# Management of Severe Anxiety and OCD Characteristics in Individuals with Higher Functioning Autism Spectrum Disorder: An Overview

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***Superheroes social skills training, Rethink Autism internet interventions, parent training, EBP classroom training, functional behavior assessment: An autism spectrum disorder, evidence based practice (EBP) training track for school psychologists***

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## Introduction

This monograph seeks to provide an overview of the treatment of anxiety disorders and obsessive compulsive disorder (OCD) in pediatric populations diagnosed with a higher-functioning autism spectrum disorder (HFASD). As a comparative reference, the monograph begins with a discussion of anxiety and obsessive compulsive disorders in typically-developing pediatric populations, followed by a discussion of the same disorders in HFASD children populations. Social, cognitive, parent and ASD-specific factors associated with anxiety and OCD diagnoses are discussed prior to consideration of available treatment options. The monograph concludes with an overview of published anxiety and OCD treatment research conducted with HFASD populations and closes with recommendations for future research.

## Children and Anxiety: Prevalence Rates in Typically-Developing Populations

Anxiety disorders present across a range of diagnostic symptomatology including, but not limited to; social anxiety, specific phobias, and generalized anxiety disorder. Specific phobias

**TABLE 2. Prevalence estimates of childhood mental disorders for which data are not routinely collected**

| Disorder | Surveillance system | Estimate (%) |
|---|---|---|
| Anxiety disorders | | |
| Agoraphobia | NCS-A* | 2.4 |
| Generalized anxiety disorder | NCS-A* | 2.2 |
| | NHANES† | 0.3 |
| Obsessive-compulsive disorder | DSM-IV§ | 1.0–2.3 |
| Panic disorder | NCS-A* | 2.3 |
| | NHANES† | 0.4 |
| Posttraumatic stress disorder | NCS-A* | 5.0 |
| Separation anxiety | NCS-A* | 7.6 |
| Social phobia | NCS-A* | 9.1 |
| Specific phobia | NCS-A* | 19.3 |
| Bipolar I or II disorder | NCS-A* | 2.9 |
| Childhood onset schizophrenia | Primary study¶ | 0.014 |
| Eating disorder | NHANES† | 0.1 |

**Abbreviations:** DISC = Diagnostic Interview Schedule for Children; DSM-IV = *Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision*; NCS-A: National Comorbidity Survey—Adolescent Supplement; NHANES = National Health and Nutrition Examination Survey.

occur when the child's anxiety and fear is linked to a distinct stimulus (i.e. dogs, clowns, etc.) whereas generalized anxiety disorder lacks a specific trigger and results in a pervasive and chronic anxious state. Prevalence rates for anxiety disorders in typically developing children range from 0.04 percent to 19.3 percent, with differences observed for specific disorder classification, gender, and age (CDC, 2013). Prevalence estimates from the Center for Disease Control (CDC) suggest that specific phobias, separation anxiety, and social phobia are the most commonly diagnosed childhood anxiety disorders with prevalence rates of 19.3, 7.6, and 9.1 percent of children meeting diagnostic criteria, respectively (CDC, 2013).

Separation anxiety and specific phobias appear to have a developmental component and thus, are more commonly observed in younger children than older children (Achenbach, 1991). The nature of childhood fears change over time and shift from fear of loud noises, being alone, and fear of the toilet to fear of exams, supernatural beings, and getting hurt (Ilg & Ames, 1955; Jersild, A.T., 1968). Often, specific phobias and separation anxiety will improve as the child ages without any targeted intervention (Achenbach, 1991). That being said, anxiety disorders that do not appear to have a developmental component or do not go away as the child ages may require intervention to improve outcomes.

Additional prevalence rates for anxiety disorders are available from the National Institute for Mental Health (NIMH) and the American Psychological Association (APA). NIMH reports a 25.1 percent lifetime prevalence rate of anxiety disorders amongst children 13-18 years with an additional 5.9 percent lifetime prevalence rate of anxiety disorders that meet "severe" criteria (2013). Finally, APA reports composite prevalence rates of all anxiety disorders in the general pediatric population ranging from 2 - 15 percent, with an average prevalence of 5 - 8 percent (1994).

**Diagnostic criteria for Anxiety Disorders**

Anxiety disorders are often characterized by marked fear or anxiety regarding social situations (Social Anxiety Disorder), specific objects (Specific Phobia Disorder), open/crowded spaces (Agoraphobia), or a universal anxious disposition that is stimulated by a number of events or activities (Generalized Anxiety Disorder) (American Psychiatric Association, 2013). Individuals with anxiety disorders may be diagnosed with a comorbid "Panic Attack Specifier" in addition to the primary anxiety diagnosis. The Panic Attack Specifier criteria is indicated by "abrupt surges of intense fear or discomfort accompanied by accelerated heart rate, sweating, trembling, shortness of breath, nausea, chills, chest pain, feelings of choking, detachment from self, derealization, and fear of dying or going crazy" (American Psychiatric Association, 2013). Individuals with anxiety disorders who have not been co-diagnosed with the Panic Attack Specifier or Panic Attack Disorder will likely still have physiological responses to their anxiety and fear however the intensity of physiological response will likely be less severe.

It is important to note that individuals with anxiety disorders experience an intricate combination of physiological arousal and distorted cognitive appraisals, which often lead to a variety of avoidant behaviors designed to gain temporary relief from the physiological and cognitive symptoms experienced (Beck, 2011). For example, the socially anxious individual that believe that others will find him strange or unlikeable during an interaction may subsequently avoids such interactions in an attempt to soothe the discomfort associated with the belief. The chronic use of such avoidant strategies, in an attempt to manage anxiety, creates a pattern of negative reinforcement in which the individual feels relief without ever challenging the cognitive distortions and/or developing more adaptive behaviors. Thus, the anxious individual continues

to believe that the stimulus that triggers their anxiety is, in fact, dangerous and should continue to be feared and avoided.

Research examining the cognitive appraisals of children with anxiety found two broad beliefs that seemingly contribute to the child's anxiety symptoms, namely: an *overestimation* of the perceived threat and an *underestimation* of one's ability to deal with the threat constructively (Beck et al., 1985; Pilecki & McKay, 2011; Wright & Borden, 1991). Stated simply, the anxious child perceives the event at hand as undefeatable while doubting their ability to cope, problem solve, and obtain a successful outcome. As an illustration of such cognitive distortions, consider the following: a child who fears school may overestimate the challenges he will face at school

| Distortion | Frequently | Sometimes | Never |
|---|---|---|---|
| **All-or-nothing thinking:** You see things in black and white categories. If your performance falls short of perfect, you see yourself as a total failure. | ○ | ○ | ○ |
| **Overgeneralization:** You see a single negative event as a never-ending pattern of defeat. | ○ | ○ | ○ |
| **Mental filter**: You pick out a single negative detail and dwell on it exclusively so that your vision of all reality becomes darkened, like the drop of ink that discolors an entire beaker of water. | ○ | ○ | ○ |
| **Disqualifying the positive:** You reject positive experiences by insisting they "don't count." You maintain a negative belief that is contradicted by your everyday experiences. | ○ | ○ | ○ |
| **Jumping to conclusions:** You make a negative interpretation even though there are no definite facts that convincingly support your conclusion. | ○ | ○ | ○ |
| **Mind reading:** You arbitrarily conclude that someone is reacting negatively toward you without bothering to determine if your assumption is correct. | ○ | ○ | ○ |
| **The Fortune Teller Error**: You anticipate that things will turn out badly and feel convinced that your prediction is an already-established fact. | ○ | ○ | ○ |
| **Magnification (catastrophizing) or minimization**: You exaggerate the importance of things (such as your own goof-up or someone else's achievement), or you inappropriately shrink things until they appear tiny (such as your own desirable qualities or another person's imperfections). | ○ | ○ | ○ |
| **Emotional reasoning**: You assume that your negative emotions necessarily reflect the way things really are: "I feel it, therefore it must be true." | ○ | ○ | ○ |
| **Should statements:** You try to motivate yourself with "shoulds" and "shouldn'ts," as if you had to be punished before you could be expected to do anything. "Musts" and "oughts" are also offenders. The emotional consequence is guilt. When others direct should statements toward you, you feel anger, frustration, and resentment. | ○ | ○ | ○ |
| **Labeling and mislabeling**: This is an extreme form of overgeneralization. Instead of describing your error, you attach a negative label to yourself: "I'm a loser." When someone else's behavior rubs you the wrong way, you attach a negative label to him, "He's a loser." Mislabeling involves describing an event with language that is highly colored and emotionally loaded. | ○ | ○ | ○ |
| **Personalization**: You see yourself as the cause of some negative external event for which, in fact, you were not primarily responsible. | ○ | ○ | ○ |

Adapted from Burns, David D., MD. 1989. The Feeling Good Handbook. New York: William Morrow and Company, Inc.

*Figure 1: Examples of common cognitive distortions*

(i.e. an exam, a social interaction, talking in front of the class), catastrophize the potential outcomes, and underestimate his ability to handle the challenges. Thoughts like, "*If the teacher calls on me, I just know I will say something stupid and everyone will think I'm an idiot. I better not try. I can't do it without sounding dumb*" magnify the event and potential outcomes while minimizing the student's belief in his ability to handle the situation. Such beliefs may then lead to avoidant behaviors like not raising one's hand, averting one's gaze when the teacher asks a question and potentially, avoiding school altogether. In this example, avoidant behaviors are reinforced when the child is not called on or refuses school and more adaptive/moderate thoughts like "*I can do my best and maybe I will say something important"* do not have the opportunity to be explored. A more complete list of common cognitive distortions associated with anxiety disorders in both adults and children is provided on the previous page.

Individuals with anxiety disorders are at risk for serious education problems, underemployment, substance abuse, and other psychiatric problems (Velting et al., 2004). Anxiety is also associated with an increased risk of depression, social isolation, and withdrawal (Tantam, 2000). Research suggests that anxiety may also have transgenerational effects, based on the modeling of fearful and avoidant behaviors from parent to child (Dubi, Rapee, Emerton, & Schniering, 2008).

Interventions designed to challenge/correct cognitive distortions, increase problem solving, increase self-awareness, and calm physiological symptoms are recommended to improve outcomes for anxious individuals. Cognitive behavioral therapy (CBT) integrates cognitive and behavioral approaches designed to target maladaptive thoughts and behaviors and improve adaptive functioning and is considered an evidence-based intervention for the treatment of anxiety in both children and adults (Beck, 2011).

**Obsessive Compulsive Disorders (OCD): Diagnostic criteria and prevalence rates**

Obsessive compulsive disorders (OCD) are related to anxiety disorders in the sense that both diagnoses are characterized by perseverative, distressing, and anxious thoughts. The diagnoses differ, however, in the topography of behaviors demonstrated by the individual as an attempt to manage distress. As mentioned before, individuals with anxiety often engage in avoidant behaviors to lessen their distress and may or may not engage in additive, soothing behaviors. On the other hand, individuals with OCD begin to engage in additive, compulsive behaviors that are believed to reduce or prevent the distressing thoughts. Indeed, the most colloquially-familiar OCD behavior is the individual who fears germs and compulsively washes their hands. The compulsive behavior in this case is somewhat-logically related to the anxious thoughts, but many compulsive behaviors observed in individuals with OCD are unrelated to the perceived threat and will not realistically impact the outcomes in the way the individual believes they will (American Psychiatric Association, 2013). Compulsive behaviors become repetitive and ritualistic and can greatly reduce one's quality of life due to their time-consuming, ever present nature. Prevalence rates of OCD in typically-developing children and teenagers range from 0.5 - 3.0 percent and 50 percent of adults with OCD report childhood or adolescent onset (CDC, 2013). CBT involving exposure and ritualistic response prevention methods is considered a first-line defense for individuals with OCD and has been proven effective in a large number of clinical trials for both children and adults (Nathan & Gorman, 2002). Serotonergic reuptake inhibitors (SRIs) have also been known to reduce OCD symptomatology in children, but should only be considered in moderate to severe cases and/or after CBT with exposure and response prevention (ERP) has not produced desired results (Neil & Sturney, 2014).

## Anxiety, OCD and Autism

### Anxiety

Children with autism spectrum disorders (ASD) are more likely to have a comorbid anxiety disorder than their typically developing peers, peers with ADHD, peers with externalizing disorders and peers with intellectual disabilities (Green & Wood, 2013). In fact, research suggests that anywhere from 30-87 percent of children with an ASD have an additional anxiety disorder diagnosis and the majority of studies report comorbid anxiety prevalence rates around 50 percent (Scarpa & Attwood, 2013). Anxiety disorders have been reported as the second most concerning problem (following autism) by parents of youth with ASD (Mills & Wing, 2005). Children with high-functioning ASD (HFASD: indicated when there is an ASD diagnosis without concurrent intellectual disability diagnosis) appear to be at an even greater risk for comorbid anxiety diagnoses than children with ASD who are not identified as HFASD (Scarpa & Attwood, 2013; Gillott et al., 2001; Kuusikko et al., 2008).

### OCD

Children with an ASD are 14 times more likely than their typically developing peers to be diagnosed with an OCD disorder (Mack, 2010). In fact, a comorbid OCD diagnosis for the child with an ASD is the second most common diagnosis after specific phobia/anxiety disorders (Mack, 2010). OCD diagnosis prevalence rates for children with an ASD are nearly double the highest prevalence estimates for OCD in the typical population (6.2 percent vs. 3 percent) (Anholt, 2010). Additional research has found that children with a primary OCD diagnosis tend to show more autistic traits than those in the typical population (Mack, 2010). It is important to note that the similar symptomatology between OCD and ASD has led to some confusion amongst researchers and clinicians as to whether both disorders are present and diagnosable or if

a singular, primary diagnosis exists while presenting similar symptomatology of the other diagnosis.

**Restrictive and Repetitive Interests and Behaviors**

Restrictive/repetitive interests and behaviors are considered one of the primary diagnostic features of ASD. The Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5) describes the restrictive and repetitive interests and behaviors associated with ASD as "repetitive motor movements/speech… insistence on sameness…ritualized patterns of verbal/nonverbal behavior…inflexible adherence to routines…rigid thinking patterns…highly restricted interests…and hyper/hyporeactivity to sensory input" (American Psychiatric Association, 2013). Frequency, intensity, and duration of restrictive and repetitive behaviors vary from one child with an ASD to the next and may present differently in different settings.

The diagnostic criteria of restrictive and repetitive behaviors/interests for ASD is often compared to the compulsive and ritualistic behaviors associated with OCD and differentiating between the two can be somewhat difficult (Stewart et al., 2016; Neil & Sturney, 2015; Mack et al., 2010). One way to describe and understand the presence of restrictive and repetitive behaviors in children with ASD is to determine the function/purpose of the behavior. For example, many children with ASD engage in restrictive and repetitive behaviors for self-stimulation but do not appear to demonstrate additional anxious and avoidant tendencies. On the other hand, some children with ASD may engage in ritualistic and repetitive behaviors in an attempt to self-soothe anxiety and stress. Thus, it is important to determine the function of the restrictive and repetitive behaviors when considering a comorbid OCD diagnosis for a child with ASD.

It is also important to consider that previous research has found that children with HFASD may lack insight regarding their internal state and often underreport their anxiety and obsessive compulsive symptoms (Sukhodolsky, 2013; Ung, 2015). The child with HFASD may lack self-awareness regarding their distress and/or may not find the experiences as distressing as their typically developing peers would. That being said, additional research conducted with typically-developing populations has shown similar low effects for child-report of initial symptoms and treatment outcomes, suggesting that perhaps many children do not perceive their anxiety as distressing as their parents do, or that they perceive the treatment as less effective than their parents (Sukhodolsky, 2013).

**Social Anxiety and HFASD Characteristics**

Previous research has supported that excessive self-focus (Kendall & Ronan, 1990), social cognitive deficits (Bellini, 2003), and heightened levels of arousal (Pfeiffner, 2005) may be risk factors for developing an anxiety disorder for children with HFASD. In a study examining social anxiety and perceived social abilities amongst HFASD teenagers, Bellini found a positive correlation between self-reported social skills deficits and meeting diagnostic criteria for social anxiety diagnosis (2003). A negative correlation was found between assertive social skills and social anxiety with lower reports of social confidence and assertion linked to higher reports of social anxiety.

In another study measuring social anxiety and aggression in children with HFASD, oppositional defiance disorder (ODD) and social anxiety disorder (SAD), Pugilese found that children with HFASD reported significantly more fears of humiliation and rejection than peers in the ODD group with reports commensurate to those in the SAD group (2013). Interestingly, Pugilese also found a curvilinear relationship between fears and aggression, unique to the

children in the HFASD group, with low and high levels of social fear associated with high levels of aggression. Previous research has shown that while many socially anxious children show behavior inhibition and over-regulation, some may respond to social fears and perception of peer rejection with disinhibition, poor emotional regulation, hostile behavior, rigidity, and aggression (Kashdan, 2009; Caron and Rutter, 1991). This appears to be especially true when the child additionally struggles with self-regulation (Ayduk et al., 2000). It is important to consider such findings and how they relate to the child with HFASD. For example, a child with HFASD has more awareness of the intricacies of social communication than a peer with ASD who also has an intellectual disability, but likely still struggles with the sophistication of typical social interactions. This creates a difficult "in-between" space where the HFASD child is aware of imbalanced/awkward social interactions, desires social connection, and yet does not possess all the skills to interact with his/her peers in an optimal way. Because of these social difficulties, social skills training for individuals with HFASD is often helpful in explicitly teaching an individual how to interact optimally and is often included in programs meant to reduce social anxiety (Sung, 2011; Sukholdosky, 2013; Ung, 2015; Reaven et al., 2012; Ehrenreich, 2014; Wood, 2009; Scarpa, 2011; McConachie, 2014; Sofronoff, 2005; McNally, 2013).

Children with HFASD may have initial difficulties with "social thinking" that precede their social actions. For example, facial recognition research involving cortical region activation has shown that while children with HFASD are able to correctly identify facial expressions, they do not exhibit the predicted empathic/emotional response when presented with these expressions (Corbett, 2008). The difficulty to anticipate and understand another person's feelings and thinking (referred to as "theory of mind" (TOM)) is a skill deficit often associated with HFASD, and is also considered a risk factor for developing an anxiety disorder (Blackshaw et al., 2001;

Brent et al., 2004). Children with HFASD may misinterpret the facial expressions, comments, actions, and intentions of those around them and may heavily rely on literal and concrete thinking in their attempts to understand and engage their peers. They may, for example, fail to understand when a peer is disinterested in their favorite topic of conversation, or hurt a companion with a literal comment regarding a new hairstyle.

In a 2014 study, Sharma found that teens with HFASD demonstrated lower ToM abilities than both typically-developing peers and peers with an anxiety disorder. Sharma also examined study participants' cognitive appraisal profiles using methods originally described by Smith and Lazarus in 1993. Smith and Lazarus proposed that individuals will appraise the same experiences in different ways depending on a variety of personal factors. Further, they consolidated typical cognitive appraisals displayed by anxious individuals into four distinct dimensions: self-accountability, emotion-focused coping potential, problem-solving coping potential and future expectancy. "Self-accountability" refers to how much responsibility the individual takes for outcomes and is often indicative of guilty feeling states. "Emotion-focused coping potential" refers to the individual's response to fear and worry and how emotional/labile the response is. "Problem-solving coping potential" refers to the individual's ability to contrive and execute actions when faced with problems. Finally, "future expectancy" refers to the individual's belief in the outcomes of his/her actions.

In the Sharma study, the HFASD individuals reported significantly lower levels of both emotion and problem focused coping potential and low levels of future expectancy. The HFASD individuals also reported significantly higher levels of self-accountability for negative outcomes, indicating high levels of self-blame (Sharma, 2014). These findings suggest that the children with HFASD struggle to understand the intentions and actions of others, doubt their personal

ability to both problem solve, struggle to regulate emotions, anticipate more negative outcomes, and take personal responsibility for outcomes. An additional 2006 study found that children with HFASD reported higher levels of negative cognitions than both typically developing peers and peers with anxiety disorder (Farrugia & Hudson). Such findings indicate the need for HFASD-friendly interventions that improve perspective taking, affective knowledge, emotional regulation, cognitive restructuring, and social problem solving.

**Cognitive Behavioral Therapy (CBT): Anxiety and HFASD**

CBT is considered an effective treatment for anxiety disorders and OCD in typically developing children and implementation has been supported in many randomized clinical trials (Silverman, 2008). CBT treatments usually consist of numerous components including cognitive restructuring, coping self-talk, in vivo exposure, modeling, and relaxation training. CBT programs are based on the premise that anxiety is an appropriate, protective response to real danger, but chronic and excessive responses to situations that are not truly dangerous lead to maladaptive cognitions, behaviors, and symptomatology (Scarpa & Attwood, 2013).

CBT's primary treatment goal is to challenge dysfunctional beliefs, catastrophic cognitions, and automatic thoughts while additionally changing problematic/maladaptive behaviors (Beck, 1991). Critical components of CBT interventions include psychoeducation, cognitive restructuring, relaxation training, development of coping strategies and practiced exposure to feared stimuli (Chorpita, 2007; Friedburg & McClure, 2002; Kendall 1992, 1993). Individuals in CBT treatment programs practice identifying negative self-thoughts, anxious self-talk, perceived threats, and negative self-evaluations. Then, individuals begin to challenge such beliefs with Socratic questioning, thought records, positive self-talk, and other methods (Moore, 2010). As awareness of cognitive patterns and anxious symptomatology improve, the individual

begins to practice adaptive cognitive patterns and coping behaviors meant to break the cycle of anxious, limiting beliefs and maladaptive, avoidant behaviors.

"Exposure" is an additional treatment component used in 80 percent of anxiety interventions and has specific implications for children with OCD diagnoses (Chorpita & Daleiden, 2009). Exposure treatments require the child to approximate the stimulus of their fear in a hierarchical fashion while challenging catastrophic thinking and extinguishing avoidant behaviors (Davis & OIlendick, 2005). For children with OCD, "response prevention" is added to the exposure condition and the child is prevented from engaging in the compulsive behaviors that typically reduce distress (March & Mulle, 1998). Exposure and response prevention (ERP) usually begins with the child constructing a "fear hierarchy". The fear hierarchy task requires the child to list feared scenarios from the least anxiety-inducing to most distressing. During treatment, the child begins incremental exposure in successive sessions and works through the fear hierarchy while using cognitive restructuring and adaptive coping behaviors to reduce distress. If the child has compulsive behaviors, response prevention is used to limit the compulsive behaviors and a competing response may be taught to help the child redirect (March & Mulle, 1998). Exposure and response prevention components of treatment are important for the eventual cessation of avoidant behavior patterns.

| Behavior | Fear rating |
|---|---|
| Think about a spider. | 10 |
| Look at a photo of a spider. | 25 |
| Look at a real spider in a closed box. | 50 |
| Hold the box with the spider. | 60 |
| Let a spider crawl on your desk. | 70 |
| Let a spider crawl on your shoe. | 80 |
| Let a spider crawl on your pants leg. | 90 |
| Let a spider crawl on your sleeve. | 95 |
| Let a spider crawl on your bare arm. | 100 |

*Figure 2 Fear Hierarchy Example for Exposure Treatment*

## Treatment of Anxiety and Obsessive Compulsive Disorders in Child Populations with HFASD: A Review of the Literature

### Literature Reviews and Meta-Analyses

A 2010 review of research literature (Lang), two meta-analyses (Sukholdosky, 2013; Ung, 2015) and numerous independent randomized trials suggest that CBT is an acceptable and effective intervention for the treatment of anxiety in children with HFASD (Lang, 2010; Sukholdosky, 2013; Reaven, 2009, 2011; Wood, 2009; Storch, 2012; Chalfant, 2007; White, 2012; Sofronoff, 2005; Sung, 2011).

In a 2013 meta-analysis, Sukholdosky analyzed the results of eight randomized, clinical trials utilizing CBT interventions for ASD populations and found an overall moderate effect size in the reduction of anxiety symptoms. The outcome results were based on parent and clinician report while child self-reports were not sensitive to change (Sukholdosky, 2013). Further treatment descriptions of the eight studies in the meta-analysis indicated that three of the interventions included social skills training and two did not include any type of exposure treatment.

In 2015, Ung updated the Sukholdosky meta-analysis, reviewing a total of 14 studies comparing CBT to treatment as usual, waitlist controls, or a different intervention (social recreational program). A total of 7 different treatment manuals were used across the 14 studies. Combined analysis of outcomes suggests, like in the Sukholdosky meta-analysis, an overall moderate effect size in the reduction of anxiety symptoms (Ung, 2015).

It is important to note that many of the studies in both the Sukholdosky and Ung meta-analyses did not use the traditional CBT manuals verbatim and numerous adaptations to better meet the needs of children with HFASD were very common (Sukholdosky, 2013; Ung, 2015).

Moreover, several studies implemented CBT programs developed with ASD populations in mind and with HFASD-specific modifications already built in. ASD modifications to CBT programs in the studies included; increased use of visual stimuli, use of child-specific interests, increased affective education, inclusion of social skills and communication training, increased involvement of parents in treatment, longer sessions, contingency management systems, increased emphasis on behavioral components rather than cognitive restructuring, adjustments to language used for cognitive restructuring to accommodate concrete and literal thinking, and longer overall treatment duration. Table 1 indicates some of the various programs used in the studies contributing to the literature review and meta-analysis. A closer look at the individual programs and study outcomes will now be reviewed.

***Table 1: Review of Programs***

| Program/Manual | Author | Features | Effectiveness |
|---|---|---|---|
| *Cool Kids (Original)*<br>*Cool Kids ASD Adapted* | Lyneham, Abbott, Wignail & Rapee (2003) | *Visual materials, structured worksheets, simplified cognitive therapy, increased relaxation and exposure components, involvement of parents, homework exposure sessions, increased duration of treatment* | In a 2007 study comparing Cool Kids to WLC, 71.4 of participants (n=47) no longer met diagnostic criteria for anxiety, post treatment. |
| *BIACA: "Behavioral Interventions for Anxiety in Children with Autism*" | Wood, McLeod, Hiruma & Pham (2009). Based on the "Building Confidence" CBT program by Wood and McLeod, 2008 | *Embedded social skills training, parent training, involvement with school, reward system, increased focus on adaptive skills* | In a 2014 open trial study with 20 ASD teenagers, a significant reduction in anxiety severity was reported by parents and clinicians (not all gains held at 1 month follow up)<br><br>In a 2009 study comparing BIACA to WLC, a large effect size was found in favor of BIACA with 80 percent of participants maintaining results at 3 month follow up. |
| *Face Your Fears (written with ASD population in mind)* | Reaven, Blakely-Smith, Nichols & Hepburn (2011) | *Embedded social skills, parent involvement, psychoeducation with concrete visuals, extra role modeling and practice sessions, token economy systems, video modeling, graded exposure,* | In a 2012 study comparing FYF to TAU, a .87 ES was found in favor of FYF. |

| | | | |
|---|---|---|---|
| | | *development of coping statements* | |
| *STAMP "Stress and Anger Management Program for young children (ages 5-7) with ASD". Based on the "Exploring Feelings" treatment program.* | Scarpa, Wells, & Attwood (2013) | *Utilizes the "emotional toolbox" to help children understand emotions and coping strategies, shorter sessions, age appropriate games, use of songs, many visual components and hands-on activities, psychoeducation parent training* | In a 2011 RCT comparing immediate treatment to delayed treatment with 11 5-7 year olds, parents reported improved emotional regulation from their child and increased confidence/self-efficacy in their ability to manage their child. Children were also able to produce more coping strategies in response to presented vignettes. |
| *Exploring Feelings* | Attwood, 2014 | *Utilizes the "emotional toolbox to help children understand emotions and coping strategies, increased affective education, use of visual metaphors (i.e. toolbox, scientist, thermometers, etc.), involvement of parents/social supports, etc.)* | In a 2005 RCT comparing 2 treatment options (Child Only or Child + Parent) for 10-12-year-old participants with Asperger's diagnosis to a WLC, a significant reduction in anxiety symptomatology was found at 6 week follow up for both treatment groups. |
| *MASSI: "Multimodal Anxiety and Social Skills Intervention for Adolescents with Autism Spectrum Disorder)* | White et al., 2010 | *Considers the bidirectional relationship between anxiety and social difficulties by targeting anxiety first and then social skills, involves parents, provides lots of practice sessions with specific feedback, teaches teens how to observe the antecedents and consequences of their behaviors (functional behavior assessment.* | In a 2013 RCT comparing MASSI treatment to a WLC (n=30 teens with HFASD), White observed large effect sizes in improved social skills and moderate effect sizes for reduction of anxiety severity. |
| *Coping Cats (with ASD modifications)* | McNally, 2013 | *Modified the standardized Coping Cats CBT for ASD population by: adding concrete reviews at the beginning and end of sessions, increasing visual stimuli, utilizing child-specific interests and sensory components, making the language more concrete, and using reinforcement strategies.* | An RCT comparing the adapted Coping Cats program to a WLC with 22 children with an ASD diagnosis found that 58 percent of children in the treatment group no longer met anxiety diagnostic criteria post-treatment while 100 percent of the WLC children still met criteria. At two month follow up, the recovery rate for the treatment group had dropped to 36 percent. |

***Facing Your Fears (Reaven, Blakely-Smith, Nichols & Hepburn)***

The Facing Your Fears (FYF) program is a 14-week group therapy intervention designed with the ASD population in mind. CBT components of FYF include psychoeducation and skill teaching concerning automatic negative thoughts, development of coping statements, somatic management of physiological symptoms, graded exposure, and relapse prevention (Reaven, Blakely-Smith, Nichols & Hepburn, 2011). A parent and child workbook are available in addition to the treatment manual, and the program was designed with the intent of simultaneously-occurring parent and child sessions.

Parent groups provide psychoeducation regarding anxiety disorders, identification of child's symptoms, and a discussion of parenting styles and parental anxiety. "Excessively protective" parenting styles that may limit a child's opportunity to practice effective coping strategies are emphasized and parents are instead encouraged to use an "adaptive parenting" style (Reaven, Blakely-Smith, Nichols, & Hepburn, 2011).

Child groups are interactive and activity-based, and measures are taken to facilitate generalization of skills outside of sessions. Children are taught to identify their anxiety as "worry bugs" and are taught about "helper bugs" that "fight" anxiety. Relaxation strategies are taught, and children create fear hierarchies to use in graded exposure. To meet the needs of HFASD populations, an increased number of hands-on activities, extra practice sessions, and token economy systems are employed. Additionally, FYF participants take part in video modeling sessions and create individual videos of their graded exposure progress. Social skills are taught and further facilitated by the treatment group dynamic. Finally, booster sessions are also available and are designed for utilization 4 - 6 weeks post-treatment.

The efficacy of the FYF program was observed in both an initial pilot study and a randomized control study (Reaven et al., 2009; Reaven, Blakely-Smith, Culhane-Shelburne & Hepburn, 2012). In the pilot study, 33 school-aged children and their parents participated in the FYF program. The experimental program was compared to a wait list control (WLC). Potentially efficacious results for the FYF program were found in parental reports of both anxiety symptomatology and anxiety-related life interference reduction (Reaven et al., 2009). Unfortunately, the results of the pilot should be considered with caution due to the small sample size, lack of random assignment, and lack of blind conditions amongst evaluators.

The second FYF study did include random assignment to the FYF program or treatment as usual (TAU) comparison and a larger overall sample size (n=52) (Reaven, Blakely-Smith, Culhane-Shelburne & Hepburn, 2012). Study participants were between the ages of 7 and 14, with estimated full-scale IQ scores ranging from 63 to 140. The second study also remedied the first study's lack of blind procedures by including independent clinical evaluators who were unaware of participant's treatment assignment.

Outcome measures from the second FYF study included diagnostic status of anxiety disorders, the ICE's Clinical Global Impression Scale of Severity (CGIS-S; Guy & Bonato, 1976) and the ICE's Clinical Global Impressions Scale of Improvement (CGIS-I; Guy & Bonato, 1976). 66 percent of the participants in the FYF group demonstrated a positive change in anxiety diagnostic status compared to only 20 percent of the TAU group. The FYF treatment group also demonstrated a significant decrease in anxiety symptomatology (observed with the CGIS-S), while the TAU group did not demonstrate a significant reduction in symptom severity. Finally, the CGIS-I results demonstrated significant improvement for the FYF group with a large effect size (.84) noted for change in improvement. Limitations for the 2012 FYF study include a

largely male and Caucasian population that does not closely resemble the larger population and lack of study replication by researchers not primarily linked to FYF program development. Continued FYF research conducted by independent researchers and with more representative participant samples will confirm the initial promising results regarding the efficacy of the FYF program.

***Cool Kids ASD Program (Chalfant)***

The Cool Kids ASD program is built around a previously-available Cool Kids program, but includes specific modifications made to better suit ASD populations (Lyneham, Abbott, Wignall & Rapee, 2003). The Cool Kids programs, which also include online options and a 3-6-year-old program, were originally developed in Australia and have been translated into several languages. Cool Kids Programs fall into the "promising research" category with a scientific rating of 3 from the California Evidence-Based Clearinghouse (CEBC), however the Cool Kids ASD program has not been independently validated (CEBC, 2016).

The program is available in group (grades 2 - 6) and individual format (children or adolescents of any age) and includes 10 weekly sessions (50 minutes for individual programming, 2 hours for group formatting). Children and parent workbooks are available and parent involvement in programming is encouraged. Cool Kids program adaptations made for the ASD population included program length extension, increased use of visual aids, increased relaxation and exposure sessions, daily homework assignments, simplification of cognitive components and cognitive cueing (i.e. providing lists to choose from, etc.), and a parent program addressing anxiety education, relaxation program, cognitive restructuring exercises and relapse prevention.

In 2007, Chalfant studied the efficacy of the Cool Kids ASD program with 42 school-aged children. Participants were randomly assigned to treatment or a wait list control (WLC) condition. Treatment took place over 9 weekly sessions with 3 monthly booster sessions implemented post-treatment. Treatment sessions occurred in group format and were 2 hours in duration. Outcomes measures included anxiety diagnostic severity measured by the Anxiety Disorders Interview Schedule (ADIS-C/P), the Spence Children's Anxiety Scale (SCAS) and the Children's Automatic Thoughts Scale (CATS). The CATS is a 40-item, self-report measure assessing negative self-statements in children and adolescents (Schniering & Rapee, 2002).

Results of the study suggested overall significant changes in favor of the treatment condition. Further, treatment participants reported significant reductions in worry thoughts, internalizing thoughts and poor self-esteem, as measured by the CATS. Parents and teachers also reported significant main effects in the reduction of emotional and anxiety symptoms for participants in the treatment group. Significant reductions in externalizing difficulties were also observed for the treatment group. Study limitations include small sample size, lack of treatment integrity measurements, lack of blind conditions, and lack of alternate treatment comparison. Further research regarding the Cool Kids programs should include (in addition to remedy of the conditions just mentioned), independent replication by researchers not primarily linked to the Cool Kids ASD program curriculum developmental and follow-up outcomes beyond post-treatment measures.

***BIACA (Behavioral Interventions for Anxiety in Children with Autism) & Building Confidence***

The BIACA program is an autism-specific program based on the previously-developed Building Confidence program (Wood, McLeod, Hiruma, & Phan, 2008). The Building

Confidence program falls into the "supported" category of treatments with a scientific rating of 2 from the California Evidence-Based Clearinghouse (CEBC), but the BIACA program has not been independently validated (CEBC, 2016). BIACA follows a modular approach based on the individual needs of the client with core components of psychoeducation, cognitive restructuring, and in-vivo exposure delivered to all participants, and accompanying components varying from participant to participant.

The BIACA program is designed for adolescent participants but has been used with participants as young as seven years old. The program is implemented in 16 weekly sessions with the following schedule: 30-minute session with adolescent, followed by 30-minute session with parent. BIACA treatment components designed for individuals with ASD include increased attention to social skill development, use of kid-friendly acronym to introduce CBT principles (K.I.C.K: "Knowing I'm Nervous, Icky Thoughts, Calm Thoughts, Keep Practicing"), increased parental involvement, and parent training on planned ignoring, rewards systems, and more. The BIACA program also includes 4 additional modules specifically for the ASD population targeting friendship skills, social coaching, self-help skills, and reduction of circumscribed interests. Regardless of the individual BIACA programming, each participant spends a minimum of 3 sessions learning and practicing basic coping skills and a minimum of 8 sessions in vivo exposure.

A 2014 open trial and 2009 RCT tested the efficacy of the BIACA program with WLC comparisons for the RCT (Ehrenreich et al., 2014; Wood et al., 2009). 20 adolescent participants participated in the open trial, 9 at a research site in California and 11 at a comparable research site in Florida. Participants received 16 sessions of modularized intervention with child and parent components. Outcome measures included anxiety disorder severity (ADIS-IV-C/P,

Pediatric Anxiety Rating Scale (PARS), CGI-S, symptom improvement (CGI-I), combined anxiety and depression measures (Revised Child Anxiety and Depression Scale-RCADS) and child behaviors (Child Behavioral Checklist (CBCL). Overall, the open trial findings suggest significant reductions in anxiety disorder diagnosis, severity, symptoms, and impairment. Additionally, parents reported less internalizing and externalizing symptoms seen in their children. Outcomes were measured again at 1-month post-treatment, with treatment gains significantly maintained. Similar to other studies, participant self-reports did not show a significant reduction in anxiety and depression symptoms. A downward trend was noted in the self-report measures, but statistically significant reductions were not observed. Limitations to this study include the open trial design (lacking treatment comparison), small sample size, and relatively short follow-up period.

In 2009, Wood compared the BIACA program to a WLC with 40 children participants in a randomized, intent-to-treat design. Treatment procedures were similar to the Ehrenreich open trial but were conducted with a somewhat younger participant population (7 - 11 years of age). Similar outcome measurements were also used, with the addition of the Multidimensional Anxiety Scale for Children (MASC). Study outcomes suggested overall large effect sizes in the reduction of anxiety symptomatology. That being said, child-report did not demonstrate a statistically significant change in anxiety symptoms. Limitations to this study include smaller sample size and implementation by BIACA program developers. Further research conducted by independent researchers with larger samples and comparisons to alternate treatments will help validate the initial findings from both the 2009 and 2014 studies.

***Exploring Feelings & STAMP (Stress and Anger Management Program) (Attwood & Scarpa)***

*Exploring Feelings* was originally designed for anxiety management for 9-12-year-old children with a comorbid Asperger's diagnosis. The program is highly structured and designed to occur over six, 2-hour group sessions. A child and parent workbook is included and homework assignments are given each session. Autism-specific modifications include increased focus on affective education, increased parental involvement, incorporation of social skills and Social Stories. Additionally, concrete visuals/metaphors for skill acquisition and development are presented with a toolbox analogy in which emotional, social, physical and other "tools" are used to "fix" feelings.

Two randomized controlled studies observe the efficacy of the *Exploring Feelings* program with ASD populations (McConachie et al., 2014; Sofronoff, 2005). In the 2005 study, 71 children with an Asperger's diagnosis (10 -12 years) were randomly assigned to a WLC or one of two Exploring Feelings treatment conditions: intervention for child only, or intervention for child and parent. Outcome measures included a novel problem solving task designed by the Exploring Feelings author, anxiety symptom severity (SCAS-P), and the Social Worries Questionnaire-Parent Form (Spence, 1995).

Results of the 2005 study suggest that the Exploring Feelings treatment conditions had a significant effect in parent-rated anxiety symptoms. That being said, many participants did not show significant change post treatment and significant results were only observed at six-week follow up. Additional study results demonstrated significant reduction of social worries, and significant improvements in ability to generate strategies in the problem solving task for the treatment groups. Finally, the additive effect of parent involvement resulted in significant treatment gains (greater reduction in anxiety symptoms and greater number of strategies

generated) for participants in the child and parent condition compared to those in the child only intervention.

In 2014, McConachie implemented the *Exploring Feelings* program in a group format with an added parent component. 32 children (9 -13 years) were randomly assigned to immediate or delayed therapy, with treatment occurring in seven weekly sessions. Outcome measures included the ADIS, SCAS-P/C, and CGI-I and results indicated significant symptom reduction for both parent and child reports. Limitations to both of the *Exploring Feelings* studies include smaller sample sizes, reliance on parent report and questionable autism diagnosis in the 2014 study (5 participants did not indicate autism diagnosis per ADOS measurement).

The *STAMP* program *(Stress and Anger Management Program)* is considered an extension of the *Exploring Feelings* program and is specifically designed for younger children (5-7 years old) with comorbid anxiety and ASD. The program can also be used for children with externalizing, anger-management difficulties. It is designed for group implementation across 9 weekly sessions. The "toolbox" utilized in the *Exploring Feelings* program is also used in the *STAMP* program while teaching developmentally-appropriate coping strategies.

Other developmental modifications to the *STAMP* program include the use of singing, story time, and games. Parent group meetings occurred simultaneously during the child sessions, and include observation of the child sessions to encourage generalization of treatment procedures beyond the clinic setting. Child group sessions target skill acquisition and development regarding: relaxation strategies, social skills, cognitive "thinking" skills, and the use of special interest tools (incorporation of child's restrictive interest into treatment procedures). Programming culminates in each child starring in a "commercial" meant to highlight tools to remember from their treatment sessions.

In 2011, Scarpa conducted a randomized, pilot trial testing the efficacy of the STAMP program. 11 children (5 - 7 years of age) were randomly assigned to immediate or delayed treatment and received the intervention in the format just described. Outcome measures included Emotional Regulation Checklists, Behavioral Monitoring, Self Confidence rating scales and problem solving measures (both a novel problem solving task developed by Scarpa and the task previously described in the *Exploring Feelings* studies). Treatment results indicated a significant reduction in child outbursts for both the frequency and intensity of outbursts, and parents reported increased levels of confidence in ability to manage their child's emotions. Finally, participants in the treatment condition were able to produce significantly more strategies in the problem solving tasks. Limitations to the study include small sample size, lack of independent replication, and initial group differences (i.e. familial incomes were significantly different).

***MASSI (Multimodal Anxiety and Social Skills Intervention for Adolescents with ASD) (White, Scahill & Ollendick)***

As the name implies, the MASSI program is designed for teenagers (12 -17 years) with comorbid ASD and anxiety diagnoses. MASSI is based on the principles of CBT while additionally drawing on the principles of applied behavior analysis (ABA). ABA assumes that an individual's behavior has a purpose or function that is motivated by the individual's desires and needs. Thus, ABA interventions teach appropriate, replacement behaviors that meet the same needs that problem behaviors are currently meeting. Numerous examples of previous work support ABA effectiveness with individuals with ASD (Foxx, 2008; Green, 1996; Schreibman, 2000) and the MASSI program incorporates related ABA components in the treatment program. Additional MASSI components meant to meet the needs of individuals with ASD include: parent and family involvement, skill practice, direct feedback, modeling, increased structure,

psychoeducation and explicit teaching about both ASD and anxiety, emphasis on positive social experiences, and varied teaching strategies such as dramatic reenactment, tactile reminders, use of special interests in curriculum, etc.

The MASSI program can be implemented in individual therapy sessions with the adolescent, adolescent group sessions, and parent education sessions but the authors recommend multimodal implementation to ensure generalization. 12 individual therapy sessions are available and last between 50 -75 minutes. Group therapy sessions usually begin 3 weeks after the start of individual therapy and occur every other week. The 60-minute group therapy sessions are designed to provide the teen with a positive social learning opportunity where they might confront their social anxiety and practice social skills.

In 2012, White et al. evaluated the feasibility and outcomes of the MASSI program with 30 adolescents between the ages of 12 and 17 years. Participants were randomly assigned to the treatment group or WLC. Outcome measures observed anxiety disorder severity and ASD social impairments, measured using the ADIS-C/P, Social Responsiveness Scale (SRS), Child and Adolescent Symptom Inventory-4 ASD Anxiety Scale (CASI-Anx), CGI-I, and PARS. Additionally, program feasibility was examined and attendance rates, homework completion, treatment integrity, and consumer satisfaction measures were used. While the program was implemented with high fidelity and participants reported high satisfaction with MASSI, the reported reduction in anxiety symptoms was not statistically significant. There was a statistically significant effect in improved ASD related social impairments with a within-group effect size = 1.18. Limitations of the study include small sample size, limited use of outcomes measures (difficult to make comparisons to other studies), and lack of treatment transportability to other

settings. Future research should examine the MASSI program in different settings and with larger samples.

***Coping Cats: Modified for ASD population (McNally 2013)***

The *Coping Cats* program was the first CBT program designed to treat childhood anxiety (Kendall & Hedtke, 2006). The *Coping Cats* program falls into the "well-supported" category of treatments with a scientific rating of 1 from the California Evidence-Based Clearinghouse (CEBC, 2016). Treatment occurs over 16 therapy sessions and child and parent workbooks are available. Primary treatment goals for the Coping Cats program include increasing a child's awareness of anxious arousal and teaching the child to use the awareness as a cue to implement anxiety management techniques. Sessions 1-8 focus on skill training (i.e. affective education, awareness of somatic sensations, cognitive restructuring, and developing coping plans) while sessions 9 through 16 focus on exposure tasks in a hierarchical sequence. Two parent sessions are included and homework assignments are utilized.

In 2013, McNally implemented the *Coping Cats* program with modifications made to accommodate ASD populations. Modifications included: material reviews, extended sessions, added written and visual materials (i.e. visual schedules, pictorial scales of anxiety, etc.), use of concrete language, inclusion of specific interests, frequent sensory input, and individualized treatment based on unique needs. Participants (N = 22) were randomly assigned to the treatment condition or a WLC. Outcomes were measured using the ADIS-P and the SCAS, and post treatment outcomes were followed by a two month follow up.

Results of the 2013 Coping Cats study found that 58 percent of the treatment population no longer met anxiety diagnostic criteria post treatment, while 100 percent of the WLC participants still met diagnostic criteria. 36 percent of the treatment population continued to not

meet the diagnostic criteria at 2 month follow up. Child self-reports were not statistically significant on either measure. Overall, large effect sizes were observed when comparing reduction of anxiety symptoms between the treatment and WLC participants. Limitations of the study include smaller sample size, reliance on parent report, reliance on measures designed for typically developing children, and primary author implementation (may lead to bias and/or lack of outcome generalizability). Future research should include replication with a larger sample and treatment responses across multiple providers.

***Social Recreational (SR) Program (Sung, 2011)***

While many of the CBT programs mentioned so far emphasize social skill development, the majority of them do not exclusively target social development. In 2011, Sung examined the efficacy of a "social recreation" (SR) program compared to a CBT program with a sample of Singapore children diagnosed with comorbid anxiety and HFASD. 70 participants (9 -16 years of age) were randomly assigned to one of the treatment conditions with 36 participants in the CBT condition and 34 in the SR condition. The CBT intervention combined traditional CBT elements with the previously-described *Coping Cats* and *Exploring Feelings* programs. ASD-specific modifications included session structure, increased visual components, role play, and use of social stories. The SR intervention program consisted of crafts, cooperative games, motor coordination skill development, and activities meant to encourage functional skills. It is important to note that the SR condition did not directly target anxiety symptomatology and did not emphasize strategies to improve anxiety.

Both the CBT and SR conditions were implemented across 16 sessions and were delivered in small group format (2 - 3 children). Neither treatment included a parent component and both treatments were manualized. Anxiety outcomes were measured using the SCAS-C and

CGI-S at pre-treatment, post-treatment, three, and six-month follow-up. Results of the study indicated that both the CBT group and SR group showed significant reductions in generalized anxiety and total anxiety symptoms at six-month follow up, despite the indirect treatment associated with the SR group.

Sung proposed that while the SR intervention did not explicitly teach anxiety management; the emphasis on self-help skills, use of structure, group activities, and visual cues to encourage behavioral regulation may have inadvertently led to a reduction in anxiety due to improved abilities to self-regulate and interact with others (Sung, 2011). Additional findings from the study suggest reduced diagnostic severity for both groups and reduced frequency of panic attacks symptoms for the SR group. Limitations of the study include small sample size, lack of parent involvement in treatment, no wait-list comparison, and short-term follow-up period. More research is needed, in diverse settings, with diverse samples to determine if SR programs like the one in this study are comparably efficacious and effective in the reduction of anxiety for ASD populations.

## OCD and ASD: Treatment

### Reviews and Meta-Analyses

Research regarding the treatment of OCD for individuals with ASD is relatively limited and consists mostly of case studies. While research in this area is growing, the author of the present paper could find no published meta-analyses and only one review paper on the topic of OCD treatment in ASD populations. The review paper, a recent publication (2014) by Neil & Sturney, 2014 considers both the assessment and treatment of OCD in individuals with ASD and reviews a total of 55 papers with 21 papers related to definitions, diagnosis, prevalence, developmental trajectory, risk factors and assessment and 34 papers related to treatment. 15 of the treatment papers presented psychosocial treatments (CBT or behavior modification) while

the other 19 discussed pharmacological treatments using a variety of antipsychotics, serotonin reuptake inhibitors (SRIs and SSRIs) and a small assortment of other medications. Roughly half of the treatment papers (n=7) consisted of case reports, two were small *N* experiments, two involved multicomponent treatments for anxiety in addition to OCD and two were uncontrolled group designs. It is, perhaps, interesting to note that several of the authors contributing to this OCD literature review were cited above in the development and testing of anxiety CBT programs for children with ASD (Reaven & Hepburn, 2003; Sofronoff et al., 2005; Wood et al., 2009; Sze & Wood, 2009).

Neil & Sturney (2014) used the familiar Chambless criteria for "empirically supported treatments" (Chambless & Hollon, 1998; Chambless et al., 1998) to determine the support for each OCD treatment in their review. While a complete discussion of the criteria is beyond the scope of this paper, a brief description is in order. Simply stated, studies are categorized as *well-established, probably efficacious, possibly efficacious* and *experimental* based on the methodological characteristics of the study and include but are not limited to: random group

**Table 4** A summary of evidence-based practice for treatment of OCD among individuals with ASD

| Intervention | Status of Evidence |
|---|---|
| Psychosocial Interventions | |
| 1. Cognitive behavior therapy | Experimental |
| 2. Behavior analysis and behavior modification | Probably efficacious |
| 3. Other psychosocial treatments | Unevaluated |
| Pharmacological intervention | |
| 4. Risperidone | Probably efficacious |
| 5. Olanzapine | Experimental |
| 6. Quetiapine | Experimental |
| 7. Aripiprazole | Experimental |
| 8.Clomipramine | Experimental |
| 9. Fluvoxamine for children | Experimental |
| 10. Fluvoxamine for adults | Probably efficacious |
| 11. Fluoxetine | Probably efficacious |
| 12. Citalopram | Experimental |
| 13. Methylphenidate | Experimental |
| 14. Divalproex sodium | Experimental |
| 15. Oxytocin | Experimental |
| 16. Other biological treatments | Unevaluated |

*Figure 3: Neil & Sturney, 2014*

assignment, blind assessment, treatment superiority to wait-list (or equality to already-established treatment), independent replication of findings and appropriate statistical analysis (Chambless & Hollon, 1998; Chambless et al., 1998). As shown in Figure 3, results of the review suggest that CBT is an "experimental" intervention for the treatment of OCD for individuals with ASD as the available research did not always use blind evaluators, treatment comparisons, randomization, reliable and valid measures and representative samples. Future research with stringent study designs and representative samples may provide the evidence needed to deem CBT "efficacious" for the treatment of OCD in ASD populations. Available research on behavior analysis and behavior modification suggest that this type of intervention is "probably efficacious" for the treatment of OCD with ASD populations. Behavior analysis and behavior modification treatments cited in the review included antecedent strategies, differential reinforcement (both differential reinforcement of low rates of behavior differential reinforcement of alternative behavior), token economies, blocking, fading and extinction procedures. Further, the majority of pharmacological treatments were considered "experimental" while Risperidone and Fluvoxetine were considered "probably efficacious". Neil & Sturney close the review with a request for additional research regarding comorbid OCD and ASD and call for further development of curriculum and training manuals meant to facilitate implementation and replication of treatment.

**CBT treatment comparison**

A recent case controlled study compared the efficacy of CBT for OCD with both ASD and typically-developing populations (n = 22 for ASD + OCD group and n = 22 for OCD + No ASD group) (Murray 2015). All participants received CBT in individual sessions with exposure and response prevention (ERP) incorporated. The intervention also included psychoeducation

and relapse prevention and the majority of participants received 14 sessions across a 17-week time frame. Sessions were roughly an hour long and homework assignments were given each week to consolidate in-session learning. Outcomes were measured using the Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS) and suggested that participants in the OCD + ASD were responding less well to treatment (10/22: 46%) when compared with the OCD + No ASD group (16/22: 73%) however the difference did not reach clinical significance. Remission rates between the groups also differed with participants in the OCD + ASD group demonstrating lower remission rates at the end of treatment than those in the OCD + No ASD groups (2/22; 9% vs. 10/22; 46%).

Murray states that the preliminary results of this study do not indicate that CBT is an overall-ineffective intervention for comorbid OCD and ASD, but that standard CBT protocols meant for typically-developing children may not be as effective for children with ASD. She suggests that future research should emphasize the modification and evaluation of OCD-CBT packages designed for ASD populations in an effort to improve treatment outcomes and evaluate efficacy of such protocols.

**A review of OCD case and group studies**

Due to the limited availability of published RCTs designed for the treatment of OCD in ASD populations, a review of single-subject experiments is called for. Though a thorough review of such experiments is beyond the scope of this paper, we will now briefly discuss a number of single-subject experiments and their outcomes to further understand OCD treatment modifications for ASD populations and related outcomes. It should be noted that the majority of these studies used the March and Mulle's 1998 CBT protocol while a few additional studies used the *Building Confidence* program described above. Components of the March and Mulle's CBT

program include: establishing a neurobehavioral framework, introducing a "tool kit", mapping one's OCD, putting ERP into action, family sessions, moving through the stimulus hierarchy while using the "fear thermometer" and symptom list, relapse prevention, and homework assignments. ASD specific modifications to these CBT programs varied and included: parental involvement in therapy, use of reinforcements, use of social stories, use of behavior momentum, increased affective education, earlier onset of exposure components, incorporation of child's specific interests, use of visual prompts, role playing and providing choice (El-Ghoroury & Krackow, 2011; Lehmkhul et al., 2008; Reaven and Hepburn, 2003; Sze and Wood, 2009). Treatment outcomes varied from study to study with all studies reporting reduction in participants' obsessive-compulsive symptoms following CBT.

In 2005, Sofronoff randomized 71 children with ASD (10-12 years old) to either group CBT, group CBT with parental involvement or a waitlist control. The CBT intervention used the *Exploring Feelings* CBT protocol described above and taught children how to use their "emotional toolboxes" to combat OCD. Sessions were 2 hours in length and took place across a span of six weeks. Outcomes were measured with the SCAS-P and demonstrated significant OCD symptom reduction for both treatment groups at post-treatment and 6-week follow up. The waitlist control group, on the other hand, did not show a reduction in OCD symptoms. While these results are promising, Sofronoff did not use independent blind evaluators and a clear diagnosis of OCD was not included in the study. Future RCTs are needed to determine the efficacy of such interventions.

**Discussion**

Children with ASD demonstrate increased rates comorbid anxiety and OCD diagnosis when compared to their typically-developing peers. Further, children with ASD demonstrate

higher rates of anxiety and OCD than peers with intellectual disabilities, communication disorders and other diagnoses like ADHD, CD and ODD. Children with high-functioning ASD (ASD diagnosis without concurrent intellectual disability) seem to have the greatest susceptibility to comorbid anxiety and OCD diagnoses. The factors that might explain why children with ASD have higher rates of comorbid anxiety and OCD are not easily understood. That being said, some corollary research suggests that ASD-related features like social difficulties, theory of mind limitations, communication deficits, rigid and restrictive thinking, and lower self-sufficiency may increase susceptibility for an anxiety and/or OCD diagnosis.

Social deficits may be especially problematic for the child with high-functioning ASD as they may be aware of the inefficiency of their social skills and/or the effect they have on others but unaware of ways they might improve their interactions. Overprotective parenting styles and parents' own experience with/modeling of anxiety may further predispose the child with ASD to later anxiety and OCD diagnosis. Anxiety and OCD diagnoses are considered risk factors for serious education problems, isolation, later unemployment, substance abuse and other psychiatric problems (specifically, depression). For children with ASD, anxiety and OCD comorbidity also contribute to worsening of ASD symptoms and may increase the child's restrictive/repetitive behaviors, self-stimming, aggressive behaviors and social withdrawal.

Treatment for anxiety and OCD in both typically-developing and ASD children is imperative for improved quality of life. CBT interventions aim to stop the distorted, avoidant and occasionally-compulsive trajectory that many anxious individuals engage in and is considered an empirically supported treatment for anxiety and OCD in typically developing children. More recently, research has examined the efficacy of CBT programs for ASD populations with initially promising results. A number of RCTs, single-subject experiments,

open trials and pilot studies demonstrate reductions in anxiety and OCD symptomatology with interventions incorporating both ASD-modifications to already-available CBT programs and ASD-specific CBT programs designed with ASD populations in mind. While research in this area is limited and often lacks the optimal methodological rigor, initial findings are encouraging. A call for additional research replicating such interventions with larger samples, in a variety of settings, by independent researchers and with appropriate study elements (randomization, blind assessment, appropriate statistics, etc.) is critical to further understanding of efficacious interventions for anxiety and OCD in ASD populations and ensure positive treatment outcomes in practice.

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