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AUTISM, ANXIETY AND THE IMPACT OF THERAPEUTIC PRACTICES  
AND EVIDENCE BASED STRATEGIES

A MASTER'S THESIS  
SUBMITTED TO THE FACULTY  
OF BETHEL UNIVERSITY

BY  
ROBERTA LUBY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
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BETHEL UNIVERSITY

AUTISM, ANXIETY AND THE IMPACT OF THERAPEUTIC PRACTICES  
AND EVIDENCE BASED STRATEGIES

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APPROVED

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Thank you to my students, past and present, who teach me every day about life, love, and patience.

## Abstract

This literature review examined research on the prevalence of anxiety disorders in individuals with Autism Spectrum Disorder (ASD) and the effectiveness of therapeutic interventions for managing anxiety symptoms. Studies consistently demonstrated high anxiety rates, ranging from 40% to 91.6%, with specific phobia, generalized anxiety disorder, and social anxiety disorder the most common among autistic adolescents. Cognitive Behavioral Therapy (CBT), emerged as one of the most effective evidence-based interventions for managing symptoms. Family-focused CBT showed promise in treating anxiety symptoms in young children with ASD, along with modified CBT using visualized language. Mindfulness-based therapies and exposure therapy also proved effective in reducing anxiety symptoms. The review underscored the importance of addressing anxiety in individuals with ASD and the need for effective therapeutic interventions tailored to their unique characteristics.

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## CHAPTER I: INTRODUCTION

A sharp pain radiates down your arm. Your heart rate starts to increase, it feels like it is pounding out of your chest. Your breathing becomes shallow, you can't take a deep breath and you know you aren't getting enough air. You look down at your hands and notice them trembling which leads to an overwhelming feeling of dizziness and nausea. You need to sit down, you need to run to safety, but where is safety, everything is already closing in around you. You must be dying, there is no other explanation to how you are feeling. Should you call 911, your parents, your partner, your best friend? Will they believe you when you say you need help, that you are dying, or are you going crazy, is this all in your head? You feel scared, helpless and alone.

Anxiety disorders are prevalent among many, especially in the autistic community. Imagine having anxiety but not the ability to communicate your feelings and fears. As educators it is essential that we understand the impact anxiety can have on our students, and be armed with resources, evidence-based interventions and therapeutic practices for those on the autism spectrum. The literature review addressed the topic of co-morbid diagnosis of autism and anxiety; the impact of therapeutic practices for someone with anxiety and autism; evidence-based strategies used to support those with autism and anxiety; and how treatment is implemented.

### Definition of Terms

#### Autism Spectrum Disorders

Autism Spectrum Disorder (ASD) is a complex developmental condition that involves challenges with social communication, restricted interests, and repetitive behaviors. The degree of impairment varies among individuals with autism. Signs of ASD can be noticed in children before the age of one, but symptoms typically become more evident by the age of two or three. Some children may show mild impairments, which become more pronounced when they start school.

Social communication deficits in autism involve difficulties with sharing interests, understanding emotions, maintaining eye contact, and using non-verbal gestures. People with autism may also display scripted speech and struggle to make and keep friends. Restricted interests and repetitive behaviors in autism include inflexibility with routines, intense focus on specific topics, resistance to changes, sensory hypersensitivity, and engaging in repetitive movements (American Psychiatric Association, 2021).

### **Anxiety Disorders**

Over 40 million adults have an anxiety disorder. Anxiety disorders affect 31.9% of adolescents between the ages of 13 and 18 making it the most common mental illness (ADAA, 2013). The American Psychological Association (APA) has defined Anxiety Disorders as excessive anxiety and worry (apprehensive expectation) occurring more days than not for at least six months, about a number of events or activities (such as work or school performance) (APA, 2013). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the criteria for a diagnosis of generalized anxiety disorder (GAD) includes excessive anxiety and worry about a variety of topics or events, occurring more days than not for at least six months.



In addition to the overall anxiety and worry, an individual must experience three or more of the following symptoms:

1. Restlessness or feeling keyed up or on edge
2. Being easily fatigued
3. Difficulty concentrating or mind going blank
4. Irritability
5. Muscle tension
6. Sleep disturbance (difficulty falling or staying asleep, or restless, unsatisfying sleep)

According to the National Institute of Mental Health (NIMH, n.d.), there is evidence that the risk for generalized anxiety disorder (GAD) can be influenced by familial factors. Various brain regions and biological processes have been identified as playing a significant role in the experience of fear and anxiety. Understanding brain and body functioning in individuals with anxiety disorders is critical for the development of more effective treatments. Researchers have discovered that external factors, such as exposure to traumatic events or being in a stressful environment, can increase the likelihood of developing GAD (NIMH, n.d.).

### **Generalized Anxiety Disorder**

Generalized Anxiety Disorder (GAD) is a mental health condition where people experience ongoing, excessive worry that disrupts their daily life. This can be accompanied by physical symptoms like restlessness, difficulty concentrating, and problems sleeping. The worries may focus on everyday things and can be challenging to control (American Psychiatric Association, 2022).

### **Panic Disorder**

Panic Disorder is characterized by recurrent panic attacks, which are overwhelming experiences of physical and psychological distress. During these attacks, several symptoms can occur, such as rapid heart rate, sweating, trembling, shortness of breath, chest pain, dizziness, and fear of losing control or dying. These symptoms can be so intense that some people mistake them for a heart attack or a life-threatening condition, leading them to seek emergency medical care. Panic attacks may be expected in response to specific fears or appear unexpectedly, seemingly occurring for no reason. Panic disorder may be associated with other mental health conditions like depression or PTSD (American Psychiatric Association, 2022).

### **Specific Phobia**

A specific phobia is an intense and irrational fear of a particular thing or situation that is not usually harmful. People with this fear know it is excessive, but they cannot control it. The fear causes distress, and some individuals will go to great lengths to avoid what they fear. Examples include fear of public speaking, fear of flying, and fear of spiders (American Psychiatric Association, 2022).

### **Social Anxiety Disorder**

Social Anxiety Disorder is characterized by a strong fear of being embarrassed, humiliated, or rejected in social situations. They may avoid these situations or endure them with great anxiety. Examples include fear of public speaking, meeting new people, or eating in public. This fear causes problems in their daily life lasting for at least six months (American Psychiatric Association, 2022).

### **Separation Anxiety Disorder**

Someone with Separation Anxiety is overly fearful or anxious about being separated from those they are attached to. This fear goes beyond what is normal for their age, lasts for at least four weeks in children and six months in adults, and causes difficulties in functioning. They may worry about losing their loved ones, avoid going out or sleeping away from home without them, and experience nightmares about separation (American Psychiatric Association, 2022).

### **Obsessive Compulsive Disorder**

Obsessive-compulsive disorder (OCD) is a condition where people have recurring, unwanted thoughts (obsessions) and feel compelled to perform repetitive actions (compulsions) to get rid of these thoughts. These behaviors, like hand washing or checking things repeatedly, can disrupt daily life and social interactions. While many people may have distressing thoughts or repetitive actions, those with OCD find them persistent and difficult to control. They often fear severe consequences if they don't perform these actions. OCD affects around 2-3% of people in the US, with slightly more women affected than men. It usually starts in childhood, adolescence, or early adulthood (American Psychiatric Association, 2022).

## **CHAPTER II: LITERATURE REVIEW**

### **Literature Search Procedures**

Many research tools were used to conduct research in regards to the topic. The initial and main tool was the Bethel online library. Searches of ERIC, Psychology Database, and Education Journals were also conducted for publications from 2008 to 2023. The list was narrowed through the use of empirical studies from peer-reviewed journals. The keywords used for this research were “anxiety and autism”, “autism spectrum disorder”, “anxiety disorder”, “anxiety, autism and therapies”, “Cognitive Behavior Therapy and autism”, “Mindfulness-based therapy and Autism”, “Exposure therapy and autism”, and “evidence-based strategies”. This chapter is a review of literature on therapeutic therapies and evidence-based strategies for co-occurring autism and anxiety disorders.

### **Autism Spectrum Disorder and Anxiety Disorders**

Van Steensel et al. (2011), conducted a meta analysis that examined the prevalence of anxiety disorders in children with autism spectrum disorder (ASD). Through their review of multiple studies, they found that the overall rate of anxiety disorders in adolescents with ASD was 40%, with the most common types of anxiety disorders being specific phobia, generalized anxiety disorder and social anxiety disorder (Van Steensel et al., 2011). In a 2013 study, 108 high functioning autistic children between the ages of seven and 15 with autism spectrum disorder were enrolled to receive treatments for anxiety disorder. Of the 108 children, 91.6% met criteria for two or more anxiety disorders, where 41.7% met criteria for social phobia, 25.9% had generalized anxiety disorder, 15.7% were found to have separation anxiety disorder, 12.0% had

obsessive compulsive disorder and 4% were identified with specific phobia. The findings of this study support the Van steensel et al. study conducted in 2011 (Ung et al., 2013).

It can be difficult to differentiate the characteristics of anxiety from ASD symptomatology. Differential diagnosis has caused dilemmas when diagnosing and treating children for anxiety who also have ASD. Renno & Wood (2013) sought to determine and discriminate the validity of anxiety symptoms through the use of various methods. The study examined discriminant and convergent validity. Discriminant validity is the independence of traits, while convergent validity refers to the consistency of different measurement methods of the same trait (Renno & Wood, 2013).

The study aimed to determine whether anxiety and ASD symptoms severity were weakly related, which would indicate discriminant validity. The results of this study supported the idea that anxiety and ASD are distinct from one another, and that accurate assessment of anxiety is crucial for treating anxiety separately from an ASD diagnosis. Various measures assessed subjects for autism spectrum disorder (ASD) as well as anxiety disorders. The ASD measures included the Autism Diagnostic Interview—Revised (ADI-R), Autism Diagnostic Observation Schedule (ADOS) and Social Responsiveness Scale (SRS). The anxiety measures used were Anxiety Disorders Interview Schedule for DSM-IV—Child and Parent (ADIS-C/P) and the Multidimensional Anxiety Scale for Children—Child and Parent (MASC-C/P). These measures gathered data on ASD symptom severity, anxiety disorder diagnosis, and specific anxiety symptoms along with the severity. The study indicated discriminant validity between the severity of anxiety and ASD. The study showed that anxiety severity and ASD severity were not

statistically significantly correlated. In terms of convergent validity, there was evidence of convergence among measures of separation anxiety, total anxiety, and ASD severity. Measures of separation anxiety and total anxiety were significantly correlated with each other in several tests. This study suggested that while different methods converge regarding the relative severity of anxiety in children with ASD, they may not reliably discriminate among the specific types of anxiety that are most prominent for each child, such as specific phobia, social anxiety or generalized anxiety disorder (Renno & Wood, 2013).

A 2008 study conducted by Kuusikko et al. (2008), compared the characteristics of social anxiety in adolescents with High Functioning Autism and Asperger's syndrome (although Asperger's Syndrome now falls under the Autism Spectrum umbrella). The Social Phobia and Anxiety Inventory for Children (SPAI-C), the Social Anxiety Scale for Children - Revised (SASC-R), and the Child Behavior Checklist (CBCL) were administered to 54 adolescents aged 10 to 17 with Autism Spectrum Disorder and 305 community members who did not have a diagnosis of Autism Spectrum Disorder. It was noted in the study that ASD symptoms may overlap with the symptoms of social anxiety, such as social withdrawal, not speaking in social settings or situations, and the inclination to be alone (Kuusikko et al., 2008). Despite the overlaps, the study showed those who had autism scored higher than the community members in every checklist and rating scale, with 38% of the ASD participants meeting the criteria for social anxiety, and only 3% of the neurotypical community members without ASD meeting criteria for social anxiety. This study also indicated that social anxiety was more prevalent in girls who were autistic compared to boys (Kuusikko et al., 2008).

Facial recognition and processing is imperative for social cognitive development. Typically-developing infants show a fondness for faces, which helps develop neural circuits for face processing. Infants and children with ASD, however, show a lack of attention to faces, which leads to atypical development of neural circuits. According to the Neuhaus et al., (2016) study, atypical development of neural circuits are associated with social cognition and behavior, and also have an effect on later emotional functioning in autistic individuals. The connection between the amygdala, the part of the brain involved in regulating and evaluating emotions and behavioral responses, and the cortical areas, leads to an increase in vigilance of potential threats and fearful faces that may serve as an indicator of threat. Not being able to identify or read faces, especially those expressing fear, can lead to an anxiety disorder as the child gets older.

The goal of the Neuhaus et al. (2016) study was to explore the relationships between neural responses to fearful faces and the ASD symptoms in children. The researchers examined 26 children at the age of three and longitudinally at six, nine, and 14 years of age. The researchers wanted to find the relationship between facial processing at age three and anxiety symptoms at age 14. All participants received an ASD diagnosis at the first timepoint. Both the Autism Diagnostic Interview-Revised (ADI-R) and the Autism Diagnostic Observation Schedule (ADOS) provided diagnostic thresholds with a high level of accuracy in terms of both sensitivity and specificity for distinguishing children with and without ASD. At each age point (three, six, nine, and 14 years), social affect (SA) scores and calibrated severity scores (CSS) were computed using the ADOS. SA scores represented social and communication difficulties, while CSS

represented overall symptom severity. Different components of the ADOS were used depending on participant developmental level, but the algorithm scores were derived from the same number of items across components. Additionally, participants' overall developmental level was assessed using the Visual Reception, Fine Motor, Expressive Language, and Receptive Language scales of the Mullen Scales of Early Learning (MSEL) at age three years (Neuhaus et al., 2016).

The results of the study found significant associations between facial processing and ASD symptoms. Slowing of neural response to fearful faces relative to neutral faces was associated with both increased social communication difficulties and better symptom improvement, and longer reaction time to neutral faces and a lack of differential reaction between fearful and neutral faces appeared to be associated with higher levels of anxiety later in life (Neuhaus et al., 2016).

N. Mikita et al. (2016) conducted a research study to examine the mechanisms of comorbid anxiety disorders and ASD. N. Mikita et al., (2016) explored the relationship between brain activations during reward processing and ASD traits such as social communication difficulties and restrictive and repetitive behaviors. The researchers used modified monetary incentive delay (MID) fMRI reward task, which studies the different stages of reward based learning to assess reward anticipation and feedback stages. The researchers also wanted to investigate whether the brain activations observed during the study could predict the onset of anxiety in individuals with high ASD traits.

The participants for this study were 2,223 adolescents recruited from schools in eight sights in France, Ireland, Germany and the UK. The participants were 14 in the first wave and 16



in the second wave. Participants with cognitive levels at or below 70 were excluded. The researchers utilized the Wechsler Intelligence Scale for Children—Fourth Edition (WISC-IV), the ASD section of the Development and Well-Being Assessment (DAWBA), a parent-reported structured diagnostic interview, the DAWBA computer algorithm and the the parent-reported emotional symptoms subscale from the Strengths and Difficulties Questionnaire (SDQ) to measure IQ, ASD traits, anxiety, oppositional defiant disorder, depression, and the emotional symptoms of the participants. Participants performed a modified version of the monetary incentive delay (MID) task so researchers could study neural responses to reward, which consisted of three conditions: reward anticipation, receipt of negative feedback, and positive feedback. Structural and functional magnetic resonance imaging (MRI) data was also acquired from all participants using 3-T MRI scanners (N. Mikita et al., 2016).

The results of this study indicated there were no differences between the groups in terms of age or performance IQ, but youth with high ASD traits scored lower on verbal comprehension. Participants with high ASD traits also had higher scores for hyperactivity, emotional problems, and conduct problems, which indicated greater functional performance deficits. Those with high ASD traits were also more likely to display symptoms of anxiety, depression, and oppositional defiant disorder (ODD); and participants with anxiety symptoms showed increased brain activation in the right middle frontal lobe and middle temporal gyrus, regardless of ASD trait severity. An interaction between ASD traits and anxiety was observed in several brain regions, indicating increased activation in individuals with both high ASD traits and anxiety. There were limitations to this study, such as not differentiating between different

anxiety disorders. Additionally, task learning was performed outside of the scanner which made it impossible to study the neural correlates of stimulus-reward learning. The researchers also acknowledged that future studies should explore whether the differential impact of specific types of anxiety on reward processing, as observed in typically developing youth, applied to youth with ASD traits (N. Mikita et al., 2016).

Due to the high percentage of people with Autism Spectrum Disorder who also have diagnosis of both anxiety and Attention Deficit/Hyperactivity Disorder (ADHD), Avni et al. (2018) conducted a study aimed to determine the frequency of ADHD and anxiety symptoms in people diagnosed with ASD, while comparing them to individuals without an ASD diagnosis. N. Mikita et al. 2016, acknowledged that not having non-clinical standardized samples was a limitation in their study. Data for the Avni et al. (2018) study was collected from 260 children. The Autism Diagnostic Interview-Revised (ADI-R) and the Autism Diagnostic Observation Schedule (ADOS) were administered to obtain an ASD diagnosis. The participants cognitive abilities were assessed using the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) or the Wechsler Intelligence Scale for Children IV (WISC-IV), while adaptive skills were evaluated using the Vineland Adaptive Behavior Scales (VABS). ADHD and anxiety severity was measured using the Conners' Rating Scale-Revised: Long Form (CRS-R:L). Based on the results of the assessments, the children were separated into four groups based on ASD diagnosis: ASD with ADHD, ASD with anxiety, and ASD with both ADHD and anxiety (Avni et al., 2018).

The results of Avni et al. (2018) study showed that there was a high prevalence of clinically elevated ADHD and anxiety symptoms in children with ASD. An interesting note from

the study was the difference between teacher and parent ratings in regards to anxiety and ADHD severity. Teacher scores for ADHD symptom severity were lower on average than the parents based on the CRS-R:L, whereas teachers scores for anxiety symptoms were higher on average than parents. The study also revealed that one specific ADHD symptom, inattention, seemed to contribute to lower adaptive functioning in children with ASD, whereas significant anxiety symptoms increased ASD symptoms such as social withdrawal furthermore impacting overall functioning.

Hallet et al. (2013) noted that it is important to consider cognitive ability when studying anxiety in people with ASD. Previous studies resulted in inconsistent findings linking cognitive levels with anxiety in ASD. Some research reported greater anxiety in high-functioning children with ASD and others reported greater anxiety in participants who were lower-functioning. The 2013 study aimed to extend previous research by exploring anxiety symptoms, their associations with other behavioral measures, and the factor structure of the anxiety scale used through medicational trials.

The study involved 445 participants between the ages of four and 17 years who took part in four federally-funded, multisite medicational treatment trials for ASD. The trials included Research Units on Pediatric Psychopharmacology 1 (RUPP1), a double-blind placebo-controlled trial of Risperidone in children with ASD; Research Units on Pediatric Psychopharmacology 2 (RUPP 2), comparing methylphenidate (Ritalin) versus placebo in children with ASD and hyperactivity; RUPP 3, comparing Risperidone alone with Risperidone and parent management training in children with ASD and severe behavioral problems; and a trial comparing Citalopram

(Prozac) or placebo for repetitive behaviors. The study used The Childhood Autism Spectrum Test for Anxiety (CASI-Anxiety scale), a 26-item parent-rated instrument to assess anxiety symptoms in children with ASD. The research also used logistic regression to test associations between high anxiety levels and various variables, such as language ability, ethnicity, ASD diagnosis, age, and IQ (Hallet et al., 2013).

The study found that children with high anxiety were more likely to have an IQ of 70 or above, verbal, and scored in the top 25% on Aberrant Behavior Checklist Subscales (ABC subscales), indicating higher levels of irritability, social withdrawal, hyperactivity, and inappropriate speech. The study analyzed the item-level characteristics of the CASI-Anxiety scale, which allowed researchers to understand the specific anxiety symptoms most commonly described including: restlessness, difficulty falling asleep, and increased anxiety in social situations. The least common behaviors experienced by the children with ASD included: worries about physical health and nightmares about separation from parents, were less commonly experienced by the children with ASD in the study. Items from the CASI-Anxiety scale were grouped into four distinct areas: Generalized Anxiety, Separation Anxiety, Over-arousal, and Social Anxiety. Overall, the study provided insight into the manifestation and measurement of anxiety in children with ASD, and indicated the need to improve the CASI-anxiety scale by adding items that capture ASD-specific aspects of anxiety and emotional reactivity (Hallet et al., 2013).

### **Autism, Anxiety and Cognitive Behavior Therapy**

Cognitive behavioral therapy (CBT) is a treatment that has been proven effective for depression, anxiety disorders, substance abuse, and relationship problems among other documented personal challenges. CBT focuses on changing faulty thinking patterns and unhelpful behaviors that contribute to psychological difficulties and helps individuals recognize and reevaluate their distorted thoughts, gain insight into others behavior, develop problem-solving skills, and build confidence. CBT is collaborative with the therapist and patient working together to isolate the problem and develop a treatment plan. There is an emphasis on homework and exercises outside of therapy sessions so individuals develop coping skills and become their own therapists (American Psychological Association, 2017).

Research studies have shown high comorbidity of ASD and anxiety disorders indicating the need for effective therapeutic practices. According to McBride et al. (2020), Cognitive Behavioral Therapy (CBT) has been a successful form of treating youth with high functioning autism and anxiety and/or OCD, but has not been proven successful for all children who have ASD. McBride et al. (2020) used four studies to analyze data with three main objectives: to examine the frequency of comorbidities in youth with anxiety and ASD, to identify participant groups based on comorbid disorders other than anxiety (ODD, CD, ADHD), and to analyze treatment outcomes based on comorbidity groups.

The study used participants from four completed CBT trials that targeted anxiety in school-aged youth ages 7-16 with ASD. The participants were given pre-treatment, mid-treatment, and post-treatment assessments. Participants met ASD criteria using the Autism Diagnostic Interview-Revised (ADI-R), Child Autism Rating Scale, and/or Autism Diagnostic

Observation Schedule(ADOS), while also having had a diagnosis of separation anxiety disorder, generalized anxiety disorder, social phobia, specific phobia, or obsessive-compulsive disorder (OCD) according to results from the Anxiety Disorder Interview Schedule-IV-Child/Parent (ADIS-IV-C/P) clinical severity rating. Participants were divided into three groups. The first group (EXT-group) consisted of youth with ADHD plus Oppositional Defiant Disorder (ODD) or Conduct Disorder (CD) plus ADHD, along with their diagnosis of anxiety disorder and ASD. The second group (ADHD group) of participants had comorbid ADHD as well as primary anxiety and ASD diagnosis but did not have ODD or CD. The final group (NO-EXT group) consisted of participants with only ASD and a primary anxiety/OCD diagnosis without comorbid externalizing disorders (McBride et al., 2020).

The results of this study showed that the ADHD group had increased odds of responding to treatment when compared to the NO-EXT group. The study indicated that one possibility for the positive response was severe anxiety symptoms that were misinterpreted as ADHD, so the symptom improvement reflected reduced anxiety symptoms. Another explanation that researchers had to this finding was that the CBT program demonstrated therapeutic effects for the ODD/CD and ADHD not subject to the impact on anxiety/OCD, or possibly that externalizing symptoms contributed to increased anxiety for participants (McBride et al., 2020).

It is important to also acknowledge that this study was limited in terms of the participants, which included more males than females (82.9% male participants) and 78.8% identified as non-white hispanic. It is also noteworthy to mention that 56.7% of participants were taking psychiatric medication at the time of the study (McBride et al., 2020).

Reaven, Blakeley-Smith, Culhane-Shelburne, and Hepburn (2012), conducted a study to evaluate the effectiveness of family-focused CBT interventions for children with ASD and clinical anxiety. The initial study (conducted in 2009), showed limitations in generalizing the findings, so a new study (2012) was conducted to address the limitations by implementing randomized assignments and independent clinical evaluators. The study included 50 participants ages seven to 14, all with a confirmed diagnosis of ASD, clinically significant symptoms, and the ability to speak in full sentences (Reaven et al., 2012).

Participants in this study were randomly assigned to two different groups, either the Treatment as Usual (TAU) condition, where families maintained their current intervention programs, while also allowed to pursue new programs over the four month trial period. Monthly contact was made with the families to track medication and any services the child was receiving. The second group was the Facing Your Fears condition (FYF), where subjects participated in a 12 week intervention that included weekly multi-family group sessions. Each session was 1 ½ hours long and included large-group activities, small-group activities, and dyadic work. The intervention used cognitive-behavioral therapy (CBT) strategies adapted for children with high-functioning ASD and focused on anxiety symptoms, CBT strategies, graded exposure tasks, and social skills development (Reaven et al., 2012).

The results of this study showed that the children in the FYF group demonstrated a reduction in anxiety symptoms when compared to the TAU group. Follow up assessments conducted at three months and six months post treatment reflected reduced anxiety symptoms

for both time periods. The evidence from this study further contributes to the existing data supporting CBT for children with high-functioning ASD (Reaven et al., 2012).

As was demonstrated in both the Reaven et al. (2012) and the McBride et al. (2020) studies, CBT has been most successful in treating children with high-functioning autism, or autistics who used verbal language. Ekman and Hiltunen (2015) wanted to evaluate the impact of modified CBT using visualized language (pictures and/or other visual elements) for children with autism spectrum disorder and anxiety disorders. The participants were four female adults, three female teens, seven male adults and four male teens who were all diagnosed with ASD and anxiety disorders. Researchers conducted four assessments, two pre-assessment, one mid-therapy, and one post therapy assessment. The treatment consisted of 15 sessions conducted every other week with visualization techniques introduced during the first session, and used at every session thereafter (Ekman & Hiltunen, 2015).

Ekman and Hiltunen's (2015) study results indicated that modified CBT using visualized language reduced anxiety symptoms, as well as the frequency of anxiety. The majority of the clients in the treatment program also stated that the visualized language helped them understand and remember conversations from therapy, and they were able to use visualizations to use as homework between sessions.

Several studies have shown that CBT can be an effective form of therapy for adolescents and adults with autism and anxiety disorders, yet limited research has been conducted to determine the effectiveness of CBT with young children who are autistic. Driscoll, Schonberg, Stark, Carter, and Hirshfeld-Becker (2020) introduced a study of parent-child Cognitive Behavior



Therapy (CBT) including 16 children between the ages of three and seven diagnosed with autism and anxiety and had an IQ score of above 80.

The children and their parents participated in family treatment using the “Being Brave” curriculum, which aimed to teach parents how to coach their child in overcoming anxiety and provided exposure practice for the parents. The first three sessions included only the parents and focused on the CBT model, teaching parents how to observe their child’s anxiety along with their response to the anxiety. The following three sessions were parent meetings focused on teaching parents how to play with their child in a relaxed manner, use specific praise, reinforce coping responses, and plan and implement graduated exposure exercises. The next eight to 13 sessions included both the child and the parent and aimed to teach coping skills such as relaxation exercises and making coping plans. Parents were also coached on how to provide support. Exposure exercises were planned, rehearsed, and practiced with contingent reinforcement. The final parent session addressed maintaining progress and continuing the work (Driscoll et al., 2020, p. 3909).

Upon completion of the family CBT sessions, The Pediatric Anxiety Rating Scale (PARS) scores noted significantly decreased anxiety symptoms from baseline to post-treatment and follow-up. Significant improvements in coping skills and family functioning found that 81% of the children were “very much improved” or “much improved” on the Clinical Global Impressions-Improvement (CGI-I) scale. Eleven of the 16 children participated in the four month follow-up assessment, and 82% no longer met the criteria for an anxiety disorder. The findings

of this study indicated that CBT targeted for young children and their family members improved anxiety symptoms in children with ASD (Driscoll et al., 2020).

### **Autism, Anxiety and Mindfulness-based Therapy**

Mindfulness-based cognitive therapy (MBCT) is another form of intervention used to address ASD and anxiety. MBCT combines pieces of cognitive therapy and mindfulness-based therapy into each therapy session. MBCT has been used with various psychiatric conditions with focus on encouraging individuals to adopt new ways of connecting their thoughts and feelings while emphasizing mindfulness rather than challenging specific cognitions. Randomized controlled trials indicate that MBCT is effective in preventing relapse for individuals with recurrent depression and demonstrates positive results for treatment of active depression, including treatment-resistant depression, as well as in bipolar disorder and anxiety disorders (Sipe & Eisendrath, 2012).

Although cognitive behavior therapy has been documented as a method to address comorbid symptoms in those with autism, Spek, van Ham, and Nyklíčěk (2013) proposed using Mindfulness-based therapy (MBT) as an alternative. The research and studies on MBT in those with autism is limited; therefore this study focused on the effects of a modified MBT protocol called MBT-AS (mindfulness-based-therapy for autism spectrum disorders). The study also examined how rumination (repetitive thinking regarding causes and choices of emotional experiences) can impact anxiety.

The participants in this study were between the ages of 18 and 65, diagnosed with autism spectrum disorder, Asperger syndrome or pervasive developmental disorder (PDD-NOS),

and experienced symptoms of anxiety, depression or rumination. The 42 participants were divided into two groups, an experimental group and a waitlist group. The therapists in this study implemented MBT-AS over a nine week period with the participants, omitted cognitive elements such as avoiding topics that used imagination skills, and the use of metaphors. The program included mindful eating, body scan, breathing meditation, mindful walking, mindful movements, and observing thoughts (Spek, van Ham, & Nyklíčěk, 2013 p. 249).

The results of Spek, van Ham, and Nyklíčěk's (2013) study showed that the participants in the experimental group had reduced anxiety, depression, and rumination. The control group did not demonstrate statistically significant reductions in any of these areas. The results of this study also reflected that decreased anxiety and depression symptoms correlated with decreased rumination, but that rumination for participants with autism may be positive, since the decreased rumination did not impact the overall positive increase. More studies need to be conducted targeting Mindfulness-based Therapy. Based on this study MBT produced positive results participants (Spek, van Ham, & Nyklíčěk, 2013).

Sizoo and Kuiper (2017) wanted to explore whether mindfulness-based therapy or cognitive behavior therapy was the most successful therapy when working with autistic people with anxiety and/or depression. They hypothesized that both mindfulness-based therapy and cognitive behavior therapy would have similar results for reducing anxiety and depression, but CBT would have a greater impact on dysfunctional cognitions (processing, memory, etc.) and that MBT would increase mindful attention awareness.

The study consisted of 59 adults with an autism diagnosis, including 38 males and 21 females with an average age of 37.4. Participants completed the Hospital Anxiety and Depression Scale Checklist (HADS). Participants continued in the studies if they had a clinically significant score (seven or more). The MBT and CBT groups consisted of nine to 11 participants each, with three consecutive groups planned for each method. Two process measures determined specific changes in each treatment group. The Mindfulness Attention Awareness Scale (MAAS) measured the frequency of mindful experiences, and the Irrational Beliefs Inventory (IBI) assessed irrational cognitions or thoughts. Both of the treatment groups lasted for 13 weeks, and included 90-minute sessions each week with required home practice or homework. (Sizoo & Huiper, 2017).

The results of the Sizoo and Huper (2017) study conveyed that mindfulness-based therapy and cognitive behavior therapy had positive effects on the treatment of anxiety, depression, and rumination in adults with autism. The study also found that participants who received CBT demonstrated increased irrational beliefs following the treatment. The increase may have been because the participants expressed their beliefs more freely when they felt less anxious or depressed. It is important to mention that this study did not include a control group who continued treatment as usual (TAU) and would be important to include a control group in future studies (Sizzo & Huper, 2017).

### **Autism, Anxiety and Exposure Therapy**

Exposure therapy is another type of therapy used to treat those with anxiety. According to the American Psychological Association (2017), exposure therapy is a treatment used

effectively with social anxiety disorder, panic disorder, post-traumatic stress disorders, obsessive-compulsive disorder, generalized anxiety disorder and phobias. Different variations of exposure therapy include in vivo exposure (directly facing feared objects or situations), imaginal exposure (vividly imagining feared objects or situations), virtual reality exposure (using virtual reality technology when vivo exposure is not suitable), and interoceptive exposure (deliberately inducing harmless but feared physical sensations). Exposure therapy pacing varies based on individual needs such as graded exposure (progressing from mild to difficult exposures), flooding (starting with the most challenging tasks), or systematic desensitization (combining exposure with relaxation exercises).

Storch et al. (2019) acknowledged the effectiveness of cognitive behavior therapy for treating anxiety in people who are autistic, but wanted to discover if there was a therapy that could be more easily streamlined. The focus of this study was to determine the efficacy in family-based exposure-focused treatment in individuals with ASD and a comorbid anxiety disorder.

The study included 32 children and adolescents aged six to 17 years and their parents, who participated between July 2012 and May 2015. Participants were required to have a diagnosis of ASD and a clinical diagnosis of anxiety. Participants who met the criteria were randomized in a one-to-one ratio to receive either family-based exposure-focused treatment (FET) or treatment as usual (TAU). The FET parent-child group received 12 weekly face-to-face therapy sessions with parents and children. The sessions covered psychoeducation, hierarchy development, reward systems, and exposure. The FET protocol incorporated ASD-focused

modifications, involving parents for social support and coaches for exposure, enhancing motivation, and generalization, and reducing occurrence of anxiety (Storch et al., 2019).

The findings of the study were fairly consistent with the findings of CBT approaches within this community. Approximately 79% of youth responded to FET, whereas 0% responded in the TAU group; and 85.7% of youth in the FET group achieved clinical remission on the anxiety disorder interview schedule (ADIS-IV-C/P), compared to 0% in the TAU group. The study suggested that exposure therapy played a critical role in reducing anxiety symptoms in youth with ASD and comorbid anxiety. However, more comprehensive interventions may be necessary to address other aspects of ASD, such as social functioning and social communication (Storch et al., 2019).

Previous research has shown the CBT, mindfulness-based, and exposure therapy could be effective in reducing anxiety for individuals with ASD, mostly focused on generalized anxiety or social phobia. Maskey et al. (2014) conducted a study focused on reducing specific phobias/fears in young people with autism spectrum disorders (ASD) through a virtual reality environment intervention. Individuals with ASD have a more difficult time with imagination and recognizing their feelings, so the study proposed using virtual reality environments (VREs) as an adapted approach. Maskey et al. (2014) used an advanced VRE called the Blue Room, which utilized audio-visual images projected onto walls and ceilings of a 360-degree seamless screened room. Unlike virtual reality (VR) experiences that require headsets or goggles, participants in the Blue Room were not required to wear any additional equipment and could move around the room, and interact with the video as they like.

The study involved nine boys aged seven to 13 with ASD and specific phobias. Each of the nine children had one assessment and preparation session at home, where they were shown video clips of the Blue Room VRE. The children then had four VRE sessions that lasted approximately 30 minutes. Two weeks after the final VRE session a follow up visit was held to assess the child's confidence and receive a verbal report from the parents. Three more follow-up sessions were conducted at six weeks, six months and at 12 to 16 months to receive anxiety questionnaires and a verbal report from the parents. The treatment procedures used cognitive behavior techniques along with the four VRE sessions. Parents were able to observe the VRE sessions via a video link so they witnessed the therapy techniques used in each session (Maskey et al., 2014).

The results of this study showed that eight of the nine boys improved in their ability to handle the targeted situations following the VRE sessions. Within six weeks of the final VRE session, eight out of the nine children were able to confront and handle the target situations in real life. Four of the children completely overcame specific phobias and maintained success at the 12-16 month check-in. Overall, the study suggested that VRE treatment was beneficial in reducing specific phobia for young people with ASD (Masket et al., 2014).

### **Evidence-based strategies to reduce anxiety in students with ASD**

As discussed throughout research, there are challenges when differentiating between symptoms of ASD and social anxiety. According to Espelöer et al. (2021) individuals with ASD may have social anxiety due to misunderstanding social communication and difficulty engaging in social situations. Those with ASD may also have deficits in mentalizing, or inferring others

thoughts, feelings, and intentions; and this at times could be interpreted as social anxiety disorder (SAD) rather than ASD.

Espelöer et al. (2021) conducted a study that included 23 participants with ASD, 25 non-clinical control (NC) individuals along with 68 individuals with social anxiety disorder (SAD) between the ages of 18 and 65. The ASD and NC participants were matched based on their age and IQ, while the SAD group did not differ significantly in their ages. The instruments used included The Social Anxiety—Social Competence Deficit Scale (SASKO), a 40-item self-reporting measure which includes two main scales: social anxiety and social competence deficits. The social scale has two subscales: anxiety of speaking and being the focus of attention (speaking) and anxiety of being rejected by others (rejection). The Social Competence Deficits scale also has two subscales: interaction deficits (interaction) and deficits in processing social information (information). The participants rated each statement on a four point scale based on how strongly it applied to them (“always/mostly”, “often”, “sometimes”, and “never”).

The results of the study showed that the scores on the SASKO did not differ between the ASD and SAD groups and both were clinically significant, whereas the NC group was not. Social anxiety (speaking and rejection) was as high for both the ASD group and the SAD groups, corroborating increased levels of social anxiety for those with ASD. The deficits in Social competence (interaction and information) were notably pronounced in the ASD group compared to the SAD and the NC group, suggesting that social anxiety symptoms in ASD may be due to deficits in social competence. This study highlights the importance of tailored social skills



training for those who have ASD, which in turn may decrease symptoms of social anxiety (Espelöer et al., 2021).

Laugeson et al. (2014) emphasized that it was important for social skills interventions to take place in school settings on a daily basis. Daily social skills instruction allows for immediate practice with similar aged peers and better generalization compared to accessing social skills in out-patient clinics. The study completed by Laugeson et al. (2014) was conducted using the Program for the Education and Enrichment of Relational Skills (PEERS) Curriculum for School-Based Professionals, which focused on friendship skills and managing social challenges. PEERS includes multiple components, such as role-play, modeling, behavioral rehearsal, coaching and feedback, and weekly socialization assignments. PEERS is unique because it includes parents. Parents are required to attend some sessions, model appropriate social behavior, and encourage their children to engage in social situations. PEERS has been successful in clinical and caregiver settings based on previous research, but the school-based curriculum has not yet been studied to determine efficacy. The study compared the PEERS curriculum to another manualized social skills curriculum to decipher the effectiveness (Laugeson et al., 2014).

Seventy three adolescents who attended Village Glen Middle School participated with their parents and teachers in this study. All adolescents were diagnosed with ASD without intellectual disabilities. Eight teachers participated in the study, taught at Village Glen Middle School, and were recruited based on their willingness to implement a manualized daily social skills program in their classrooms. Assessments were completed by parents, students, and

teachers to assess social functioning at two time points: baseline (T1) and immediately after treatment (T2). The seven assessments given included the Social Responsiveness Scale (SRS), a 65-item rating scale completed by parents and teachers and measured the severity of autism spectrum symptoms in social settings. The Social Skills Rating System (SSRS), a 52-item questionnaire completed by parents and teachers, which assesses adolescent cooperation, assertion, responsibility, self-control, and internalizing/externalizing behaviors. The Quality of Play Questionnaire (QPQ), a 12-item questionnaire completed by parents and adolescents, to assess the frequency of hosted and invited get-togethers and the level of conflict during hosted get-togethers. The Social Anxiety Scale (SAS), a 22-item scale completed by adolescents and parents separately, that measured social anxiety experienced in peer relations. The Friendship Qualities Scale (FQS), a self-reporting measure completed by adolescents to assess the quality of their best friendships. The Piers-Harris Self-Concept Scale-Second Edition (PHS-2), a self-reported measure of self-esteem and self-concept in adolescents, consisting of 60 items and taking approximately 10 minutes to complete. The Test of Adolescent Social Skills Knowledge (TASSK), a 26-item criterion-referenced measure that assesses changes in adolescent knowledge about social skills taught during the PEERS intervention (Laugeson et al., 2014).

The PEERS curriculum was delivered daily for 30-minute lessons over a 14 week period. Teachers assigned to teach PEERS were provided with a three hour training and one hour of weekly supervision or consultation. Parents received weekly handouts with ways to support their child in developing and maintaining friendships. The weekly lessons covered conversational skills, electronic communication, humor, hosting and guest behavior during

parties, resolving arguments and managing rumors and gossip. The active treatment group was given information regarding the scope and sequence of the social skills curriculum provided by the school (Super Skills). The school curriculum targeted fundamental social skills such as eye contact, voice volume, social initiation, getting along with others, and social response skills. Teachers in the control group had previous experience implementing this curriculum (Laugeson et al., 2014).

The results of this study showed that the PEERS group demonstrated greater improvement in social skills knowledge and showed greater improvement in the frequency of initiated and reciprocal social interactions compared to the active treatment group (Super Skills). Teachers in the PEERS groups also reported a greater reduction of autistic behaviors in the areas of social awareness, social communication, social motivation, and autistic mannerisms (Laugeson et al., 2014). This study exhibits that PEERS is a curriculum and strategy that could be used in the school setting to increase social skills competence, and could decrease social anxiety in students with ASD.

Research has shown that it is important to address social and emotional learning in schools. According to Durlak et al. (2011) learning at school involves social, emotional, and academic components, however academic performance, behavior, and health are negatively affected because many students lack social-emotional competencies. Social and emotional learning (SEL) can be integrated into school-based interventions to help students acquire competencies such as recognizing and managing emotions, setting and achieving positive goals,

establishing positive relationships, making responsible decisions, and constructively handling interpersonal situations.

Durlak et al. (2011) conducted a meta analysis to explore the effects of social and emotional learning programs on various outcomes such as social and emotional skills, attitudes toward self and others, positive social behavior, conduct problems, emotional distress and academic performance. The meta analysis included 213 studies and involved 270,034 students. The findings suggested that school-based SEL programs conducted by school staff, particularly classroom programs led by teachers, significantly improved social and emotional skills, attitudes, behaviors, and academic performance.

Cheng et al. (2018) conducted a study focused on recognizing facial expressions for individuals with ASD using a mobile learning system called 3D Complex Facial Expression Recognition (3CFER). The study utilized a pretest-posttest design and involved 24 participants with ASD between the ages of nine and 12. Subjects were randomly assigned to either a control group or an experimental group. The control group used paper-based emotion pictures and Social Stories to identify emotions, while the experimental group used the mobile emotional learning system 3CFER over a three week period. The researchers used a complex-emotion (CE) scale to assess the learning effects of the 3CFER system. The experiment consisted of four phases: pre-test session, intervention session, post-test session, and a brief interview. During the pre-test and post-test sessions, participants in both groups responded to questions using complex emotion pictures (CEP) and situation pictures (SP) during the intervention sessions that

were 40 minutes each. The experimental group used the 3CFER system three times. The control group did not receive any intervention.

The study found that the 3CFER system resulted in positive learning effects for individuals with ASD in recognizing complex emotions. The participants in the experimental group showed notable improvements in post-test scores compared to the control group. They demonstrated better comprehension of 3D complex facial expressions and were able to recognize and understand emotions in different social situations. The instructional content and system design, including the 3D animated emotions and social activities, were helpful for the participants in their daily activities. The findings of the Cheng et al. (2018) study highlighted the benefits of using a mobile emotional learning system. The system features provided immediate feedback and catered to various cognitive abilities and personalized learning experiences. While 3CFER appeared to be an evidence-based strategy to enhance social and emotional learning for students, there were limitations. The sample size was small, and there was no research conducted to see whether the skills were generalizable by the participants.

Individuals with ASD can benefit from the use of animal-assisted therapy and other activity programs. Studies have shown that animal-assisted interventions (AAI), such as canine animal-assisted therapy (AAT), can be effective in supporting the developmental needs of individuals with ASD. These interventions have resulted in improved social skills, communication, language, and on-task behavior in children with ASD. Evidence exists that animals can act as social catalysts, helping individuals with ASD become more comfortable in therapeutic environments and engage in higher-level interpersonal skills (Grandin et al., 2011).

According to Grandin et al. (2011), people with ASD often relate to animals due to sensory-based thinking. Animals do not think in words but process and store memories as detailed sensory information. This sensory-based thinking is different from the language-based thinking that is typically seen in humans. Animal sensory experiences, such as smells, sounds, and physical sensations, resonate with individuals with ASD who perceive similar sensory phenomena. AAT can be beneficial for individuals with varying levels of ASD, from mild to moderate. Animals can provide companionship, friendship, and support conversations around life challenges. Animals have been found to enhance social connections and alleviate feelings of isolation and loneliness.

Droboniku and Mychailyszyn (2021) explored the influence of human-animal interactions on various aspects of human behavior and well-being. Two specific types of AAI noted were Canine-Assisted Intervention and Equine-Assisted Intervention. Canine-Assisted Intervention incorporated trained dogs into planned therapy sessions or therapeutic activities. The therapy typically took place in a therapy office or a school setting. During sessions, the therapist teaches methods of communication, appropriate ways to play and interact with the dog, and engages the child in therapeutic activities or skills. Canine-Assisted Intervention aims to foster the development of treatment targets for the child. The presence of the dog enhanced the therapeutic context.

Equine-Assisted Intervention focused on emotional and behavioral functioning. It involved implementing therapeutic goals for the participant, interaction with a carefully selected and trained horse, and the presence of a trained therapist or administrator. Equine

intervention was conducted at a facility with trained personnel, including instructors and animal trainers. Participants had an introductory session to become acclimated to the horse and complete a needs assessment. Activities were incorporated that allowed the child to engage in behaviors related to target skills within the context of learning horseback riding techniques. Instruction was provided to teach the child ways to communicate with and respond to the horse and other humans present (Droboniku & Mychailyszyn, 2021).

Droboniku and Mychailyszyn (2021) conducted a meta analysis of the impact of AAI on the adaptive functioning of children with ASD. The meta-analysis included studies that used either canine or equine interactions for AAI. The researchers examined changes in adaptive functioning as a result of child-animal interactions, including language use, language comprehension, prosocial communication, prosocial behaviors, and problem behaviors. Problem behaviors included aggressive behaviors, outbursts, or tantrums. To be included in the meta analysis, the study must have focused on Animal-Assisted Interventions (AAI) involving interactions between children and either dogs (canines) or horses (equines). Participants must have had a diagnosis of autism spectrum disorder, have been assessed with reported needs matching the outcome variables related to the adaptive functioning of children with ASD (language use, language comprehension, and prosocial behavior and communication). Participants were between the ages of three and 17 and the studies must have been conducted between January 1, 2000 to April 1, 2023.

The results of the meta-analysis indicated that interacting with a horse (equine-assisted intervention) had a statistically significant small-to-moderate effect on the adaptive functioning

of children with ASD. The study did not find a significant difference between the effectiveness of equine-assisted intervention and control groups. The limited number of canine-assisted intervention studies prevented the researchers from drawing meaningful conclusions due to variability. The meta-analysis suggested that equine-assisted intervention could have a positive effect on the adaptive functioning of children with ASD. However, the impact of the canine-assisted intervention was limited due to the scarcity of available studies to analyze (Droboniku & Mychailyszyn, 2021).

O'Haire (2017) highlighted the need for scientific evaluation of AAI for ASD and the development of evidence based practices. They conducted a study evaluating 28 studies of AAI and ASD that were published between 2012 and 2016. The studies covered AAI with horses (12 studies), dogs (five studies), guinea pigs (three studies), and dolphins (two studies), along with companion animals and service animals (six studies). The outcome measures of the studies varied and were focused on social skills, adapted behaviors, communication, sensory processing and other autism-related characteristics.

The studies evaluation provided key findings. Positive results for social interaction were noted in 79% of the included studies; 75% of the studies that incorporated language and communication with AAI reported significant improvements; 29% of the 28 studies evaluated problem behaviors, with mixed findings. Some studies reported no changes, and others indicated reduced hyperactivity. All studies that included emotional experience reported positive results such as increased positive emotional signals and reduced irritability, while restrictive and repetitive behavior results were mixed with some studies reporting significant



changes and others reported no change at all. Based on this study, AAI showed promising results as an intervention for autism, but as an effective complementary approach rather than a stand-alone treatment. The researchers noted that more research of AAI tools should be done to maximize outcomes for humans and animals participating in this treatment (O'Haire, 2017).

## CHAPTER III: DISCUSSION AND SUMMARY

### Summary of Literature

The prevalence of anxiety disorders in children with ASD has been extensively studied. Van Steensel et al. (2011) conducted a meta-analysis and found that the overall rate of anxiety disorders in adolescents with ASD was 40%, with specific phobia, generalized anxiety disorder, and social anxiety disorder being the most common types. In a 2013 study by Ung et al., 91.6% of high-functioning autistic children with ASD met criteria for two or more anxiety disorders, with social phobia being the most prevalent at 41.7%.

Accurately distinguishing between autistic behaviors and anxiety has proven to be challenging. This distinction becomes even more challenging when autistic behaviors are more prevalent. Renno & Wood (2013) investigated the difficulty in differentiating anxiety symptoms from ASD comorbidity. They found evidence supporting the discriminant validity between anxiety and ASD severity, indicating that accurate assessment of anxiety is crucial for proper treatment. Kuusikko et al. (2008) compared social anxiety in adolescents with high-functioning autism and asperger's syndrome, showing that those with ASD scored higher in social anxiety measures than community members without ASD, while Hallet et al. (2013) emphasized the importance of considering cognitive ability when studying anxiety in individuals with ASD. They found that higher-functioning children with ASD showed greater anxiety levels.

In their respective studies, N. Mikita et al. (2016) and Avni et al. (2018) explored the relationship between Autism Spectrum Disorder (ASD) traits and comorbid anxiety and ADHD symptoms in individuals with ASD. N. Mikita et al. (2016) focused on brain activations during

reward processing in individuals with high ASD traits and found an interaction between ASD traits and anxiety in brain regions associated with reward processing. On the other hand, Avni et al. (2018) examined the frequency of ADHD and anxiety symptoms in individuals diagnosed with ASD, revealing a high prevalence of clinically elevated ADHD and anxiety symptoms, particularly in children with ASD.

Cognitive Behavioral Therapy (CBT) has been widely recognized as an effective treatment for various psychological difficulties, including anxiety disorders. In the context of ASD, there is a high comorbidity with anxiety, highlighting the need for effective therapeutic approaches. Research studies by McBride et al. (2020) and Reaven et al. (2012) have demonstrated the success of CBT in treating youth with high-functioning autism and anxiety. Additionally, Ekman and Hiltunen (2015) explored the impact of modified CBT using visualized language for individuals with ASD and anxiety, reporting positive outcomes. Moreover, Driscoll et al. (2020) conducted a study on parent-child CBT for young children with autism and anxiety, resulting in significant reductions in anxiety symptoms and improvements in coping skills and family functioning. These findings accentuate the effectiveness of CBT in treating anxiety in autistic individuals, supporting the importance of individualized approaches to address comorbid conditions and enhance overall well-being.

Mindfulness-based cognitive therapy (MBCT) is a form of intervention that combines elements of cognitive therapy and mindfulness-based therapy to address ASD and anxiety. In the context of ASD, Spek, van Ham, and Nyklic'ek (2013) proposed using a modified MBT protocol called MBT-AS (mindfulness-based therapy for autism spectrum disorders) as an

alternative to address comorbid symptoms. Their study showed that MBT-AS resulted in reduced anxiety, depression, and rumination in participants with ASD. Another study by Sizoo and Kuiper (2017) compared the effectiveness of MBT and CBT in treating anxiety and depression in autistic adults and found both therapies to have positive effects on these symptoms. However, CBT had a greater impact on dysfunctional cognitions, while MBT increased mindful attention awareness. Further research is needed to fully explore the potential benefits of mindfulness-based therapies for individuals with ASD and comorbid conditions (Sipe & Eisendrath, 2012).

Exposure therapy is an intervention used for anxiety disorders, including in individuals with ASD. Different variations of exposure therapy, such as in vivo exposure, imaginal exposure, virtual reality exposure, and interoceptive exposure, provide individualized approaches to address specific fears and phobias. Storch et al. (2019) investigated the efficacy of family-based exposure-focused treatment (FET) in individuals with ASD and comorbid anxiety. The results indicated that FET led to significant reductions in anxiety symptoms, with 79% of participants responding positively to the treatment. Similarly, Maskey et al. (2014) explored the use of virtual reality environments (VREs) in reducing specific phobias in young people with ASD. The Blue Room VRE was utilized, and the study demonstrated that eight out of nine participants showed improvements in handling their targeted fears following VRE sessions, indicating the potential benefits of this adapted approach for individuals with ASD and specific phobias. These studies highlight the efficacy of exposure therapy and innovative methods like VREs in reducing anxiety symptoms and specific phobias in individuals with ASD.

Evidence-based strategies to reduce anxiety in students with ASD include social skills training, social and emotional learning (SEL) programs in schools, the use of emotional learning systems, and animal-assisted interventions (AAI). Espelöer et al. (2021) emphasize the importance of addressing social competence deficits in individuals with ASD to decrease symptoms of social anxiety. The PEERS curriculum, as studied by Laugeson et al. (2014), has shown positive effects on social skills and reductions in autistic behaviors in students with ASD when implemented daily in school settings. Durlak et al. (2011) emphasize that SEL programs in schools can significantly improve students' social and emotional skills, attitudes, behaviors, and academic performance. Cheng et al. (2018) highlight the benefits of using a mobile learning system, such as the 3D Complex Facial Expression Recognition (3CFER), to enhance students' ability to recognize complex emotions and improve social interactions. Additionally, animal-assisted interventions, particularly canine-assisted and equine-assisted interventions, have shown promise in enhancing social skills and adaptive functioning in students with ASD, as proven by meta-analyses conducted by Droboniku and Mychailyszyn (2021) and O'Haire (2017).

### **Limitations of the Research**

The studies provided valuable insights into the prevalence, characteristics, and associations between anxiety and ASD in children and adolescents, as well as effective therapeutic interventions and evidence-based strategies to address co-morbidity. However, like all research, these studies have certain limitations that should be acknowledged. Many of the studies have relatively small sample sizes, which limits the generalizability of findings to a broader population. Additionally, the participants in these studies were often recruited from

specific sites or clinics, which may introduce selection bias and make it challenging to apply the results to more diverse populations of individuals with ASD. Some studies lacked control groups, making it difficult to compare the prevalence of anxiety and other symptoms in individuals with ASD to those without ASD. Control groups are important for drawing valid conclusions about the differences observed in the study population, and including them could increase validity. There were a few studies that lacked diversity in terms of race, ethnicity, gender and cultural background, which limits the generalizability of the findings.

### **Implications for Future Research**

Future research should aim to include larger and more diverse samples of participants to verify the results are applicable to a broader population of individuals with ASD and anxiety. Including diversity in future studies allows for better understanding of how culture, race, ethnicity and gender impacts treatment and intervention, and ensures that treatments and interventions are culturally appropriate and sensitive.

Another implication for future research should be the exploration of combined interventions. Many of the interventions studied showed promising results when using modified approaches, so the next step would be to investigate the effectiveness of combining therapeutic modalities (e.g., animal assisted therapy with mindfulness-based therapy) to determine whether they lead to better outcomes.

Additionally, it would be beneficial for more research to be conducted in the effectiveness of therapeutic interventions and strategies when working with autistic individuals who have a low IQ score. Most of the studies required that the participants have an IQ of 70 or

higher, but this limits the understanding of how these approaches affect a larger population. It is more difficult to administer IQ tests to someone who is autistic because the tests rely on communication and interaction, oftentimes with an unknown person. While there is a non-verbal IQ test, the results are not always accurate.

### **Implications for Professional Application**

Based on an abundance of research and studies, ASD and anxiety co-occur at a prolific rate. As educators, it is imperative that we understand and know the behaviors to be aware of when working with students so we can effectively support them. In my experience I have seen educators track behavior as a way to move students to a more restrictive environment, and while this is appropriate in some instances, this should not be the primary lens used when observing behavior. In contrast, we should be studying student behavior to identify the cause of behaviors and to implement appropriate evidence-based interventions.

Additionally, a special education setting should implement multiple interventions at one time. In order to have effective interventions for each student, more studies and research need to be conducted to ensure teachers use evidence-based practices. There is a tremendous amount of pressure put on teachers. To provide support, the interventions should be widespread and well known by administrators, special educators and grade level teachers. When school clientele work together to support the students and one another, the students will be most successful.

Additionally, schools and educators need more access to mental health workers. Students are being placed in inappropriate settings due to their mental health. This would not

be the case if social workers and school psychologists were more available in our schools. This is becoming abundantly clear following the global Covid 19 pandemic.

### **Conclusion**

Although we have vast information and research regarding the correlation of ASD and anxiety, the symptoms, and interventions, the most essential thing we do as educators is to get to know our students as individuals. We are with them day in and out, and at times school may be the safest space they enter. We may see signs and symptoms that a student with ASD also has anxiety, but it is not the schools job to diagnose, but rather provide strategies and interventions that allow students to feel safe and successful. If more educators understand anxiety and have access to evidence-based interventions, more students can be reached and supported.



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