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Emotion Regulation and Autism Spectrum Disorders: A Literature Review

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Emotion Regulation and Autism Spectrum Disorders: A Literature Review

by

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Chapter 1: Introduction

Autism spectrum disorder (ASD) is considered to be a pervasive developmental disorder that is more prevalent in males than females (Lurigio, 2016). Goldstein, Naglieri, Rzepa, and Williams (2012) reviewed research in the area of autism suggesting that, “autism is the most complex developmental disorder that is empirically based and has cross-national diagnostic criteria” (Volkmar & Klin, 2005, p. 1002), meaning, that data used to define ASD was collected through direct behavioral observation.

A national parent survey study completed by the Center for Disease Control and Prevention (CDC) suggests that, 1 in 45 children, ages 3 through 17 were identified on the autism spectrum in 2014. The increase in the identification of autism may be linked to the changes in the criteria used to identify ASD (King & Bearman, 2009). A statistic provided by Autism Speaks (2017) stated that, “autism affects more than 70 million people worldwide. Around one- third of the people impact by autism are nonverbal. Around 1 in 5 children present with developmental regression, or loss of skills, such as language and social interests” (p. 25). The prevalence and diversity of skills in individuals with autism poses a challenge for educators. The challenge to meet the needs of this diverse population is requiring special education services to incorporate high-quality social, emotional, and behavioral interventions into the current education model.

Emotion dysregulation is an area that is not included in the diagnostic criteria of ASD, yet it is frequently discussed by parents, educators, and clinicians involved with ASD (Samson, Hardan, Lee, Phillips, & Gross, 2015a). Individuals on the autism spectrum have been noted to engage in tantrums or melt-downs as a response to an environmental stimulus, social situation, or

a strong emotion. Many individuals on the autism spectrum demonstrate deficits in their ability to elicit an effective emotion regulation (ER) strategy, which may increase the likelihood they will engage in maladaptive behaviors to manage their emotional states. The characteristics associated with ASD such as perspective taking, cognitive rigidity, difficulty reading social/emotional cues, and limited emotional language may directly impact effective ER for individuals on the ASD (Mazefsky & White, 2014).

Autism Spectrum Disorder Criteria/ Foundational Concepts

ASD is defined by the DSM-5 by three sets of behavior characteristics. The behavioral characteristics are split into two domains: social interaction/communication and repetitive/stereotyped behaviors. Using the DSM-5, autism criteria is met if an individual demonstrates qualitative impairments in social interaction, which include impairments of nonverbal behaviors, failure to develop peer relationships or lack of social and emotional reciprocity. The second area refers to qualitative impairments in communication, which include impairments in the ability to initiate or maintain conversations when language is present, idiosyncratic language use, or the lack of social imitative play. The third area is comprised of repetitive and stereotypical patterns of behavior, which involves restricted interests, preoccupation in behavior that is abnormal in intensity, compulsions, adherence to specific nonfunctional routines, or self-stimulatory behaviors.

A study conducted by Goldstein et al. (2012) examined the interrelationship among symptoms associated with ASD, revealing self-regulation as one of the core behavioral clusters associated with ASD. Several studies that examined emotion regulation revealed maladaptive emotion responses such as tantrums, aggressive behaviors, self-injurious behaviors, and

uncontrolled behavioral outbursts to be common for individuals with ASD. Further research is being conducted to examine emotion regulation for individuals on the autism spectrum in hopes to gain a better understanding of how/if the maladaptive emotional responses are a result of the core deficits associated with ASD. Researchers' are also studying interventions specific to emotion regulation to determine the effectiveness of each intervention for addressing emotion regulation deficits in individuals with ASD.

Importance of the Review

Based on the prevalence of ASD identification many professionals in the educational sector will encounter children on the autism spectrum. Since the current diagnostic criteria used to identify ASD does not include ER, it is important for professionals to have an understanding of the core behavioral characteristics of ASD as well as an understanding of how the characteristics of ASD impact ER. It is imperative that professionals conceptualize the impact that having ASD may have on an individual's ability to engage in effective ER. This information may help guide professionals to effective interventions that address deficits in ER and promote adaptive skill development in ER for individuals with ASD.

I am currently working as an autism specialist for an educational cooperative which serves seven school districts. Autism is the second largest disability served in my education cooperative. I am frequently asked by school professionals and parents about ER development in individuals on the autism spectrum. I have come to realize the importance that this topic has for people associated with ASD. I have also become aware of the lack of resources currently available in our community to address ER for the population impacted by ASD. In order to effectively support families and professionals working with the ASD population, I need to have

an understanding of interventions that are effective in teaching appropriate ER skills to individuals on the autism spectrum.

Focus of the Paper

The focus of this paper was to use literature to examine the effectiveness of cognitive emotional regulation interventions. I examined the effectiveness of cognitive behavioral therapy, cognitive reappraisal, and expressive suppression on the development of adaptive emotional regulation skills in school-aged children on the autism spectrum.

The studies included in Chapter 2 consist of peer-reviewed quantitative studies that examine emotion regulation interventions for children with ASD. Only studies ranging from 2011-2015 were included in the review found in Chapter 2. The participants included in the studies range from 6 to 20 years of age, met the diagnostic criteria for ASD, according to the DSM-IV or DSM-V, and were determined to have high functioning autism (HFA) or average to above average verbal expressive skills.

The literature included in Chapter 2 was located using the Academic Search Premier and PsychInfo databases. Some of the key words and word combinations I used include: *cognitive behavioral therapy, autism, school-aged children, emotional regulation, emotional reactivity, cognitive reappraisal, suppression, intervention, emotional experience, maladaptive behavior, emotional dysregulation, higher functioning autism, therapy, behavioral problems*. I also used information from the U.S. Department of Health and Human Services Centers for Disease Control and Prevention as well as the *Diagnostic and Statistical Manual of Mental Disorders-5th* edition.

Research Question

This literature review explores one question. What cognitive emotion regulation strategies are effective for increasing the use of adaptive regulation strategies in individuals on the autism spectrum?

Definitions

This section includes definitions for the terms that are used in Chapter 2.

Emotional Regulation is the process of effectively managing emotions in response to environmental demands; it is context-dependent and requires an individual to accurately identify the critical aspects of a situation. ER is the process that is responsible for monitoring, evaluating, and adjusting emotional reactions to achieve a goal (Weiss, 2014).

Cognitive Behavior Therapy is an approach that is structured by content-driven problem-solving by linking thoughts, feelings, and behaviors to develop effective behavior patterns (Friedburg & McClure, 2003). It focuses on monitoring and modifying negative thoughts that influence negative or maladaptive behaviors. CBT works to link the impact that thoughts and feelings have on an individual's behavioral or social response. It is a cognitive approach to impact an individual's beliefs, social rules, expectations for self and others.

Cognitive Reappraisal is an antecedent-focused strategy that attempts to reinterpret and emotional-eliciting situation in a way that alters its meaning and changes its emotional impact (Gross & John, 2003). This strategy is used prior to the activation of the emotional response or the behavioral response. It is considered to be a strategy that involves cognitive change (Samson et al., 2015a).

Expressive Suppression is a response-focused strategy that attempts to hide, inhibit, or reduce ongoing emotion-expressive behavior. This strategy is used once the emotion has been elicited and a behavioral response has already been exhibited. Is considered to be a strategy that involves modulating the behavioral expression of an emotion response (Samson et al., 2015a).

Typically Developing is an individual that is impacted by a developmental disability; their neuro-development is aligned with typical neurological development (Merriam-Webster, 2017).

Chapter 2: Review of Literature

This chapter reviews literature that examines the effectiveness of cognitive emotion regulation interventions designed to increase the use of adaptive emotional regulation strategies for individuals on the autism spectrum. Eight studies were reviewed in this chapter in chronological order based on content of the study. The chapter includes three sections: *Emotion Dysregulation Inventory* (EDI) self-regulation related to ASD, and cognitive behavioral therapy related to ASD. All the individuals included in the studies reviewed below met the DSM-IV-TR or DSM-V criteria for ASD, and had a full-scale intellectual quotient (FSIQ) above 70. However, two studies conducted by Berkovits, Eisenhower, and Blacher (2016), and Mazefsky, Day, Yu, Pilkonis, Siegel, and White (2016), included participants with a FSIQ above 50.

Emotion Dysregulation Inventory (EDI)

Mazefsky et al. (2016) examined the effectiveness of the *Patient-Reported Outcomes Information System* (PROMIS) guidelines to measure emotion dysregulation across verbal and nonverbal individuals with ASD. The researchers completed literature reviews on research related to emotion dysregulation in ASD as a process to develop the EDI content questions. The search included such terms as irritability, mood, coping, temperament, depression, anxiety, anger, frustration, reactivity, and lability (Mazefsky et al., 2016). Based on the literature reviewed, PROMIS guidelines and the researchers' extensive experience with ASD, a conceptual structure for emotion dysregulation was created to ensure that all relevant items were covered. A qualitative review of the EDI questions was completed by clinicians and researchers with experience in ASD from over ten academic and hospital sites. The researchers then completed nineteen cognitive interviews with parents of individuals with ASD ranging from verbal to

nonverbal. The researchers completed the interviews to assess the clarity of the questions and the meaning of the items included in the EDI. Once these processes were completed the researchers piloted the EDI on individuals with ASD who were in an inpatient psychiatric facility.

Once the piloted study was complete, the researchers selected 287 participants with *Autism Diagnostic Observation Schedule* (ADOS), a confirmed label of ASD in a psychiatric hospital setting. Out of the 287 participants, 80% were male, and 68 participants were not included in the analysis due to missing data. Most of the reports came from biological parents, the population represented in the study was primarily Caucasian, and the participants ranged in age from 4-20 years old. The participants were split into groups based on their verbal abilities as measured by the ADOS; the categories were labeled nonverbal/minimally verbal or verbal. The EDI was given to all the participants during the admission process and before they were discharged from the setting. Once the EDI was complete, a total score was calculated that summed up scores from all the items included. The researchers calculated an EDI change score by subtracting the EDI discharge scores from the EDI admission scores. The EDI change scores were only calculated on individuals that stayed in the facility for 14 days or longer. The analysis indicated that EDI discharge scores were significantly lower than the EDI intake scores.

The researchers used Pearson correlations to determine the relationship between variables. The results indicated that the EDI scores were not strongly correlated with age, FSIQ, or verbal ability. The study reviewed EDI data from individuals with a range of ASD symptom severity, verbal abilities, ages, and FSIQs. Which indicates that the EDI is a viable option to measure emotion dysregulation in many individuals with autism across different settings. This

study provided the first look the emotional process of individuals with ASD using the EDI.

Limitations of this study include a participant pool consisting solely of participants with ASD and unregulated parent visits in the population housed at the psychiatric facility.

Emotion Regulation Related to Autism

Goldstein et al. (2012) examined the relationship among the symptoms associated with ASD using the *Autism Spectrum Rating Scale (ASRS)*. The study consisted of two sample groups of children ages 6-18; the first group was rated by their parents and the second group was rated by their teacher. The parent group consisted of 1,881 children of which 1,024 were males. The group rated by teachers consisted of 2,171 children of which, 1,116 were males. Each of the children's behavior was documented using the ASRS. The ASRS scale is based on the criteria included in the DSM-IV-TR. The assessment looks at social/communication, unusual behaviors, self-regulation, peer socialization, adult socialization, social/emotional reciprocity, atypical language, stereotypy, behavioral rigidity, sensory sensitivity, and attention.

The exploratory factor analyses (EFA) were conducted on the 71 items included in the ASRS to examine the relationship among symptoms associated with autism. The results of the parent and teacher ASRS data suggested that a three-factor solution best represented the symptom groups associated with ASD. The following groups emerged: social/communication included items that assessed social, verbal, and nonverbal communication, unusual behaviors included stereotypical and repetitive behaviors, and self-regulation included inattention, impulsivity, and noncompliance. The identification of the behaviors categorized under the group self-regulation is important because it is not part of the DSM-V diagnostic criteria for ASD.

The relatively small size of this study indicates that more research is needed to further examine the convergence of social/communication symptoms and evaluate the impact that self-regulatory behaviors have in children on the autism spectrum.

Samson, Podell, Gross, Hardan, and Phillips (2015b) examined emotional regulation in individuals with ASD specifically targeting emotional reactivity and spontaneous use of an emotion regulation strategies (problem-solving, cognitive reappraisal, avoidance, distraction, venting, suppression, and relaxation). The participants included 21 individuals with ASD ages 8-20 and 22 typically developing (TD) individuals ages 8-20.

The participants were given an adapted *Reactivity and Regulation Situation Task*. The task consisted of 16 scenarios designed to elicit negative emotional reactions experienced in daily life. The scenarios were presented on the computer and covered topics such as family situations, social relationships, academic performance, or feeling physically uncomfortable. The participants were asked to read the scenario out loud and think about the situation. They were then asked to describe the first thought that came to their mind and the examiner recorded their response. The participants were then asked to rate the extent to which the scenario made them feel tense or worried on scale of 1 to 5, where a 1 equaled 'not at all' and 5 equaled "very much." Lastly, the participants were asked what they would do to calm themselves down and the examiner recorded their response. In the second block the examiner described the process of cognitive reappraisal to the participant. The description given was a simplified version stating that people can change their emotions by changing the way they think about the situation they are presented with or have been presented with. The scenarios were presented in the same order as the first block; however, if the participants rated the scenario as a 1 they did not have to repeat

the scenario. During the second round of the scenarios the participants were asked to think of the situation in a different way that was less worrisome/scary, meaning they were asked to use cognitive reappraisal. The participants were then asked to rate how tense or worried they felt using the same 1 to 5 rating scale as described above for each scenario.

The responses from Block 1 and Block 2 were analyzed to determine the average ratings, use of emotional regulation strategies, use of prompted cognitive appraisal (Block 2), and effectiveness of cognitive reappraisal (comparison of ratings from Block 1 to Block 2). The statements were categorized using the process model of emotional regulation (Gross, 1998) and types of spontaneous emotional regulation. The categories were as follows: avoidance, problem-solving, distraction, cognitive reappraisal, suppression, venting, relaxation, no regulation, and not codeable. After the responses were categorized they were rated by two independent raters.

The study revealed differences in the participants with ASD and the TD participants. The participants with ASD came up with cognitive reappraisal in fewer scenarios than the TD participants. The participants with ASD tended to use suppression as well. The results indicated that if the participants used cognitive reappraisal, both the ASD and the TD group benefited from the strategy. Suggesting that individuals with ASD can increase the number of reappraisals used during emotion eliciting scenarios given specific prompting. In research that had been done prior to this study, it was suggested that cognitive reappraisal may be linked to perspective taking, executive functioning, and cognitive linguistic abilities (Losh & Capps, 2006).

There were limitations to the study that should be considered when reviewing the results. The study used hypothetical written scenarios to elicit emotional responses, which may have limited some of the responses provided by the participants with ASD due to difficulties with

perspective taking. There was not a control task making it difficult to conclude that the differences demonstrated by the participants with ASD were specific to emotional regulation deficits.

The study did not look at the emotional regulation deficits in context of the core features of autism, such as sensory input or social/communication deficits. Future research should be conducted to address these limitations and provide a more comprehensive evaluation of emotional regulation strategies effective for individuals with ASD.

Samson, Wells, Phillips, Hardan, and Gross (2015c) examined the efficacy of adaptive and maladaptive ER strategies in individuals with ASD compared to TD individuals. The study examined emotion experience, frequency of ER strategy use, and efficacy of ER strategies. Parental data were collected from 31 parents of individuals with ASD and 29 parents of TD individuals. The parents completed an *Emotion Regulation Interview* (Werner, Goldin, Ball, Heimberg, & Gross, 2011) based off a process model of ER designed by Gross (1998) that assesses the use of ER strategies in stressful situations. The interview also included a wider range of ER strategies including: avoidance, problem-solving, seeking social support, sharing emotions, distraction, cognitive reappraisal, acceptance, expressive suppression, exercise, relaxation, and repetitive behaviors. Parents then rated the use and efficacy of the strategies during three emotional states anger, anxiety, and amusement. A rating scale 1= (never) to 5= (very often) was used to rate each of the three emotions targeted. Parents rated how often their child used each ER strategy during each of the three emotions and how effective their child was at implementing the strategy. The study also involved 27 individuals with ASD and 20 TD individuals that participated in the diary journaling. The daily diary entries were required to be

completed for a minimum of 10 days, the participant was asked to what extent they had experienced anger, anxiety, and amusement during the day, and the degree to which they used ER strategies (strategies used are listed above in the parent interview data). A rating system of 1= (not at all) to 5= (very much/strong) was used to rate emotions experienced as well as ER strategies.

The group differences were analyzed using ANCOVAs, because of the variation in the participant's age and FSIQ. A secondary analysis was completed to control emotion experience to determine if ER differences were based solely on differences in emotional experiences. The following results were collected from parent interviews and the participant's journaling:

Parent Interview

Emotion experience. The results collected from parent interview indicated that individuals with ASD experienced more anger and anxiety, and less amusement than the TD individuals.

Frequency of emotion regulation. The frequency at which individuals used ER strategies when experiencing anger differed from the TD individuals. The data analysis conducted using age and IQ as control variables indicated that individual with ASD used problem- solving, reappraisal, distraction, and acceptance less frequently than the TD individuals; however, they used repetitive behaviors more frequently than the TD individuals. When including emotional experience as an additional control variable, the groups demonstrated the same differences as listed above when age and IQ were the only two control variables.

When reviewing the use of ER strategies in the presence of anxiety, the individuals with ASD and the TD individuals differed. The data analysis conducted using age and IQ as control

variables indicated that individual with ASD used problem-solving, reappraisal, acceptance, and acceptance less frequently than the TD individuals; however, they continued to use repetitive behaviors more frequently than the TD individuals. When emotional experience was added in as an additional control variable an additional strategy was identified, social support, along with the ER strategies listed above. The frequency at which individuals with ASD used ER strategies when experiencing amusement differed from the TD individuals. The data analysis conducted using age and IQ as control variables indicated that individual with ASD used problem solving and acceptance less frequently than the TD individuals, however, they again used repetitive behaviors more frequently than the TD individuals. The same trend occurred when emotion experience was included as an additional control variable.

Emotion regulation efficacy. When regulating anger, individuals with ASD were less effective using problem-solving, social support, reappraisal, distraction, and acceptance than the TD individuals. When including emotional experience as an additional control variable, the differences listed above continued to be evident. Next, when regulating anxiety, individuals with ASD were less effective using problem solving, social support, reappraisal, and acceptance than the TD individuals. When emotional experience was added in as an additional control variable, the differences remained consistent.

Finally, when regulating amusement, individuals with ASD were less effective implementing problem solving, social support, and acceptance than the TD individuals. When emotional experience was included as an additional control variable, the differences remained.

Participant Daily Diary

Emotion experience. Individuals with ASD reported similar levels of anger and anxiety as the TD individuals. The individuals with ASD reported they experienced less amusement compared to the TD individuals.

Frequency of emotion regulation. The frequency at which individuals used ER strategies when experiencing anger differed from the TD individuals. The data analysis conducted using age and IQ as control variables indicated that individual with ASD used problem solving, reappraisal, distraction, acceptance, relaxation, and avoidance less frequently than the TD individuals. When including emotion experience as an additional control variable, additional strategies of social support and suppression were added to the strategies used less frequently by individuals with ASD. Individuals with ASD identified that they used repetitive behaviors more frequently than TD individuals when emotional experience was added. Next, in the domain of anxiety, individuals with ASD use of ER strategies differed from the TD group. The data analysis conducted using age and IQ as control variables indicated that individual with ASD used problem-solving, reappraisal, distraction, acceptance, relaxation, and avoidance less frequently than the TD individuals. When emotional experience was added in as an additional control variable, the differences remained the same. Lastly, in the realm of amusement, individuals with ASD use of ER strategies did not differ considerably from the TD group meaning that no ANCOVAs were completed.

In conclusion, the study revealed differences in emotional experience, use of ER strategies, and efficacy of ER strategies between individuals with ASD and TD individuals. It brought up some interesting contradictions to other studies reviewed in this chapter. This study

found that individuals with ASD used expressive suppression less frequently to cope with anger (self-report) and anxiety (parent report). Another interesting difference was noted in the data collected from parents and individuals around negative emotions during self-report; individuals with ASD did not show a difference from TD individuals this area. Previous studies have found that both parents and individuals report negative emotions in the domain of anxiety.

The study had limitations including: small sample size and the data collected was based on observational findings recorded once a day by the individual, which limits in the moment associations between the experience and the ER strategy.

Samson et al. (2015a) examined the role that emotional experience and emotional regulation have on maladaptive behaviors in individuals with ASD and typically developing (TD) individuals. The study used self and parent report questionnaires that assessed emotional experience, emotional regulation, and maladaptive behavior. The study consisted of 31 individuals on the autism spectrum and 28 TD individuals who were between the ages of 8 to 20 years old. The TD individuals went through an interview process that involved medical and psychiatric history as well as an IQ assessment.

The participants and their parents were sent questionnaires to complete online. *The Positive and Negative Affect Schedule* (PANAS) was used to assess emotional experience of the participants. It consisted of 20 items that measure positive and negative emotional experiences on a scale of 1 to 5, where a 1 means slightly impacted to a 5 meaning significantly impacted. The parents were asked to report on their child's emotional experiences. The participants completed *The Emotional Regulation Questionnaire* (ERQ) to assess their ability to regulate their emotional states. The questionnaire consisted of 10 items, six of the items assessed the use

of cognitive reappraisal, and four assessed the use of expressive suppression. The parents completed a questionnaire focusing on their child's responses to emotional stimuli. Maladaptive behaviors were assessed by the participant's parents using the *Vineland Adaptive Behavior Scales-2nd Edition* (VABS-2). The VABS-2 measures skills in the areas of socialization, communication, daily living skills, and motor skills to produce an overall adaptive behavior score.

The results of this study indicated that the ASD group used cognitive reappraisal less frequently than the TD group, resulting in increased negative emotions, which lead to increased levels of maladaptive behavior. The study used the combined effects of emotional experience and regulation to gain a better understanding of underlying mechanisms associated with maladaptive behaviors in ASD. The results suggest that interventions targeting the ability to use cognitive reappraisal may improve emotional experiences leading to a decrease in maladaptive behaviors in individuals with ASD.

The sample size studied is relatively small, so more research is needed in this area to determine the impact that emotional experience has on self-regulation and maladaptive behaviors. The study used a cross-sectional design to explore possible directional relationships between emotional experience, regulation, and maladaptive behavior which, does not allow conclusions to be made about causality.

Berkovits et al. (2016) conducted a study to examine emotion regulation deficits in children (ages 4-7) with ASD over a 2-year period. The study assessed characteristics that may relate to emotion regulation. The participants consisted of 108 children with ASD and their primary caregivers. All the participants met ASD criteria on the *Autism Diagnostic Observation*

Schedule 2 (ADOS-2), had a FSIQ of 50 or higher, and were in the age range of 4-7. Participants were also given the *Comprehensive Assessment of Spoken Language* (CASL-2) to measure grammatical and syntax skills as well as their pragmatic skills, which is the ability to use language in social situation. The participants were assessed twice during the first year and once in the second year. The data collected from the second assessment in Year 1 and the assessment in Year 2 was used for the study. All the procedures listed below were done in both Year 1 and 2 to evaluate changes over time.

The first measure filled out by the parents was the *Emotion Regulation Checklist* (ERC-ER) which consisted of 24 items related to emotion regulation (overall mood, ability to label emotions, ability to express emotions, ability to display appropriate emotions in positive/negative social situations) and liability/negativity (flexibility, changes in mood, dysregulation, and tendency to behave in a boisterous manner). The second measure used was *The Child Behavior Checklist 1½ -5 and 6-18* (CBCL), which measures socio-emotional and behavioral functioning. The CBCL 1½ -5 assesses children ranging from 1½ to 5 years old, and contained 100 items. The CBCL 6-18 assesses children ranging from 6-18 years old, and consisted of 113 items. The emotion dysregulation index (CBCL-EDI) for children 6-18 consisted of 18 questions. In this study, younger participants were given the CBCL-EDI; therefore, the administrators of the study eliminated questions related to self-harm and suicidality reducing the number of questions to 16. The third measure used was the *Social Skills Improvement System* (SSIS), which is a parent report questionnaire. It assesses skills in the areas of social, problem behaviors, and academics for children ages 3-18. The measure uses a 4-point frequency scale (never, seldom, often, most always); the scores are converted into a standard score with a mean of 100. The last measure

used was the *Social Responsiveness Scale* (SRS), which consisted of 65-items assessing social behaviors in children ages 4-18. SRS includes receptive, cognitive, expressive, and motivational aspects of social behavior as well as preoccupations associated with ASD.

The study used correlation analysis and linear regression to examine relationships over time (Year 1 and Year 2) between emotion regulation and other control variables (demographics, FSIQ, age, gender, family income, and level maternal education). The variables were only included if they were statistically relevant.

Relationship between emotion regulation and FSIQ. FSIQ and emotion regulation were analyzed to determine to what extent, if any, FSIQ impacts emotion regulation. The correlation between the two variables was not statistically significant, indicating that emotion regulation appears to be a function independent of cognitive ability.

Social and behavior functioning impacted by emotion regulation. When examining emotion regulation in relation to social skill abilities, behavioral functioning, and severity of autistic symptoms, the researchers found a high correlation between the variables. Meaning that the participants emotion regulation impacted their social and behavior functioning. This was evident when the ERC-ER data was analyzed and indicated that participants receiving a higher ERC-ER score in Year 1 demonstrated an increase in their social skills scores in Year 2. The participants that received a higher ERC-ER score in year one also exhibited a decrease in externalizing behaviors. Also, the participants that received a lower emotion dysregulation score in Year 1 on the CBCL demonstrated a decrease in internalization in Year 2. The participants that received a lower score on the ERC-ER in year one demonstrated stable social and behavior functioning over Year 1 and Year 2. On the CBCL, emotion dysregulation was a statistically

significant predictor of increased internalizing behaviors. This information indicates that emotion regulation is impacted by social and behavioral deficits, which are commonly associated with individuals demonstrating severe autistic symptoms.

Based on the level of stability of emotion regulation demonstrated by the data collected on the participants with ASD, this study found that emotion regulation can be effectively measured over time. The stability of emotion regulation found during this study also indicates that without targeted interventions emotion regulation and dysregulation remains consistent in young children with ASD. A strong correlation was found between emotion regulation abilities and social and behavioral functioning, along with the severity of symptoms related to autism. This relationship is significant as it suggests that deficits in emotion regulation maybe at the core of some of the maladaptive behaviors associated with ASD. The study also did not find a strong correlation between FSIQ and emotion regulation. This information indicates that a high FSIQ may not be a predictor of strong emotion regulation abilities.

The limitations of the study include the slightly differing results across measures used, the sample of individuals studied only included individuals with ASD, and parent reporting was used instead of direct observation of specific behaviors.

Cognitive Behavior Therapy Related to Autism

Scarpa and Reyes (2011) studied the effectiveness of developmentally modified *cognitive behavior therapy* (CBT) for young children with ASD. The study used an adapted version of the group CBT used by Sofronoff for young learners from ages 5-7 with ASD. The modifications that were made included short sessions, increased use of songs, stories, and play activities, as well as parent training. The study included 11 children total; two girls, and nine boys that could

follow verbal directions. The study focused on emotional regulation strategies specific to coping with anger or anxiety.

The researchers measured the participants' emotion regulation ability using strong images, short descriptions, or accounts of emotional experiences. The researchers then asked the child to provide a strategy they could use for the given situation. The participants' parents filled out an emotional regulation scale, frequency and duration data in minutes was collected on anxiety/anger episodes demonstrated by their child, and two question survey was created to determine parental confidence and parental confidence in their child's ability to handle anxiety and anger. The children were then assigned to either an experimental group (five children) or delayed-treatment control group (six children). The delayed-treatment control group started the intervention about a week after the experimental group ended. This allowed for comparison of skills between the two groups prior to the delayed-treatment control group started as well as after the both groups had completed the intervention.

The children were in groups of two-three children for 1 hour group meetings for 9 consecutive weeks. The sessions focused on skill building by teaching the children to recognize emotions within themselves and others, relaxation, physical, social, and cognitive tools. All nine of the sessions were structured the same; however, each session differed focusing on a specific skill related to emotional regulation. The parents participated in a group that concentrated on problem-solving and generalization strategies.

The results shared by the parents of the experimental group reported fewer outbursts and shorter duration per outburst when they occurred. The participants in the experimental group identified more strategies when presented with the strong images, short descriptions, or accounts

of emotional experiences than the delayed-treatment group. Once both groups had completed the all the therapy sessions data were collected on the entire group. All the participants demonstrated lower intensity behaviors and better overall emotional regulation as demonstrated on the emotional regulation questionnaire completed by parents. All the participants identified more regulation strategies when presented with strong images, short descriptions, or accounts of emotional experiences. Indicating that the treatment may have increased the participant's knowledge of emotional regulation strategies, which served to decrease the duration and intensity of the outbursts.

Limitations of the study are as follows: the study used a small sample size; the researchers suggested conducting a more precise analysis of the data collected to address possible biases.

Thomson, Burhnam Riosa, and Weiss (2015) conducted a study to examine the effectiveness of a multicomponent cognitive behavioral therapy treatment program to improve emotional regulation for children on the autism spectrum. The study included 13 males and one female from the ages 8-12 and their parents. The participants demonstrated average intellectual functioning in vocabulary and matrix reasoning on the *Wechsler Abbreviated Scale of Intelligence- 2nd Edition* (WASI-II), and demonstrated a willingness to participate in therapy sessions.

To gather baseline data the parents completed three measures prior to the start of the treatment program. The first measure parents completed was the *Emotional Regulation Checklist* (ERC) which looked at lability/negativity (mood swings, dysregulated negative affect) and Emotional Regulation (self-awareness, appropriate emotionality, and empathy). The second

measure was the *Anxiety Disorders Interview Schedule: Parent Interview-4th Edition* (ASIS-P-IV), a semi-structured diagnostic interview to assess emotional disorders. The last measure they completed was the *Behavior Assessment System for Children-2nd Edition* (BASC-2), a standardized measure of clinical concerns related to behavior and adaptive skills. The children completed the *Children's Emotion Management Scale: Anger, Sadness, Worry* (CEM), which consists of an 11-item Anger scale, 12-item Sadness scale, and 10-item Worry scale. The CEM measures dysregulation, coping, and inhibitions across emotions. The children were also presented with two scenarios to read; the first scenario was about test anxiety, and the second was about bullying. The children were asked to offer solutions for the individuals in the scenario to cope with the situation and given points for all appropriate responses. The results of the ASIS-P-IV and the BASC-2 were summarized by a clinician that was not involved in the data collection to gain a *Clinical Global Impressions Scale* (CGI) rating. The CGI is a rating of illness severity and treatment-related improvement. A score of 0, 1, or 2 indicated individuals that would likely respond positively to treatment.

The participants were part of a 10-week treatment program. A computer-based intervention called, *Secret Agent Society: Operation Regulation* was used. This is an individualized spy-themed intervention consisting of computer games, modeling, and role playing to practice skills, education-based cognitive behavior therapy, relaxation/ mindfulness activities (sensory activities to promote awareness), and strategies to generalize skills to the home and school environments. The program used a token economy reinforcement system to maintain attention and motivation. Parents were encouraged to attend with the individual to promote generalization of skills to the home and school environments.

The results of the CBT intervention used in this study showed overall improvements were noted on parent reported results in the areas of emotional lability, internalizing symptoms, behavioral dysfunction, and adaptive behavior. The participants demonstrated an increase in their ability to offer appropriate coping behaviors in response to the scenarios given in the pre-intervention assessments. There was also a statistically significant decrease in CGI scores where nine of the participants were given a rating of “improved” or “very much improved” and none of the participants had a rating that had worsened.

Limitations of this study include, a small sample size, lack of data from teacher report to assess generalization of skills, lack of follow-up data to assess maintenance of skills, and a disproportionately male sampling. More research is needed to study the effectiveness of CBT on ER for individuals on the autism spectrum.

Table 1

Chapter 2 Summary

AUTHOR/S	PARTICIPANTS	PROCEDURE	RESULTS
Mazefsky et al. (2016)	287 children, ages 4-20 with ASD.	EDI administration during admission and discharge.	EDI was an effective measure of emotion dysregulation across verbal and nonverbal individuals with ASD.
Goldstein et al. (2012)	4, 052 children, ages 6-18 with ASD. Parent and teacher raters.	ASRS completion from parent and teacher raters.	The ASRS data suggested that a three-factor solution to represent ASD symptom; social/communication, unusual behaviors, and self-regulation.

Table 1 (continued)

AUTHOR/S	PARTICIPANTS	PROCEDURE	RESULTS
Samson et al. (2015a)	31 individuals with ASD and 28 TD individuals, ages 8-20.	PANDAS- completed by the participants; ERQ, & VABS-2- completed by parent/caregiver.	<p>Parent reports-individuals with ASD experience less positive emotion and use cognitive reappraisal less frequently than the TD individuals.</p> <p>Participant reports-individuals with ASD used cognitive reappraisal and expressive suppression less frequently than the TD individuals.</p> <p>Both reported significantly higher rates of maladaptive behavior for the individuals with ASD.</p>
Samson et al. (2015b)	21 individuals with ASD and 22 TD individuals, ages 8-20.	Reactivity/Regulation Task-response ratings were assigned; Reactivity/Regulation Task re-administered cognitive reappraisal introduced.	Individuals with ASD demonstrated the ability to use cognitive reappraisal significantly less than the TD individuals.
Samson et al. (2015c)	32 individuals with ASD, 31 TD individuals, ages 8-20.	Parent interview using the Emotion Regulation Interview and daily diaries including emotions experienced and ER strategies used daily. The study focused on anger, anxiety, and amusement.	<p>Parent interviews and child diaries suggested that individuals with ASD experienced all three emotions differently than the TD individuals.</p> <p>Individuals with ASD used less frequent adaptive ER strategies and were less effective at implementing ER than the TD individuals.</p>

Table 1 (continued)

AUTHOR/S	PARTICIPANTS	PROCEDURE	RESULTS
Berkovits et al. (2016)	108 participants with ASD, ages 4-7.	Parents completed the ERC-ER, CBCL 1½-5 and 6-18, & SSIS Participants were screened using the WPPSI-III, CASTL-2, ADOS-2, and SRS Data was collected on ER over a two-year span. They examined the data collected once during the first year and the data collected in second year to determine correlation of symptoms and stability to ER skills within the participants.	The results indicated that ER remained stable overtime in the participants. The results indicated that ER appears to be independent of cognitive or language functioning Social skill development was correlated with the severity of symptoms. If a participant received a higher ERC-ER score the demonstrated increases in their social skill score on the CBCL.
Scarpa & Reyes (2011)	11 individuals with ASD, ages 4.5-7.	ER skills were assessed by observation of scenarios where the child was expected to identify an ER strategy and parent report. The participants were split into two groups: experimental or time-delay. The participants attended one hour group using a modified CBT approach.	All participants showed significant reductions in negativity/lability subscales after the treatment. Parents indicated shorter episodes of dysregulation and better overall mood. Children identified more strategies to control anger or anxiety.
Thomson et al. (2015)	14 individuals with ASD, ages 8-12 years old.	Parents completed the ERC, ADIS-P-IV, and BASC-2. Participants completed the CEM and two scenarios; one about anxiety & one about bullying. Participants were involved in a group based therapy games, modeling, role playing and practice skills based on CBT, mindfulness, and relaxation. CGI rating of clinical severity was given based on the data collected above.	Parents noted improvements in their child's emotional liability, internalization, behavior dysregulation, and adaptive behavior. Participants indicated significantly more inhibition and less dysregulation across anger, anxiety, and sadness. Nine of the participants CGI rating went down significantly receiving a rating of improved or significantly improved.

Chapter 3: Conclusions and Recommendations

Autism spectrum disorder is characterized by a set of core behavioral deficits in the areas of social communication and restrictive or repetitive behaviors or interests. Individuals on the autism spectrum often have difficulty modulating their reactions to social, emotional, or environmental stimuli. This difficulty results in many individuals on the autism spectrum engaging in maladaptive behaviors. The purpose of this starred paper was to determine what cognitive emotion regulation strategies are effective for increasing the use of adaptive regulation strategies in individuals on the autism spectrum. In Chapter 1, the core behavioral categories were reviewed along with the current diagnostic criteria for autism. Emotion regulation (ER) related to autism was also discussed and the terms associated with ER were defined. Lastly, in Chapter 1, an overview of *cognitive behavior therapy* (CBT), as it relates to autism, was provided. In Chapter 2, I reviewed eight studies related to assessment of ER for individuals with ASD, influence of ER on ASD, and the effectiveness of CBT for individuals on the autism spectrum. In Chapter 3, I discuss the results of the research reviewed, provide recommendations for future research, and discuss the implications of current practices.

Conclusions

Emotion regulation was discussed in terms of assessment, differences in ER, and CBT for individuals on the autism spectrum, across eight different studies. All eight of the studies used a quantitative research design to measure the symptoms of ASD, ER differences between individuals with ASD, and typically developing (TD) individuals, or the effectiveness of the intervention used. A variety of ER measurements were used throughout the studies, and the procedures used in each study differed based on the number of participants and the length of the

study. Overall, the studies found significant differences in the way that individuals with ASD interpret emotional experiences and utilize ER strategies. Goldstein et al. (2012) found a 3-factor solution to describe the behavioral symptoms associated with ASD, which included self-regulation. Mazefsky et al. (2016) developed and piloted a measurement to assess emotion dysregulation specific to individuals with autism.

Two of the eight studies reviewed assessments used to measure behaviors associated with ER in individuals with ASD. Goldstein et al. (2012) conducted a study using the *Autism Spectrum Rating Scales* (ASRS) to determine what categories best fit the patterns of data collected from the ASRS. The research discovered that a three-factor solution best fits the patterns found in the data. The three categories identified were social/communication, unusual behaviors, and self-regulation. This indicates that based on the data collected through the study, behaviors related to self-regulation clustered together to form a group and further data should be collected on the impact self-regulation has on individuals with ASD. Mazefsky et al. (2016) developed a framework using the *Patient-Reported Outcomes Measurement Information System* (PROMIS) to organize and assess emotion dysregulation for verbal and nonverbal individuals with ASD. The framework developed was *The Emotion Dysregulation Inventory* (EDI). The researchers used the framework to assess emotion dysregulation for both verbal and nonverbal individuals. The results indicated that EDI measured dysregulation in all the participants, regardless of their verbal abilities.

Four of the eight studies assessed the differences in ER of individuals with ASD and TD individuals. Samson et al. (2015b) found that individuals with ASD used cognitive reappraisal significantly less frequently than the TD individuals. At the same time, the individuals with

ASD used suppression more frequently than the TD individuals; indicating that there are significant differences between the participants with ASD and the TD participant's ability to utilize cognitive reappraisal effectively. Samson et al. (2015a) assessed the impact that emotional experience had on ER and maladaptive behaviors in individuals with ASD. The research discovered that individuals with ASD use less adaptive ER strategies than the TD individuals, which resulted in increased negative emotions. The increase of negative emotions was displayed through increased maladaptive behaviors. Berkovits et al. (2016) aimed to examine the relationship between ER for individuals with ASD and behavioral/cognitive functioning, to determine if ER remains stable overtime if there are not specific interventions put into place for the individual with ASD. The research suggested that ER is a function independent of cognitive ability, meaning a FSIQ did not indicate better ER. However, the research revealed a strong relationship between ER and severity of symptoms related to autism. If the individual was more significantly impacted by ASD symptoms, they demonstrated less adaptive ER strategies and slower growth of ER skills overtime; however, if they were less impacted by ASD symptoms they demonstrated more adaptive ER strategies and more growth of ER skills overtime.

Two of the eight studies examined the impact of CBT for individuals with ASD. Scarpa and Reyes (2011) examined the effectiveness of CBT for young children. The results indicated improved ER strategy identification, reduced maladaptive behaviors, and shorter duration of maladaptive behavioral episodes. Thomson et al. (2015) researched the impact of a multicomponent CBT program on ER for individuals with ASD. The study used small group and computer-based interventions to target ER skills, and teach adaptive ER strategies. The

research suggested improvements from both parents and participants in emotional lability, internalization, dysregulation, and adaptive behaviors. Furthermore, participants identified more adaptive ER strategies when presented with emotional eliciting scenarios after CBT treatment.

Recommendations for Future Research

Research related to emotion regulation for individuals with autism is in its infancy. Specifically, in the areas of behavior, the impact of ASD core deficits on ER, development of accurate assessment tools, and effective strategies to increase adaptive ER skills. All the literature reviewed in this paper was conducted in the past decade. It was suggested that I locate more articles; however, I was not able to locate more articles that were specific to ER in individuals with ASD. The number of peer reviewed studies is limited. Additionally, all the studies I reviewed had small sample sizes, so none of the studies were able to gain a representative group sample. As the number of individuals identified on the autism spectrum continues to grow, the need for research in this area will become more pressing. As more individuals enter the educational and vocational settings, there will become an increased need to understand the underlying mechanisms associated with ER to better support this population.

Further research specifically focused on the impact of ER on the overall development of individuals with autism is needed to determine if ER is a core symptom of ASD. Mazefsky (2015) called attention to past research in the area of ASD, stating the focus of the research has been on language, social competence, behavior, and cognitive abilities, which fails to consider the role of ER. She discusses the implications of the current diagnostic criteria for ASD, which excludes ER, and may lead to the incidental overlook of ER as a core deficit or a defining characteristic of ASD. Mazefsky discussed the high incidence of comorbid psychiatric disorders

in individuals with ASD. Which may be result of the absence of dysregulation in the diagnostic criteria. This information would help clinicians, parents, and educators create meaningful programming that encompasses all of the core deficits related to ASD in a systematic manner. It would also provide individuals impacted by autism gain a stronger understanding of their own emotions and strategies to increase their ability to appropriately modulate their emotional output.

Further research should be completed looking explicitly at how the deficits in social, communication, and restrictive/repetitive behavior associated with ASD impact ER development. Mazefsky and White (2014) stated, “The social and cognitive deficits that define ASD also create ER challenges, particularly given that adaptive ER is context-dependent and requires one to accurately identify critical aspects of the situation (p. 17).” The strategies such as CBT need to be modified to address the unique abilities and areas of need that are associated with ASD. The strategies need to be implemented in a variety of settings to help individuals with generalization of ER skills across settings.

Additional research and development of a normative assessment tool to measure ER for individuals on the autism spectrum would help clinical and educational teams determine ER functioning in the ASD population they support. Mazefsky and White (2014) discussed the current assessment tools used to measure psychiatric conditions associated with autism; specifying that the current assessments do not accurately assess nonverbal individuals. Since nonverbal individuals make up a portion of the autistic population, the current assessments are inadequate. Development of tool that has the ability to assess individuals across the spectrum over a period of time, would also allow teams to assess efficiency of interventions of all individuals impacted with ASD.

Finally, research looking at specific neural mechanisms responsible for ER will help determine if individuals with ASD are predisposed to issues with emotion regulation as a result of neural circuitry (Mazefsky & White, 2014). If research is able to isolate the mechanism responsible, it may shed some light on the reasons behind why individuals on the autism spectrum often respond to environmental stimulus differently than typical developing individuals. Gaining a better understanding of the mechanisms responsible for ER will also allow researchers to examine the effect that sensory processing differences has on ER for individuals with ASD. Research in this area would serve as a guide for professionals helping to create programs that specifically address these deficits.

Implications for Current Practice

Autism spectrum is currently the second largest disability category served in my educational cooperative. One of the most challenging issues for the educators I work with is managing maladaptive behaviors displayed by individuals on the autism spectrum. Approximately 35% of the individuals from my educational cooperative engage in self-injurious behaviors, verbal outbursts, tantrums, aggression, property destruction, or shutdowns (refuse to respond to stimuli presented to them). These behaviors sometimes appear to be discrepant when reviewed in the context of the environment, meaning the individual had a large reaction to a small problem. The behavior is commonly viewed as noncompliant, escape/avoidance, attention seeking, manipulative, or deliberate. While some of these behaviors do fall under the categories listed above, some of them are a result of emotion regulation deficits. The lack of research in this area has served as a roadblock in changing professional perspectives on the function of the maladaptive behaviors displayed by this population.

As I reviewed the studies examining emotion regulation in individuals with autism, I came to realize how few studies have been conducted specifically on ER for individuals with ASD. All the studies I reviewed had been completed in the last decade, with the oldest study conducted in 2011. Indicating that research has only started to identify and explore the impact that ER has for individuals with ASD. The lack of research leads to lack of training and preparedness for the professionals working with this population, which makes it difficult to develop effective proactive programming to address these needs. Research indicates that without specific interventions, ER skills remain stable over time (Berkovits et al., 2016). Meaning that as individuals with ASD grow up and develop other skills, ER will remain unchanged. The inability to effectively manage emotional states limits the educational and vocational opportunities of many individuals with autism. It also creates a large discrepancy in behavior between individuals with autism and typically developing individuals.

The current research does not include longitudinal studies that document the efficacy of interventions overtime. Without longitudinal data, researchers are unable to examine the lasting impact that the intervention/s had on an individual's overall ER development. This information is essential for the development of effective interventions that evoke permanent change to an individual's ability to deploy adaptive ER strategies. The goal of the interventions addressing ER is to increase the positive outcomes for the individual through development; more research is needed to determine if current interventions are adequate.

One of the strategies assessed was CBT adapted for individuals with ASD. Both studies that I reviewed (Scarpa & Reyes, 2011; Thomson et al., 2015) discovered CBT to be an effective intervention to teach adaptive ER skills to individuals with ASD. However, there are no

therapists in my geographical area that specialize in CBT specific to autism. Although, the intervention is effective, it is not a viable option for many of the individuals and families with whom I work

Weiss (2014) suggested that treating emotion regulation using a disorder-specific approach may miss the underlying causes of the problem. Because of the limited research on the underlying cause of the problem, many of the treatment plans currently being used are disorder-specific. There is not a vast understanding of the mechanisms responsible for ER, and there is a limited research base to pull from to develop new strategies that effectively address ER deficits associated with autism. Resulting in treatment plans that have not been researched or normed on the ASD populations. Weiss (2014) proposed using a transdiagnostic framework that addresses the underlying factors resulting in deficits in ER for individuals with autism to develop treatment plans. Treatment plans that address the underlying factors may lead to cognitive change, which could result in better outcomes for individuals with autism.

Finally, my educational cooperative uses the *DSM-5* diagnostic criteria to determine eligibility for educational services in the category of autism spectrum disorders, under which ER is not included. I have found that many of the individualized education plans for students served under the category of ASD, who demonstrate ER deficits, do not have goals that address ER. This absence of ER goals may indicate that programming specific to ER is not consistently being implemented with all students that demonstrate needs in this area. This is concerning when looking at data that states ER remains stable overtime if specific interventions are not implemented (Berkovits et al., 2016).

Overall, ER is an area that impacts many individuals with autism. Greene (2005) once said, “Behaviorally challenging kids are challenging because they are lacking the skills to not be challenging” (p. 154). This describes many of the individuals with whom I work. It is essential for educational teams to keep in mind that many of these individuals lack the skills to regulate their emotions, which often leads to higher levels of maladaptive behaviors. Many of the individuals I work with struggle to control their emotions effectively, which makes it challenging for them to successfully maintain in the educational setting. This creates barriers for individuals to achieve their highest potential. The results of the research reviewed will help educational teams work to address these deficits to prepare these individuals for the future.

Summary

While more research needed in the area of emotion regulation related to autism, the current research has provided a foundation to build from. The research has identified differences in emotion regulation for individuals with autism when compared to typical developing individuals. These differences are highlighted throughout the studies and indicate the need for specific interventions. The research identified effective emotion regulation interventions such as cognitive behavior therapy as well as adaptive emotion regulation strategies such as cognitive reappraisal. One of the studies (Mazefsky et al., 2016) introduced a measurement tool that proved to be an effective assessment of ER skills for both nonverbal and verbal individuals with ASD. As more research becomes available, I believe educational settings will be able to better address ER for individuals with ASD. Temple Grandin once said, “The world needs all kinds of mind” (Montgomery, 2012). This research has helped me to better understand some of the great minds with whom I have the privilege to work.

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