. I had to be. You know what I'm saying? It is like you can't stop bad things from happening. But if you can

regulate how you feel when that happen, then you won't be as sad, you won't be sadder."

Brian also described a decrease in expressive suppression by utilizing his emotion awareness and taking actions, which is a negative emotion regulation strategy that hide one's ongoing emotions rather than processing them. He mentioned, "Like I said, [my emotion regulation] has gotten better because if this is your pervasive recognition when I am stressed, then I am taking a break or whatever it cools me down." As he stated, the SIERA intervention encouraged participants to process emotional distress rather than suppress the emotions.

Though the participants did not specifically verbalize changes in psychological inflexibility/experiential avoidance as they presented in the quantitative results, the young adults reported that they *felt pleasant emotions more frequently and were able to be aware of their emotions* after completion of SIERA. Megan stated that the most noticeable changes that she has experienced after completion of SEIRA is the way she thinks and feels in her daily life. She said, "I've definitely been happier, calmer, and a lot more rational. I don't think as impulsively anymore." Amelia also stated SIERA made her have more pleasant emotions in daily living by saying, "Let me think. I am definitely more in "Blue Zone" for sure."

Along with experiencing more pleasant emotions in daily life, participants also indicated their improvement in emotion awareness as one of the outcomes that they recognized through participating in SIERA. Alex reported his own emotion awareness has been enhanced after the SIERA intervention. He stated, "I got a little bit more clarity on what my feelings like… Most of the time, I've become aware of why I felt the way I did and whether not acting on that feeling is worth it." Mike also stated emotion awareness is something he learned out of the SIERA intervention that he did not seem to possess before the intervention. He said, "I think personally, I know more what's going on or what I'm thinking about. So I would assume that would be a

change compared to not having this at all." Similarly, Tyler also stated that SIERA encouraged him to be aware of how emotions come and go by saying, "… I feel like being aware of how stress went away."

In addition, all the participants expressed their experience with SIERA was positive. Amelia stated her experience with SIERA was positive by saying, "I would say things went pretty well. So 4 [satisfied] maybe?" Mason stated his satisfaction of the intervention by saying, "Um, probably five and a half." when five meant very satisfied. Tyler also indicated that the SIERA was a nice experience for himself. He said, "And I felt like it was a pretty good experience. Everyone got along. And sometimes relatable. And I feel good."

In short, both quantitative and qualitative results showed that the SIERA participants presented more use of adaptive emotion regulation strategies (e.g., DSS and cognition reconstruction) and had pleasant emotions in daily life, while they showed less use of maladaptive emotion regulation strategies (e.g., expressive suppression) and decreased emotion dysregulation (e.g., reactivity and dysphoria) with completion of the SIERA intervention along with having satisfactory experiences.

CHAPTER 5: DISCUSSION

The purpose of this study was to evaluate the feasibility and efficacy of a modified DBT skills training program on emotion regulation for young adults with ASD. To accomplish this, explanatory mixed methods research design was used to collect both pre- and post-measures and focus group interviews, which were conducted one week after the completion of the eight-week SIERA intervention. Quantitative data obtained from young adults with ASD were analyzed using the IBM Statistical Package for the Social Sciences (SPSS) version 25.0 and qualitative data were analyzed using the HyperRESEARCH 4.0.3. A two-tailed paired *t*-test was conducted to compare changes in participants' emotion regulation pre- and post-intervention; and thematic analysis was also conducted to capture study participants' lived experience with the SIERA intervention. This chapter provides a discussion of the findings. Also, implications in practice, education, and future research directions are addressed.

Clinical Efficacy

According to the quantitative results, young adult participants in this current study showed (a) a significant decrease in psychological inflexibility/experiential avoidance, (b) a significant increase in positive emotion regulation strategies (e.g., DBT skills use and cognitive reappraisal), (c) a significant decrease in emotion dysregulation (e.g., reactivity and dysphoria) and (d) a slight decrease in maladaptive emotion regulation strategies (e.g., dysfunctional coping skills and expressive repression) even though no statistically significant change was found. In other words, the study participants who completed SIERA showed substantial improvement in acceptance and positive emotion regulation strategies, whereas they showed slight reduction in inappropriate emotion regulation strategies.

Since there is little DBT skills training research on young adults with ASD, this researcher also drew some inferences from similar interventions on other disability groups in this section. The improvements in participants' emotion regulation through SIERA were consistent with other stand-alone DBT skills training research in different clinical disorders, including individuals with ASD, BPD, eating disorders, mood disorders, substance use disorders, and have suicidal ideation (e.g., Cavicchioli et al., 2019; Decker et al., 2019; Frazier & Vela, 2014; Hartmann et al., 2019; Kamody et al. 2020; McNair et al. 2017; Muhomba et al., 2017; Neacsiu et al. 2018; Southward et al., 2021; Tobon et al. 2020; Wilks et al., 2018).

Changes in Acceptance

Acceptance refers to embracing one's feelings and experiences without trying to control or judge them (Segal et al., 2002), which also implies having the ability to accept undesirable thoughts and feelings. As Linehan (2015) stated, DBT was developed based on careful consideration of balancing both acceptance and change because a single focus on change can cause additional distress for people who are emotionally sensitive. Accordingly, SIERA was designed not only to change/reduce one's unwanted emotions but also to understand/accept the emotions. Thus, SIERA includes a series of exercises to increase individuals' emotion awareness, to increase experience of positive emotions, and to decrease unwanted emotions that can promote emotional acceptance and changes of unwanted emotions. Young adult participants in this current study presented an improvement in emotional acceptance after finishing the eight-week of SIERA, which was consistent with other acceptance-based intervention studies.

Up to date, little DBT skills training research on young adults with ASD were conducted, but similar interventions on other disability groups were drawn. Several studies found that acceptance plays a central role in the understanding of one's emotion dysregulation and

psychological well-being because the use of acceptance is associated with decreased negative affect (Kashdan et al., 2006; Kotsou et al., 2018; Shallcross et al., 2010). Acceptance and commitment therapy (ACT; Hayes, 2012) is one of acceptance-based therapies that shows individuals' decrease in psychological inflexibility through the therapy. Cancer patients who had an ACT intervention presented increased psychological flexibility after the intervention (Feros et al., 2013), individuals with multiple sclerosis who were in ACT group showed improvement in psychological flexibility (Nordin & Rorsman, 2012), and individuals with chronic pain who participated in ACT group also showed slight increase in psychological acceptance (McCracken et al., 2013). Furthermore, individuals who participated in another acceptance-based intervention, mindfulness-based cognitive therapy (MBCT; Segal et al., 2002), also showed increase in psychological flexibility after finishing the intervention (Maddock et al., 2019; Pots et al., 2014).

Changes in Adaptive Emotion Regulation Skills

SIERA was originally developed to support young adults with ASD to learn and utilize adaptive emotion regulation skills. Participants in the current study presented overall improvement in adaptive emotion regulation strategies, particularly an increase in DBT skills (e.g., wise mind, focusing on positive aspects, self-care, etc.) and cognitive reappraisal after completion of SIERA. A sizable body of literature supported individuals who underwent DBT skills training group showed an increase of adaptive emotion regulation skills. For example, individuals with anxiety and depression (Neacsiu et al., 2014; Southward et al., 2021), borderline personality disorder (Chugani et al., 2013; McMain et al., 2017; Rizvi & Steffel, 2014), substance use disorder (Cavicchioli et al., 2019), and Veterans with suicidal ideation (Decker et al., 2019) showed increase in DBT skills use upon completion of DBT skills training group

interventions. Moreover, binge eating adolescents who participated in the modified DBT skills training group intervention reported increase in both cognitive reappraisal and DBT skills use (Kamody et al. 2020). One study was conducted on young adults with ASD, in which participants who underwent the modified DBT emotion regulation group intervention also showed increase in their cognitive reappraisal after completion of the intervention (Hartmann et al., 2019).

Changes in Emotion Dysregulation

Several elements in DBT skills training intervention reduce emotion dysregulation directly or indirectly through emotion regulation skills (Chapman & Hope, 2020). Caregivers of the SIERA participants reported that their adult child with ASD demonstrated a significant decrease in emotion dysregulation (e.g., reactivity and dysphoria) after the completion of the intervention. A review by Frazier and Vela (2014) supported that a stand-alone DBT skills training showed a clinically significant improvement in treating anger and aggression in various populations, including transitioning youth, individuals with intellectual disabilities, oppositional defiant disorder, and returning citizens. Results of the SIERA intervention were aligned with the existing stand-alone DBT skills training literature. To be more specific, anxious and depressed adults (Neacsiu et al., 2018), college students with mood disorders (Panepinto et al., 2015), adolescents with ASD (Haney, 2017), individuals with BPD traits/significant emotion dysregulation (Kells et al., 2020), Veterans with suicidal ideation (Decker et al., 2019), and individuals with substance use disorders (Cavicchioli et al., 2019; Wilks et al. 2018) who participated in a stand-alone DBT skills training intervention all demonstrated decrease in emotion dysregulation by presenting fewer negative emotions (e.g., anger, depression, and anxiety) and less intense emotional reactions.

Changes in Maladaptive Emotion Regulation Strategies

Although SIERA participants demonstrated a significant increase in adaptive emotion regulation strategies and a decrease in emotion dysregulation, they showed a slight reduction in maladaptive emotion regulation strategies such as dysfunctional coping skills and expressive suppression, which was not statistically significant. This finding did not support the results of Muhomba et al. (2017) that college students with mood disorders demonstrated a significant change in dysfunctional coping skills after finishing their DBT skills group program. This inconsistency may come from several reasons such as different length of the intervention, participants' different primary diagnosis, and different content focus areas. First, the length of SIERA consisted of eight sessions, whereas Muhomba et al. (2017)'s intervention was 10-week long. Also, the SIERA participants showed lower score in dysfunctional coping strategies at the pre-intervention due to not having severe mental disorders. On the other hand, Muhomba et al. (2017)'s study participants demonstrated higher score in dysfunctional coping strategies at pre-intervention owing to their clinical diagnosis of mental disorders. Although little research has done, Lochman (1985) found the relationship between the length of treatment and the intervention outcomes that a longer session intervention produced more significant changes in behavior than a shorter session intervention. Even though the two session difference may not be extensive, it is plausible that participants can learn additional skills or have more days to practice learned skills during the additional sessions and duration. Second, considering the different clinical diagnoses between the current study and Muhomba et al. (2017) that participants had different baseline scores in dysfunctional coping strategies at pre-intervention is likely to be confounding variables that contributed to the difference in the results in dysfunctional coping skills changes after the completion of the intervention. Third, the SIERA intervention mainly

focused on teaching and learning *adaptive emotion regulation strategies* instead of *not using maladaptive emotion regulation skills*. Thus, SIERA participants may continue to use or did not reduce their use of maladaptive emotion regulation strategies, while they increased the use of newly learned adaptive emotion regulation strategies at a faster rate.

In addition, from a neuroscience perspective, unlearning may not be as feasible as learning new skills/tasks (Ramirez & Arbuckle, 2016). Memories are formed by synapse plasticity that a connection between two neurons becomes stronger when a presynaptic neuron consistently activates a postsynaptic neuron, whereas the connection gets weaker if the presynaptic neuron consistently fails to make the postsynaptic neuron fire a spike (Hebb, 1949). That is, once memories are formed from learning, they stay in brain rather than disappear. Accordingly, SIERA participants may show little changes in reducing the use of existing maladaptive emotion regulation strategies because they may continue to use maladaptive emotion regulation strategies while they are also using newly learned adaptive emotion regulation strategies. Furthermore, the SIERA participants did not present severe psychiatric issues. Originally, DBT was developed to treat individuals with BPD who are chronically suicidal and have severe psychiatric problems. On the other hand, young adult participants in this present study did not report having any severe clinical behavioral and/or psychiatric issues that may have contributed to pre-existing dysfunctional thinking or behaviors. As a result, the change in maladaptive emotion regulation strategies might be minimal, which led statistically non-significant change.

Feasibility of Intervention

Bowen and researchers (2009)'s conceptualization of feasibility encompasses eight dimensions, which includes: (a) acceptability, (b) demand, (c) implementation, (d) practicality,

(e) adaptation, (f) integration, (g) expansion, and (h) limited-efficacy testing. Since the current study was one of the few studies to adapt an existing evidence-based, manualized DBT skills training program for young adults with ASD, not all aspects of feasibility were possible to investigate. Overall, results of the current study showed some evidence of feasibility even though there are certain areas that may need further refinements and replications given more time and resources. Among the eight dimensions by Bowen et al. (2009), integration and expansion were not applicable dimensions to measure as they solely investigate the implications with an organization in which the service is provided. The other six dimensions were addressed in the present study by providing some preliminary evidence from the quantitative and qualitative results.

Acceptability pertains to the participants' reaction to the intervention (Bowen et al., 2009). Though no direct measure of acceptability was conducted, both the quantitative and qualitative results supported acceptability. Quantitatively, a 100% of the completion rate with a mean attendance of 97.8% were reported. Qualitatively, according to the focus group interviews, participants indicated that SIERA was a feasible and acceptable intervention as they expressed positive feedback. Particularly, the qualitative results showed the evidence of participants' satisfaction and the appropriateness of the intervention as they perceived the invention would benefit them. Demand is defined as the use of selected intervention activities among the participants or settings (Bowen et al., 2009). The results from the current study showed some aspects of demand, as reported in the qualitative data that participants expressed their interest and intention to use the learned skills in daily life. Although demand from the systemic level was not appropriate to address at this point of the study, individual level of demand was indeed addressed in the SIERA intervention. Implementation refers to whether an intervention can be

implemented as planned/proposed in an uncontrolled design (Bowen et al., 2009). Use of the fidelity checklist in the present study indicated that implementation was shown to be excellent. For practicality, some aspects were evident, as a majority of the participants showed that they were able to carry out the learned activities and do so with positive effects. However, other aspects of practicality such as cost-effectiveness analysis and utilization by clinical staff were not appropriate to measure (Bowen et al., 2009). Adaptation is defined as changing original intervention contents or procedures to be appropriate in a new situation to accommodate different population or format (Bowen et al., 2009). Other study results (e.g., Hanley, 2017; Hartmann et al., 2019) were shown that adaptation outcomes were promising, but no formal process outcomes comparison could be made due to the preliminary nature of this present study. As discussed above, results from the current study demonstrated some limited-efficacy testing by showing an improvement in the overall emotion regulation profile, including an increase of acceptance and learned positive emotional coping skills, though no significant reduction of maladaptive emotion regulation skills were demonstrated.

In addition to the conceptualization of feasibility by Bowen et al. (2009), a handful of intervention research further supported that a modified stand-alone emotion regulation skills training program can be feasible for individuals in need. A pilot study conducted by Rizvi and Steffel (2014) and Moritz et al. (2021) bolstered the limited-efficacy testing that their participants who have ADHD reported the program that they completed was acceptable with significant improvements in emotion regulation. In addition, the acceptability was further strengthened by recent research of Cavicchioli et al. (2020), Decker et al. (2019), Moritz et al. (2021), and Rizvi and Steffel (2014) that their adapted DBT skills group program was feasible in

terms of having lower attrition/high attendance rates along with having positive feedback from the study participants.

Strengths

The purpose of this study was to evaluate the initial feasibility and efficacy of the SIERA intervention, that was adapted from an existing evidence-based DBT skills training program. A major strength of the current study is that SIERA is unique in at least in seven aspects: (a) focus on young adults with ASD, (b) focus solely on teaching individuals' adaptive emotion regulation skills and the measure of the targeted skills taught, (c) improved sample size as compared to existing emotion regulation skills training program on young adults with ASD, (d) use of focus group interviews of major stakeholders to review and modify the content before the field testing, (e) use of fidelity checklist to test study fidelity, (f) inclusion of an additional parent observation rating for emotion dysregulation, and (g) use of mixed methods to corroborate both clinical and feasibility results. Below, these strengths will be further elaborated in detail.

First, while ample studies focus on emotion regulation for young children with ASD, there are only three emotion regulation studies on non-children with ASD. Thus, the design and delivery of emotion regulation skills to adult is novel. Second, the three studies that focused on transitioning youth and young adults with ASD had the primary outcome measures focused on not only emotion regulation skills but also social skills. Third, their sample size is smaller than this current study. To be more specific, an unpublished research conducted by Haney (2017) described social skills improvement in four adolescents with ASD through the combined emotion regulation and interpersonal relationship intervention. Her results showed adolescents' improvement in social skills with greater increment of the interpersonal effectiveness skills and emotion regulation skills after the intervention. Hartmann et al. (2019)'s study focused on two

emotions (anger and anxiety) in seven young adults with ASD because the purpose of their modified intervention is improving social interactions of young adults with ASD through the enhancement of emotion regulation skills, which showed no group level improvement in emotion regulation outcomes. Huntjens et al. (2020)'s research is a study protocol of emotion regulation intervention, which only described their future intervention implementation plan.

Fourth, in addition to focusing on the clinical development of emotion regulation intervention, this study also built on the existing limited three studies on young adults with ASD with much improved research design including the use of a systematic input from end-users to provide feedback, revision of the intervention materials from stakeholders and individuals with ASD, larger sample size, and implemented fidelity check. To be more specific, the SIERA intervention was developed and revised based on a formal and systematic focus group consisted of multi-informants' feedback (i.e., individuals with ASD, practitioners, parents, and researchers). Initially, the SIERA manual was reviewed by young adults with ASD (n = 3), parents of transitioning youth with ASD (n = 2), practitioners (n = 3), and researchers (n = 3). Then, a combination of three individual interviews and two group interviews (n = 2, 3) were conducted to solicit input on the content and delivery of SIERA to better suit this clinical population. Input was used to ensure the intervention manual and materials were more user-friendly. As a result, SIERA participants (n =18) expressed little difficulties in understanding the manual or the contents. Fifth, by incorporating fidelity check each session, the intervention was delivered as intended, therefore increasing the scientific confidence about effectiveness of the fidelity check by the same co-facilitator across all the groups.

Sixth, the current study includes a multi-informant rating (e.g., EDI-13) along with self-rating measures. Despite various advantages of self-reports, the self-report method has

limitations including participants' extreme responding and constraints on self-knowledge (Paulhus & Vazire, 2007). By incorporating a parent rating on participants' emotion dysregulation status, additional observation in participants' changes in emotion dysregulation was possible, which eventually improved the reliability in the SIERA outcomes.

Lastly, the current study used a mixed method research design that collected both quantitative and qualitative data from the participants. Using a mixed methods study has several advantages in research including collect rich and comprehensive data and appreciation research data more in-depth (Creswell & Creswell, 2018). In this current study, by having both quantitative and qualitative data from the participants, the feasibility and efficacy of SIERA was explicitly explained. Especially, the conceptualization of feasibility by Bowen et al. (2009) was also conspicuously addressed by having both quantitative and qualitative data.

Limitations

Nevertheless, the current study has a few limitations that need to be taken into consideration when interpreting the results. The limitations of the current study are: (a) relatively small sample size, (b) changes in delivery formats, (c) reliance of self-reported measures on major emotion regulation skills learning, (d) lack of research rigor, and (e) not using standardized diagnostic tests.

First, although the sample size of this study was larger than the existing three studies mentioned above, the sample size of 18 was still relatively small. Furthermore, most participants (n = 14) in the current study were students who just graduated from high school or in college. Thus, results cannot be generalized to the ASD population of different groups.

The second limitation of the SIERA intervention study was the change in the delivery format due to COVID-19. Although the test of potential group difference was rejected between

the one face-to-face group and three online groups, study participants felt more fatigue due to the use of Zoom. Also, the sample size of the face-to-face group was extremely small, which indicated a high likelihood of low power to detect any effect size. In addition, those who participated in the SIERA synchronous online format had less opportunities to socialize with other group members and facilitators because of the limitation of not sharing the same physical space. Thus, further study to compare the potential differences of in-person and online must be warrant.

The third limitation of SIERA was the reliance on self-reported measures. Although the current study employed one parent-rating on emotion dysregulation status, the quantification of skills was self-rated report to compare changes in one's psychological flexibility, emotion regulation skills learning, and frequent use of emotion regulation strategies. For example, one study participant reported clinically incorrect response in one of the pre-surveys. Thus, it would be more helpful to include other measures that can objectively examine individuals' changes and/or utilization of emotion regulation skills in daily life to increase the consistency of reporting, as well as understanding of the generalizability of the skills learned in other contexts.

The fourth limitation of SIERA is lack of a higher standard of rigorous research design. The current study employed a single group, pre- and post-test comparison of an intervention without follow-up sessions. Although this researcher checked on participants individually after completion of each group through checking-in phone calls and emails, treatment effect was not verified. Future research is recommended to include a control group and follow-up sessions to increase the rigor of intervention study. Related to research design, since the current study was at the early stage of an adaptation and development of an intervention as a dissertation study, there were improved feasibility measures that needs to be further implemented. In addition, other

feasibility dimensions that expand to the systems level such as the implementation at community setting clinics could enhance the utility of promising interventions.

The last limitation of this study was that there were no standardized diagnostic tests to verify participants' ASD diagnosis. The current study participants self-reported their primary diagnosis with the credential of the provider to be included in the SIERA intervention. Thus, it is recommended to add diagnostic evaluation of ASD in the future research to verify participants formal diagnosis that can further improve the validity of SIERA.

Implications

The current study results indicated that a stand-alone modified DBT emotion skills training is feasible for young adults with ASD. Also, study participants demonstrated a substantial improvement in psychological flexibility and adaptive emotion regulation strategies, decline in emotion dysregulation, as well as some decrease in inappropriate emotion regulation strategies. The following sections discuss further on implications in practice, education, and research.

Implications in Practice

The present study findings add to the support of offering a type of rehabilitation service that teaches brief and skills-oriented emotion regulation strategies for young adults with ASD. Results of this study proved the initial feasibility and efficacy of an adapted DBT emotion regulation skills training on young adults with ASD. These results should be taken into account when considering what and how to provide psychoeducation/skills-based training services to individuals with ASD.

Specific to practices, first, this type of skills-based training may be helpful for young adults with ASD, particularly during the transition period by learning essential skills to manage

their emotions in unexpected situations. As previously mentioned, transition to adulthood is a vulnerable time for many individuals with ASD because of the limited appropriate services during and after high school (Kucharczyk et al., 2015; Roux et al., 2015, 2021), the core characteristics of ASD, and many unexpected new life changes that would add more stressors and challenges. Accordingly, transitioning youth and young adults with ASD are less prepared than their peers to navigate new roles and identities as an adult, which further causes additional distress to them. Considering that the SIERA intervention supported young adults with ASD to strengthen adaptive emotion regulation skills, counseling practitioners can provide such service to transitioning youth and young adults with ASD to equip them with positive and effective coping strategies to better handle their challenges they face in different life domains.

Second, skills learned in SIERA are likely to benefit the mental health aspect of individuals with ASD. In adult services for ASD, social skills training (e.g., Laugeson, 2017) and/or vocational skills training programs (e.g., Wehman et al., 2013) have been mostly provided for transitioning youth and young adults with ASD as part of rehabilitation counseling services. On the other hand, mental health services, such as teaching individuals to manage their stress and emotions was often neglected for transitioning youth and young adults with ASD despite increased service needs reported by stakeholders and individuals with ASD (Anderson et al., 2018; White et al., 2016). This was in part due to the clinicians' perception that DBT may not a very effective treatment modality (White et al., 2020) owing to the characteristics of ASD (e.g., alexithymia, poor flexibility, poor problem solving, and difficulty reading social and emotional cues) that may impede effective emotion regulation (Mazefsky & White, 2014). However, given the direct impact of emotion dysregulation on social impairment and psychiatric issues on individuals, emotion regulation needs to be addressed as an underlying mechanism to yield a

successful rehabilitation process and individuals' overall functioning (Weiss, 2014). With the initial evidence gathered from this current study, it provides some promise to addressing a psychological mechanism by teaching concrete skills of emotional acceptance and adaptive emotion regulation strategies to enhance the overall emotion regulation status. Thus, rehabilitation counseling service can expand its scopes to address the underlying psychological mechanism to potential improve the many aspects of one' life domains.

Third, the results of this intervention inform practitioners the importance of teaching positive skills for individuals with ASD. The SIERA intervention focused on teaching and learning adaptive emotion regulation skills rather than addressing removal of the dysfunctional coping skills that many individuals with ASD already have. In other words, the SIERA intervention addressed positive features rather than focused on deficits/pathology (Seligman & Csikszentmihalyi, 2000). The preliminary evidence collected from the current study further implies the positive and strengths-based approach in rehabilitation services maximize service outcomes in individuals with ASD.

Implications in Education

The current study findings provide an area that can add to further rehabilitation counseling education as a profession. First, results of this present study lay the groundwork in accumulating viable evidence-based practice in rehabilitation counseling education. Evidence-based practice (EBP) refers to the application or translation of research findings to the particular situation to provide quality services to individuals (Dijkers et al., 2012). Evidence-based practice is especially pivotal in rehabilitation counseling because it is relevant to the rehabilitation counseling profession's accountability, best practices, and quality outcomes (Chan et al. 2015). Thus, being consumers of evidence-based practice allows educators to train pre-service students

as competent rehabilitation counselors working with clients with similar mental health issues that a viable practice can improve the rehabilitation outcomes.

Second, findings from this study allude to the inclusion of viable counseling practice to the rehabilitation counseling field. With psychology as the science, counseling as the profession, and rehabilitation as the specialty area (Wright, 1980), rehabilitation counseling program has brought faculty from diverse disciplines to provide quality education to students since the merger into Council for Accreditation of Counseling and Related Educational Programs (CACREP) (Leahy et al., 2018). Counseling theory is one of the core courses for students to learn and apply in counseling skills and theoretical background in the practice (CACREP, 2015). Although traditional counseling theories are taught in class, more contemporary or "third wave" therapeutic approach (Hayes et al., 2004) such as dialectical behavior therapy and acceptance and mindful-based counseling approaches are less addressed during the coursework. Considering the initial evidence gathered from this current study had a significant influence on young adults with ASD, rehabilitation counselor educators should be cognizant of including promising counseling approaches in their training. Relatedly, since rehabilitation counseling is a highly applied profession, rehabilitation counselor training programs have strong component of clinical practicum and internship where students learn the knowledge and theories and apply to working with people with disabilities. Thus, rehabilitation counselor educators and clinical supervisors can promote contemporary counseling practice and training in practicum and internships, as well as supervision in this area.

Implications in Research

The results of the current study provide promising research directions in rehabilitation counseling and disability studies. First and foremost, the current study strengthens the empirical

support for stand-alone DBT skills training research. Standard DBT has a wealth of evidence supporting the treatment effectiveness and rigorous research has been extensively conducted for diverse disability groups. However, in most community settings, stakeholders' demand for treatment is high, but resources are frequently limited to implement standard DBT. Fortunately, ample research has also shown clinical and research effectiveness in stand-alone DBT skills training. The preliminary results of SIERA inform researchers that stand-alone DBT skills training can continuously implement to resource-limited community clinical settings to support individuals in need.

Second, the SIERA results suggested an additional research paradigm for young adults with ASD that DBT skills training can be effective in psychosocial outcomes. While most rehabilitation research for ASD has traditionally focused on individuals' social skills deficits; maladaptive behaviors; and vocational outcomes (e.g., Berry et al., 2018; Clarke et al., 2016; Karalunas et al., 2018; Laugeson et al., 2015; Leekam et al., 2011; Smith et al., 2015), little research has been conducted in emotion regulation. The preliminary results of SIERA proposed that such programs can further complement existing ASD research, which can eventually contribute to providing holistic rehabilitation services. Also, the results of this pilot study can flourish ASD research by expanding the research agendas, which would further illuminate less addressed concerns and issues of individuals with ASD in research.

Future Research Directions

The results of this preliminary emotion regulation study provided a promising foundation in teaching emotion regulation skills for young adults with ASD. However, more research will in fact be necessary to refine the novel findings and to provide further evidence supporting its utility in various areas. First and foremost, replication of this intervention with larger sample size

is recommended to understand the efficacy of skills training on emotion regulation as an effective intervention for young adults with ASD. Along with having a larger sample size, applying more rigorous research design is also suggested in the future. Including this present research, most emotion regulation intervention studies have utilized pre- and post-research design (e.g., Haney, 2017; Hartmann et al., 2019) and none of the existing research has been using the randomized controlled trial design, which is considered the most rigorous research design (Beck et al., 2020). Thus, start with having a control or waitlist group would allow a stronger comparison of the treatment effect of the intervention. Furthermore, adding follow-up sessions to sustain participants' learned skills would heighten the clinical outcomes of the research. Although the treatment efficacy of the current research was very promising, the larger gains of this research were limited to psychological flexibility; adaptive emotion regulation skills learning; and diminished unpleasant emotions. The reduction of maladaptive emotion regulation strategies in this study was very small. It is unknown yet, if teaching positive coping skills is adequate to decrease maladaptive emotion regulation strategies, which could further affect the outcomes. Thus, investigating the potential effects of different types of coping skills could be another future research direction along with follow-up sessions.

Second, enhancing other aspects of the feasibility dimensions needs to be scrutinized for better understanding of the application and utility of the intervention. For instance, the rating of the fidelity could be enhanced by having an independent rater, instead of the co-facilitator to check for fidelity to avoid unintentional biases. Certain feasibility evaluation can be also improved by implementing a more formal rating scale. For instance, an acceptability rating can be added in addition to program or participant satisfaction, which was used in the current study. A more formal tracking of the actual utilization of learned skills by administering follow-up data

collection can be further used to understand demand aspect of feasibility. Though certain aspects of practicality and adaptation were studied in the present study, they were limited due to the nature of this preliminary research that the intervention was conducted within a higher education setting for research purposes. Thus, replicating this intervention in a community setting clinic, where the nature and infrastructure are better fit for the provision of clinical services, may allow the investigation of other aspects of practicality as defined by Bowen et al. (2009). Accordingly, the feasibility concept of expansion and integration can also be deeply examined to further increase the utility and effectiveness of the intervention.

Third, although this intervention had undergone focus group interviews with individuals with ASD and stakeholders to review and provide suggestions for making the content and the delivery model more tailored for young adults with ASD before the implementation, additional mindful modification of the intervention still needs to be considered for the future research. According to the post-intervention focus group interview results, participants in the current study still had some suggestions for improvement. Recent studies have suggested that CBT is beneficial to individuals with ASD and intellectual and developmental disabilities (IDD), but the delivery method needs to be matched with individuals' cognitive abilities (Ekman & Hiltunen, 2015; Scarpa & Lorenzi, 2013; Shepherd & Beail, 2017). DBT skills training also includes the principles of CBT. Thus, further modification needs to be carefully examined in relation to participants' cognitive profile. Particularly, in this present research, the participants suggested adding one additional session to check on their understanding and acquisition of particular skills (e.g., check the facts, opposite action, and problem-solving skills). This suggestion further implies teaching such skills that require participants' different cognitive abilities needs to be discreetly elaborated by repeating the skills multiple times during the intervention, breaking

down the concepts/contents into bite size concepts, maximizing visual materials, and including an additional session to check in participants' learning.

Fourth, additional assessment and formal diagnosis testing should be included in future research to establish the validity of the emotion regulation intervention for this particular group of individuals who have various functioning levels and comorbid disorders. As this intervention study is designed to run as a group format, similar functioning levels among participants in a group is pivotal to maintain the group learning pace and participants' confidence in learning. Thus, having the formal screening and/or assessment would support clinical diagnosis of ASD. For example, screening measures such as the Social Responsiveness Scale-2 (SRS-2; Constantino & Gruber, 2012) and Social Communication Questionnaire (SCQ; Rutter, Bailey, et al., 2003) would strengthen the initial screening process. Also, having other clinicians administrating a formal diagnosis such as Autism Diagnostic Interview-Revised (ADI-R; Rutter, LeCouteur et al., 2003) and Autism Diagnostic Observation Schedule-2 (ADOS-2; Lord et al., 2012) would help with a better characterization of the autism sample. In addition, including assessments that can verify individuals' functioning level (e.g., adaptive functioning, cognitive ability, and severity of comorbidities) will also needs to be taken into account for future intervention, considering the influence of such features on individuals' learning. For instance, Achenbach System of Empirically Based Assessment (ASEBA) Adult Self-Report and Adult Behavior Checklist (ASR and ABCL; Achenbach et al., 2003) and Wechsler Adult Intelligence Scale-IV (WAIS-IV; Weschler, 2008) can measure individuals' adaptive functioning and cognitive ability. Also, anxiety inventories such as Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006) and State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983), as well as depression questionnaires like Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001)

and Beck Depression Inventory-II (BDI-II; Beck et al., 1996) would identify the existence and/or severity of comorbidity of mental health conditions. This is especially important because it is speculated that a lower decrease in dysfunctional coping skills from the current study could be attributed to the participants not having a severe comorbidity of mental disorders. These indicators will also allow researchers to evaluate how they affect emotion dysregulation by strengthening the relationship between mental health and emotion regulation.

Fifth, future studies should consider family/parent involvement in the intervention. The current research included one measure that caregivers rated their perception of the overall emotion dysregulation status of their adult child that can cross validate the self-rating of our participants. However, the rating of DBT skills learning could be further improved through direct observation by clinician or other family members. Family plays an imperative part of individuals with ASD's transition to adulthood as parents often maintain caregiving roles in this age range (Chamak & Bonniau, 2016), as well as provide other types of support even beyond adulthood. According to the initial focus group feedback from stakeholders (e.g., parents and practitioners) and individuals with ASD that Lee and colleagues (2020) conducted, families' involvement was recommended in the SIERA intervention in terms of utilizing learned emotion regulation skills at home more often with support from the family. Thus, by implementing the parent version of SIERA intervention while or before their adult child is participating in SIERA, future research can anticipate and maximize young adult participants' daily emotion regulation skills practice in various settings.

Sixth, having a consistent delivery format and testing a different delivery modality is recommended for the future. With the service accessibility issue, compounded by the impact of COVID-19 in early 2020, the use of telehealth services has expanded. The current study was

originally intended to run the intervention in a face-to-face format, but COVID-19 precipitated it to be delivered via synchronous online format. Though a very small sample size (n = 3) group was run in-person and no significant difference was detected between the face-to-face group and the rest of the synchronous online groups, the test of different delivery modes must be investigated with additional planful research design. This further recommends future research direction in which SIERA can be delivered through various formats including face-to-face, synchronous online, and asynchronous online. Diverse formats would increase participants' accessibility to such interventions.

Lastly, implementing standard DBT for young adults with ASD also can be considered for the future. The current study focuses on emotion regulation, which is one of the four components of DBT skills training. Other skills training modules such as mindfulness, distress tolerance, and interpersonal effectiveness have not been extensively incorporated in this current study. Inclusion of the other skills could potentially further enhance the individuals' stress tolerance level and interpersonal skills, which often present as common challenges of young adults with ASD. Furthermore, by integrating individual counseling, as needed phone coaching, and consultation team to provide continuous long-term service, longer treatment effects may be guaranteed, which could benefit young adults with ASD extensively.

Conclusion

Emotion regulation is an essential ability that individuals need to possess because, in the immediate term, emotion regulation enables individuals to control unwanted emotions and have more pleasant emotions. Subsequently, these lead to a better performance in daily life/at work/at school, enrich interpersonal relationships, and lead to overall well-being. However, existing emotion regulation intervention has less emphasis on young adults with ASD despite increased

service needs by stakeholders and individuals with ASD. To respond to the needs of stakeholders and individuals with ASD, SIERA was developed by adapting *DBT® Skills Training Manual* (2nd ed) for young adults with ASD. The results of SIERA indicated that the modified stand-alone DBT emotion regulation skills training was feasible and effective in improving adaptive emotion regulation strategies and decreasing emotion dysregulation. Therefore, providing emotion regulation intervention for young adults with ASD seems promising as part of rehabilitation services to enhance an individual's daily functioning and overall quality of life.

APPENDICES

APPENDIX A: IRB Documentation

MICHIGAN STATE
UNIVERSITY

EXEMPT DETERMINATION

January 16, 2019

To: Ka Lai Gloria Lee

Re: **MSU Study ID:** STUDY00001895
Principal Investigator: Ka Lai Gloria Lee
Category: Exempt 1
Exempt Determination Date: 1/16/2019

Title: The Effectiveness of Dialectical Behavior Therapy Skills Training on Emotion Regulation for College Students with Autism Spectrum Disorder

This study has been determined to be exempt under 45 CFR 46.101(b) 1.

Principal Investigator (PI) Responsibilities: The PI assumes the responsibilities for the protection of human subjects in this study as outlined in Human Research Protection Program (HRPP) Manual Section 8-1, Exemptions.

Continuing Review: Exempt studies do not need to be renewed.

Modifications: In general, investigators are not required to submit changes to the Michigan State University (MSU) Institutional Review Board (IRB) once a research study is designated as exempt as long as those changes do not affect the exempt category or criteria for exempt determination (changing from exempt status to expedited or full review, changing exempt category) or that may substantially change the focus of the research study such as a change in hypothesis or study design. See HRPP Manual Section 8-1, Exemptions, for examples. If the study is modified to add additional sites for the research, please note that you may not begin the research at those sites until you receive the appropriate approvals/permissions from the sites.

Change in Funding: If new external funding is obtained for an active study that had been determined exempt, a new initial IRB submission will be required, with limited exceptions.

Reportable Events: If issues should arise during the conduct of the research, such as unanticipated problems that may involve risks to subjects or others, or any problem that may increase the risk to the human subjects and change the category of review, notify the IRB office promptly. Any complaints from participants that may change the level of review from exempt to expedited or full review must be reported to the IRB. Please report new information through the study's workspace and contact the IRB office with any urgent events. Please visit the Human Research Protection Program (HRPP) website to obtain more information, including reporting timelines.

Office of Regulatory Affairs
Human Research Protection Program

4000 Collins Road
Suite 136
Lansing, MI 48910

517-355-2180
Fax: 517-432-4503
Email: irb@msu.edu
www.hrpp.msu.edu

Personnel Changes: After determination of the exempt status, the PI is responsible for maintaining records of personnel changes and appropriate training. The PI is not required to notify the IRB of personnel changes on exempt research. However, he or she may wish to submit personnel changes to the IRB for recordkeeping purposes (e.g. communication with the Graduate School) and may submit such requests by submitting a Modification request. If there is a change in PI, the new PI must confirm acceptance of the PI Assurance form and the previous PI must submit the Supplemental Form to Change the Principal Investigator with the Modification request (available at hrpp.msu.edu).

Closure: Investigators are not required to notify the IRB when the research study can be closed. However, the PI can choose to notify the IRB when the study can be closed and is especially recommended when the PI leaves the university. Closure indicates that research activities with human subjects are no longer ongoing and have stopped. This means there is no further interaction or intervention with human subjects and/or no further analysis of identifiable private information.

For More Information: See HRPP Manual, including Section 8-1, Exemptions (available at hrpp.msu.edu).

Contact Information: If we can be of further assistance or if you have questions, please contact us at 517-355-2180 or via email at IRB@msu.edu. Please visit hrpp.msu.edu to access the HRPP Manual, templates, etc.

Exemption Category. Please see the appropriate research category below from 45 CFR 46.101(b) for full regulatory text. [123]

Exempt 1. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

Exempt 2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Exempt 3. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if:
(i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

Exempt 4. Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Exempt 5. Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

Exempt 6. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

[1]Exempt categories (1), (2), (3), (4), and (5) cannot be applied to activities that are FDA-regulated.
[2] Exemptions do not apply to research involving prisoners.
[3] Exempt 2 for research involving survey or interview procedures or observation of public behavior does not apply to research with children, except for research involving observations of public behavior when the investigator(s) do not participate in the activities being observed.

APPENDIX B: Demographic Information

Instructions: Please complete the following form as completely as possible. Please answer all questions truthfully. This information is being collected for research purposes only. Your information will be kept confidential and will not be shared in any way by the research team.

1. Gender:

    ____ Male

    ____ Female

    ____ Not listed (please specify): _____

    ____ Prefer not to respond

2. Age (years): _____

3. Race/Ethnicity (Check all that apply):

    ____ African American/Black

    ____ Asian/Pacific Islander

    ____ Hispanic/Latino

    ____ Native American/American Indian

    ____ White

    ____ Multiracial

    ____ Not listed (please specify): _____

    ____ Prefer not to respond

4. What diagnosis were you given? _____

5. At what age were you diagnosed? _____

6. Who provided you with the diagnosis?

    ____ Clinical psychologist

    ____ School psychologist

    ____ Medical doctor

    ____ Other: Please specify: _____

7. Do you have any identified disabilities? (besides Autism Spectrum Disorder), such as ADHD, speech delay, or other special needs?

    ____ Yes

____ No

7a. If you answered "yes" to #7, please indicate what other delays/disability(ies) you have been identified as having.

_____

8. What is your highest level of education?

____ Some high school

____ High school diploma

____ Some college

____ Other: Please specify: _____

9. What is your current occupation?

____ Students (go to Q 10)

____ Employed (go to Q11)

____ Unemployed (go to Q12)

____ Other: Please specify: _____

10. What is your current year in school?

____ Post high school such as trade or technical training

____ Undergrad Freshman

____ Undergrad Sophomore

____ Undergrad Junior

____ Undergrad Senior

____ Other: Please specify: _____

10a. Are you enrolled as a: (college students only)

____ Full-time student

____ Part-time student

10b. What is your current or intended major? (college students only)_____

11. Are you currently employed?

____ Full time paid employment

____ Part-time

____ Paid employment

____ Supported employment (e.g. works in a paid job with some assistance, such as a job

coach)

____ Works in a paid job with modifications

____ Sheltered workshop

____ On the job training

____ Prevocational setting

____ Activity setting/day program

____ Volunteer activities

____ Does not work or attend school

____ Other: Please specify: _____

12. What is your plan? (e.g., going to college, get a job, etc.)

_____

13. Marital Status

____ Single

____ Married/With a partner

____ Separated/Divorced

____ Widowed

____ Prefer not to respond

14. Have you received any of the following services in school? (both college and high school students)

____ IEP

____ Transition plan

____ 504 accommodation

____ Other: Please specify: _____

15. What is your current living arrangement?

____ Living at home with family members

____ Living in a residential hall

____ Other relatives

____ Assisted living

____ Own home/apartment

____ Group home

____ Supervised apartment

____ Larger facility

____ Residential school

16. What is your current sources of financial support for your studies/trainings?

____ I am primarily responsible.

____ Another family member is primarily responsible.

____ I share responsibility with another family member.

____ A professional agency is primarily responsible.

____ Other: Please specify: _____

17. Are you receiving any of the following supports? (Yes, No, Does not Need)

____ Case management

____ Career counseling

____ Job placement

____ Job coach/supported

____ Employment

____ Residential placement

____ Respite care

____ Transportation

____ Medical care

____ Dental care

____ Occupational therapy

____ Physical therapy

____ Speech therapy

____ Psychotherapy/mental health

____ Counseling

____ Behavioral intervention

____ Social security benefits or other

____ Government/disability benefits

____ Money for personal expenses

____ Other: Please specify: _____

APPENDIX C: Acceptance and Action Questionnaire-II

Below you will find a list of statements. Please rate the truth of each statement (for the agreed time period) in the column on the right, using the following scale:

1	**2**	**3**	**4**	**5**	**6**	**7**
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1.	My painful experiences and memories make it difficult for me to live a life that I would value	
2.	I'm afraid of my feelings	
3.	I worry about not being able to control my worries and feelings	
4.	My painful memories prevent me from having a fulfilling life	
5.	Emotions cause problems in my life	
6.	It seems like most people are handling their lives better than I am	
7.	Worries get in the way of my success	

Total score =

Note. No permission is required to use this measure.

APPENDIX D: DBT-Ways of Coping Checklist

The items below represent ways that you may have coped with stressful events in your life. We are interested in the degree to which you have used each of the following thoughts or behaviour to deal with problems and stresses.

Think back on the **LAST ONE MONTH** in your life. Then check the appropriate number if the thought/behaviour is: never used, rarely used, sometimes used, or regularly used (i.e., at least 4 to 5 times per week). Don't answer on the basis of whether it seems to work to reduce stress or solve problems—just whether or not you use the coping behaviour. Use these response choices. Try to rate each item separately in your mind from the others.

0= never used, 1= rarely used, 2=sometimes used, 3=regularly used

I have:

1. Bargained or compromised to get something positive from the situation.	0, 1, 2, 3
2. Counted my blessings.	0, 1, 2, 3
3. Blamed myself.	0, 1, 2, 3
4. Concentrated on something good that could come out of the whole thing.	0, 1, 2, 3
5. Kept feelings to myself.	0, 1, 2, 3
6. Made sure I'm responding in a way that doesn't alienate others.	0, 1, 2, 3
7. Figured out who to blame	0, 1, 2, 3
8. Hoped a miracle would happen	0, 1, 2, 3
9. Tried to get centered before taking any action.	0, 1, 2, 3
10. Talked to someone about how I've been feeling.	0, 1, 2, 3
11. Stood my ground and fought for what I wanted.	0, 1, 2, 3
12. Refused to believe that it had happened.	0, 1, 2, 3
13. Treated myself to something really tasty	0, 1, 2, 3
14. Criticized or lectured myself.	0, 1, 2, 3
15. Took it out on others.	0, 1, 2, 3
16. Came up with a couple of different solutions to my problem.	0, 1, 2, 3
17. Wished I were a stronger person – more optimistic and forceful	0, 1, 2, 3
18. Accepted my strong feelings, but not let them interfere with other things too much.	0, 1, 2, 3
19. Focused on the good things in my life.	0, 1, 2, 3
20. Wished that I could change the way that I feel it.	0, 1, 2, 3
21. Found something beautiful to look at to make me feel better.	0, 1, 2, 3
22. Changed something about myself so that I could deal with the situation better.	0, 1, 2, 3
23. Focused on the good aspects of my life and gave less attention to negative thoughts or feelings.	0, 1, 2, 3
24. God mad at the people or things that caused the problem.	0, 1, 2, 3
25. Felt bad that I couldn't avoid the problem.	0, 1, 2, 3
26. Tried to distract myself by getting active.	0, 1, 2, 3
27. Been aware of what has to be done, so I've been doubling my	

efforts and trying harder to make things work.	0, 1, 2, 3
28. Thought that others were unfair to me.	0, 1, 2, 3
29. Soothed myself by surrounding myself with a nice fragrance of some kind.	0, 1, 2, 3
30. Blamed others.	0, 1, 2, 3
31. Listened to or played music that I found relaxing.	0, 1, 2, 3
32. Gone on as if nothing had happened.	0, 1, 2, 3
33. Accepted the next best thing to what I wanted.	0, 1, 2, 3
34. Told myself things could be worse.	0, 1, 2, 3
35. Occupied my mind with something else.	0, 1, 2, 3
36. Talked to someone who could do something concrete about the problem.	0, 1, 2, 3
37. Tried to make myself feel better by eating, drinking, smoking, taking medications, etc.	0, 1, 2, 3
38. Tried not to act too hastily or follow my own hunch.	0, 1, 2, 3
39. Changed something so things would turn out right.	0, 1, 2, 3
40. Pampered myself with something that felt good to the touch (e.g., a bubble bath or a hug).	0, 1, 2, 3
41. Avoided people.	0, 1, 2, 3
42. Thought how much better off I was than others.	0, 1, 2, 3
43. Just took things one step at a time.	0, 1, 2, 3
44. Did something to feel a totally different emotion (like gone to a funny movie).	0, 1, 2, 3
45. Wished the situation would go away or somehow be finished.	0, 1, 2, 3
46. Kept others from knowing how bad things were.	0, 1, 2, 3
47. Focused my energy on helping others.	0, 1, 2, 3
48. Found out what other person was responsible.	0, 1, 2, 3
49. Made sure to take care of my body and stay healthy so that I was less emotionally sensitive.	0, 1, 2, 3
50. Told myself how much I had already accomplished.	0, 1, 2, 3
51. Made sure I respond in a way so that I could still respect myself afterwards.	0, 1, 2, 3
52. Wished that I could change what had happened.	0, 1, 2, 3
53. Made a plan of action and followed it.	0, 1, 2, 3
54. Talked to someone to find out about the situation.	0, 1, 2, 3
55. Avoided my problem.	0, 1, 2, 3
56. Stepped back and tried to see things as they really are.	0, 1, 2, 3
57. Compared myself to others who are less fortunate.	0, 1, 2, 3
58. Increased the number of pleasant things in my life so that I had a more positive outlook.	0, 1, 2, 3
59. Tried not to burn my bridges behind me, but leave things open somewhat.	0, 1, 2, 3

Note. No permission is required to use this measure.

APPENDIX E: Emotion Regulation Questionnaire

The Emotion Regulation Questionnaire is designed to assess individual differences in the habitual use of two emotion regulation strategies: cognitive reappraisal and expressive suppression.

Instructions and Items:

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**

1.	( )	When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.
2.	( )	I keep my emotions to myself.
3.	( )	When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about*.
4.	( )	When I am feeling *positive* emotions, I am careful not to express them.
5.	( )	When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.
6.	( )	I control my emotions by *not expressing them*.
7.	( )	When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.
8.	( )	I control my emotions by *changing the way I think* about the situation I'm in.
9.	( )	When I am feeling *negative* emotions, I make sure not to express them.
10.	( )	When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation

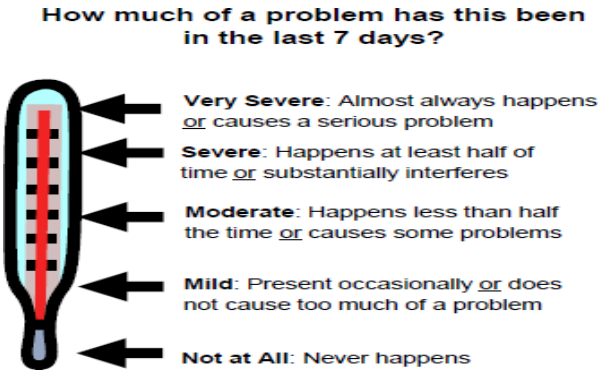
Note. No permission is required to use this measure.

APPENDIX F: Emotion Dysregulation Inventory – Reactivity Short Form and Dysphoria

About the Person Being Rated: Initial:_____Today's Date: _____

Relationship to Person Being Rated: _____

Remember to consider how the person is with others and how the person does in different situations and places.



	Not at all	Mild	Moder -ate	Severe	Very Severe
Has explosive outbursts					
Cries or stays angry for 5 minutes or longer					
Has extreme or intense emotional reactions					
Hart to calm him/her down when he/she is mad or upset					
Does not seem to enjoy anything					
Emotions go from 0 to 100 instantly					
Has trouble calming him/herself down					
Very little makes him/her happy					
Reactions are usually more severe than the situation calls for					
Refuses to leave the house or go to school or activities unless forced					
Not responsive to praise or good things happening					
Seems sad or unhappy					
Appears uneasy through the day					

Note. Permission has been granted by the authors to use this scale.

APPENDIX G: Group Cohesiveness Scale

How strongly do you agree with each of the following statements concerning your experience with the group?

	Strongly disagree		**Agree**		**Strongly agree**
1. I feel accepted by the group.	1	2	3	4	5
2. In my group, we trust each other.	1	2	3	4	5
3. The members like and care about each other.	1	2	3	4	5
4. The members try to understand why they do the things they do; try to reason it out.	1	2	3	4	5
5. The members feel a sense of participation.	1	2	3	4	5
6. The members appear to do things the way they think will be acceptable to the group.	1	2	3	4	5
7. The members reveal sensitive personal information or feelings.	1	2	3	4	5

Note. No permission is required to use this measure.

APPENDIX H: Helping Alliance Questionnaire-II

Instructions: These are ways that you may feel or behave in relation to your main facilitator. Consider carefully your relationship with your facilitator, and then make each statement according to how strongly you agree or disagree. Please mark each of 19 items.

	Strongly disagree	**Disagree**	**Slightly disagree**	**Slightly agree**	**Agree**	**Strongly agree**
1. I feel I can depend upon the facilitator.	1	2	3	4	5	6
2. I feel the facilitator understands me.	1	2	3	4	5	6
3. I feel the facilitator wants me to achieve my goals.	1	2	3	4	5	6
4. At times, I distrust the facilitator's judgment.	1	2	3	4	5	6
5. I feel I am working together with the facilitator in a joint effort.	1	2	3	4	5	6
6. I believe we have similar ideas about the nature of my problems.	1	2	3	4	5	6
7. I generally respect the facilitator's views about me.	1	2	3	4	5	6
8. The procedures used in my group are not well suited to my needs.	1	2	3	4	5	6
9. I like the facilitator as a person.	1	2	3	4	5	6
10. In most sessions, the facilitator and I find a way to work on my problems together.	1	2	3	4	5	6
11. The facilitator relates to me in ways that slow up the progress of the group.	1	2	3	4	5	6

12. A good relationship has formed with my facilitator.	1	2	3	4	5	6
13. The facilitator appears to be experienced in helping people.	1	2	3	4	5	6
14. I want very much to work out my problems.	1	2	3	4	5	6
15. The facilitator and I have meaningful exchanges.	1	2	3	4	5	6
16. The facilitator and I sometimes have unprofitable exchanges.	1	2	3	4	5	6
17. From time to time, we both talk about the same important events in my past.	1	2	3	4	5	6
18. I believe the facilitator likes me as a person.	1	2	3	4	5	6
19. At times the facilitator seems distant.	1	2	3	4	5	6

Note. No permission is required to use this measure.

APPENDIX I: Weekly Progress Checklist

Today's Session: _____ Date: _____ Review: _____

Please answer the following questions.
Please choose the best description that represents your today's session experience:

	1 Strongly disagree	**2 Disagree**	**3 Neutral**	**4 Agree**	**5 Strongly agree**
Q1. I felt engaged and was able to participate in today's session.					
Q2. I could easily understand the content covered in today's session.					
Q3. I have learned something from today's session that I can apply to my emotion regulation.					

Q4. How was my mood **BEFORE** today's session?

5 I'm feeling excellent!	**4 I'm feeling prettygood!**	**3 I'm feeling a littleunsure.**	**2 I'm beginning tolose it.**	**1 I lost it. I need help.**

Q5. How is my mood **AFTER** today's session?

5 I'm feeling excellent!	**4 I'm feeling prettygood!**	**3 I'm feeling a littleunsure.**	**2 I'm beginning tolose it.**	**1 I lost it. I need help.**

APPENDIX J: SIERA Fidelity Checklist

SIERA Fidelity Checklist

Date of Session: _____ Session Topic: _____
Initial: _____

Session 1:

REMINDER	COMPONENT	SCORE*
Structure and Setting		
□	Attendance is taken	
□	Facilitator starts and ends the intervention on time	
□	Mindfulness practice is conducted in the beginning of the group	
□	Homework assignment is reviewed after the mindfulness practice	
□	Break time is provided	
□	Homework assignment is explained and demonstrated in the group	
□	The intervention space allows the forms or modes to be delivered adequately (e.g., large enough room)	
Dialectical Instruction		
□	Facilitator provides overview of topics covered in the curriculum	
□	Facilitator communicates content and activities clearly communicated with explicit instruction	
□	Facilitator responds to questions raised by participants	
□	Facilitator encourages participants active participation in discussion	
Experiential Activity		
□	Facilitator clearly explains steps of the practice activity	
□	Facilitator checks-in with participants during the practice activity	
□	Facilitator discusses their observations and links back to curriculum	
Intervention Content		
□	Group rules and roles are explained	
□	Explained the concept of wise mind	
□	Explained various scenarios of mindfulness practice	
□	Goals of emotion regulation are introduced	

*Scoring Key: 2= implemented; 1= partially implemented; 0= did not implemented; NA= not applicable

SIERA Fidelity Checklist

Date of Session: _____ Session Topic: _____
Initial: _____

Session 2:

REMINDER	COMPONENT	SCORE*
Structure and Setting		
□	Attendance is taken	
□	Facilitator starts and ends the intervention on time	
□	Mindfulness practice is conducted in the beginning of the group	
□	Homework assignment is reviewed after the mindfulness practice	
□	Break time is provided	
□	Homework assignment is explained and demonstrated in the group	
□	The intervention space allows the forms or modes to be delivered adequately (e.g., large enough room)	
Dialectical Instruction		
□	Facilitator provides overview of topics covered in the curriculum	
□	Facilitator communicates content and activities clearly communicated with explicit instruction	
□	Facilitator responds to questions raised by participants	
□	Facilitator encourages participants active participation in discussion	
Experiential Activity		
□	Facilitator clearly explains steps of the practice activity	
□	Facilitator checks-in with participants during the practice activity	
□	Facilitator discusses their observations and links back to curriculum	
Intervention Content		
□	Goals of emotion regulation are reviewed	
□	Model for describing emotions is introduced	
□	Ways to describe emotions is introduced	

*Scoring Key: 2= implemented; 1= partially implemented; 0= did not implemented; NA= not applicable

SIERA Fidelity Checklist

Date of Session: _____ Session Topic: _____
Initial: _____

Session 3:

REMINDER	COMPONENT	SCORE*
Structure and Setting		
□	Attendance is taken	
□	Facilitator starts and ends the intervention on time	
□	Mindfulness practice is conducted in the beginning of the group	
□	Homework assignment is reviewed after the mindfulness practice	
□	Break time is provided	
□	Homework assignment is explained and demonstrated in the group	
□	The intervention space allows the forms or modes to be delivered adequately (e.g., large enough room)	
Dialectical Instruction		
□	Facilitator provides overview of topics covered in the curriculum	
□	Facilitator communicates content and activities clearly communicated with explicit instruction	
□	Facilitator responds to questions raised by participants	
□	Facilitator encourages participants active participation in discussion	
Experiential Activity		
□	Facilitator clearly explains steps of the practice activity	
□	Facilitator checks-in with participants during the practice activity	
□	Facilitator discusses their observations and links back to curriculum	
Intervention Content		
□	Goals of emotion regulation are reviewed	
□	Functions of emotions are introduced	
□	Reasons of emotion dysregulation are introduced	
□	Myths about emotions are discussed	

*Scoring Key: 2= implemented; 1= partially implemented; 0= did not implemented; NA= not applicable

SIERA Fidelity Checklist

Date of Session: _____ Session Topic: _____
Initial: _____

Session 4:

REMINDER	COMPONENT	SCORE*
Structure and Setting		
□	Attendance is taken	
□	Facilitator starts and ends the intervention on time	
□	Mindfulness practice is conducted in the beginning of the group	
□	Homework assignment is reviewed after the mindfulness practice	
□	Break time is provided	
□	Homework assignment is explained and demonstrated in the group	
□	The intervention space allows the forms or modes to be delivered adequately (e.g., large enough room)	
Dialectical Instruction		
□	Facilitator provides overview of topics covered in the curriculum	
□	Facilitator communicates content and activities clearly communicated with explicit instruction	
□	Facilitator responds to questions raised by participants	
□	Facilitator encourages participants active participation in discussion	
Experiential Activity		
□	Facilitator clearly explains steps of the practice activity	
□	Facilitator checks-in with participants during the practice activity	
□	Facilitator discusses their observations and links back to curriculum	
Intervention Content		
□	Goals of emotion regulation are reviewed	
□	Mindfulness of current emotions are practiced	
□	TIP skills are introduced	
□	Check the facts is introduced	

*Scoring Key: 2= implemented; 1= partially implemented; 0= did not implemented; NA= not applicable

SIERA Fidelity Checklist

Date of Session: _____ Session Topic: _____
Initial: _____

Session 5:

REMINDER	COMPONENT	SCORE*
Structure and Setting		
□	Attendance is taken	
□	Facilitator starts and ends the intervention on time	
□	Mindfulness practice is conducted in the beginning of the group	
□	Homework assignment is reviewed after the mindfulness practice	
□	Break time is provided	
□	Homework assignment is explained and demonstrated in the group	
□	The intervention space allows the forms or modes to be delivered adequately (e.g., large enough room)	
Dialectical Instruction		
□	Facilitator provides overview of topics covered in the curriculum	
□	Facilitator communicates content and activities clearly communicated with explicit instruction	
□	Facilitator responds to questions raised by participants	
□	Facilitator encourages participants active participation in discussion	
Experiential Activity		
□	Facilitator clearly explains steps of the practice activity	
□	Facilitator checks-in with participants during the practice activity	
□	Facilitator discusses their observations and links back to curriculum	
Intervention Content		
□	Goals of emotion regulation are reviewed	
□	The definition of opposite action is explained	
□	When to use opposite action is explained	
□	Steps of opposite action is explained	
□	Figuring out opposite actions is discussed	

*Scoring Key: 2= implemented; 1= partially implemented; 0= did not implemented; NA= not applicable

SIERA Fidelity Checklist

Date of Session: _____ Session Topic: _____
Initial: _____

Session 6:

REMINDER	COMPONENT	SCORE*
Structure and Setting		
□	Attendance is taken	
□	Facilitator starts and ends the intervention on time	
□	Mindfulness practice is conducted in the beginning of the group	
□	Homework assignment is reviewed after the mindfulness practice	
□	Break time is provided	
□	Homework assignment is explained and demonstrated in the group	
□	The intervention space allows the forms or modes to be delivered adequately (e.g., large enough room)	
Dialectical Instruction		
□	Facilitator provides overview of topics covered in the curriculum	
□	Facilitator communicates content and activities clearly communicated with explicit instruction	
□	Facilitator responds to questions raised by participants	
□	Facilitator encourages participants active participation in discussion	
Experiential Activity		
□	Facilitator clearly explains steps of the practice activity	
□	Facilitator checks-in with participants during the practice activity	
□	Facilitator discusses their observations and links back to curriculum	
Intervention Content		
□	Goals of emotion regulation are reviewed	
□	The definition of problem solving is explained	
□	When to use problem solving is explained	
□	Steps of problem solving is explained	

*Scoring Key: 2= implemented; 1= partially implemented; 0= did not implemented; NA= not applicable

SIERA Fidelity Checklist

Date of Session: _____ Session Topic: _____
Initial: _____

Session 7:

REMINDER	COMPONENT	SCORE*
Structure and Setting		
□	Attendance is taken	
□	Facilitator starts and ends the intervention on time	
□	Mindfulness practice is conducted in the beginning of the group	
□	Homework assignment is reviewed after the mindfulness practice	
□	Break time is provided	
□	Homework assignment is explained and demonstrated in the group	
□	The intervention space allows the forms or modes to be delivered adequately (e.g., large enough room)	
Dialectical Instruction		
□	Facilitator provides overview of topics covered in the curriculum	
□	Facilitator communicates content and activities clearly communicated with explicit instruction	
□	Facilitator responds to questions raised by participants	
□	Facilitator encourages participants active participation in discussion	
Experiential Activity		
□	Facilitator clearly explains steps of the practice activity	
□	Facilitator checks-in with participants during the practice activity	
□	Facilitator discusses their observations and links back to curriculum	
Intervention Content		
□	Goals of emotion regulation are reviewed	
□	ABC skills are introduced	
□	Pleasant events list is introduced and participants chose events that they will do	
□	Participants set up their own mastery level	
□	Coping ahead situations were demonstrated	

*Scoring Key: 2= implemented; 1= partially implemented; 0= did not implemented; NA= not applicable

SIERA Fidelity Checklist

Date of Session: _____ Session Topic: _____
Initial: _____

Session 8:

REMINDER	COMPONENT	SCORE*
Structure and Setting		
□	Attendance is taken	
□	Facilitator starts and ends the intervention on time	
□	Mindfulness practice is conducted in the beginning of the group	
□	Homework assignment is reviewed after the mindfulness practice	
□	Break time is provided	
□	Homework assignment is explained and demonstrated in the group	
□	The intervention space allows the forms or modes to be delivered adequately (e.g., large enough room)	
Dialectical Instruction		
□	Facilitator provides overview of topics covered in the curriculum	
□	Facilitator communicates content and activities clearly communicated with explicit instruction	
□	Facilitator responds to questions raised by participants	
□	Facilitator encourages participants active participation in discussion	
Experiential Activity		
□	Facilitator clearly explains steps of the practice activity	
□	Facilitator checks-in with participants during the practice activity	
□	Facilitator discusses their observations and links back to curriculum	
Intervention Content		
□	Goals of emotion regulation are reviewed	
□	PLEASE skills are introduced	
□	DEAR MAN is explained and demonstrated	
□	Emotion regulation skills are reviewed	

*Scoring Key: 2= implemented; 1= partially implemented; 0= did not implemented; NA= not applicable

APPENDIX K: SIERA Focus Group Interview Questions

Importance of Intervention Contents

1. What are your thoughts on each of the topics that covered in SIERA? Please share your thought about the importance of each week.

2. Are there other topics you think is important to learn but have not covered in SIERA?

Feasibility of the Format

1. What are your thoughts on how possible this intervention format can be?

a) Group intervention with 4-5 participants and 2 facilitators

b) A total of 8 weekly sessions

c) Days and time that we chose

d) Place where the group is run (e.g., MSU campus, community, etc)

e) Each session for about 90 minutes with the how the intervention laid out

Benefits and Challenges of the Intervention

1. Please share your thoughts on any benefits that you had from the 8 weeks of Emotion Regulation intervention? In other words, what topics/lessons helped you the most?

2. Please share your thoughts on any challenges or difficulties of the 8 weeks of Emotion Regulation intervention? In other words, what needs to be changed and improved for the betterment of the intervention?

Suggestions to Enhance Intervention

1. Please share any suggestions for use to make this emotion regulation intervention better?

Final Thoughts

1. Are there any other aspects (other than the above) you can think of that are not mentioned?

2. How satisfied are you with the SIERA intervention?

3. Anything else that you want to share?

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