Group Cognitive Behaviour Therapy for Children with Autism Spectrum Disorder and Comorbid Anxiety: Examining Factors That Impact Outcomes

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Ethics Statement

The author, whose name appears on the title page of this work, has obtained, for the research described in this work, either:

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Abstract

Anxiety is common in children with Autism Spectrum Disorder (ASD; MacNeil, Lopes, & Minnes, 2009; Kim, Szatmari, Bryson, Streiner, & Wilson, 2000; White, Oswald, Ollendick, & Scahill, 2009) and can lead to significant impairment (Farrugia & Hudson, 2006; Kim et al., 2000; van Steensel, Bögels, & Dirksen, 2012). Implementing treatments in real-world environments has been identified as one of the top priorities for researchers in the area of anxiety in youth with ASD (Vasa, Keefer, Reaven, South & White, 2018). The current study examined the effectiveness of a manualized, group-based Cognitive Behaviour Therapy (CBT; *Facing Your Fears (FYF)*; Reaven, Blakeley-Smith, Culhane-Shelburne, & Hepburn, 2012; Reaven, Blakeley-Smith, Nichols, & Hepburn, 2011) with children with ASD without intellectual disability (IQ>70) and their parents at BC Children's Hospital. The primary goals of this research were to a) measure the effectiveness of the treatment protocol in a community setting with a complex population, and b) examine a selection of possible predictors of treatment outcomes (e.g., amount of homework completion, level of clinician-provided parent support during in vivo exposure practice, parent-child relationship variables, and parent personality variables), and thus contribute to the sparse literature in this regard. Significant decreases in child anxiety were observed from pre- to post-treatment at the levels of a) parent questionnaire ratings (η_p^2 = .36), b) clinician severity ratings based on parent interview (*d*=.98), and c) parent ratings on primary individual exposure targets (last 7 weeks of group; *d*=1.50). After controlling for baseline child anxiety, variables that were found to significantly predict parent ratings of child anxiety symptoms at post-treatment were a) level of clinician support provided during in vivo exposure practice, b) parent-child communication, and c) self-reported parent trait anxiety. Overall, results from the current study are consistent with previous research demonstrating the effectiveness of the *FYF* treatment program for children with ASD.

Keywords: Autism Spectrum Disorder; Anxiety Disorders; Cognitive Behaviour Therapy; Group Psychotherapy; Treatment Effectiveness Evaluation; Psychotherapeutic Outcomes.

I would like to dedicate this work to my mother, who is a strong, devoted, and resilient woman;

my grandparents, who have always provided me consistent loving encouragement;

my husband, who is patient with me and has supported me in my many ambitious pursuits;

my sisters, who have steadfastly believed in me and whom I greatly admire;

and my nieces and nephews -Arthur, Hunter, Isabella, and Lilly - who have captured my heart and are, to me, joy incarnate;

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~Thank you, from the bottom of my heart

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List of Acronyms

ACT	Autism Community Training
ADI-R	Autism Diagnostic Interview - Revised
ADHD	Attention Deficit Hyperactivity Disorder
ADIS, ADIS-IV	Anxiety Disorders Interview Schedule
APA	American Psychiatric Association
ASD	Autism Spectrum Disorder
BAP	Broad Autism Phenotype
BAPQ	Broad Autism Phenotype Questionnaire
BASC-2	Behavior Assessment System for Children
BCCH	British Columbia Children's Hospital
CBT	Cognitive Behaviour Therapy
CGI	Clinical Global Impression Scale
CI	Confidence Interval
CSR	Clinician Severity Rating
DV	Dependent Variable
IQ	Intelligence Quotient
M	Mean
OCD	Obsessive Compulsive Disorder
PPMC	Pearson Product Moment Correlation
PRQ	Parenting Relationship Questionnaire
PSI	Parenting Stress Index
FYF	Facing Your Fears
RCT	Randomized Controlled Trial
SCARED	Screen for Child Anxiety Related Disorders
SCAS	Spence Children's Anxiety Scale
SCQ	Social Communication Questionnaire
SD	Standard Deviation
SES	Social Economic Status
SFU	Simon Fraser University
SWQ	Social Worries Questionnaire
SR	Social Recreational
STAI	State Trait Anxiety Scale

TAU	Treatment As Usual
TD	Typically Developing
WASI-II	Wechsler Abbreviated Scale of Intelligence

Chapter 1. Introduction

1.1. Anxiety in Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that primarily affects social interaction and communication and restricts activities and behaviours (American Psychiatric Association, 2013). Children with ASD are also at high risk for other medical and psychiatric disorders such as (but not limited to) intellectual disability, attention deficit hyperactivity disorder, anxiety, depression, Tourette's syndrome, and seizure disorder. Anxiety is one of the most commonly occurring comorbid disorders in young people with ASD. In fact, children with ASD experience even greater levels of anxiety than typically-developing (TD) children (Kim, Szatmari, Bryson, Streiner, & Wilson, 2000; MacNeil, Lopes, & Minnes, 2009). A systematic literature review on clinically significant anxiety in children with ASD revealed that prevalence rates are reported to be up to 84% (White, Oswald, Ollendick, & Scahill, 2009), clearly indicating that there are many children on the spectrum who are in need of treatment. This is particularly true for youth with autism spectrum disorder without intellectual disability (IQ>70; Gillott, Furniss, & Walter, 2001; Mayes, Calhoun, Murray, Ahuja, & Smith, 2011). According to the National Needs Assessment Survey conducted by the Canadian Autism Spectrum Disorders Alliance (Weiss, Whelan, McMorris, & Caroll, 2014), 68% of Canadian caregivers of school aged children with ASD report concerns about anxiety. This concern rises to 70% in adulthood and is even higher in adult self-advocates (78%) based on self-report.

1.1.1. Differential Diagnosis

With such high rates of anxiety in this population, debate in the literature has centred around issues relating to apparent overlap of symptoms in the context of differential diagnosis and issues of conceptualization. Whether anxiety represents a true

comorbidity, is an artifact of overlapping symptoms, is a common sequela of ASD, is representative of measurement issues, or a combination of multiple factors is discussed in the literature (e.g., Kerns & Kendall, 2012; Wood & Gadow, 2010). Overlap in symptom expression between ASD and anxiety has been a particularly salient issue and many aspects of this have been discussed in the literature. Examples include, repetitive and restrictive behaviours and interests or perseveration observed in ASD that can appear similar to some Obsessive-Compulsive Disorder behaviour, symptoms that present as separation anxiety that are really a function of avoidance of environmental features (e.g., noisy spaces, or change in routine), or seemingly socially phobic behaviour that is rooted in lack of social interest or competence as opposed to fear of humiliation or embarrassment (Mazefsky & White, 2013; Wood & Gadow, 2010).

Accepted evidence-based clinical conventions outlined in the DSM 5 specify that when criteria for both ASD and anxiety are met, both diagnoses can be made (APA, 2013). However, consideration of the function, sequence, degree, and quality of behaviours exhibited by the individual with ASD is important when making clinical judgements about the presence of comorbid conditions. Clinical considerations for identifying episodic disorders such as anxiety disorders have been assembled (e.g., as outlined in Mazefsky & White, 2013). Included are guidelines which state that symptoms should be qualitatively or quantitatively different from baseline functioning, observable changes in baseline behaviours or the addition of new behaviours should be present, that additional impairment as a result of the anxiety symptoms should also be evident, and that attention to the individual profile of symptoms related to ASD in context of the observed change in behaviours should be carefully considered.

1.1.2. Measurement

Echoing the challenges in differential diagnosis are issues related to measurement of anxiety which is complex for several reasons, including (but not limited to) overlap in ASD and anxiety symptomatology (e.g., social avoidance), atypical presentation (e.g., more externalizing behaviours in ASD), language level requirements of existing measures which can limit their suitability for this population, and an overall lack of validated measures. Existing measures developed for TD populations include

abstract concepts (e.g., time, emotions) and are not always well-suited youth with ASD who often have limited self-awareness and insight into their symptoms and emotions. For these reasons, there is considerable debate in the field regarding how best to measure anxiety in youth with ASD and which measures are most suitable. Although there are no well-validated measures for use with this population, a recent review (Lecavalier et al., 2014) suggests some promising front-runners (i.e., measures with good to excellent reliability and validity, but with limited information on relevant test measurement characteristics for use with children with ASD, such as test-retest reliability or convergent validity) for use with youth with ASD without intellectual disability including the Anxiety Disorders Interview Schedule (ADIS-IV; Silverman & Albano, 1996) and the Multidimensional Anxiety Scale for Children (MASC; March, 2012). Another review (Grondhuis & Aman, 2012), identified that the Spence Children's Anxiety Scale (SCAS; Spence, 1998) would be another potentially appropriate measure for use with children with high-functioning autism and may be best paired with the ADIS-IV for use in clinical and research settings.

1.1.3. Clinical Significance

Anxiety disorders are associated with a multitude of negative outcomes in typically developing children ranging from social difficulties (Settipani & Kendall, 2013), to victimization (Crawford & Manassis, 2011), lower academic achievement (Seipp, 1991), suicidal behaviours (Kanwar et al., 2013), high comorbidity levels (Kendall et al., 2010), and negative outcomes into adulthood (Pine, Cohen, Gurley, Brook & Ma, 1998). Anxiety is particularly important to consider in youth with ASD because it can exacerbate difficulties related to social development, communication, and day-to-day functioning that are already faced by these children by interfering with their participation in home, school, and community activities. It may complicate treatment approaches aimed at improving social functioning and hinder social competence at a level beyond what would be expected based on the social disability associated with ASD alone (White, Scahill, & Ollendick, 2013). Ultimately, disproportionate anxiety and poor coping in social situations may limit social (and other) learning opportunities and circumvent the building of meaningful social relationships (Bellini, 2006).

Anxiety and mood symptoms have also been found to be associated with higher levels of aggressive and oppositional behaviour and to have a negative impact on social relationships and family life (Kim et al., 2000). Higher anxiety symptoms in youth with ASD are also related to more negative automatic thoughts, behavioural problems, and life interference (Farrugia & Hudson, 2006). Further, anxiety has been found to negatively impact quality of life over and above challenges associated with ASD (van Steensel, Bögels, & Dirksen, 2012). In a study examining parent-rated anxiety across two time points, researchers found that, without intervention, clinical levels of anxiety were relatively stable across time (Teh, Chan, Tan & Magiati, 2017). Anxiety can complicate the clinical picture and lead to significant impairment over and above symptoms associated with ASD alone. Treatments that are specifically tailored to children with ASD may be effective in reducing the impact of anxiety on ASD.

1.2. Cognitive Behaviour Therapy to Treat Anxiety

Cognitive Behaviour Therapy (CBT) is an evidence-based therapeutic approach that focuses on identifying and modifying dysfunctional cognitions and beliefs, as well as changing problematic behaviour (Beck 1993; Kendall 1993). Within the CBT framework children learn a new coping template through learning to identify and modify problematic thinking and self-talk, developing coping skills such as relaxation skills, and creating and implementing exposure hierarchies (Kendall, 1993). CBT approaches typically include four components including assessment, psychoeducation, cognitive restructuring, and exposure (Moree & Davis, 2010). Exposure is an integral piece of the CBT model, and is used in most treatment approaches for anxiety (Chorpita & Daleiden, 2009). It involves exposure to the feared stimulus in order to elicit and challenge maladaptive cognitions and facilitate habituation and the extinction of avoidance behaviour. The use of systematic exposure guided by pre-established fear hierarchies in a controlled setting helps individuals learn to face anxiety in small steps using the skills they have acquired during other aspects of treatment (e.g., psychoeducation, relaxation training, or cognitive restructuring; Chorpita, 2007; Friedburg & McClure, 2002).

There is considerable evidence supporting the effectiveness of cognitive behavioural therapy (CBT) in the treatment of anxiety in typically-developing children

(e.g., Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; Compton et al., 2004; In-Albon & Schneider; 2006; Ishikawa et al., 2007; Reynolds, Wilson, Austin, & Hooper, 2012; Sawyer & Nunez, 2014). This literature includes research on group-based CBT approaches which have been found to be effective and potentially cost-effective treatment options (Flannery-Schroeder & Kendall, 2000; Kendall, 1994; Kendall et al., 1997; Kendall et al., 2004; Kendall & Southam-Gerow, 1996; Silverman, Pina, & Viswesvaran, 2008; Wergeland, 2014). There is also established empirical support for the application of CBT in treating anxiety in children with ASD individually (e.g., Danial & Wood, 2013; Lang, Regester, Lauderdale, Ashbaugh, & Haring, 2010; Rotheram-Fuller & MacMullen, 2011; Scattone & Mong, 2013; Storch, 2013; Sukhodolsky, Bloch, Panza, & Reichow, 2015; Wood et al. 2009). There is also growing support for the use of modified group treatment protocols with children with ASD (e.g., Chalfant, Rapee, & Carroll, 2007; Reaven, Blakely-Smith, Culhane-Shelburne, & Hepburn, 2012; Sofronoff, Attwood & Hinton, 2005). In a 2015 meta-analysis, Sukhodolsky and colleagues concluded that CBT was effective (relative to waitlist control groups or treatment as usual; TAU, where families are allowed to pursue alternative treatments or programs) for the treatment of anxiety in children and adolescents with ASD (parent-rated outcomes for treatment effect were large overall; *d*=1.19).

1.2.1. Modified Cognitive Behaviour Therapy for Children with ASD

Several researchers have developed modified CBT protocols in an effort to meet the unique needs of this population (e.g., challenges associated with emotional understanding and insight) and have demonstrated reductions in anxiety following treatment (e.g., Chalfant et al., 2007, McNally et al., 2013, Reaven, et al., 2009; Sofronoff et al., 2005; Wood et al., 2009). These protocols are based on the core elements of CBT implemented with TD children and most often include exposure as a component of treatment (Reaven & Willar, 2017), however there are some exceptions (e.g., McConachie et al., 2014; Sofronoff, Attwood, & Hinton, 2005; Sung et al., 2011). Nevertheless, there continues to be constructive discussion in the literature about how best to implement and tailor treatments (e.g., CBT) for individuals with ASD (Moree & Davis, 2010). Moree and Davis (2010) outline four adaptations that have been shown to

be successful in adapting CBT for use with children with ASD. First is the use of disorder specific hierarchies that address anxiety at the same time as addressing specific problems associated with ASD such as difficulties with social skills and communication that can play a role in the expression of social anxiety. Second is the use of concrete, visual tactics such as visual worksheets and role-play. Third is the careful use of child specific interests to promote motivation and engagement in treatment (note that the authors speak to the balance between using an interest for therapeutic gain without encouraging problematic obsessions). Fourth is parental involvement which can increase understanding of the therapeutic process, help facilitate treatment gains through home-based practice, decrease family accommodation, and aid in generalization.

As ASD is characterized by challenges related to social cognition and social competence, individuals with ASD can find it difficult to perceive and interpret the thoughts and feelings of other people. In a therapeutic context, additional time and teaching may be necessary to support children with ASD and anxiety, especially when social context is related to the presentation of their anxiety. Limited emotional understanding may also make self-reflection and reporting symptoms challenging and additional effort may be required to support and scaffold skill development in this area. Further, difficulties in the areas of language (e.g., pragmatic and semantic understanding, voice intonation, inadequate use of context, interpreting meaning, adapting to social conventions), cognitive flexibility, abstract thinking, and restricted repertoires of behavioural responses to emotionally arousing situations (Attwood & Scarpa, 2013) may mean that youth with ASD require extra coaching to engage in effective reciprocal communication when anxious. It may also mean that they require additional time spent adapting and developing skills in the context of treatment for better results. Overall, the application of CBT for individuals with ASD may emphasize development of practical skills and a more behavioural, versus cognitive, approach to treatment (Lang et al., 2010). However, the process of deciding components of treatment is not as simple as opting for a behavioural approach. The process of deciding on components of treatment should be carefully considered on an individual basis since children with ASD have been found to have the ability to engage in more cognitive CBT tasks (e.g., discriminating between thoughts, feelings, and behaviours)

after accounting for differences in verbal IQ (Lickel, MacLean, Blakeley-Smith, & Hepburn, 2011).

Clinicians adapting CBT for use with young people with ASD will find that the process is often nuanced and multifaceted as the constellation of anxiety and ASD (and other) symptoms, strengths and weaknesses of each child manifest in the context of treatment. Attwood and Scarpa (2013) offer a number of considerations about effectively adapting CBT treatments that include consideration of the learning/cognitive profile of students (including executive functioning), capitalizing on logical reasoning skills, using visual aids and hands-on activities, expanding flexible thinking, capitalizing on special interests to enhance motivation and understanding, as well as structuring programs with routines that increase predictability. The importance of using a variety of exposure practice including role plays, behavioural rehearsal, and in vivo practice in real-life situations, while considering developing skills required for independence in the target situations were also noted. The authors suggest several key factors for adapting treatments including the use of visual representation of information (such as use of a workbook), inter-session projects offering the opportunity to generalize skills, the support and exchange of information with parents after group, and careful selection of group participants with adequate leader support. Taken together, a modified CBT framework for use with young people with ASD emphasizes the importance of a) including parents; b) using concrete and visual tactics to encourage the building and generalization of skills and c) adapting to the child's individual profile of symptoms, interests, strengths, and weaknesses.

1.2.2. Group-Based Cognitive Behaviour Therapy

Although there is no research directly comparing individual and group CBT in the context of ASD, there are potential advantages of conducting group-based CBT rather than TAU. In addition to being able to minimize the use of clinician time (i.e., seeing more than one patient at once), it also allows for teaching and discussion to take place within a supportive group environment for both children and parents (Reaven et al., 2009; Scattone & Mong, 2013), as well as for normalization of experiences and decreased isolation (Rapee, Wignall, Hudson, & Schniering, 2000). Providing treatment

in a group context may offer the opportunity for children to gain insight and awareness into how their behaviour impacts other people, which may be the precursor to change (Reaven & Willar, 2017). Groups may also provide opportunities for social interaction, additional exposure, peer modeling, and social reinforcement (Flannery-Schroeder & Kendall, 2000).

CBT delivered in a group format in the general pediatric population has been shown to be at least as effective as individual treatment (Manassis et al., 2002; Rapee et al., 2000). Individually-administered CBT has also been found to be more cost-effective than TAU (which includes a mix of different interventions, such as individual/ parental/ family psychosocial treatment for ASD-related difficulties, social skills training, and medication) in treating children with ASD and comorbid anxiety (van Steensel, Dirksen, & Bogels, 2014). Offering group CBT may serve to further increase this cost-effectiveness. Nevertheless, group treatments are not a good fit for all children in need of treatment. Individual differences such as behavioural issues that impact 'group readiness' can mean that some children are not a good fit for a group treatment where attention and individualization are more limited. Thus, adequate clinical screening and diagnosis become key factors in making appropriate recommendations and ensuring a good fit between the child (along with their presenting problems, strengths, and weaknesses) and the support provided.

1.2.3. Group-Based Cognitive Behaviour Therapy for Youth with ASD and Anxiety

Several randomized controlled trials (RCT) evaluating group CBT for anxiety in children with ASD without intellectual disability have been conducted to date (Chalfant et al., 2007; McConachie et al., 2014; Reaven et al., 2012; Sofronoff et al., 2005; Sung et al., 2011) in addition to at least two pilot programs (Reaven et al., 2009; Spain, Blainey, & Vaillancourt, 2017). A review conducted by Reaven and Willar (2017) highlighted a number of aspects these programs have in common including being well-matched on age (including children aged 8 to 17) and gender, as well as having 3-5 children (with parents) in each group and between 2 and 4 group facilitators who were most often psychologists or psychology trainees. Factors that differed across the studies include variability in parent involvement (from limited to completely integrated) and length of

treatment (ranging from 6-20 sessions). Although positive treatment gains (i.e., decreases in child anxiety) were observed in each study, it is challenging to directly compare these programs because they emphasize somewhat different components of CBT and use different outcome measures.

The first RCT, conducted by Sofronoff, Attwood and Hinton (2005) in a university research setting, studied a group of 71 children with Asperger's syndrome between 10 and 12 years of age. They examined the effectiveness of a brief CBT treatment (6 two-hour sessions) for anxiety and also evaluated the impact of parent involvement by assigning participants to one of three conditions: child only treatment, parent and child treatment, or a waitlist control group. The CBT treatment included psychoeducation and activities centred on emotion recognition and regulation, and incorporated sessions that focused on changing negative thinking patterns and using Social Stories (Gray 1998) for emotion management. The researchers measured treatment outcomes using the Spence Children's Anxiety Scale (SCAS, parent-report, Spence 1998) and the Social Worries Questionnaire (SWQ; Spence 1995). Results showed that children in the CBT group had fewer anxiety symptoms on both measures (SCAS and SWQ) at treatment follow-up and were able to generate more positive strategies for managing situations with high levels of anxiety. Differences in parent reported anxiety (SCAS, parent report) between the child only and the combined parent-child groups indicated that parent involvement was beneficial for both parents and children. A major limitation of this study is that it did not incorporate the use of exposure despite this being the most widespread and effective treatment for anxiety (Chorpita & Daleiden, 2009).

In a second RCT, 47 children with ASD without intellectual disability and a comorbid anxiety disorder were randomized to a 12-week (nine weekly treatment sessions plus three monthly booster sessions) treatment program (n=28) or waitlist control group (n=19; Chalfant, Rapee, & Carroll, 2007). This clinically-delivered CBT treatment was based on the Cool Kids program (Lyneham, Abbott, Wignall, & Rapee, 2003), a program designed for use with TD children. Treatment outcomes were measured using the Anxiety Disorders Interview Schedule (ADIS-IV; Silverman & Albano, 1996), the SCAS (parent and child report, Spence 1998), the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985), Children's Automatic Thoughts Scale (Schniering & Rapee, 2002), and the Strengths and Difficulties

Questionnaire (Goodman 1997, parent and teacher report). At post-treatment, 71% of the children in the CBT group no longer met criteria for an anxiety disorder compared to 0% of the waitlist condition. Overall, the treatment group experienced a significant decrease in anxiety symptoms as measured by self-, parent-, and teacher-reports. Although the treatment included an in-session exposure planning component, all of the actual exposures were conducted at home with parents. Parents informally recorded information about home practice exposures, however, there was no formal measurement of homework compliance. Additional limitations of this study include that it did not include long term follow-up (i.e., 6 months) and that the raters were not blind to treatment condition.

Third, Sung and colleagues (2011) randomly assigned 70 children with ASD and anxiety between 9 and 16 years of age to either a 16-week CBT (n=36) or Social Recreational program (SR; n=34). Most of the children were of Chinese ethnic heritage and children in both groups (CBT and SR) had approximately average cognitive functioning. The CBT treatment was adapted from a collection of treatments used with typically developing children such as the *Coping Cat* program (Kendall & Hedtke, 2006) and *Exploring Feelings* (Attwood, 2004), among other resources. Researchers used the SCAS-C (child report) and Clinical Global Impression-Severity Scale (CGI-S; National Institute of Mental Health, 1970) at pre- and post-treatment as well as at follow-up at 3 and 6 months. Overall, by child- (SCAS-C) and clinician- (CGI-S) report, anxiety significantly improved in both groups by 6-month follow-up. The authors hypothesized that similarities across the two groups (e.g., structured setting, presence of therapists who helped to address issues of behavioural regulation and positive social skills, social exposure, and opportunities to learn self-help skills) may have resulted in the gains observed in both conditions. Potential limitations of the program are lack of parental involvement, lack of waitlist control condition for comparison, and potentially (as reported by the authors) limited sample size to compare two active treatments. In addition, the treatment did not include any exposure component that directly targeted individual anxiety stimuli.

In a fifth RCT, McConachie and colleagues (2014) randomly assigned 32 children with ASD (IQ>69; mean=100 in both groups) and anxiety between the ages of 9 and 13 to immediate or delayed treatment using the Exploring Feelings manual

(Attwood, 2004). This treatment was specifically developed for use with children on the autism spectrum and involves child and parent groups run simultaneously for 7 weeks. The sessions focussed on identifying feelings and building a toolbox of coping strategies. Anxiety outcome measures included the CGI-I (National Institute of Mental Health, 1970), ADIS-IV (Silverman & Albano, 1996), and the SCAS-P (parent report, Spence 1998). Results showed that children and parents assigned to the immediate therapy condition reported more substantial reduction in anxiety symptoms as measured by the ADIS-IV and summary questions aimed at measuring change in anxiety across a 3 to 4 month period. Further, most families found the treatment to be acceptable (based on family interviews post-treatment) and attrition was low. Limitations include a relatively small sample size and absence of an exposure component.

Additionally, in a pilot study using a modified version of the *Coping Cat* program, McNally and colleagues (2013) found significant reductions in anxiety in the treatment group consisting of children with ASD between 8 and 14 years of age (n=22, IQ≥70), as compared to a waitlist control group. Anxiety was measured using the SCAS (child and parent versions, Spence 1998) as well as the ADIS-IV (parent version, Silverman & Albano, 1996). Number needed to treat (NNT) was reported to be 1.72, indicating that for every approximately two children who participate in the treatment, one would be expected to experience remission of anxiety symptoms to non-clinical levels by the end of the group treatment. Treatment gains were also maintained at two-month follow up (McNally, Keehn, Lincoln, Brown, & Chavira, 2013).

A pilot study (Reaven et al., 2009) as well as a fourth RCT, conducted by Reaven, Blakley-Smith, Culhane-Shelburne, and Hepburn (2012), will be described in the following section entitled *Facing Your Fears: A Manualized Group Therapy Program*.

Facing Your Fears: A Manualized Group Cognitive Behaviour Therapy Program

In a pilot study (2009), Reaven and colleagues had 33 children with ASD and their parents participate in an original modified CBT group treatment targeting severity of anxiety symptoms. Anxiety was measured using the Screen for Child Anxiety and Related Emotional Disorders (SCARED; Birmaher et al., 1999). Most (23 of 33) parent-child pairs participated in a waitlist condition and later participated in the active treatment

condition. The remaining 10 participants did not participate in the waitlist condition and were placed directly in the treatment condition. Children in the active treatment were found to experience a significant decrease in anxiety symptoms over time as measured by parent ratings on the SCARED, whereas children on the waitlist did not.

The resulting treatment program published by Reaven and colleagues (2011), entitled *Facing Your Fears* (*FYF*), includes 14 weekly multi-family group therapy sessions of 1.5 hours duration and includes large-group components as well as child-only and parent-only break out groups. Parents are fully integrated into the treatment and attend every session. The program was designed specifically for children with ASD and employs a modified CBT protocol that incorporates key elements of evidence-based treatment protocols developed for typically developing children, such as the *Coping Cat* program (Kendall & Hedtke, 2006).

Adaptations for children with ASD include: "(a) use of worksheets combined with multiple choice lists, (b) written examples of core concepts, (c) hands-on activities, (d) emphasis on creative outlets for expression, (e) focus on strengths and special interests, (f) multiple opportunities for repetition and practice, (g) video modeling and a specific video activity (e.g., creating movies) to enhance generalization of concepts, and (h) a detailed parent curriculum" (Reaven et al., 2012, p. 141). Most of the adaptations that have been recommended for successful adaptation of CBT for use with children with ASD (e.g., Moree & Davis, 2010) have been incorporated into the *FYF* program. For example, the program incorporates visuals (e.g., workbook), actively involves parents, and supports parents to distinguish between behaviours related to multiple disorders (e.g., in this case, autism and anxiety) in a way that allows for parental discrimination between the antecedents and functions of certain behaviours (i.e., whether or not they are better attributed to and explained by anxiety or ASD).

The weekly sessions include psychoeducational activities done as a large group (with children, parents, and group leaders), such as learning about different words for worry, learning about physiological symptoms of anxiety, and relaxation skills. Parent-child dyad work is also completed in the large group with activities such as rating fears and engaging in in-vivo exposure activities (after session 7). The child group activities expand on themes introduced in the larger group and include activities on recognizing

automatic negative thoughts and developing coping statements. Core concepts are reviewed in the parent group in addition to understanding the dynamics between parent and child anxiety, helping parents support their children's participation, discussion around the role that ASD plays in their child's anxiety as well as in their parenting behaviours, as well as discussion of parenting issues that are relevant to their child's treatment.

In 2012, Reaven and colleagues conducted a randomized controlled trial comparing *FYF* to treatment as usual (TAU; consisting of various interventions including medication, social skills interventions, and individual interventions targeting emotion regulation/coping skills) with a sample of 47 high-functioning children with ASD and comorbid anxiety, and a parent for each child. Treatment outcomes were measured using the ADIS-IV (parent report, Silverman & Albano 1996) and the SCARED (Birmaher et al., 1999). Results demonstrated an overall reduction in anxiety symptoms (across all anxiety types) for participants in the treatment group. Fifty percent of children in the CBT group were deemed to have a clinically meaningful positive treatment response, as compared to 8.7 percent of children in the TAU group. Finally, treatment gains in anxiety symptoms, as measured by the SCARED (parent and child; by mail), appeared to be maintained at 3 and 6-month follow-ups.

Additionally, in the context of a multi-site US-Canada collaboration, Reaven along with collaborators from IWK (Izaak Walton Killam) Health Centre and Dalhousie University (2015) found clinically meaningful reductions in anxiety (53% of the sample) using the Clinical Global Impressions Scale - Improvement (National Institute of Mental Health, 1970) at post-treatment. It was determined that treatment fidelity was high following a clinician workshop and with the inclusion of ongoing consultation. Further, *FYF* was found to have good acceptability ratings from parents, children, and clinicians (mean= 4.15 out of 5). In another multi-site collaboration examining acceptability ratings for the *FYF* treatment, researchers found overall high acceptability ratings for children (mean= 4.12/5) and parents (mean= 4.40/5; Walsh et al., 2018). This study also found that both parents and children rated exposure-focussed sessions as more acceptable than psychoeducation sessions. Consistent with this, results from a clinical program evaluation using the same data-set used in the current study (described below) revealed high acceptability ratings reported by parents (n=65; mean: 4.14/5), children (n=60;

mean: 3.89/5), and clinicians (n=10; mean: 4.7/5; Johnston, McConnell, McFee, & Iarocci, 2018). Altogether, evidence indicates that the *FYF* program is an engaging and effective treatment for this complex population.

1.3. Statement of the Research Problem

1.3.1. Effectiveness Research as a Key Priority

Modified group CBT treatments addressing anxiety, such as *FYF*, are needed at the community level to support children with ASD and anxiety. The National Needs Assessment Survey conducted by the Canadian Autism Spectrum Disorders Alliance identifies that 25% of school-aged children with ASD in the province of British Columbia receive a formal diagnosis of anxiety, whereas 68% of Canadian caregivers of school aged children with ASD report concerns about anxiety (Weiss et al., 2014). In the broader literature, prevalence rates for anxiety in the context of ASD are as high as 84% (White et al., 2009), indicating that there is a high need for effective and available treatments for this population. However, appropriate mental health treatment is not readily available in communities. According to the survey, 25% of Canadian caregivers of school-aged children with ASD describe mental health treatment as being difficult to obtain.

Most research examining the effectiveness of group treatments has been conducted in highly controlled research contexts (Reaven et al., 2014) which can be far removed from the real-life community settings that provide services to children and families. It is important that researchers continue to investigate whether treatment gains can be replicated in everyday practice settings with complex populations of children. Implementing treatments in real-world contexts has been identified as one of the top priorities for researchers in the area of anxiety in youth with ASD (Vasa, Keefer, Reaven, South & White, 2018). However, pursuing community effectiveness research is challenging in ways that extend beyond management of the complexity of the population being targeted to include coordination and procurement (and training) of clinicians and resources (e.g., rooms and materials), organizing within institutional systems and service delivery models, in addition to recruitment and coordinating with community healthcare

providers. Despite challenges, community hospital environments are often ideal settings in which to offer and evaluate treatments as they often serve as a hub to mental health services in the community and are often connected to medical research centers which can support and properly evaluate clinical research efforts.

Transferring treatment research to more ecologically valid clinical settings is a critically important aspect of the development of evidence-based treatments that is often neglected (Weisz, Ugueto, Cheron, & Herren, 2013). This transition is critical for determining variants in treatment that contribute to real-world outcomes, which may differ substantially from research settings (e.g., therapist training, complexity of cases and other child factors, parent psychopathology, treatment fidelity, etc.). Perhaps as expected, meta-analytic research has found average effectiveness of psychotherapy to decrease in effectiveness when transferred to community care environments (e.g., from *d*=.54 to .30; Weisz, Jensen-Doss, Hawley, 2006). These findings further underscore the importance of identifying how treatments are being transferred to broader community settings as well as factors that predict better outcomes so that approaches may be effectively adapted to these new settings.

1.3.2. Identifying Factors That Impact Treatment Outcomes

Clinicians and researchers have identified the inclusion of parents/caregivers to be important in the treatment of anxiety for children with autism (Moree & Davis, 2010; Sofronoff, Atwood, & Hinton, 2005). An important component of parent involvement in the *FYF* (Reaven et al., 2011) program is supporting children to face fears in small steps in-session and in their typical daily environments. Parents are provided instruction and guidance in the parent-group component as well as support from group leaders during in-session exposure practices. With the added involvement of families in treatment, it becomes important to look specifically at parent and family factors that may contribute to treatment outcomes or complicate service delivery. Progress in this regard may serve to aid in screening, planning of parent-child activities, content of the parent group, and designing group-level supports.

Although the second half of the *FYF* group focuses on teaching and implementing exposures, parent-child relationship factors such as communication and

relational frustration, can influence the practice and participation. For example, parent-child relationship factors may contribute to parent-child pairs having difficulty discussing sensitive or triggering issues (which in the context of a group, are often related to anxiety producing situations). This may even lead to disruptive conflict within the group session, which can further lead to disagreement around selection of anxiety targets or child refusal behaviours. Parent-child pairs with strained communication or high levels of relational frustration may find it difficult to participate in a group context or work together to complete homework outside the treatment setting. According to Reaven and Willar (2017), disagreement and conflict commonly occurs between parents and children during participation in treatment. In the context of a family-focused treatment approach, examining relational frustration between parent-child pairs as it relates to treatment outcomes may provide insights for clinicians and researchers supporting families in this setting.

Communication difficulties have been associated with higher levels of anxiety in typically developing children (e.g., Beitchman et al., 2001). With deficits in social communication central to ASD diagnoses (APA, 2013), it may be particularly important to examine the role of communication skills in the context of group treatment for anxiety in which children are required to interact and communicate with their parents as a component of treatment. In a study examining the impact of communication deficits in children with ASD as compared to TD children, Davis and colleagues (2011), found that anxiety decreased as communication abilities increased for children with ASD compared to children with no diagnosis. However, little is known about the role of communication skills in the context of treatment outcome literature, much less in the context of group treatment.

Families who seek treatment services in community mental health clinics are often from diverse backgrounds (e.g., SES) and face a number of real-world adversities (e.g., multiple children with ASD, scheduling challenges, lengthy commutes to treatment services, and high caregiver burden and stress), which can add stress to families. Treatment also often occurs in the after-school hours when children can be fatigued and more vulnerable to challenges in communication and information processing, especially in more active treatment components like during in vivo exposure. Research has found parents of children with ASD experience more parenting stress than parents of TD

children and other children with developmental disabilities (e.g., Down syndrome; Hayes & Watson, 2013). These parents also tend to score lower on measures of quality of life including lower physical and mental health, social functioning, and satisfaction with their environment (Vasilopoulou & Nesbet, 2016). These challenges may mean that parents, especially in the context of a family-based treatment, might require additional supports and considerations.

High family stress, parent mental health challenges, as well as lower parent involvement and support have all been associated with lower treatment adherence in TD youth (Weisz et al., 2013). Parent internalizing symptoms have also been found to be associated with CBT-based treatment outcomes in TD populations (e.g., Wergeland et al., 2016). There has been some initial investigation into the relationship between parent and child anxiety in the context of ASD. For example, Connor, Maddox, and White (2013) found that parent state anxiety was significantly related to parent-reported teen anxiety using the Child Adolescent Symptom Inventory-20 (CASI; Sukhodolsky et al. 2008). They also found decreases in parent trait anxiety for child treatment responders but not for non-responders suggesting, as Reaven (2015) interpreted, a youth-to-parent influence in families of children with ASD. Reaven et al. (2015), also examined the relationship between parent anxiety and treatment response in children with ASD using the Screen for Child Anxiety and Related Emotional Disorders (SCARED; Birmaher et al., 1999). In this case, they did not find a relationship between parent (state or trait) anxiety and parent-reported child anxiety at pre- or post-treatment. As the researchers point out, this could be for several reasons (e.g., differences in measurement of child anxiety symptoms). However, results of the study were consistent with Connor and colleagues' (2013) findings that trait anxiety decreased for parents of treatment responders. More research is needed to clarify the relationship between parent and child anxiety in the context of ASD and in the context of community-based treatments for youth with ASD.

Milder autism traits representative of an underlying genetic vulnerability can be present in non-autistic relatives of people with autism, a concept known as the broad autism phenotype (BAP; Folstein & Rutter, 1977). Along with parental anxiety, BAP characteristics in parents may have an impact on parent-child interactions, parental acquisition and implementation of CBT skills, parental participation in a group format,

and ultimately, treatment outcomes. The impact of BAP characteristics in parents may be most evident in interactive and unstructured components of group. For example, parent support of children during exposure practice involves a prescriptive element (i.e., a structured plan) and also a non-structured component that is dependent on child behaviours and anxiety level (e.g., attunement to and the ability to 'read' child anxiety levels). Parents who have challenges reading emotional cues themselves, may also have a difficult time interpreting child distress cues in the context of exposure planning or implementation. Exploring the relationship between parent broader autism phenotype characteristics and how they relate to treatment outcomes may provide insight into additional helpful screening measures before entry into group treatments and may also provide useful information for researchers and clinicians when developing parent-group teaching components of treatment (e.g., suggest additional emphasis on the detection of child emotional cues).

With the inclusion of parents participating as "co-therapists" (Sofronoff et al., 2005), parents can build therapeutic (e.g., CBT) skills to expand use of coping and fear-facing at home, thus aiding in the generalization of skills and possibly contributing to maintenance and solidification of treatment gains. However, with the inclusion of parents comes the responsibility to support their skill acquisition in addition to the children's skill development. Parents may have different aptitudes or even parenting styles that may be expressed in the context of exposure practice. Parent skill acquisition may contribute to the quality of the implementation of the in-session exposure practice, and more importantly, the home-based exposures which parents complete without clinician support. Overall, little is known about how parents develop CBT/exposure skills whether in the context of in-session or home-based exposure practice. Learning more about parent skill acquisition and the amount of support provided by clinicians in this context may allow researchers to continue to develop and appropriately prioritize and bolster parent skill development in the context of group treatments.

Finally, research on TD children examining the role of therapist-reported exposure in treatment outcomes has found a dose-dependent relationship between quantity of exposure and positive treatment response (Peris et al., 2017). This study also found that more time spent on challenging exposures as well as therapist ratings of child compliance were further associated with better outcomes. Exposure is also

thought to be important in the treatment of anxiety in children with ASD (Sukhodolsky et al., 2013) and remains appropriate within the context of modified CBT treatments for this population (Moree & Davis, 2010). However, there is little specific knowledge in the literature on the role of exposure (e.g., amount of home practice exposure) in the context of group treatments for children with ASD. Based on TD literature, it is reasonable to assume that the amount of exposure completed by families may play a role in predicting treatment outcomes. However, further investigation is warranted and may provide clarity around dosage recommendations regarding exposure treatment in the group context.

1.4. The Current Study

The current study examined the effectiveness of the manualized *FYF* group-based CBT treatment with children with ASD without intellectual disability (IQ>70) and their parents at BC Children's Hospital (BCCH), a tertiary/quaternary health-care centre in an ethnically diverse urban setting. Overall, the sample was highly heterogeneous and clinically complex, and thus successfully represented 'real-life' conditions typical of community care settings. The primary goals of this research were to a) evaluate the effectiveness of the treatment protocol in a community setting with a complex population, and b) examine factors (e.g., amount of homework completion, level of clinician-provided parent support during in vivo exposure practice, parent-child relationship variables, and parent personality variables) that may predict treatment outcomes, and thus contribute to the sparse literature in this regard.

Before and after participating in the 14-week treatment group, parents participated in a formal interview to screen children for clinical levels of anxiety and determine whether children met criteria for an anxiety disorder. Parent (questionnaire) ratings of child anxiety symptoms were measured at four time points (pre-treatment, mid-treatment, post-treatment, and at 6 weeks follow-up). In addition, parents completed a battery of child- and self-report measures at pre- and post-treatment that included measures of parent-child relationship qualities (e.g., communication and relational frustration), child behavioural functioning, and parent personality characteristics (e.g., trait anxiety, BAP characteristics).

Previous research has examined pre- post- differences in clinician- (based on standardized interview) and parent (questionnaire) ratings of child anxiety, however, there has not been any research examining treatment gains on individual treatment targets (e.g., fear of spiders) that children work on over the course of the group. Pertaining to the first stated goal, the current research examined changes in anxiety in three ways: a) using parent (questionnaire) ratings of their child's anxiety; b) using clinician ratings of child anxiety (based on parent interview); c) using parent ratings of child anxiety on primary individual treatment targets (e.g., fears of spiders, loud noises, public speaking, etc.). Specific hypotheses pertaining to the first stated research goal variables can be found in the following section 1.4.1.

As per the second stated goal, this study also aimed to contribute to the research literature by examining several variables hypothesized to be associated with anxiety-based child treatment outcomes. Specifically, these included variables related to treatment adherence and implementation (e.g., homework completion and level of clinician provided parent support during in vivo in-session exposure practice), parent-child relationship factors (e.g., communication and relational frustration), and parental mental health and personality variables (e.g., parental trait anxiety and BAP characteristics). Specific hypotheses pertaining to the second stated goal can be found in the following section 1.4.1.

1.4.1. Hypotheses

Effectiveness of the Group Treatment Program

1a. Parent (questionnaire) ratings of child anxiety will significantly decrease over time (pre-treatment, mid-treatment, post-treatment, & follow-up).

1b. Post-treatment gains in parent-rated child anxiety symptoms will be maintained at 6 weeks follow-up.

2. Clinician severity ratings of child anxiety (based on parent interview) will significantly decrease from pre- to post-treatment.

3. Parent ratings of primary child anxiety treatment targets will significantly decrease from the beginning of exposure practice (week 7) to the conclusion of treatment (week 14).

Examining Predictors of Treatment Outcomes

4. Treatment adherence variables such as amount of homework completion (between weeks 1 and 7) and the number of self-reported exposure practices at home (between weeks 8 and 14) will predict post-group parent (questionnaire) ratings of child anxiety after controlling for pre-group child anxiety.

5. Level of clinician-provided parent support provided for in-session exposures (as rated by clinicians) will predict post-group parent (questionnaire) ratings of child anxiety after controlling for pre-group child anxiety.

6. Parent-child relationship variables such as the quality of parent-child communication and degree of relational frustration will predict post-group parent (questionnaire) ratings of child anxiety after controlling for pre-group child anxiety.

7. Parent variables such as self-rated trait anxiety and broad autism phenotype characteristics will predict post-group parent (questionnaire) ratings of child anxiety after controlling for pre-group child anxiety.

Chapter 2. Methods

2.1. Participants

The sample was comprised of children with a DSM-IV diagnosis of ASD (IQ> 70) between 8 and 13 years of age who participated in the *Facing Your Fears* (*FYF*) treatment program at BC Children's Hospital, along with a participating parent for each child. A diagnosis of ASD was confirmed upon the review of collateral psychiatric/psychological diagnostic assessment reports collected at the time of referral. On average, children participating in the group treatment received a diagnosis of ASD at age 6 (SD=2.8). However, age of diagnosis ranged from 2 to 12 years of age with 22% of children having received a diagnosis within 2 years of attending the group. Exclusion criteria included severe child behavioural problems, IQ below 70, child or parental psychopathology expected to interfere with group or study participation, insufficient spoken English/low literacy in parent or child, and Obsessive Compulsive Disorder (OCD) or depression as the primary presenting concern. Referrals were accepted from a variety of community clinicians including psychologists, psychiatrists, medical doctors, or behavioural specialists (e.g., Behavioural Consultants). To be included, children needed to be between the ages of 8 and 12 (just turned 13 was acceptable), have been diagnosed with both ASD, and clinically significant (i.e., impairing) anxiety using an evidence-based, multi-method approach that included parent interview, parent- and child-ratings of child anxiety, as well as collateral information from community sources (e.g., teacher or community clinician).

The sample size (n=50) was constrained by the intensive nature of the intervention itself, the limited number of participants allowed per intervention group (i.e., maximum 5 families per group), as well as limited clinical and administrative resources available in Department of Neuropsychiatry at BC Children's Hospital. Within this context, the *FYF* group was offered as a free clinical service for which research participation was voluntary. A substantial subset of the families who participated in the group also consented to participate in research (74%).

2.1.1. Sample Characteristics

Between the years of 2011 and 2017, 50 research subjects participated in the *FYF* program at BC Children's Hospital. The sample of youth participants included 39 males (78%) and 11 females (22%). An additional 13 participants participated in the group but declined to participate in the optional research component. In total, approximately 80% of families participating in the group treatment participated in the research component. Given the small sample size, the current study has limited power to detect differences between males and females should they exist. However, descriptively males and females did not score meaningfully different on any of the variables of interest in the current study. Abbreviated intelligence scores (WASI-II) or data gathered from recent (i.e., within one year of intake) collateral psychoeducational reports with reported results of full cognitive assessments based on Wechsler Intelligence Scale for Children (WISC) were used to approximate intellectual functioning. The mean intelligence score was average (M=102.56, SD=15.95) but ranged between 70 and 154. The sample consisted of individuals who ranged in severity of autism symptoms (SCQ scores range: 4-30) with a mean of (M=13.28, SD=5.86).

All participants lived in the Lower Mainland of Vancouver, British Columbia, Canada. Parent participants consisted of mostly mothers (80%) and were on average 44 years of age (ranging from 33-56 years). Participants were of mixed ethnic heritage, but self-identified as predominantly of western European (58%) or Asian heritage (22%). A minority (12%) of the participants were of mixed heritage or identified as Middle Eastern, South Asian, African/Black, or of South American descent. All participants spoke fluent English and most of the sample (96%) spoke English as their primary language.

Employment information was collected from 6 groups of participants (n=23) between 2015 and 2016. For these participants, the majority of parents worked full time (35%) and the remainder were homemakers (26%), worked part-time (22%), were unemployed (4%), or identified as 'other' (13%). On average parents reported completing 15 years of education ranging between 11 and 17 years (5 participants did not disclose this information). Family incomes ranged considerably with 8% of families falling within an income bracket of under $30,000, 10% between $31,000-50,000, 10%

between $51-70,000, 16% between $71-90,000, and 40% over $90,000 (a further 16% did not disclose). A summary of family demographic information can be found in Table 1.

Table 1 Summary of Family Demographic Statistics

Demographic Information	%
Participating Parent Relationship To Child with ASD	
Mothers	80
Fathers	20
Family Ethnicity (n=50)	
Western European	58
Asian	22
'Other'	12
Did not disclose	8
Parent Employment Status (n=23)	
Full time	35
Homemaker	26
Part time	22
Unemployed	4
'Other'	13
Parent Education (in years; n=50)	
11-12	6
13-14	22
15-17	62
Did not dislose	10
Family Income (n=50)	
<$30,000	8
$31,000-50,000	10
$51,000-70,000	10
$71,000-91,000	16
>$90,000	40
Did not disclose	16

On average children attending the group met criteria for more than one anxiety disorder at pre-treatment (M=2.97, SD=1.09; see Table 5). Children also met criteria for

other comorbid conditions including depression (n=4, 8.5%), dysthymia (n=3, 6.4%), oppositional defiant disorder (n=11, 23.4%), and attention deficit hyperactivity disorder (n=29; 61.7%) as detected upon administration of the ADIS-IV at the point of group intake. Clinical diagnoses were not made using ADIS-IV criteria in the context of group intake, nevertheless, these scores can provide insight into the various symptom profiles present in this sample of children. Depression, in particular, commonly co-occurs with anxiety (Angold, Costello, & Erkanli, 1999; Lewinsohn, Zinbarg, Seeley, Lewinsohn & Sack, 1997). For this reason, a descriptive analysis of depression symptoms (as measured by the BASC-2) in the sample was conducted. T scores were found to range between 41 (in the normal range) and 105. On average, T scores were 64.02 (SD=15.70) which is slightly above the clinical cut-off (60). Nevertheless, ADHD symptoms were the most common in the sample with over half of participants meeting clinical cut-off criteria by parent interview on the ADIS-IV. In addition, 30% of parents at intake reported their child had been previously diagnosed with ADHD. A summary of the participant characteristics can be found in Table 2.

Table 2 Pre-Treatment Participant Demographic Statistics

	Mean	SD	Range
Age (years)	10.79	1.37	8-13.38
IQ	102.56	15.95	70-154
Comorbidities			
Number of additional comorbid conditions (ADIS-IV)	.94	.84	0-4
Comorbid Depression Symptoms (BASC-2)	64.02	15.83	41-105
Anxiety Disorders			
Number of Anxiety Disorders (ADIS-IV)	2.97	1.09	1-5

Note. *T scores were used for depression symptoms; data presented under "Number of additional comorbid conditions" does not include anxiety disorders, which are represented in* Table 6*.*

Most children (80%) had experience participating in a group context involving social skills groups, group sports, or other non-treatment group programming. Thirty percent of children had previously received treatment for anxiety. However, none of the children being followed in the community for anxiety-related concerns were actively in treatment for anxiety during participation in the group.

Twenty eight percent (n=14) of child participants were taking medication at the time of their participation in group. Medications taken by children in the group included those to manage anxiety/depression (n=10), behavioural concerns (n=1), ADHD (n=6), and comorbid seizures (n=1). Changes in medication were tracked over the course of group participation. Only two children (one at post-treatment and one at 6-week follow-up) had changes in medication both of which involved changes in ADHD medication and one that also included the addition of an antidepressant upon follow-up.

A wide variety of anxiety disorder types were represented in the sample with specific phobia, generalized anxiety disorder and social phobia being the most common. Table 3 further outlines the number of comorbid anxiety diagnoses as well as diagnostic categories present in the sample.

Table 3 Pre-treatment Anxiety Diagnostic Comorbidity

	n	% of total (n=47)
Number of Anxiety Disorder Diagnoses		
1	6	12.8
2	7	14.9
3	19	40.4
4	12	25.5
5	3	6.4
Type of Anxiety Disorder Diagnosis		
Specific Phobia	42	89.4
Generalized Anxiety Disorder	39	83
Social Phobia	36	76.6
Separation Anxiety	17	36.2
Panic Disorder	3	6.4
Obsessive Compulsive Disorder[a]	2	4.3

Note. [a] *Must not have been primary clinical concern*

2.2. Procedure

2.2.1. Recruitment

The *FYF* group was advertised through email announcements distributed to mental health professionals (in private and public health sectors) in the Vancouver and surrounding areas of British Columbia (BC) who see children with autism within the context of their practice, as well as community organizations (e.g., Autism Community Training; ACT). Most often, referral sources identified children with ASD as being potential candidates for group therapy (i.e., having significant anxiety-related concerns) and sent in the referral forms after consulting with the child's parents. In other cases, interested parents would contact the clinic after hearing about the group. In these cases, as the gateway to the intake appointment process, parents were required to submit a clinician referral to the group specifying that their child had ASD as well as concerns regarding anxiety. This process was designed to support community pre-screening of clinical levels of anxiety before reaching the formalized intake process, which included a standardized clinical interview with parents regarding their child's anxiety as well as administration of several standardized and non-standardized anxiety measures based on parent- and child-report. Referral sources were primarily physicians (46%) but also included psychiatrists (38%), psychologists (10%), and other allied health professionals (2%; referral source information for an additional 2% of participants was not available).

2.2.2. Intake Screening Process

As part of the intake screening process parents were required to submit a copy of the child's original autism diagnostic assessment report to confirm the child had a formal diagnosis of ASD, a copy of any psychoeducational assessments completed in the past 5 years, a copy of any relevant collateral reports (e.g., psychiatric), and any relevant Speech Language or Occupational Therapy assessment reports. Parents were also asked to complete an intake form with screening questions pertaining to inclusion and exclusion criteria. Information was reviewed by a psychologist for the purpose of determining if the child could be a suitable group treatment candidate according to clinical concerns identified and inclusion/exclusion criteria. If the child was deemed to be a potentially suitable candidate for the group, the parent and child were invited to

attend a 1-2 hour intake appointment conducted by a psychologist and trained psychology doctoral student.

2.2.3. Intake Appointment

The intake appointment included the administration of several standardized and non-standardized assessment tools to screen for clinically significant child anxiety. As part of the intake appointment parents met with a clinician in a separate room to complete the Anxiety Disorders Interview Schedule (ADIS-IV) parent report and the child met with another clinician to complete a brief cognitive screening assessment (Wechsler Abbreviated Scale of Intelligence; WASI-II), the Spence Children's Anxiety Scale (SCAS), as well as a selection of other standardized and non-standardized measures of anxiety and comorbid symptoms. Most often, by the end of the assessment, either an invitation to attend the group was extended to the family or the group was found not to be a suitable fit for the child according to inclusion/exclusion criteria. In these cases, a referral to alternative community resources (e.g., individual treatment) was provided. In rare circumstances, such as when the group was nearly full (e.g., 4 out of 5 children were already placed in the group) and the child being screened was deemed to be a suitable fit for the group but would require a level of support for which the limited resources of the group could not accommodate (i.e., given staffing levels), the child was asked to wait for the next available group and was prioritized for entry into that group. A brief summary of the intake process can be found in Figure 1.

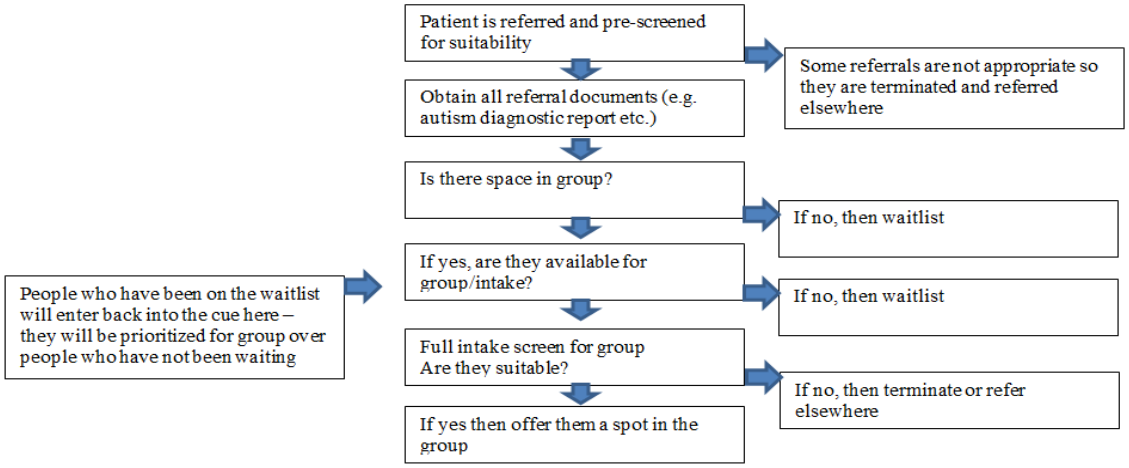

Figure 1 Process of Placing Children in the Treatment and Waitlist Groups

2.2.4. Invitation to Participate In the *FYF* Research Component

This group treatment was offered as a clinical service with an opt-in research component. Information about the purpose of the research and what participation involved was provided to the family by a member of the research team (supervising psychologist) at the time of intake. The research component involved using data from measures parents were already completing as part of standard clinical care (i.e., the standard screening and evaluative measures) as well as an additional package of questionnaires containing research-only questionnaires. Parents were informed that the research portion of the assessment (additional questionnaires to complete over and above what was administered for standard clinical care) was anticipated to take approximately 1.5 hours to complete. Parents were given the opportunity to take the consent form and the research package home and decide whether or not they would like to participate in the research portion of the group. Each family was offered a minimum of two weeks (and a maximum of 20 weeks) to consider whether or not they wanted to participate. Parents were informed that their child could participate in the group regardless of whether or not they decided to participate in the research. A copy of the parent consent form can be found in Appendix A.

2.2.5. Waitlist

Families were placed on the waiting list at the level of pre-intake screening (i.e., prior to completing an intake appointment) for a variety of reasons including: a) the referral came in after the group had started for that semester, b) there were no spots available for the child in the group(s) for that semester, or c) the referral documents in combination with discussion with the child's parents indicated that the child was not a suitable fit in relation to the composition of the children already placed in the group in terms of ability or level of staffing support needed (e.g., behavioural support). Children who had participated in an intake appointment also occasionally ended up on the waitlist when: a) unforeseen circumstances (e.g., scheduling issues) arose that prompted parents to ask to be placed on the waitlist for entry into the next group, or rarely if b) the child was not a suitable fit (e.g., required a higher level of support than could be accommodated at the time) for the currently assembled group. When this happened, the child was placed in the cue for the next available group and the intake appointment was repeated prior to placement in group in order to provide updated information about the child's anxiety since there were substantial gaps (6 months) between the start of one group and the next cycle.

In all cases, when children were placed on the waitlist parents were informed of alternative treatment options including public and private psychology referral sources should they have decided their child could not wait for services. Children were never asked to wait more than the length of one group cycle without being prioritized for services in the next round of groups. Groups ran twice per year beginning in March and September. Children who waited for more than one cycle of group did so solely at the request of their parents based on family and scheduling issues. Parents were permitted to turn down a maximum of two group offerings before being taken off the waitlist and referred for alternative services in the community.

On average, children waited for 3 months before being placed in group. The amount of waiting time ranged from being screened for group immediately (i.e., no wait) to waiting for 10.5 months. Length of wait times depended on several factors including when the referral was submitted, whether the child was suitable for placement in the group being screened, and of particular relevance, family scheduling factors (e.g.,

coordination involving child activities, childcare for siblings and transportation, as well as parent vocational commitments) which occasionally led to families asking to remain 'in the cue' for the next group.

Research Component of the Waitlist

Random assignment to condition (treatment and waitlist control) was deemed not feasible in the context of the scale of this clinical group and given the timeline and resources at the disposal of the research team. Nevertheless, an effort was made to collect data on children participating in a waitlist condition concurrent to children participating in the group condition in order to provide some measure of the effect of group. Families who were placed on the waiting list between 2014 and 2016 (corresponding with groups 8-13) were invited to participate in a voluntary non-randomly assigned (quasi-experimental) waitlist research condition. Parents of children who were eligible for the waitlist were sent an introductory letter (see Appendix B) as well as the research consent form to review. Each parent was informed that their child could remain on the waitlist for the group regardless of whether or not they decided to participate in the research. Participation in the waitlist condition involved parents completing the (parent-report version) of the SCAS at the beginning of a group cycle (pre) and at the end (post) along with the parents of the children who were placed in the group. Participants were also asked to complete a brief demographics form.

Overall, although a substantial number of children (n=20) were placed on the waitlist, very few of them were successfully placed in group (n=7) due to inclusion and exclusion criteria restrictions, scheduling issues, and wait list attrition. As a result, there was only a small number of children placed on the research waitlist that ended up participating in the group. In many cases, patients presented differently in person than they did on paper and intake interviews were especially important to determining primary presenting problem as anxiety, screening for behavioural challenges relating to 'group readiness', and evaluating cognitive functioning among other inclusion/exclusion criteria.

2.2.6. Clinical Resources

Therapists consisted of a multidisciplinary group of psychologists, psychology doctoral students and residents, post-doctoral students, psychiatry residents,

psychiatrists, and social workers. Each group had a minimum of 3 and up to 4 group leaders, with 5 families participating in each group. Groups were each supervised by a registered clinical psychologist employed at the BC Children's Hospital. Expertise represented in the clinical leadership of each group included advanced experience in the area of ASD, mental health issues in the context of ASD, CBT skills, and behaviour management. All advanced graduate (doctoral) students were from clinical or educational psychology, or psychiatry programs. Trainees participating in the group were provided with 2.5 hours of supervision (including planning and debriefing meetings) per week in addition to 2 hours of supervision and orientation prior to the start of group. All therapists were provided the treatment manual and also selected research articles to help facilitate their training experience as needed.

2.2.7. Treatment Fidelity

Treatment fidelity was tracked using fidelity checklists provided by the treatment developers identifying core content for each of the 14 treatment sessions for 10/14 facilitated groups. Clinicians recorded fidelity after each treatment session. The design of the treatment protocol allows for some flexibility (e.g., select topics could be covered the current week or the following week) in covering content from session to session. In the current study, this flexibility was implemented most often during sessions 5 and 6 in the parent group, which are more content heavy than later sessions. Overall, clinician-reported treatment fidelity was very high at 98%.

2.2.8. Data Collection Time Points

Assessments were completed at several time points including pre-treatment (pre), mid-treatment (mid), post-treatment (post), and 6-week follow-up. Pre and post measurement time-points were the most intensive data collection time-points with most measures given at pre being re-administered at post. Data collection at mid and follow-up only involved administration of the SCAS and two non-standardized anxiety screening tools which were in the development phase. Data collected at each time point is summarized in Table 4. Descriptions of each measure can be found in the following section (2.3 Measures).

Table 4 Major Data Collection Time Points (Groups 10-15)

Measure	Pre (Time1)	Mid (Time 2)	Post (Time 3)	Follow-Up (Time 4)
Cognitive Screen				
WASI II	✓			
Anxiety Measurement				
ADIS-IV	✓		✓	
SCAS	✓	✓	✓	✓
Child-Parent Relationship				
PRQ	✓		✓	
Parent Variables				
STAI	✓		✓	
BAPQ	✓			

Some data were collected on a weekly basis such as reports for homework completion at the beginning of each group after week 2. A summary of data collected on a weekly basis is provided in Table 5.

Table 5 Weekly Data Collection Measures (Groups 10-15)

Weekly Measures	Weeks 1-7	Weeks 8-14
Homework: Worksheet or Activity	✓	
Homework: Exposure		✓
Clinician Support Ratings of In-session exposure		✓
Parent (and child) Anxiety Target Ratings	✓	✓

2.3. Measures

2.3.1. Child Anxiety Measures

Spence Children's Anxiety Scale, Parent Form (SCAS-P)

The Spence Children`s Anxiety Scale parent report (SCAS-P; Spence, 1998) is a 39-item rating scale with 4 response options: Never, Sometimes, Often, Almost Always. Questions focus on measuring global anxiety symptoms in children between 8 and 12 years of age (Spence, 1998). A total score as well as 6 subscales, including

Generalized Anxiety Disorder, Obsessive Compulsive Disorder, Specific Phobia, Panic and Agoraphobia, Separation Anxiety Disorder, and Social Anxiety are provided. The total score, which was employed in the current study, consists of the sum of the items and ranges from 0 to 114 with higher scores representing higher levels of anxiety.

The SCAS was normed on a population of 2,052 children in Australia. This measure demonstrated high internal consistency for the total (.92) and acceptable subscale scores (ranging between .60 and .82), acceptable 6 month test-retest reliability (total score= .60), and high convergent validity with the RCMAS (Reynolds & Richmond, 1985; total score comparison r=.71; Spence, 1998). Spence scores correlated with depression scores as measured by the Child Depression Inventory (r=.48), which was found to be different from the correlation between SCAS and RCMAS, which demonstrates discriminant validity of the SCAS as an indicator of anxious, rather than depressive symptoms. Confirmatory and exploratory factor analyses were consistent with DSM-IV anxiety categories and first-order factors loaded strongly on a higher-order factor of overall anxiety (Spence, 1998).

Nauta et al. (2004) examined the psychometric properties of this scale using 484 parents of children with anxiety disorders and 261 parents of typical control children between the ages of 6 and 18 years of age from Australia and the Netherlands. Confirmatory factor analysis showed support for 6 intercorrelated factors. Parent report was also shown to correspond with child self-report; parent child agreement correlation ranged from .41 to .66 in the group with anxiety and from .23 to .60 in the control group. Parent report was also shown to correspond with DSM-IV anxiety diagnostic categories (i.e., separation anxiety, generalized anxiety, social phobia, panic/agoraphobia, obsessive–compulsive disorder, and fear of physical injuries). The reliability of the subscales was satisfactory to excellent and there was support for convergent validity (i.e. the SCAS correlated highly with parent report for internalizing symptoms) and divergent validity (i.e., the SCAS correlated lower externalizing symptoms). The SCAS was also able to distinguish between children with anxiety and controls and also between different anxiety disorders except Generalized Anxiety Disorder.

Zainal et al. (2014) investigated the use of the SCAS-P as a screening tool with 32 parents of children with ASD and found acceptable to excellent sensitivity, specificity,

and positive predictive value when evaluated against a standardized clinical interview (based on the DSM-IV-TR) and the Kiddie-Schedule for Schizophrenia and Affective Disorders (K-SADS-PL; Kaufman et al., 1997). The SCAS-P was also found to have convergent validity with the K-SADS-PL and Developmental Behavior Checklist (DBC; Brereton, Tonge, Mackinnon, & Einfeld, 2002). Internal consistency for the Total score was also found to be high (α=.88) in this study.

In a systematic review examining outcome measurement tools for use with children with ASD, Wigham and McConachie (2014) found that the SCAS was among the most robust in terms of its measurement properties. The review found the SCAS to have good internal validity, structural validity, convergent and divergent validity, and criterion validity. Magiati and colleagues (2017) examined the internal consistency, convergent, divergent and discriminant validity of the SCAS-P as well as the factor structure in a sample of 870 caregivers of children with ASD. Although they found the SCAS total score good to excellent validity across all types listed above, the data did not support a six-factor model. Overall, an advantage of using the SCAS for the current study is that several of the studies looking at CBT delivered in a group format with children with ASD have used this measure (e.g., Chalfant, Rapee & Carroll, 2007; Sofronoff, Attwood, & Hinton, 2005). In the current sample, the SCAS was observed to have high internal consistency across time points, as determined by a Cronbach's alpha of .85 at pre-treatment, .79 at mid-treatment, .86 at post-treatment, and .82 at follow-up. A copy of the SCAS parent report (published with the author's permission) can be found in Appendix C.

Anxiety Disorders Interview Schedule, Parent Interview (ADIS-IV).

The Anxiety Disorders Interview Schedule (ADIS-IV; Silverman & Albano, 1996) is widely considered to be the gold standard in the diagnostic assessment of anxiety and has been used in intervention research with children with ASD. It is a structured interview schedule that is compatible with DSM-IV diagnostic criteria for anxiety disorders and allows clinicians to determine if symptoms warrant a diagnosis of an anxiety disorder. A recent review rated the ADIS-IV among the most appropriate measures for use with this population (Grondhuis & Aman, 2012) and it has previously been used in studies examining CBT delivered in a group format (Chalfant et al., 2007;

Reaven et al., 2012). The parent interview schedule – child version (i.e., parents were interviewed about their child's anxiety) was used in the current study. The interview takes 60-90 minutes to administer and provides cut-offs for diagnostic thresholds for each anxiety disorder. Clinician severity ratings (CSRs) between 0 (no symptoms) and 8 (very severe impairment) are also assigned by clinicians based on the content of parent responses. The ADIS-IV has been found to correspond strongly with the Multidimensional Anxiety Scale for Children (MASC; March, 1997) for typically developing children with clinical levels of anxiety in the areas of Social Phobia, Social Anxiety Disorder, and Panic Disorder (Wood, Piacentini, Bergman, McCracken, & Barrios, 2002). Kappa coefficients for the ADIS-IV (P) for Social Anxiety Disorder, Social Phobia, Specific Phobia, and Generalized Anxiety Disorder were in the good to excellent range (κ=.65-.88). The ADIS-IV was administered by psychologists at the time of intake (1-2 months before group) and post-treatment (within 2 weeks). Limited clinical resources and staffing coordination barriers (e.g., maternity leave) restricted the feasibility of consistently blind ADIS-IV administration, therefore, only a portion of post-treatment ADIS-IV administrations were blind to child pre-treatment anxiety.

Fear Tracker: Individual Anxiety Target Tracking Sheet

Parent ratings of each child's primary individual treatment target (e.g., fears of spiders, loud noises, public speaking, etc.) was tracked from the start of in-session exposure practices (at week 7; mid-treatment) to the end of group (at week 14; post-treatment). There is a worksheet in the child workbook titled "Fear Tracker" (Reaven et al., 2011, p. 35) which was used to collect these data (see Appendix D). Parent and child ratings on the Fear Tracker were made based on child SUDs (subjective units of distress; using a visual aid called a 'stress-o-meter') ratings which ranged between 1 and 8, although 0 was also spontaneously used by some children and parents. The stress-o-meter consisted of 3 ranges of 'anxiety' indicated by three different colours; green was used to indicate low levels of anxiety and contained numbers 1-2 with 3 on the border between green and yellow, 'yellow' was used to measure moderate levels of anxiety and contained numbers 4 and 5 with 6 on the border between yellow and red, finally 'red' representing high levels of anxiety and contained the numbers 7 and 8. Similar to the clinician severity ratings (CSR) based on parent interview (on the ADIS-IV), Fear Tracker ratings are made using an 8-point scale of anxiety severity

2.3.2. Measures for Variables Predicting Treatment Outcomes

Treatment Adherence: Clinician Record of Home Practice by Parent-Child Pair Report

Each week children were assigned "home practice" to complete before the next group session. For the first 6 weeks of treatment, as participants learned more about anxiety and how to manage it, the home practice mostly involved completing worksheets based on the lessons or concepts learned and/or completing relaxation practice (see Table 6). From weeks 7-14 the home practice primarily entailed exposure practice at home along with continuing to practice their relaxation skills. Parents and children were asked to complete exposure practice once per day for the duration of the second half of group (7 weeks; total of 49 exposures). Home practice was self-reported by children with parent support at the beginning of each group session. For each week, homework completion was rated by clinicians as not completed (0), partially completed (1), or fully completed (2). Therefore, average homework completion scores theoretically range between 0 and 2. For the purposes of the current study, the amount of home practice completed from weeks 1-6 and from 7-14 was calculated and average scores of each (accounting for absences) were used in the analyses examining treatment adherence in the prediction of post-group anxiety (see Appendix E).

Table 6 Homework Timeline

Homework Assignment	Week
Wordsearch: Identifying emotion terms	2
Worksheet: Awareness of physical symptoms of anxiety	3
Worksheet: Identifying supportive people for child	4
Sheduled relaxation practice + use of reward	5
Worksheet: Generating helpful thoughts	6
Worksheet: Exposure hierarchy	7
Exposure practice	8-14

Note. Week is when the home practice check-in for each item occurred.

Clinician-Rated Parent Support: In Vivo In-Session Exposure Practice

Although the actual amount of home practice completed may be important, the quality of these home practice exposures may also be important to consider. As such, a

method of approximating parent skill acquisition by measuring level of clinician support required to implement an in vivo exposure step in the group session was created. Starting in week 7 parents and children were provided time during the group session to practice an exposure step listed on the child's anxiety target hierarchy under the supervision and guidance of group leaders. As the group progressed, parents developed skills related to setting up and implementing exposure steps while continuing to support their children as they faced fears. Clinicians worked with the parent-child pairs and individualized the amount of support they provided based on the parent's ability to independently develop, structure, and appropriately adapt exposure practices. The process of titrating exposure was discussed in clinician meetings before and after each session so as to facilitate an accurate match between support provided and support needed by parents. Support generally went from modeling to providing support to observation with help coming up with steps or fine-tuning. Circumstances in which leaders would provide more support included when parents and children were not sure where to start, when parents forgot key components of the intervention (e.g., soliciting fear ratings), or in circumstances in which parent-child pairs benefited from support in problem-solving.

After each in-session exposure, clinicians rated the level of support that they provided based on the parent's skill development. Occasionally, parent-child pairs were supported by more than one clinician; in these circumstances consensus ratings were used. Figure 2 depicts the parent rating system used by clinicians to measure level of support provided in each exposure session (also see Appendix E).

5	Leader *modeled a large portion* of the in-session exposure with parent in supportive role	E.g., parent scribes for child, interacts with child during exposure but does not actively lead it, expresses uncertainty about what to do, asks for help, struggles to follow exposure plan
4	Parent *required heavy support* and/or *some modeling* to implement in-session exposure	E.g., leader may have modeled a portion of the exposure, parent requires *frequent prompting/ support to set up* the practice (e.g., picking appropriate exposure step/setting up/using rewards etc.) *AND* requires *continued support to implement exposure practice* (e.g., coaching child on helpful thoughts/deep breathing/length of time for exposure/titrating the exposure/using stress-o-meter etc.)
3	Parent *required moderate support* and *some leader involvement* to implement in-session exposure	E.g., leader provides support/ coaching for parent, parent requires *some support/prompts to set up* the practice (e.g., picking appropriate exposure step/setting up/using rewards etc.) *AND some support/prompts to implement exposure practice* (e.g., coaching child on helpful thoughts/deep breathing/length of time for exposure/ titrating the exposure/using stress-o-meter etc.)
2	Parent *required some minor support* or reminders from leaders to implement in-session exposure	E.g., *parents are mostly independent in coaching/leading exposure practice with some minor reminders from leaders in a supportive capacity* (e.g., actively brainstorming with leaders for step, minor support provided for things like pacing and titrating of exposure steps, or prompts to check in on stress-o-meter ratings throughout the practice)
1	Parent effectively executed in-session exposure *independently with leader supervision (as needed)*	E.g., parents may have received some ideas/input from leaders regarding steps that they could work on and the parent used that information as well as their own information based on what the child did that week at home to come up with and implement an exposure practice largely independently

Figure 2 Levels of Clinician Support

Note: clinician ratings were completed at the end of each group session; in the event that more than one clinician supported a parent-child pair, clinicians came to a consensus before rating.

Parent-Child Relationship: Parenting Relationship Questionnaire (PRQ)

The Parenting Relationship Questionnaire (PRQ; Kamphaus & Reynolds, 2006) is designed to measure the parent's perspective on the parent-child relationship. The PRQ is a 71-item rating scale that is standardized for use with parents or guardians of children between the ages of 6 and 18. Scores are compared to a norm sample that is based on the child's age and the respondent's sex. It has seven subscales including Attachment, Communication, Discipline Practices, Involvement, Parenting Confidence, Satisfaction with School, and Relational Frustration. Given the limited sample size and

resulting power limitations, two predictors were selected (see power analysis in section 3.4.4). The current study used the Communication and Relational Frustration scales, as these were hypothesized to have the most direct impact on parent-child interactions relevant to participation in a group context and thus have the biggest impact on treatment outcomes. The Communication scale measures the "quality of information exchanged between the parent and child and the parent's listening skills that promote a trusting relationship" (Kamphaus & Reynolds, 2006, p. 3). The Relationship Frustration scale measures the "parent's level of stress or distress in relating to and controlling the behaviour and affect of the child, along with the tendency to be over-reactive and frustrated in common parenting situations**"** (Kamphaus & Reynolds, 2006, p. 4).

The standardization sample for this measure includes over 4000 cases from across the United States. Although this measure has not yet been validated in a sample of children with ASD, it has been used in the context of developmental disabilities (e.g., Lewallen & Neece, 2015) and it has been found to have good psychometric properties in a typically developing sample. In the standardization sample, internal consistency was found to be fairly high with median coefficient alphas ranging from .82 to .87. Coefficient alphas for the communication subscale ranged between, .82 and .89 across school-age groups and the relational frustration scale ranged between .86-.89. Test-retest reliability analysis was also conducted, and reliabilities ranged from .72 to .81. In the same sample, correlations between the PRQ-CA and the Parenting Stress Index (PSI) were found to be in the high-moderate range.

Parent Anxiety: State-Trait Anxiety Scale (STAI)

The State-Trait Anxiety Inventory (STAI; Spielberger, 1983, Speilberger, 2010) is a self-report measure of anxiety as it pertains to a relatively stable personality disposition (Trait; T scale), or to a transitory emotional state (State; S scale). It is a 40-item rating scale containing 20 questions measuring state anxiety and 20 questions measuring trait anxiety. Higher scores pertain to higher levels of anxiety for both scales on this questionnaire. The current study employed scores from the T scale (collected pre-treatment) as a measure of overall parent self-reported anxiety. The norm group for this test includes 10,000 individuals from various groups of English-speaking populations (e.g., adults in different age groups and professions; Spielberger, 1983). The STAI was

found to have good convergent validity with the Taylor Manifest Anxiety Scale (.73; Taylor, 1953) and Cattell and Scheier's Anxiety Scale Questionnaire (.85; Cattell & Scheier, 1963). It was also found to have good concurrent and discriminant validity (Spielberger, 1983). Test-retest reliability coefficients are higher for the T scale than the S scale, as would be expected given the state-dependency (transience) of the S scale. The S scales were found to be higher just before or after stressful stimuli are introduced, in comparison to conditions in which the subjects were relaxed and scores are lower. Internal consistency alpha coefficients ranged from .86 to .96 across several populations (e.g., .94 in Creamer, Foran, & Bell, 1995; and between .86 and .95 in Spielberger, 1983). In the current sample, the STAI T scale was observed to have high internal consistency as determined by a Cronbach's alpha of .92.

Parent Personality Characteristics: Broad Autism Phenotype Questionnaire (BAPQ)

The Broad Autism Phenotype Questionnaire (BAPQ; Hurley et al., 2007) is a measure of the broad phenotypic expression, such as personality and language characteristics, of ASD. Although subtler and less intrusive, these characteristics are often qualitatively similar to symptoms observed in ASD. This measure is suitable for use with adults and contains 36 questions in a rating scale format with 6 response options. Along with an overall score, there are three subscales on the BAPQ that align with core features of the Broad Autism Phenotype (BAP; Piven, Palmer, Jacobi, Childress, & Arndt, 1997): Aloof Personality, Rigid Personality, and Pragmatic Language difficulties. For the purposes of the current study the overall score was employed. Using 86 parents of children with ASD and 64 controls this measure was found to be both sensitive and specific (above 70% for all scales and 80% for overall score) for detecting the broader autism phenotype when compared to clinical interview using the Modified Personality Assessment Scale Revised (MPASR; Piven et al., 1994) and the Pragmatic Rating Scale (PRS; Tyrer & Alexander, 1979). For the total score, a cut-off of 3.14 was recommended to identify individuals falling within the BAP. Parents of children with ASD were found to have significantly higher scores on all subscales in comparison to controls. This measure was found to have good internal consistency; Cronbach's alphas ranged from .85 to .95. All three subscales were found to significantly correlate with each other. However, there is no information on test-retest reliability or larger-scale

prevalence rates of BAP characteristics that would provide normative data. In the current sample, the BAPQ was observed to have high internal consistency as determined by a Cronbach's alpha of .93. A copy of the BAPQ (published with the author's permission) can be found in Appendix F.

2.3.3. Measures for Descriptive Variables

Wechsler Abbreviated Scale of Intelligence-II (WASI-II)

The Wechsler Abbreviated Scale of Intelligence, second edition (WASI-II; Wechsler, 1999) is a brief measure of cognitive functioning suitable for individuals between the ages of 6 and 90. Along with a Full Scale estimate of general ability, the WASI-II provides composite scores that estimate abilities in two domains, Verbal Comprehension and Perceptual Reasoning (non-verbal). It has excellent psychometric properties and was standardized using very large samples. Children who had not participated in a recent (i.e., within 1 year) cognitive assessment were screened with the WASI-II as an approximation of intellectual functioning.

Social Communication Questionnaire (SCQ)

The Social Communication Questionnaire (SCQ; Rutter, Bailey & Lord, 2003) is a parent-report measure of symptoms associated with ASD for individuals above four years of age. Each of the 40 items are answered in a dichotomous format (i.e., yes or no). The SCQ was created as a screening measure for use with the Autism Diagnostic Interview – Revised (ADI-R). The SCQ items were selected to align with ADI-R items with discriminative diagnostic validity. SCQ total scores can be interpreted in reference to cut-off scores chosen to identify individuals who are likely to have ASD and for whom additional evaluation is recommended. SCQ scores can also be presented as a reflection of the level of severity of ASD symptomology, which is how it was used in the current study. Internal consistency of this measure was examined using Cronbach's alpha and the reliability coefficient for the total scale was .9 which indicated very good internal consistency (Berument, Rutter, Lord, Pickles, & Bailey, 1999). Factor analyses found that SCQ items mapped onto four domains of symptomatology including social interaction (k=20, α=.91), communication (k=6; α = .71), abnormal language (k=5; α =

.79), and stereotyped behaviour (k=8; α=.67). The SCQ has also been shown to have acceptable convergent and discriminant validity (Berument et al., 1999).

The Behaviour Assessment System for Children, Second Edition

The Behaviour Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004) includes a parent-report version that is used to measure social-emotional, adaptive, and problem behaviours in children and adolescents. The parent-report scale is a 150-item rating scale with four response options (Never, Sometimes, Often, Almost Always) to rate child behaviours. The BASC-2 provides T scores for an Internalizing Problems composite, which includes a scale that measures depression symptoms, that was used in the current study to describe the treatment sample. This subscale has been demonstrated to have strong reliability overall (αs > .85), good test-retest reliability (.84 on the child form; .82 on the adolescent form), and acceptable interrater reliability (.67 on the child form; .78 on the adolescent form). Confirmatory factor analyses demonstrate that the depression scale has a significant loading on the Internalizing Problems factor (.82 for the child and adolescent forms); however, intercorrelations with the depression scale are moderately high with several other scales. This is expected since depression and depressive symptoms often co-occur with other mental health disorders and related challenges (Birmaher et al., 1996; Biederman, Faraone, Mick, & Lelon, 1995; Kessler et al., 2003).

Demographic and Treatment Information

A demographic questionnaire was completed by participants after being admitted to the group. This questionnaire includes information on parental education, social economic status (SES), schooling information, and relevant information pertaining to family variables. See the Appendix G for a copy of the demographics questionnaire. Treatment information such as medication and alternative treatments (e.g., individual therapy) for anxiety, other treatments (e.g., social skills) and any changes made, were tracked at 3 time points; at the beginning of treatment, at the end of treatment, and at 6 weeks follow-up.

Chapter 3. Results

3.1. Data Preparation

All analyses were conducted using SPSS Statistics, Version 24. Data were scanned for potential outliers by converting to z-scores and using a critical value of ±2.58 (Field, 2009) to identify significant outliers, which were discarded prior to analyses. In the case of home practice exposure, two significant outliers were detected and removed from the analyses examining treatment adherence. One significant outlier was also removed from the analyses examining the impact of relational frustration on child anxiety. Finally, one outlier was found for SCAS anxiety scores at mid-point and was removed from repeated measures analyses incorporating mid-point as a variable. Significant skew and kurtosis was also examined using a critical value of ±2.58 (Field, 2009).

3.2. Effectiveness of the Group Treatment Program

3.2.1. Examining Changes in Child Anxiety Symptoms

Hypothesis 1a: Parent (questionnaire) ratings of child anxiety will significantly decrease over time (pre-treatment, mid-treatment, post-treatment, & follow-up).

Hypothesis 1b: Post-treatment gains in parent-rated child anxiety symptoms will be maintained at 6 weeks follow-up.

Descriptive Analyses for Parent-Rated Child Anxiety Symptoms (SCAS)

Overall, parent (questionnaire) ratings of child anxiety ranged considerably within the sample. Despite meeting diagnostic criteria on the ADIS-IV, not all children scored in the elevated range on the SCAS, indicating that it may have less sensitivity. However, mean scores for the sample were much higher than the normative reference sample of children without an anxiety disorder (means, depending on age, ranged from 11.8 to 16.0 in the norm sample; Nauta et al., 2004) at the time of intake and were in the clinically “elevated” range. A summary of descriptive data for parent rated child anxiety

on the SCAS across the four time points is outlined in Table 7. Forty four percent (n=18) of the sample at pre, 32% (n=13) at mid, 20% (n=8) at post, and 10% (n=4) at follow-up scored at or over 2 standard deviations over the respective normative sample mean. Table 8 represents a correlation matrix for parent ratings of child anxiety (on the SCAS) across the 4 time points.

Table 7 Descriptive Data for SCAS Across 4 Time Points

	Pre-Group	Mid-Group	Post-Group	Follow Up
Mean (SD)	33.37(12.04)	29.33(9.84)	26.17(10.53)	23.55(9.55)
Skew (SE)	.13(.37)	-.07(.37)	.35(.37)	.24(.37)
Kurtosis (SE)	-.04(.72)	-.38(.72)	-.68(.72)	-.41(.72)
Range	6-62	11-51	6.5-47	5-43
Descriptive Range for Mean	Elevated	Elevated	Borderline Elevated	Not Elevated
n	41	41	41	41

Note. SCAS raw scores were used; Elevated range demarcated by top 84% of population scores (>60T) as per test developers' criteria.

Table 8 Correlation Table: SCAS Across 4 Time Points

	1	2	3	4
1. Pre-Treatment	1.00	.767**	.558**	.634**
2. Mid-Treatment		1.00	.731**	.798**
3. Post-Treatment			1.00	.827**
4. Follow-up				1.00

** p<.01; n=41

Consideration of Covariates

Given the small sample size, in order to conserve power an a priori criterion of p=<.05 for correlations of covariates with the SCAS was set for inclusion in the analysis. Covariates such as age, gender, and IQ were considered and ruled out for several reasons as follows: First, age was considered since it has been found to be associated with increased clinical anxiety in children with ASD when compared across age groups (i.e., preschool, school-aged, and adolescent groups; Vasa et al., 2013). However, given that the current sample has a restricted age range (8-13 years) that is only

representative of school-aged children, variability based on age would not be expected in this sample and thus age as a potential covariate was discarded. Second, gender was considered since being female has been associated with higher levels of anxiety in typically developing children (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). However, as common in the case of studies with individuals with autism, with such a high proportion of males (4:1), the sample size was limited and thus power was insufficient to adequately measure the effect of gender and thus it was also excluded. Although it may have been ideal to include these child characteristics in our evaluation, recent research examining treatment outcomes in children with ASD have not found age or gender to predict treatment effect (Van Steensel, Zegers, & Bogels, 2017), suggesting the possibility that these variables may not be as important for children with ASD as compared to TD youth.

Third, IQ was also considered as a potential covariate given that higher IQ has been associated with higher levels of anxiety in children with ASD (Vasa et al., 2013; Sukhodolsky et al., 2008; Mayes, Calhoun, Murray, Ahuja, & Smith, 2011), although there have been mixed results (Kerns & Kendall, 2012; Eussen et al., 2013; Simonoff et al., 2008; Strang et al., 2012). In the current sample, IQ had a nonsignificant relationship with anxiety across all four time points (pre-: r=-.043, p=.771; mid-: r=-.039, p=.792; post-: r= .121, p=.414; follow-up-: r=-.007, p=.966) and thus did not meet the a priori inclusion criterion set in the interest of conserving power.

Although the intended sample size (n=51-55) was sufficient to have the power to detect a large effect with the inclusion of a covariate, in the end, the available data (n=41) limited this study's power to include a covariate. A priori power calculations using Cohen's (1988) conventions of .1, .25 and .4 for small, medium, and large effect sizes (f) respectively, with alpha=.05 and power=.8, and one covariate, show that 777 participants would have been needed to have the power to detect a small effect, 126 participants to have the power to detect a medium effect and 51 participants to have the power to detect a large effect.

Data Analytic Plan and Assumptions

Parent ratings of child anxiety, as measured by the SCAS, were collected at four time points (pre, mid, post, follow-up). A repeated measures ANOVA analysis with

planned repeated contrasts was conducted to examine changes in parent rated child anxiety ratings across the 4 time points. Specifically, contrasts were used to address research question 1b that inquired about the data measured post-group and at 6 weeks follow-up.

The assumption that the DV (anxiety) should be approximately normally distributed for each category of the IV (time) was confirmed using Shapiro-Wilk tests of normality. Mauchly's Test of Sphericity indicated that the assumption of sphericity was violated, $\mathcal{X}^2_5$= 24.06, $p \leq .001$, therefore a Greenhouse-Geisser correction was used.

One-Way Repeated Measures ANOVA Analysis

A repeated measures ANOVA with a Greenhouse-Geisser correction (Ɛ=.694) was conducted and results are in support of hypotheses 1a and 1b. There was a significant effect of time on parent-rated child anxiety symptoms on the SCAS ($F_{2, 83}$= 22.306, $p \leq .001$, $\eta_p^2 = .36$). Post hoc analyses with a Bonferroni adjustment revealed that anxiety significantly decreased from pre- to mid-group (Mean Difference= 4.04, 95% CI [.68, 7.39], p=.011<.05) and from post-group to follow-up (Mean Difference= 2.62, 95% CI [.029, 5.22], p=.046<.05), but not from mid- to post-group (Mean Difference= 3.16, 95% CI [-.09, 6.41], p=.061>.05). As follows, anxiety also significantly decreased from pre- to post-group (Mean Difference= 7.12, 95% CI [2.56, 11.83], p≤.001). Figure 3 depicts mean change in total anxiety ratings across the 4 time points of the intervention.

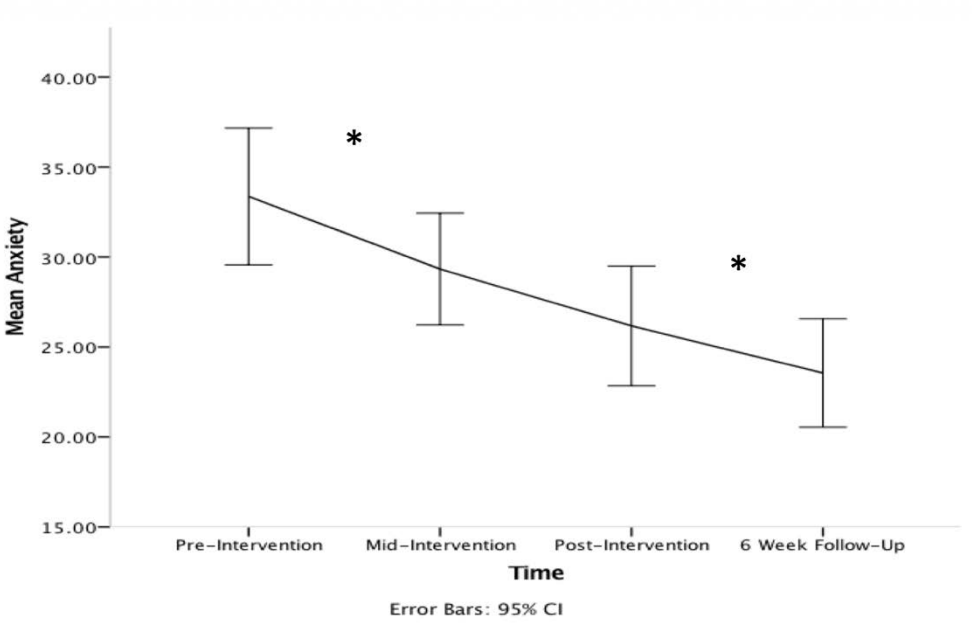

Figure 3 Mean Total Anxiety Ratings Across 4 Time-Points of the Intervention

Note: * = p<.05

Power Analysis

A priori power calculations were conducted with G*Power 3.1, using Cohen's (1988) conventions of .02, .06 and .14 for small, medium, and large effect sizes (η_p^2) With alpha=.05 and power=.8, I would need 55 participants to have the power to detect a small effect, 19 participants to have the power to detect a medium effect and 9 participants to have the power to detect a large effect. Given the observed effect size of η_p^2 = .36, alpha=.05, n=41, 1 group, 4 measurements, and a nonsphericity correction Ɛ=.694, observed power was 1.0 (Faul, Erdfelder, Buchner, & Lang, 2009).

3.2.2. Examining Changes in Clinician Severity Ratings of Child Anxiety From Pre- to Post-Group

Hypothesis 2: Clinician severity ratings of child anxiety (based on parent interview) will significantly decrease from pre- to post-treatment.

Data Analytic Plan and Assumptions

A paired samples *t*-test was used to test whether there were any statistically significant improvements in clinician severity ratings (CSRs) based on parent interview (on the ADIS-IV) from pre- to post-treatment. Data from 47 participants who met criteria for an anxiety disorder diagnosis at the time of intake were used in this analysis. The assumption of normality was checked by examining the distribution of the differences in the DV between CSRs at the two time points. In addition, Shapiro-Wilk and Kolmogorov-Smirnov tests were non-significant, supporting the assumption of normality. Normal QQ plots further verified the assumption of normality as the observed values were clustered around the line. Data preparation procedures ensured no outliers as well as no significant skew or kurtosis using a cut-off criterion of ±2.58 (Field 2009).

Descriptives: Clinician Severity Ratings of Child Anxiety

CSRs of child anxiety (based on parent interview) across all types of anxiety, were on average 18.09 at the time of intake and 10.91 by the end of group. Mean CSR ratings at the time of intake and post-treatment for the most common anxiety disorders represented in the sample were as follows: Separation Anxiety, Pre-Group M=5.6, Post-Group M=5.8; Social Anxiety, Pre-Group M=6.4, Post-Group M=5.6; Specific Phobia, Pre-Group M=6.1, Post-Group M=5.5; Generalized Anxiety Disorder, Pre-Group M=6.0, Post-Group M=5.6. As follows, average CSRs (for each type of anxiety) also decreased by 1.34 points (pre-M= 5.95; post-M= 4.61; out of total possible 8 points). Whereas children met criteria for 2.97 anxiety disorder diagnoses at the time of intake, this number reduced by 1 after participating in the group (M=1.95, SD=1.22). Eight out of 47 (17%) children no longer met criteria for any anxiety disorder diagnosis at the end of group.

Results

Supporting hypothesis 2, results from the paired samples *t*-test indicated a significant difference between CSRs at pre- (M=18.09, SD=7.65; range 4-35) and post-treatment (M=10.91, SD=7.01; range 0-23; $t_{46}=6.75$, $p \leq .001$, d=.98).

Power Analysis

A statistical power analysis was performed a priori for sample size estimation. In general, using Cohen's (1988) conventions of .2, .5 and .8 for small, medium, and large effect sizes (d) respectively, with a one tailed test, alpha=.05 and power=.8, it was determined 156 participants were needed to have the power to detect a small effect, 27 participants to detect a medium effect, and 12 participants to have the power to detect a large effect. Given the observed effect size of d=.98, alpha=.05 and n=47, observed power was .99 (Faul, Erdfelder, Buchner, & Lang, 2009).

3.2.3. Examining Changes in Parent Ratings of Primary Child Anxiety Treatment Targets

Hypothesis 3: Parent ratings of primary child anxiety treatment targets will significantly decrease from the beginning of exposure practice (week 7) to the conclusion of treatment (week 14).

Data Analytic Plan and Assumptions

A paired samples *t*-test was used to test whether there were any statistically significant changes in parent ratings for primary individualized anxiety targets from mid- to post-treatment. Data from 23 participants who participated in 6 groups between 2015 and 2016 for which 'Fear Tracker' data were recorded were used for this analysis. The assumption of normality was checked by examining the distribution of the differences in the DV between Fear Tracker ratings at the two time points (mid- and post-group). Shapiro-Wilk and Kolmogorov-Smirnov tests were non-significant, supporting the assumption of normality. Normal QQ plots further verified the assumption of normality as the observed values were clustered around the line. Data preparation procedures ensured no outliers as well as no significant skew or kurtosis using a cut-off criterion of ±2.58 (Field 2009).

Descriptives: Parent Ratings of Child Anxiety for Primary Treatment Targets

Overall, parent ratings of primary child anxiety targets on the Fear Tracker showed changes in anxiety ranging between 0 and 5 points out of a possible 8 points

(using a SUDs rating scale based on a visual aid called a 'stress-o-meter'). Individual ratings for primary treatment targets ranged between 4 and 8 at week 7 (the beginning of exposure treatment), with 83% of subjects selecting 'red zone' (i.e., ratings between 6 and 8 out of 8) targets. Mean parent ratings of child anxiety for primary treatment targets were 5.74 at pre-group and 3.43 post-group. Between weeks 7 and 14 13% of the overall sample (n=23) improved by 1 point, 26% improved by 2 points, 17% improved by 3 points, 22% improved by 4 points, and 4% improved by 5 points. Target-related treatment scores remained roughly consistent (within 1 point) from post-group to follow-up for 67% of the sample, and a further 33% of the sample improved an additional 2 points at follow-up. By parent rating, no children were observed to worsen in terms of their anxiety target ratings between weeks 7 and 14. However, a handful of children (n=4; 17% of the sample of 23 children) failed to improve on anxiety target ratings during this time. Across the board, improvements in fear tracker ratings were maintained from week 14 (post) to the booster session (follow-up, n=21).

Results

In support of hypothesis 3, results from the paired samples *t*-test indicated a significant difference between parent ratings of child anxiety for primary treatment targets at week 7 (beginning of exposure treatment; M=5.74, SD=1.22; range= 3.5-8) and week 15 (end of group; M=3.43, SD=1.54; range = 0-7; t_{22}=7.16, $p \leq .001$, d=1.50).

Power Analysis

A statistical power analysis was performed a priori for sample size estimation. In general, using Cohen's (1988) conventions of .2, .5 and .8 for small, medium, and large effect sizes (d) respectively, with a one tailed test, alpha=.05 and power=.8, it was determined 156 participants were needed to have the power to detect a small effect, 27 participants to detect a medium effect, and 12 participants to have the power to detect a large effect. Given the observed effect size of d=1.50, alpha=.05 and n=23, observed power was .99 (Faul, Erdfelder, Buchner, & Lang, 2009).

3.3. Examining Predictors of Treatment Outcomes

3.3.1. Assumptions for Regression Analyses

Prior to evaluating the following regression models, assumptions were checked to ensure that no violations were present. To test the assumption of correct specification of the form of the relationship between the predictor variables and the outcome variable, a scatterplot of standardized predicted values and standardized residuals was examined for each research question. These scatterplots were also used to test the assumption of constant variance of error to see if there was equal spread. Before each analysis, Levene's Test for equality of the variances on the residuals was checked by dividing the standardized residuals along the predicted values into two groups (above and below the mean) and conducting a t test to compare the two groups. In each case, results of this test were not statistically significant, therefore, the assumption of homoscedasticity was retained. The assumption of independence of errors was retained for each analysis as the Durbin Watson statistic exceeded the critical upper limit. The assumption of normality of errors was also retained after checking this assumption using a Kolmogorov-Smirnov test of normality and qq plots of the residuals. Across all analyses, the largest correlation among the predictors was well below .80. Nevertheless, multicollinearity was checked by examining variance inflation factor (VIF) and tolerance statistics; variance inflation factors above 10 (Cohen, Cohen, West & Aiken, 2003) and tolerance values below .10 (Field, 2009) were not observed indicating no concerning multicollinearity. The data was also examined for outliers and influential points as follows for Mahalanobis distance (based on 3 predictors and a significance level of $p<.001$; Tabachnick and Fidel 2013), centered leverage values (cut-off: min=0, max=N-1/N), Cooks Distance (cut-off: values over 1), studentized deleted residuals (cut-off: values over ±3), standardized residuals (cut-off: values over ±3) as cited in Cohen, Cohen, West, & Aiken (2003). In addition to standardized DFBETAs for each predictor (cut-off: values over ±2; Stevens, 2002).

3.3.2. Treatment Adherence: Homework Completion

Hypothesis 4: Treatment adherence variables such as amount of homework completion (between weeks 1 and 7) and the number of self-reported exposure practices at home

(between weeks 8 and 14) will predict post-group parent (questionnaire) ratings of child anxiety after controlling for pre-group child anxiety.

Data Analytic Plan

A hierarchical multiple regression analysis was used to address this research question. Block one of the regression model included parent ratings of pre-group child anxiety symptoms. Treatment adherence variables (amount of homework and number of exposures completed) were added in block 2.

Descriptives: Home Practice (Activities And Exposure Practice)

On average, children completed 77.5% of the worksheets and activities assigned to them in the first half of group. Homework completion ranged by participant between 0 (no homework completed) and 2 (all homework completed) from week to week. On average children completed 2.65 home-practice exposures per week, which was less than the ideal recommended by group leaders (once per day; 5-7 per week). However, the amount of exposure practice varied widely across participants each week (range: 0-16 exposures completed). Table 9 contains the descriptive analyses for homework completion variables based on type.

Table 9 Homework Completion: Descriptive Statistics

Type of Homework	M(SD)	Observed Range	Theoretical Range
Worksheets & Activities (first half of group)	1.56(.21)	1.16-1.83	0-2
Exposure Practice (second half of group)	2.65(1.39)	.86-6.38	0-7

Note. Average total scores for each type of homework were used for each participant; n=30; theoretical upper limit for exposure practice calculated based on exposure practice of on average once per day for the duration of the second half of group in which exposure was the focus.

Activity-based home practice in the first half of the group did not significantly correlate with child anxiety scores at pre- (r= -.198, p=.294>.05, 95% CI: -.521 ≤ ρ ≤ .174) or post-group (r=-.046, p=.811>.05, 95% CI: -.399 ≤ ρ ≤ .319). Exposure-based home practice in the second half of group did not significantly correlate with child anxiety scores at pre- (r= .182, p=.336>.05, 95% CI: -.190 ≤ ρ ≤ .508) or post-group (r =.046, p=.809>.05, 95% CI: -.319 ≤ ρ ≤ .399). Similarly, the amount of activity-based homework

completed in the first half of group and amount of home practice exposure completed in the second half of group were not significantly correlated (r= -.173, p=.361>.05, 95% CI: -.501 ≤ ρ ≤ .199). Table 10 represents a correlation matrix for the same variables along with parent-rated child anxiety at pre- and post-group.

Table 10 Correlation Table: Homework Variables and Pre-/Post-Anxiety

	1	2	3	4[a]
1. Pre- Group Child Anxiety	1.00	.576**	-.198	.182
2. Post-Group Child Anxiety		1.00	-.046	.046
3. Homework: Worksheets & Activities			1.00	-.173
4. Homework: Exposure Practice				1.00

** p<.01; n=30; [a] Exposure practice was significantly positively skewed and thus Spearman's correlation coefficient was calculated for all correlations including this variable.

Regression Analysis: Homework Variables as Predictors

Overall, findings did not support hypothesis 4 and results from this regression analysis can be found in Table 11. The analyses show that pre-group parent ratings of child anxiety (on the SCAS) explained a statistically significant proportion (33.2%) of the variance in parent rated child anxiety at the end of group (R^2=.332, $F_{1,28}$=13.89, p ≤ .001). Although model 2 was significant (R^2=.364, $F_{3,29}$=4.97, p=.007<.05), inclusion of homework variables only accounted for an additional 3.3% of the variance (ΔR^2=.033 $\Delta F_{2,26}$= .670, p=.520>.05) in the outcome variable above and beyond model 1.

Table 11 Hierarchical Multiple Regression Analysis: Homework Completion as Predictors of Post-Group Child Anxiety

Predictor Variable	B	SE B	β	p
Step 1				
Constant	9.13	4.82		.07
Pre-Group Child Anxiety	.50	.13	.58	.00
Step 2				
Constant	7.14	14.96		.64
Pre-Group Child Anxiety	.56	.15	.65	.00
Homework: Worksheets & Activities	2.27	8.26	.04	.79

Homework: Exposure Practice	-1.39	1.30	-.18	.30

Note. R^2 = .332 for Step 1; ΔR^2= .033 for Step 2

Power Analysis

Using Cohen's (1988) conventions of .02, .15, and .35 for small, medium, and large effect sizes (f^2), with alpha=.05, power=.8, in the final model with 2 tested predictors and 3 predictors in total, in my final model I would need 485 participants to have the power to detect a small effect, 68 participants to have the power to detect a medium effect, and 31 participants to have the power to detect a large effect (Faul, Erdfelder, Buchner, & Lang, 2009). Statistical post hoc power analyses (R^2 deviation from zero) found power of .87 to detect the effect of the covariate (pre-group anxiety; f^2= .50) at Step 1 with an alpha= .05. Power (R^2 increase) to detect the obtained effects at Step 2 (f^2 = .05) at the $p < .05$ level was .22.

3.3.3. Clinician-Provided Parent Support: In-Session Exposures

Hypothesis 5: Level of clinician-provided parent support provided for in-session exposures (as rated by clinicians) will predict post-group parent (questionnaire) ratings of child anxiety after controlling for pre-group child anxiety.

Data Analytic Plan

A hierarchical multiple regression analysis was used to address this research question. Block one of the regression model included parent ratings of pre-group child anxiety and mean clinician support ratings were added in block 2.

Descriptives: Clinician Provided Support During In-Session Exposure Practice

As expected, parents required higher levels of clinician support during in-session exposures upon introduction to the exposure component of the group (M: 4.62, SD: .59, range: 3-5), as compared to support required by the end of the group (M: 2.29, SD: .90, range 1-4). Average level of support provided by clinicians steadily decreased between weeks 7 and 13 (see Figure 4). Average levels of support did not significantly correlate with child anxiety scores at pre- (r= -.117, p=.613>.05, 95% CI: $-.331 \leq \rho \leq .522$), but did

at post-group (r= .483, p=.026>.05, 95% CI: -.065 ≤ ρ ≤ .756). Table 12 depicts a correlation matrix for the same variables along with parent rated child anxiety.

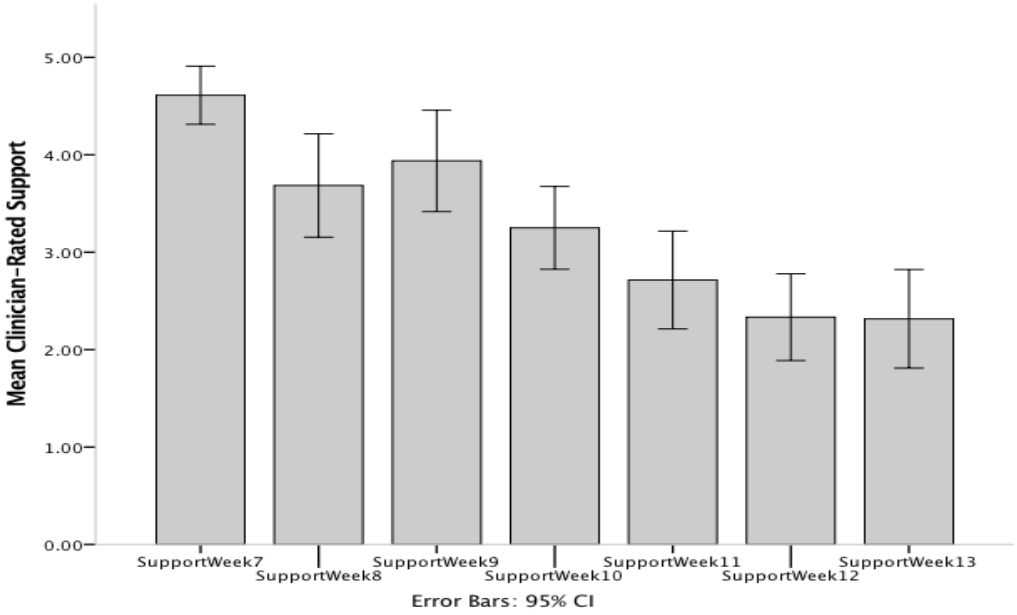

Figure 4 Mean Clinician Support Ratings Across Weeks 7 Through 13

Table 12 Correlation Table: Clinician Provided Support

	1	2	3
1. Pre- Group Child Anxiety	1.00	.580**	-.117
2. Post-Group Child Anxiety		1.00	.483*
3. Clinician Provided Support			1.00

**p<.01*, p<.05; n=21

Regression Analysis: Clinician Provided Parent Support During In-Session Exposures

Findings were in support of hypothesis 5 and results from this regression analysis can be found in Table 13. The analyses show that pre-group parent ratings of child anxiety (on the SCAS) explained a statistically significant proportion (33.6%) of the variance in parent rated child anxiety at the end of group (R^2=.336, $F_{1,19}$=9.631, p=.006<.05). Average level of clinician support added in model 2 accounted for an additional 30.8% of the variance in anxiety (ΔR^2=.308, $\Delta F_{1,18}$= 15.60, $p \leq .001$). T tests

show that both pre-group child anxiety and clinician support were statistically significant regression coefficients in model 2 (pre-group anxiety: β=.645, t_{18}= 4.561, $p \leq .001$; clinician support: β= .559, t_{18}= 3.949, $p \leq .001$). Controlling for pre-group anxiety, results indicated that for each one unit increase in clinician support, post-group child anxiety increased by .56. Added in block 3, the interaction between clinician support and pre-group anxiety did not result in a statistically significant increase in explained variance in the outcome variable (SCAS post-anxiety; ΔR^2=.005, ns) and was removed from the model. The full model accounted for 50.8% of the variance in child anxiety outcomes. The overall observed effect size was large (R^2=.644).

Table 13 Hierarchical Multiple Regression Analysis: Clinician Support Ratings as Predictors of Post-Group Child Anxiety – Summary of Model 2

Predictor Variable	B	SE B	β	*p*
Step 1				
Constant	7.58	6.37		.25
Pre-Group Child Anxiety	.52	.17	.58	.01
Step 2				
Constant	-26.67	9.90		.15
Pre-Group Child Anxiety	.58	.13	.65	.00
Clinician Provided Support	9.94	2.52	.56	.00

Note. R^2 = .336 for Step 1; ΔR^2= .308 for Step 2

Power Analysis

Using Cohen's (1988) conventions of .02, .15, and .35 for small, medium, and large effect sizes (f^2), with alpha=.05, power=.8, in the final model with 1 tested predictors and 2 predictors in total, in my final model I would need 395 participants to have the power to detect a small effect, 55 participants to have the power to detect a medium effect, and 25 participants to have the power to detect a large effect (Faul, Erdfelder, Buchner, & Lang, 2009). Statistical post hoc power analyses (R^2 deviation from zero) found power of .81 to detect the effect of the covariate (pre-group anxiety; f^2 = .51) at Step 1 with an alpha= .05. Power (R^2 increase) to detect the obtained effects at Step 2 (f^2= .87) at the p < .05 level was .98.

3.3.4. Parent-Child Relationship Qualities

Hypothesis 6: Parent-child relationship variables such as the quality of parent-child communication and degree of relational frustration will predict post-group parent (questionnaire) ratings of child anxiety after controlling for pre-group child anxiety.

Data Analytic Plan

A hierarchical multiple regression analysis was used to address this research question. Block one of the regression model included parent ratings of pre-group child anxiety. Two parent-child relationship variables, communication and relational frustration, were added in block 2.

Descriptives: Communication and Relational Frustration

On average, parent-child communication scores as rated by parents at intake was 37.83T (significantly below average; SD: 13.48). Communication scores were varied and ranged between 16T (lower extreme) and 62T (significantly above average). The mean parent-rated score for relational frustration at intake was 56T (average; SD: 10.17). However, relational frustration scores ranged between 36T (significantly below average) and 86T (upper extreme). Table 14 contains descriptive statistics for communication and relational frustration. Communication did not significantly correlate with child anxiety at pre- (r=.265, p=.157>.05, 95% CI: -.105 ≤ ρ ≤ .57) or post-group (r= -.243, p=.196>.05, 95% CI: -.554 ≤ ρ ≤ .128). However, the direction of the relationship was observed to change from pre- to post-group. That is, higher quality communication ratings were associated with higher anxiety at the beginning of group, whereas higher quality communication ratings were associated with lower anxiety at the end of group. Relational frustration was found to significantly correlate with pre- (r=.364, p=.048<.05, 95% CI: .005 ≤ ρ ≤ .64) but not post-group child anxiety (r=.180, p=.342>.05, 95% CI: -.192 ≤ ρ ≤ .507). Table 15 depicts a correlation matrix for communication and relational frustration along with parent rated child anxiety.

Table 14 Parent-Child Relationship Variables: Descriptive Statistics

PRQ Subscale	M(SD)	Observed Range	Theoretical Range
Communication	37.83(13.48)	16-62	10-100
Relational Frustration	56(10.17)	36-86	10-100

Note. T scores are represented; n=30

Table 15 Correlation Table: Parent-Child Relationship Variables

	1	2	3	4
1. Pre- Group Child Anxiety	1.00	.580**	.265	.364*
2. Post-Group Child Anxiety		1.00	-.243	.180
3. Communication			1.00	.062
4. Relational Frustration				1.00

**p<.01; * p<.05; n=30;

Regression Analysis: Parent-Child Relationship Variables – Communication and Relational Frustration

Findings were in support of hypothesis 6, however, only one of the selected predictors was found to be a statistically significant predictor of parent-rated child anxiety at post-treatment. Results from this regression analysis can be found in Table 16. The analyses show that pre-group parent ratings of child anxiety (on the SCAS) explained a statistically significant proportion (33.6%) of the variance in parent rated child anxiety at the end of group (R^2=.336, $F_{1,28}$=14.188, $p \leq .001$). Model 2 added communication and relational frustration, which accounted for an additional 17.2% of the variance in anxiety (ΔR^2=.172 $\Delta F_{2,26}$= 4.54, p=.020<.05). T tests show that pre-group child anxiety and communication were both statistically significant regression coefficients in model 2 (pre-group anxiety: β=.713, t_{26}= 4.661, $p \leq .001$; communication: β=-.429, t_{26}=-3.00, p=.006<.01; relational frustration: β=-.054, t_{26}=-.362, p=.720>.05). Controlling for other variables, results reveal that for each one unit increase in communication, post-group child anxiety decreased by .43. Added in block 3, the interaction between communication and relational frustration did not result in a statistically significant increase in explained variance in the outcome variable (SCAS post-anxiety; ΔR^2=.019, ns) and was removed from the model. The full model accounted for 50.8% of the

variance in child anxiety outcomes. The overall observed effect size was large (R^2=.508).

Table 16 Hierarchical Multiple Regression Analysis: Parent-Child Variables as Predictors of Post-Group Child Anxiety

Predictor Variable	B	SE B	β	*p*
Step 1				
Constant	10.36	4.71		.04
Pre-Group Child Anxiety	.49	.13	.58	.00
Step 2				
Constant	22.84	9.14		.02
Pre-Group Child Anxiety	.60	.13	.71	.00
Communication	-.35	.12	-.43	.01
Relational Frustration	-.06	.16	-.05	.72

Note. R^2 = .336 for Step 1; ΔR^2= .172 for Step 2

Power Analysis

Using Cohen's (1988) conventions of .02, .15, and .35 for small, medium, and large effect sizes (f^2), with alpha=.05, power=.8, in the final model with 2 tested predictors and 3 predictors in total, in my final model I would need 485 participants to have the power to detect a small effect, 68 participants to have the power to detect a medium effect, and 31 participants to have the power to detect a large effect (Faul, Erdfelder, Buchner, & Lang, 2009). Statistical post hoc power analyses (R^2 deviation from zero) found power of .87 to detect the effect of the covariate (pre-group anxiety; f^2 = .51) at Step 1 with an alpha= .05. Power (R^2 increase) to detect the obtained effects at Step 2 (f^2 = .35) at the $p < .05$ level was .88.

Supplemental Analyses: Communication Scale Correlations

Two supplemental correlational analyses examining the relationships between communication and IQ (r=-.086, p=.653>.05, 95% CI: -.432 ≤ ρ ≤ .283), as well as communication and autism symptoms (SCQ; r=-.213, p=.258>.05, 95% CI: -.532 ≤ ρ ≤ .159), were not statistically significant.

3.3.5. Parent Characteristics

Hypothesis 7: Parent variables such as self-rated trait anxiety and broad autism phenotype characteristics will predict post-group parent (questionnaire) ratings of child anxiety after controlling for pre-group child anxiety.

Data Analytic Plan

A hierarchical multiple regression analysis was used to address this research question. Block one of the regression model included parent ratings of pre-group child anxiety. Parent variables (parent trait anxiety and broad autism phenotype scores) were added in block 2.

Descriptives: Parent Anxiety and Broad Autism Phenotype Characteristics

Parents average self-reported trait anxiety was 56.91T (SD: 12.53, range: 38-90; 11-100th percentile) and state anxiety was 53.91T (SD: 10.49, range: 38-77). For the purposes of this study parent trait anxiety was used as it represents a relatively stable, dispositional quality, as opposed to state anxiety, which is based on one's reaction to temporally relevant circumstances. In general, scores over 70T (2 SD over the mean) are considered to be in the borderline-clinical range and a large number (60%) of parent trait anxiety scores fell in this range. A further 35% of parent trait anxiety scores fell 3 standard deviations above the mean (>80T). Across the entire sample, parent trait anxiety was found to correlate with child (total) anxiety at pre- (r=.701, $p \leq .001$, 95% CI: $.407 \leq \rho \leq .863$) and post-group (r=.804, $p \leq .001$, 95% CI: $.587 \leq \rho \leq .913$).

Parent scores on BAPQ were relatively consistent across subscales as represented in Table 17. Average total scores were 2.57 (SD: .69; theoretical range 1-6), which was lower than recommended cut-offs of 3.15 used to demarcate the BAP (Hurley et al., 2007). Similar to SCQ scores for child participants, observed parent scores did not span the entire possible range of scores which may be captured on the BAPQ; most scores clustered in the lower two thirds of the range. BAPQ scores were found to significantly correlate with child anxiety post-group (r=.589, p=.003<.01, 95% CI: $.234 \leq \rho \leq .805$), but not at pre-group (r=.198, p=.365>.05, 95% CI: $-.233 \leq \rho \leq .564$). Parent trait anxiety and broad autism phenotype characteristics were correlated (r=.528, p=.01≤.01, 95% CI: $.149 \leq \rho \leq .772$). Table 17 contains descriptive statistics for parent

anxiety and broad autism phenotype scores. Table 18 depicts a correlation matrix for the same variables along with parent rated child anxiety.

Table 17 Parent-Variables: Descriptive Statistics

Variable	M(SD)	Observed Range	Theoretical Range
STAI Trait Anxiety	40.78(10.31)	24-63	20-80
STAI State Anxiety	39.09(11.30)	23-65	20-80
BAPQ Summary Score	7.75(2.09)	3.83-11.58	3-18
Subscales:			
Aloof	2.56(.82)	1.08-4.25	1-6
Pragmatic Language	2.53(.78)	1.33-4.17	1-6
Rigid	2.66(.84)	1.33-4	1-6

Note. STAI raw scores represented; n=23; shaded scores were included in the regression analysis.

Table 18 Correlation Table: Parent Variables

	1	2	3	4
1. Pre- Group Child Anxiety	1.00	.564**	.198	.701**
2. Post-Group Child Anxiety		1.00	.589**	.804**
3. Parent BAP Traits			1.00	.528**
4. Parent Trait Anxiety				1.00

** p<.01; raw scores represented; n=23

Regression Analysis: Parent Variables as Predictors

Findings were in support of hypothesis 7, however, only one of the selected predictors was found to be a statistically significant predictor of parent-rated child anxiety at post-treatment. Results from this regression analysis can be found in Table 19. The analyses show that pre-group parent ratings of child anxiety (on the SCAS) explained a statistically significant proportion of the variance in parent rated child anxiety at the end of group (R^2=.318, $F_{1,21}$=9.801, p=.005<.01). Model 2 added parent (trait) anxiety and broad autism phenotype traits, which accounted for an additional 36.9% of the variance in anxiety (ΔR^2=.369, $\Delta F_{2,19}$= 11.21, $p \leq .001$). T tests show that parent trait anxiety was the only statistically significant regression coefficient in the model (parent trait anxiety: β=.613, t_{19}=2.828, p=.011<.05; BAP symptoms: β=.249, t_{19}=1.578, p=.131>.05; SCAS-

pre: β=.085, t_{19}=.455, *p*=.654>.05). Controlling for other variables, each one unit increase in parent trait anxiety, post-group child anxiety increased by .61. Added in block 3, the interaction between parent anxiety and BAP symptoms did not result in a statistically significant increase in explained variance in the outcome variable (SCAS post-anxiety; ΔR^2=.000, ns) and was removed from the model. The full model accounted for 68.7% of the variance in child anxiety outcomes. The overall observed effect size was large (R^2=.687).

Table 19 Hierarchical Multiple Regression Analysis: Parent Variables as Predictors of Post-Group Child Anxiety

Predictor Variable	B	SE B	β	*p*
Step 1				
Constant	8.13	6.30		.21
Pre-Group Child Anxiety	.52	.17	.56	.01
Step 2				
Constant	-12.48	6.45		.07
Pre-Group Child Anxiety	.08	.17	.09	.65
Parent Trait Anxiety	.65	.23	.61	.01
Parent BAP Characteristics	1.30	.82	.25	.13

Note. R^2 = .318 for Step 1; ΔR^2= .369 for Step 2

Post Hoc Power Analysis

Using Cohen's (1988) conventions of .02, .15, and .35 for small, medium, and large effect sizes (f^2), with alpha=.05, power=.8, in the final model with 2 tested predictors and 3 predictors in total, in my final model I would need 550 participants to have the power to detect a small effect, 77 participants to have the power to detect a medium effect, and 36 participants to have the power to detect a large effect. Statistical post hoc power analyses (R^2 deviation from zero) found power of .7 to detect the effect of the covariate (pre-group anxiety; f^2 = .47) at Step 1 with an alpha= .05. Power (R^2 increase) to detect the obtained effects at Step 2 (f^2 = 1.12) at the p < .05 level was .99.

Chapter 4. Discussion

The current investigation into the community effectiveness of the *Facing Your Fears* program (*FYF*; Reaven et al., 2011), a modified group Cognitive Behavioural Therapy for children with ASD, was conducted in a public hospital setting. The primary goals of the study were twofold. The first goal was to evaluate the effectiveness of the treatment in reducing child anxiety at the levels of a) parent (questionnaire) ratings, b) clinician severity ratings (based on parent interview), and c) parent ratings of primary child anxiety treatment target. The second goal was to examine potential predictors of child anxiety treatment outcome including a) amount of homework completion, b) level of clinician-provided parent support during in-session exposure practice, c) parent-child relationship variables (communication and relational frustration), and d) parent personality variables (parent trait anxiety and BAP characteristics).

Referred children with ASD who comprised this treatment sample were a clinically complex group and met criteria for an average of three anxiety disorders at the time of intake. A wide range of anxiety disorders were represented in the sample with specific phobia, generalized anxiety disorder and social phobia being the most common. Children also met criteria for a variety of other comorbid psychiatric conditions, most commonly ADHD as well as behaviour and mood disorders. These findings are comparable to rates of comorbidity observed in other clinical treatment samples (e.g., Hepburn, Stern, Blakely-Smith, Kimel & Reaven 2014). Overall, this level of comorbidity, reflects the nature of clinical service delivery at the community level and underscores the need for effectiveness research that will examine real-world applicability of treatments for this high-needs population.

4.1. Effectiveness of the Group Treatment Program

Findings from the current study are consistent with those from previous evaluations of *FYF* (Reaven et al., 2009; Reaven et al., 2012; Reaven et al., 2015). Overall, children in the current study experienced significant reductions in anxiety after participation in the *FYF* treatment. Hypotheses 1 through 3 were confirmed; significant

decreases in anxiety were observed from pre- to post-treatment at the level of a) parent (questionnaire) ratings of child anxiety, b) clinician severity ratings of child anxiety (based on parent interview), and c) parent ratings of child anxiety for primary treatment targets, which were the focus of exposure treatment during the last 7 weeks of group. Effect sizes related to treatment gains were large across each level of investigation. These effect sizes are comparable to findings from previous literature examining *FYF*, which report medium to large effect sizes (e.g., RCT of *FYF*: Reaven et al., 2012), as well as the general CBT treatment literature with this population (Sukholdolsky et al., 2013).

When anxiety was measured across 4 time points (pre, mid, post, and follow-up), significant treatment gains were observed between pre- and mid-treatment, as well as between post-treatment and follow-up at 6 weeks, indicating treatment gains were not only maintained but that many children continued to improve (based on parent questionnaire ratings) up to 6 weeks after treatment concluded. Mean parent ratings of child anxiety were considered to be in the 'elevated' range (i.e., above 60T) at the time of intake and steadily decreased over the course of treatment and were in the non-clinical range at follow-up (i.e., 6 weeks post treatment). Consistent with this reduction in parent-rated child anxiety, a significant decrease in total clinician severity ratings of child anxiety (across all types of anxiety) based on parent interview was also observed. Whereas children met criteria for on average 3 anxiety disorder diagnoses at the time of intake, this number reduced by 1 after participating in the group.

In line with previous research (e.g., Reaven et al., 2012), despite statistically and clinically significant gains, anxiety did not remit completely for most children who participated in the group. A small portion of children (approximately 20%) no longer met criteria for any anxiety disorder diagnosis at the end of treatment. However, given the clinical severity represented in the sample, the relatively brief duration of treatment (e.g., 14 weeks) in the context of this severity, and the systematic structure in exposure hierarchies (i.e., one fear target was worked on at a time), it was not expected that children would no longer experience any significant anxiety post-treatment. Given practical constraints on the number of variables I chose to focus on, the current study did not identify primary anxiety disorder diagnoses at the time of intake. Therefore, the current research is limited in our ability to draw conclusions about whether or not

children remitted from their most significant anxiety symptoms. It is unclear whether children's symptoms only remitted in the context of anxiety disorders that were related to Fear Tracker targets or whether gains were distributed across all types of anxiety. Additional research should be done to clarify these questions. Further investigation into predictors of treatment outcomes may provide insight into groups of children who may respond differently to group treatment approaches, such as *FYF*.

The current study is among the first to evaluate treatment outcomes at the level of specific anxiety targets within a group treatment setting. Although exposure is a core component of CBT treatment for anxiety, there is debate within the literature regarding the importance and role of habituation in the context of exposure treatment (Benito & Walther, 2015). Previous research has not examined the typical length of time required for habituation in the context of exposure for children with ASD (Reaven & Willar, 2017). Findings from the current study suggest that significant decreases in parent reported child anxiety on primary treatment targets can occur within a relatively short period of time for most children. Although there is no empirical literature examining the Fear Tracker scale, and specifically what can be considered clinically or statistically meaningful change, anecdotal observations can allow for additional context to understand the data. In the case of the current sample, not all children were found to experience treatment gains within the 7-week period, that is some children experienced only small decreases in parent reported child anxiety pertaining to primary treatment targets. Nevertheless, a substantial majority of parent-rated child anxiety for primary treatment targets improved.

Psychoeducation along with in-session activities allowed for the time for parent-child pairs to operationalize, to some degree, what each 'level' of anxiety looks like for the child (e.g., what children say, do, look like when at each level). Nevertheless, as with any self-report rating scale, there is naturally some subjectivity involved in fear-tracker ratings. With descriptive ranges on the 'stress-o-meter' captured within roughly two-point differences in anxiety ratings, a two-point change in anxiety will capture a qualitatively descriptive difference in anxiety ratings (i.e., change from high anxiety captured by the 'red zone' to moderate anxiety captured by the 'yellow zone'; or from the 'yellow zone', to low anxiety captured by the 'green zone'). Based on clinical and anecdotal observations after facilitating many *FYF* groups, without data to empirically

evaluate clinically meaningful changes in Fear Tracker ratings over the course of the group, a two-point difference seems to capture clinically meaningful change in anxiety ratings. However, a 3-point difference may be a more conservative estimate. Using this standard, most (69%) of children were observed to improve (by parent report) by 2 points and more conservatively, a substantial portion (43%) improved by 3 points.

Importantly, no children were observed to worsen in terms of their anxiety target ratings during exposure treatment. As is common in the context of treatment research, a small portion of the sample (n=4) did not improve. These children tended to have high levels of behaviour challenges (e.g., refusal and/or oppositionality) as expressed in the context of in-session exposure practices. Each of these children also met criteria for ADHD (with a severity rating of 6 or higher out of 8 on the ADIS-IV). However, there were other children for whom parent ratings of primary anxiety targets improved, who also experienced behavioural challenges and who had ADHD. This suggests that the presence of behavioural dysregulation does not completely explain failure to improve in this subgroup of children. However, the degree of oppositionality (2 of the 4 children met criteria for Oppositional Defiant Disorder with severity ratings of 6 or higher out of 8 on the ADIS-IV) and persistent behaviour dysregulation experienced in this subgroup was much higher than for children who experienced improvement in primary anxiety target ratings as rated by parents. Two of the children who did not improve had also met criteria for a major depressive disorder within the last 6 months (at a severity level of 6 or higher out of 8 on the ADIS-IV), which may also have had an impact on group performance and outcomes.

Parent-child pairs tracked 5 of the child's most notable or interfering fears across the course of the group. Of these 5 fears, parent-child pairs selected one primary target for exposure treatment. Parents were encouraged to allow children to influence the selection of the individual anxiety target so as to increase child buy-in related to tackling difficult fears. Parent-child pairs were advised to consider starting with a moderately-high target for exposure practice, not necessarily a target that they considered to be the 'highest' or most challenging fear on their list. The intention behind this instruction was to set families up for success in learning the framework of exposure practice in a manner that would allow children to experience some improvement within a relatively short period of time. Given that parents were asked to engage in exposure practice at home

within the first week of starting in-session exposure practice in group, starting with a significant but slightly more manageable fear was also designed to set parents up for success in independent practice. Nevertheless, there was a range (i.e., 4-8) represented in initial ratings for primary treatment targets, with most subjects selecting 'red zone' (i.e., ratings between 6 and 8) targets, even if they were not considered by parent-child pairs to be 'the most challenging'. This range was also reflected in ratings for children who did not improve over the course of the group.

Given that researchers know little about the significance or process of habituation for children with ASD (Reaven & Willar, 2017), it is possible that some children need more time to habituate to feared stimuli than others. However, it is unclear how much emphasis to place on habituation in the context of exposure practice for this group, or whether an inhibitory learning approach (e.g., Abramowitz & Arch, 2014) may better conceptualize the function of treatment gains. Further investigation into the relative importance and process of habituation in children with ASD in the context of exposure treatment, will help disentangle factors that may be relevant to selecting treatment targets and supporting families in the implementation of exposure treatments. Overall, parent-rated child anxiety for primary treatment targets were maintained from post-treatment to 6-week follow-up. This suggests that treatment gains were relatively stable and were maintained without the structure of weekly group meetings, although a few families reported continuing to engage in exposure practice post-group. However, data were not collected on this matter, thus, conclusions are speculative.

4.2. Predictors of Treatment Outcomes

4.2.1. Amount of Home Practice Exposures

Results did not support the hypothesis that the amount of homework completion, including worksheets/activities and home-based exposure practice, would predict parent (questionnaire) ratings of post-group child anxiety after controlling for pre-group child anxiety. Although it may be the case that the amount of home-practice completed is not relevant for predicting treatment outcomes in this context, there are several limitations and measurement weaknesses in the current study's evaluation of home practice that

should be considered when evaluating these results. Firstly, home-practice was self-reported by children (with parent support) in the group context at the beginning of each session, without implementation of a formal record sheet to complete at home with each exposure practice.

Given the amount of data collected from parents and children over the course of group, asking parents for additional data collected on a weekly (and possibly daily) basis, solely for research purposes, was decided against in the context of research design discussions. With the group being offered as a clinical service with an optional research component, research decisions that would impact group participants differently (e.g., having only research participants track home practice), or asking clinical group participants track despite this not being a component of the manualized treatment, was avoided. However, basing homework measurement on child/parent recollection in the context of a group homework check-in when time is limited increases the possibility of measurement error.

Ten to fifteen minutes was allotted to homework check-in, requiring a certain degree of expedience in reporting on behalf of children and parents. Considering child communication challenges, this process was somewhat challenging from a data collection perspective and child-report often required a high degree of parent and clinician scaffolding. In some cases, this process may have come at a cost to complete reporting, also contributing to possible measurement error. On occasion, such as in the context of children completing a planned exposure step at school (e.g., step: say hello to a new person in my class), parents were not present for the exposure practice the child was reporting on, and, could not verify or add to the information provided.

In addition, home practice reporting was also limited (by design) to planned home-practice exposures, as opposed to including spontaneous exposures which could occur without warning and may involve very high levels of anxiety because the ‘step’ is not controlled or carefully selected as it is in the context of planned exposure practice. Further, the goal of a spontaneous exposure may be to cope effectively given the circumstances (while adjusting expectations for the child), whereas the goal of a planned exposure involves a behavioural routine of selecting and facing a fear in small steps,

developing self-awareness using an anxiety ranking system (e.g., SUDs using the 'stress-o-meter'), engagement in planned coping skills, as well as habituation.

Since home-practice reporting was completed in a group context it was also vulnerable to social desirability bias. This could have been particularly true for children (or parents) with social anxiety for whom non-conformity or reporting failure to follow-through may have been particularly anxiety producing. Even when small steps are selected for exposure practices, they can often be challenging for children as they are systematically challenging themselves to face often well-established fears. During the last four weeks of group, in order to provide some incentive for children to complete home-practice exposures a small edible reward (i.e., small treat) was provided to children who followed through with completing at least one home practice step during the week. Offering this incentive did not result in all children completing exposure practices each week as it was not uncommon for a child to miss out on the treat because they did not complete their home-practice. However, there is a possibility that reporting could have been influenced, given the possibility of acquiring incentive.

In light of the limitations described above, future research would be improved by considering data collection methods that a) include a formal record sheet for child-parent pairs to complete during/after home practice exposures; b) allow for sufficient time to report all aspects of home practice; c) require parents to verify or monitor each planned exposure practice (and potentially allows for unmonitored spontaneous exposure practice, such as would be done during school hours); d) measure both spontaneous and planned exposure practice during the week; e) are completed individually with a clinician as opposed to in front of the group in order to decrease social desirability bias; and f) limit incentives provided to those delivered immediately after exposure practice targeting brave behaviours. As a potential next step in evaluating home practice exposures conducted by parent-child pairs, the writer has developed an app to help families track and report on home practice that is expected to be evaluated in future community-based research.

Beyond addressing measurement issues, future research should examine factors that impact aspects of treatment adherence such as completion of home-practice. Parent stress, family composition (i.e., single parent status, multiple children with

disabilities), SES, and other stressors may impact a family's ability to reliably complete treatment content outside of sessions. Findings from research with typically developing children have found certain family characteristics to be associated with lower caregiver involvement and poorer treatment adherence in the context of psychotherapy (Weisz et al., 2013), and these factors should be investigated within the context of treatment for anxiety in children with ASD as well. This may be particularly important in the context of community research with complex and heterogeneous family compositions and environmental situations and may also have implications for treatment delivery.

Despite measurement concerns around quantifying home-practice, results from a clinical evaluation using the same dataset as used in the current study found parents, children and clinicians agreed that graded exposure was one of the most helpful components of the group (Johnston et al., 2018). This is consistent with recent research investigating acceptability and treatment outcomes for the *FYF* group. Researchers found exposure sessions to be highly acceptable (even more so than psychoeducation sessions) as rated by youth and parents, and also found higher exposure acceptability ratings to predict lower child anxiety levels after treatment (Walsh et al., 2018). However, most group treatments for children with ASD do not incorporate an exposure component (see introduction section 1.2.3). Given the potential importance of exposure, future research needs to further investigate utilization and measurement of home practice in the context of group treatment, factors that impact feasibility of homework completion, the differential importance of in-session versus home-based exposure, as well as the content of home practice exposures.

It may be that *quality* over and above amount of home practice is most important in this context, especially in the case of exposure treatments. Parents in the early stages of learning and understanding how to plan and implement exposure hierarchies with their children at home are likely to vary considerably in their baseline skills as well as in their skill development. Thus, factors such as whether or not appropriate steps are selected, fear ratings are accurately solicited/identified, the focus remains on fear tolerance versus fear reduction, the length of the exposure is appropriate, and appropriate coping is implemented, may be more important than simply completing an exposure. The quality of exposure practices, as directed by parents, may be reflected in the amount of support required by parents in the context of in-session exposure

practices (which is discussed in the next section). As per the rating criteria, parents with lower support ratings were those who demonstrated more independence in planning and implementation of exposures (i.e., completed prescribed steps) with their child in session. Assuming that exposure practices in-session can be generalized to represent skills parents can implement at home, level of support may be a rough proxy for measuring parent skill acquisition. Results pertaining to level of support are discussed in the following section.

4.2.2. Clinician-Provided Support for In-Session Exposures

Results support the hypothesis that clinician-provided parent support for in-session exposures would predict parent (questionnaire) ratings of post-group child anxiety. After controlling for pre-group anxiety, clinician support ratings accounted for an additional 30.8% of the variance in post-group anxiety ratings. In the final model, both pre-group child anxiety levels and clinician support were statistically significant predictors of post-group child anxiety.

Support ratings were observed to gradually decrease over the course of the group, presumably as parents became more skilled and independent in facilitating exposure practices with their child. Nearly all parents received a higher degree of clinician support in the beginning of parent-led exposure sessions (i.e., most ratings were between 4 and 5 out of 5), regardless of how anxious their child was. This is likely due to the novelty of the approach and related CBT skills that parents were required to learn and demonstrate. Towards the end of group, parents tended to require minor to moderate levels of support to facilitate exposure practices. Some parents were also implementing exposures largely independently at the end of treatment.

When considering clinician support as reflective of parent skill acquisition (since support was primarily conditional on parent skill demonstration), results are consistent with the estimation that the quality of the exposure treatment being delivered by parents is important in the prediction of child treatment outcomes. However, further research would be needed to clarify the relationship between parent skill development and child treatment outcomes, and to better understand the developmental progression of parents as co-therapists. The pathway of parent skill acquisition may be important to examine

with the involvement of parents as co-therapists, especially when they are working independently in the context of home-practice exposures. Obtaining a better understanding of the development of parent CBT skills in the context of treatment and identifying which skills may require more clinician scaffolding and parent-group teaching may help clinicians and treatment developers adapt parent sessions so as to support parent learning in a targeted manner. If parents were systematically finding certain aspects of the CBT treatment more difficult to implement, more didactic parent training or individual coaching sessions pertaining to these more challenging aspects of treatment could be beneficial.

Future research may also consider examining the relationships between parent skill acquisition and other variables such as parent-child communication, child behaviour, and parent anxiety. For example, if it was discovered that highly anxious parents found exposures more difficult to implement (e.g., were slower to develop the skills or found certain aspects more challenging), pre-screening could help identify these parents and appropriate adaptations could be made to better support this sub-group of parents (e.g., more one-on-one support, bonus sessions, referrals for treatment as appropriate). Although the current sample is too small to statistically analyze different trajectories of clinician-rated parent support (or related increases in parent skill acquisition), an examination of treatment progress for parents in this regard with larger samples may help identify subgroups of parent-child pairs who require additional supports during specific weeks of treatment.

4.2.3. Parent-Child Relationship Qualities

The current study hypothesized that parent-child relationship variables, such as communication and relational frustration, would predict parent (questionnaire) ratings of post-group child anxiety after controlling for pre-group child anxiety. The final model including both predictors was statistically significant and accounted for an additional 17.2% of the variance in post-group anxiety. However, only communication and pre-group anxiety were statistically significant predictors in a model containing pre-group child anxiety and parental BAP characteristics. Overall, higher (i.e., better)

communication scores were found to be associated with lower levels of post-group child anxiety.

As a reminder for the reader, the communication subscale on the PRQ measures the "quality of information exchanged between the parent and child and the parent's listening skills that promote a trusting relationship" (p. 3; Kamphaus & Reynolds, 2006). In review of the items on this scale, it contains questions that inquire about the nature of communication between the child and parent for things that happen in the absence of the parent (e.g., at school, with peers) and the child's ability and openness to report on their daily life (e.g., activities at school), within the context of peer relationships (e.g., activities with friends), and in the context of problem-solving (e.g., informing parents about problems). To a more minor extent, questions also reflect verbally expressed emotional intimacy between the parent and child, as well as how well parents listen to what their child has to say. The questions do not specify that children need to volunteer the information to their parents (e.g., what they did that day at school). Therefore, responses may capture both parent solicited information as well as child volunteered information.

Although this scale measures communication skills that children with autism can sometimes have difficulties with (e.g., historical reporting), there was a great deal of variability in this sample (i.e., between the 'lower extreme' and 'significantly above average'). The average score fell in the 'significantly below average range', which is not unexpected given the sample consists of children on the autism spectrum. ASD is characterized by significant challenges in social communication ranging from difficulties engaging in reciprocal conversation and sharing of interests and emotional experiences, to challenges developing and maintaining social relationships.

On the surface, it would be reasonable to assume that higher communication scores would be associated with qualities describing higher functioning individuals (e.g., higher IQ scores and fewer autism symptoms). However, two supplemental correlational data analyses examining the relationships between communication and IQ, as well as communication and autism symptoms, were not statistically significant. Therefore, communication in this sample as measured by the PRQ may be capturing parent-child interactions that may be distributed across levels of IQ and autism severity. The items

that comprise the communication scale do not necessarily involve the ability to engage in socially nuanced conversation with others, but rather captures the quality of information shared between child and parent about a variety of aspects of daily life in the context of a close, trusting relationship.

A goal of the current research is to identify factors that predict outcomes in order to better screen and identify parent-child pairs who will benefit from the group and those who may benefit from treatment adaptations and additional supports. According to the current results, parent-child pairs who have better daily communication (reflecting a higher "quality of information exchanged") and closer more trusting relationships, are more likely to have lower anxiety post-treatment when controlling for levels of pre-treatment anxiety. Without additional research it is not possible to determine whether or not attempts to improve parent-child communication would lead to improved treatment outcomes. However, it may be helpful to screen for parent-child communication prior to group in order to identify which pairs may benefit from additional clinician support in group and particularly in the context of exposure homework planning.

In the final regression model, relational frustration (blocked with communication) was not a statistically significant predictor of parent ratings of post-group child anxiety after controlling for pre-group child anxiety. However, relational frustration was found to significantly positively correlate with parent rated pre-group child anxiety symptoms. That is, higher relational frustration was associated with higher parent-reported child anxiety symptoms at the time of group intake. There was large variability in parents report of relational frustration in the current sample with scores ranging from 'significantly below average' to what is considered to be the 'upper extreme'. Results suggest that despite sometimes high levels of relational frustration within a subgroup of parent-child pairs, children were still able to benefit from the group treatment.

4.2.4. Parent Personality Characteristics

It was hypothesized that parent personality variables, including broad autism phenotype characteristics and parent trait anxiety, would predict parent (questionnaire) ratings of post-group child anxiety after controlling for pre-group child anxiety. The final model including both predictors was statistically significant and accounted for an

additional 36.9% of the variance in post-group anxiety. However, parent trait anxiety was the only statistically significant regression coefficient in the model. Overall, these findings are consistent with the hypothesis that parent anxiety plays an important role in the context of anxiety-related treatment outcomes for children participating in the *FYF* program. Although most parents in the current sample scored below the indicated BAP cut off, higher BAP characteristics were significantly positively associated with higher rates of parent ratings of child anxiety at baseline. However, the current results do not support the hypothesis that BAP traits in parents predict child treatment outcomes, after controlling for pre-group parent rated child anxiety.

Although parent anxiety ranged considerably within the sample, a large proportion of parents scored in the borderline to clinical range. Notably, 35% percent of the parent trait anxiety scores fell 3 standard deviations above the mean, indicating clinically significant anxiety. Average scores for the current sample were much higher than for a non-clinical sample of adults reported by the test developers (Speilberger, 1983). Parent trait anxiety scores from the current sample were also higher than similar research done with parents of children with ASD (Connor et al., 2013; Reaven et al., 2015). Contrary from findings from these papers, parent trait anxiety in the current sample was significantly positively correlated with child anxiety at baseline and post-group.

A link between parent anxiety and child anxiety is not surprising given the genetic and environmental (e.g., modeled) transmission of anxiety within families. Parents of children with autism have been found to have higher rates of stress (Bonis, 2016; Hayes & Watson, 2013), lower quality of life (Vasilopoulou & Nisbet, 2016), lower subjective well-being and increased physiological stress (Costa, Steffgen, & Ferring, 2017) as compared to parents of typically developing children. Intellectual functioning in children with ASD without intellectual disability was found not to compensate for the stress that comes with parenting children with ASD (Rao & Bidel, 2009). The higher caregiver burden and stress combined with challenges associated with parenting a child with special needs (e.g., lower marital satisfaction; Sim, Cordier, Vaz, & Falkmer, 2016; behavioural difficulties; Sikora et al., 2013; lower social support, Brown, MacAdam-Crisp, Wang, & Iarocci, 2006) may put parents at higher risk for psychiatric symptoms, including anxiety.

As found in a previous research study (Connor et al., 2013), it is possible that highly anxious parents may have exhibited a response bias by globally reporting more severe symptoms for their children. However, equally likely is that some of these parents may be more able to accurately report their child's symptoms or be more attuned to their child's anxiety based on their own experience with anxiety (Connor et al., 2013). Future research with treatment samples should examine parent reporting across symptom domains (e.g., depression and externalizing symptoms) and also compare parent ratings with child ratings in order to explore parent rating more thoroughly.

Contrary to previous CBT-based treatment research with children with ASD (Van Steensel et al., 2017), parental anxiety in the current study was found to predict child treatment outcomes. The current investigation included different measurement tools and treatment protocols as well as the inclusion of both mothers and fathers, which could be responsible for the differing results. Previous research has found decreases in anxiety for parents of child treatment responders as compared to non-responders (Connor et al., 2013; Reaven et al., 2015). Although the *FYF* treatment program discusses some aspects of parental anxiety (i.e., week 5: adaptive and excessive protection in the context of supporting children with developmental disabilities to face fears), it does not specifically target many other aspects of parent anxiety. Nevertheless, parents attending weekly sessions with their children may also have indirectly benefited from the treatment and this hypothesis should be examined in future research. Regardless of whether or not parents benefit from the treatment too, the current results indicate that parent anxiety plays a significant role in treatment outcomes for children attending the *FYF* group. For this reason, it may be beneficial to screen for high levels of parent anxiety during the intake process in order to provide appropriate parent referral recommendations to address their own anxiety prior to group entry.

It may also be beneficial to pre-identify parents with high anxiety ratings who may benefit from additional leader support during group activities which may trigger their own anxiety, such as in-session exposures when parent and child fears overlap. Parents who share similar fears as their child (e.g., social or specific fears), especially when they are selected as child target fears (i.e., addressed in-session exposure practices), may indirectly be requested to face their own fears while in a supportive role for their child. In the context of parent break-out sessions, the concepts of adaptive and excessive

protection are introduced and discussed as outlined in the treatment manual (Reaven et al., 2011). Given realistic challenges faced by their children in multiple domains (e.g., physical, social, developmental, and emotional), adaptive protection refers to appropriate parental shielding of children in order to gradually expose them to environmental challenges so as to set them up for success. Alternatively, excessive protection refers to unnecessary parental safeguarding behaviours that limit a child's exposure to anxiety providing environments that limit their opportunity learn and implement appropriate coping strategies (Reaven et al., 2011). Parents with higher levels of anxiety may engage in more excessive protection of their children and find exposure practice to be more challenging, especially when their child is facing fears similar to their own. Improved tracking of parent fears as they relate to child fears may help clarify the impact of parent anxiety on child treatment outcomes as they pertain directly to exposure targets.

Research aimed at improving treatment outcomes with TD children have included supports for parent anxiety as part of treatment and found increased efficacy of the treatment in children with anxious parents (Cobham, Dadds, & Spence, 1998). However, results have been mixed; in another study, treating maternal anxiety did not result in improved child outcomes (Creswell, Willetts, Murray, Singhal, & Cooper, 2008). Nevertheless, further investigation into the possible addition of parent group components aimed at addressing parent anxiety could also be explored in the context of the *FYF* treatment model.

4.3. Limitations

As is common in clinical community research, there are a number of limitations to the current study. The research was quasi-experimental and is thus vulnerable to selection issues (e.g., self-selection, motivation, history, etc.). Without a waitlist control group, the current study is unable to determine whether the effects observed are the result of the impact of the treatment and not other factors (e.g., passage of time, expectancy bias, nonspecific clinical factors such as group attendance and access to clinicians, environmental changes such as in parental communication and responding, etc.). Overall, the lack of a waitlist control group (ideally, a randomized waitlist control)

limits the generalizability of the results. Nevertheless, the current findings are consistent with experimental research conducted in highly controlled research settings using waitlist and TAU control groups (Reaven et al., 2009; Reaven et al., 2012). Since previous research examining this program has already been conducted with waitlist control groups and an ideal next step would be to compare individual CBT to group-based CBT.

The study is also limited by a relatively small sample size which limited the type of analyses that were selected and limited the power to detect small or medium effects. Additional community research with larger samples will allow for more subgroup analyses as well as the inclusion of additional covariates and predictors (e.g., depression). The study design was also limited (by treatment design) to one 6-week follow up session and additional long-term follow up (e.g., 12-month) is necessary to determine the stability of observed treatment gains. Further, given restraints on clinical resources, post-treatment assessments were not all conducted with assessors blind to pre-treatment diagnostic status and history. This would have significantly improved the study design by restricting potential influence of bias. Finally, treatment fidelity was based on clinician-report using a checklist, as opposed to videotaped treatment sessions that could be rated and coded for adherence by blind raters, which would have been a more rigorous method of tracking fidelity.

The current study also did not take into account child self-reported symptoms, which may be particularly appropriate in children with ASD without intellectual disability (Blakely-Smith, Reaven, Ridge, & Hepburn, 2012). As a result of perceived impairments in social-emotional understanding, self-awareness, and communication abilities, children with autism have been characterized as being less reliable reporters of their own symptoms. However, research examining the SCAS in a similarly aged sample of children with ASD, suggests that child-reported anxiety had moderate agreement with caregiver report (Magiati, Chan, Tan, & Poon, 2014). Nevertheless, exclusive reliance on parent-report depends on children being able to express (either verbally or non-verbally) their emotions to parents as well as parental abilities to ‘read’ and accurately interpret and attribute child symptoms, which may be especially challenging for parents of children with ASD (e.g., atypical symptoms, child communication difficulties, parental BAP symptoms). Data collected within the broader scope of the current study included

both child- and parent-report of child anxiety symptoms and future examinations of child report data are planned.

4.4. Conclusion

Results from the current study are consistent with previous research demonstrating the effectiveness of the *FYF* treatment program for children with ASD. Significant decreases in anxiety were observed from pre- to post-treatment on parent (questionnaire) ratings of child anxiety, clinician severity ratings of child anxiety based on parent interview, and on parent ratings of child anxiety pertaining to primary individual treatment targets. As a unique contribution, the current study examined a selection of hypothesized predictors of treatment outcomes pertaining to parent ratings of child anxiety. In separate analyses, after controlling for pre-treatment levels of child anxiety, clinician-provided parent support during in-session exposures, parent-child communication, and parent self-reported trait anxiety were found to predict post-treatment child anxiety symptoms. There are several limitations to the current research including a quasi-experimental design, lack of a waitlist control group, small sample size, lack of blind raters, and exclusive use of parent-report. However, implementing treatments in real-world environments has been identified as an important priority for researchers in the area of anxiety in youth with ASD (Vasa et al., 2018). The current sample was highly heterogeneous and clinically complex, and thus successfully represented 'real-life' conditions typical of community care settings. The current results contribute to the growing collection of literature examining evidence-based treatments at the community level.

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Appendix A: Parent Consent

Parent/Legal Guardian Information and Consent Form

Innovations in assessment and treatment of anxiety in children with autism spectrum disorders: What works and why?

Principal Investigator: Kristen McFee, PhD
Psychologist, Outpatient Psychiatry
British Columbia Children's Hospital
Contact: […]

Co-Investigators: Melanie McConnell, PhD
Psychologist, Outpatient Psychiatry
British Columbia Children's Hospital
Contact: […]

Dr. Grace Iarocci
Professor of Psychology
Director of the Autism and Developmental Disorders Lab
Simon Fraser University

Introduction
You and your child are being invited to take part in a study about anxiety in children with autism. Your participation is entirely voluntary, so it is up to you to decide whether or not to take part in this study. Before you decide, it is important for you to understand what the research involves. This consent form will tell you about the study, why the research is being done, what will happen during the study, and the possible benefits, risks, and discomforts.

Your Participation is Voluntary
If you wish to participate, you will be asked to sign this form. If you decide to take part in this study, you are free to withdraw at any time and without giving any reasons for your decisions. If you do not wish to participate, you do not have to provide any reason for your decision not to participate. Your decision will not affect your/your child's access to medical care. Your child can participate in the group even if you decide not to participate in the research study.

What is the Purpose of the Study?
We want to gain a better understanding of the best ways to assess anxiety in children with high-functioning autism or Asperger's syndrome. We also want to identify which children with high-functioning autism or Asperger's syndrome respond best to group therapy for anxiety and why.

Study Procedures
If eligible, you and your child will be participating in the "Facing Your Fears" group for treatment of your child's anxiety, even if you decide not to participate in this research study. The group treatment is not part of the research study. A number of the questionnaires and interviews completed are part of our standard intake assessment and are completed regardless of whether you decide to participate in the research study. For instance, the interview and questionnaires that you complete about your child's anxiety during the intake assessment, a questionnaire your child completes about his/her anxiety and, if needed, a brief assessment of your child's thinking skills are all part of our standard clinical assessment. These measures are completed to determine whether your child is a good fit for the group and to better understand his/her symptoms of anxiety.

The goal is for to thirty families to participate in this study over the next two years. Those families who participate in the study agree to the standard clinical assessments described above being used for research purposes. You will also complete additional questionnaires and interviews that will help us

understand more about assessing and treating anxiety in children with autism spectrum disorders. If you and your child participate in this study, it will involve the following:

Waitlist: If you are invited and agree to participate in this research while your child waits on the waitlist, you will be asked to complete two questionnaires. One will ask about demographic information and the other will ask about your child's symptoms of anxiety. This will take about 15-20 minutes for you to complete and will be done twice, 14 weeks apart. It is important to be aware that agreeing to participate in this research while on the waitlist will not increase the time your child waits until s/he can participate in the group.

Prior to treatment: Your child will be asked questions about how much he/she worries and about bodily symptoms of anxiety (e.g., upset stomach). You will be asked to complete additional questionnaires regarding your child's behaviour, anxiety, and autism symptoms, as well as your own anxiety, stress, and parenting experiences. This will take about 1 hour for you and about 15 minutes for your child.

Mid-way through treatment: At the seventh group therapy session, you will be asked to complete a questionnaire about your child's anxiety. The group leaders will help your child complete three questionnaires about his/her anxiety. This will take about 30 minutes.

End of treatment: At the last group therapy session, you will be asked to complete questionnaires about your child's anxiety, behaviour and symptoms of autism. The group leaders will help your child complete three questionnaires about his/her anxiety, and you will be asked to complete questionnaires about your own anxiety, stress, personality, and parenting experiences. This will take about 45 minutes. Within two weeks of the last session, you will attend a 1-1/2-hour appointment, at which time you will be interviewed about your child's anxiety.

Follow-up/Booster session: Six weeks after the therapy group has ended, you and your child will be asked to attend a follow-up/booster session. All group participants will attend this session regardless of whether they decide to participate in research. If you are participating in the study, you will be asked to complete a questionnaire about your child's anxiety. The group leaders will also help your child complete three questionnaires about his/her anxiety. This will take about 30 minutes.

Potential Risks
There are no known risks as the questions asked during the study are similar to the questions that would be asked by a mental health professional assessing or treating your child's anxiety. It is possible that answering some of the questions about how you feel may make you or your child uncomfortable or cause some anxiety. Participants are not required to answer any questions that they do not feel comfortable answering.

Potential Benefits
The information we learn from this study will help us better understand how to assess and treat anxiety in children with autism.

Confidentiality
Information to be used for this research study will be recorded on a summary data form that will be identified only by code number and kept in a locked filing cabinet. Identifying information will not be included on questionnaires used for research purposes. Each participant will be assigned a research number. You and your child will not be identified by name in any reports of the completed study.

Funding
The study is being funded by a British Columbia Mental Health and Substance Use Services research grant.

Who will have access to the data?
No one other than Dr. McConnell, Dr. McFee, supervised research assistants, and graduate students under the supervision of Dr. McFee or McConnell will have access to your name or personal information.

Collected anonymous data may be used for graduate student theses or dissertations. The data also may be reported in a graduate thesis, presentation, publication, or future grant applications.

How long will the data be kept?
The summary and data forms will be kept in the Neuropsychiatry research office for 5 years and then confidentially destroyed.

Compensation
You and your child will not be paid to participate in this study.

Contact for information about the study
If you have any questions or would like additional information about this study, you may contact Dr. McFee at […]

Contact for concerns about the rights of research subjects
If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line at the UBC Office of Research Services at 604-822-8598 or toll-free at 1-877-822-8598 or via email at RSIL@ors.ubc.ca.

Consent
Participation in this study is voluntary. You and/or your child may refuse to participate or withdraw from the study at any time. If you and/or your child decide to refuse or withdraw from the study, it will not affect your access to services from BC Children's Hospital.

Your signature below indicates that you have received a signed and dated copy of this consent form for your own records.

I consent/I do not consent (circle) to my participating in this study.

I consent/I do not consent (circle one) to my child's participation in this study.

_____ _____
Parent or guardian signature Date

_____
Printed name of parent or guardian

Appendix B: Invitation Letter

Dear Parents/Guardians,

The Facing Your Fears program is a cognitive behaviour therapy (CBT) treatment delivered in a group format for children with autism and anxiety. There is a growing body of evidence that shows that cognitive behavioural therapy (CBT) groups are effective in treating anxiety in children with autism. However, this is a relatively new treatment format that researchers still need to learn more about. Clinicians at this hospital are among the few treatment providers in Canada that are examining this approach to treatment.

We are interested in better understanding how effective this treatment is, who it is most helpful for, and why. One way we can assess this is to gather information on children who are on a waitlist and compare it to children who are participating in the group. This will help us determine how well the treatment works for children in the group. We are also interested in learning more about which factors lead to children benefiting most from the group, so we are also collecting some information from parents. If you choose to participate, you will be asked to complete some questionnaires regarding your child's behaviour, anxiety, and autism symptoms, as well as your own anxiety, stress, personality, and parenting experiences.

We would like to invite you to take part in the study we are running that will help us understand more about assessing and treating anxiety in children with autism. Participation will include:

If you have been invited and agree to participate in a waitlist condition, this would involve completing 2 questionnaires and then completing them again 14 weeks later. The questionnaires ask about some family demographic information and about your child's anxiety level before they participate in the group. We would send these questionnaires to you and do not require you to come to the hospital to complete them. After the waitlist period, you and your child will be invited back for an intake appointment for the group.

Allowing the research team to use information collected before group starts (at the intake appointment), halfway through group (week 7), at the end of group (week 14), and at the booster session (6 weeks after group ends). These assessments are completed with **all** families participating in the group (even those who do not participate in research). Therefore, there is **no additional time required** for this portion of the research.

Consenting to the research would allow us to use the information you provide as part of the standard clinical protocol for the group. The assessments include questionnaires that
you and your child will complete, your responses to an interview (done at intake and the end of group), and results from screening your child`s thinking skills, if necessary.

In addition to the usual intake assessment that all families complete, for families participating in research, parents complete some questionnaires (which takes approximately 45 minutes).The extra questionnaires would be completed at the same time as the intake and post-group assessment appointments, so it doesn`t require an extra trip to the hospital.

Your participation in the study is completely voluntary and it will not affect whether you can participate in the group or access other services at BC Children's Hospital. If you have any questions about this study please contact Dr. Melanie McConnell at […]

Sincerely,

The Facing Your Fears Research Team

Appendix C: SCAS, Parent Report

SPENCE CHILDREN'S ANXIETY SCALE
(Parent Report)

Your Name: _____ **Date:** _____

Your Child's Name: _____

BELOW IS A LIST OF ITEMS THAT DESCRIBE CHILDREN. FOR EACH ITEM PLEASE CIRCLE THE RESPONSE THAT BEST DESCRIBES YOUR CHILD. PLEASE ANSWER ALL THE ITEMS.

1.	My child worries about things.....	Never	Sometimes	Often	Always
2.	My child is scared of the dark.....	Never	Sometimes	Often	Always
3.	When my child has a problem, s(he) complains of having a funny feeling in his / her stomach	Never	Sometimes	Often	Always
4.	My child complains of feeling afraid.....	Never	Sometimes	Often	Always
5.	My child would feel afraid of being on his/her own at home.....	Never	Sometimes	Often	Always
6.	My child is scared when s(he) has to take a test.....	Never	Sometimes	Often	Always
7.	My child is afraid when (s)he has to use public toilets or bathrooms.....	Never	Sometimes	Often	Always
8.	My child worries about being away from us / me.....	Never	Sometimes	Often	Always
9.	My child feels afraid that (s)he will make a fool of him/herself in front of people.....	Never	Sometimes	Often	Always
10.	My child worries that (s)he will do badly at school.....	Never	Sometimes	Often	Always
11.	My child worries that something awful will happen to someone in our family.....	Never	Sometimes	Often	Always
12.	My child complains of suddenly feeling as if (s)he can't breathe when there is no reason for this.....	Never	Sometimes	Often	Always
13.	My child has to keep checking that (s)he has done things right (like the switch is off, or the door is locked)..	Never	Sometimes	Often	Always
14.	My child is scared if (s)he has to sleep on his/her own.....	Never	Sometimes	Often	Always
15.	My child has trouble going to school in the mornings because (s)he feels nervous or afraid.....	Never	Sometimes	Often	Always
16.	My child is scared of dogs	Never	Sometimes	Often	Always
17.	My child can't seem to get bad or silly thoughts out of his / her head.....	Never	Sometimes	Often	Always
18.	When my child has a problem, s(he) complains of his/her heart beating really fast.....	Never	Sometimes	Often	Always

19.	My child suddenly starts to tremble or shake when there is no reason for this	Never	Sometimes	Often	Always
20.	My child worries that something bad will happen to him/her	Never	Sometimes	Often	Always
21.	My child is scared of going to the doctor or dentist	Never	Sometimes	Often	Always
22.	When my child has a problem, (s)he feels shaky	Never	Sometimes	Often	Always
23.	My child is scared of heights (eg. being at the top of a cliff)	Never	Sometimes	Often	Always
24.	My child has to think special thoughts (like numbers or words) to stop bad things from happening	Never	Sometimes	Often	Always
25.	My child feels scared if (s)he has to travel in the car, or on a bus or train	Never	Sometimes	Often	Always
26.	My child worries what other people think of him/her	Never	Sometimes	Often	Always
27.	My child is afraid of being in crowded places (like shopping centres, the movies, buses, busy playgrounds)	Never	Sometimes	Often	Always
28	All of a sudden my child feels really scared for no reason at all	Never	Sometimes	Often	Always
29.	My child is scared of insects or spiders	Never	Sometimes	Often	Always
30.	My child complains of suddenly becoming dizzy or faint when there is no reason for this	Never	Sometimes	Often	Always
31.	My child feels afraid when (s)he has to talk in front of the class	Never	Sometimes	Often	Always
32.	My child's complains of his / her heart suddenly starting to beat too quickly for no reason	Never	Sometimes	Often	Always
33.	My child worries that (s)he will suddenly get a scared feeling when there is nothing to be afraid of	Never	Sometimes	Often	Always
34.	My child is afraid of being in small closed places, like tunnels or small rooms	Never	Sometimes	Often	Always
35.	My child has to do some things over and over again (like washing his / her hands, cleaning or putting things in a certain order)	Never	Sometimes	Often	Always
36.	My child gets bothered by bad or silly thoughts or pictures in his/her head	Never	Sometimes	Often	Always
37.	My child has to do certain things in just the right way to stop bad things from happening	Never	Sometimes	Often	Always
38.	My child would feel scared if (s)he had to stay away from home overnight	Never	Sometimes	Often	Always
39.	Is there anything else that your child is really afraid of?	YES	NO		
	Please write down what it is, and fill out how often (s)he is afraid of this thing: _____	Never	Sometimes	Often	Always
	_____	Never	Sometimes	Often	Always
	_____	Never	Sometimes	Often	Always

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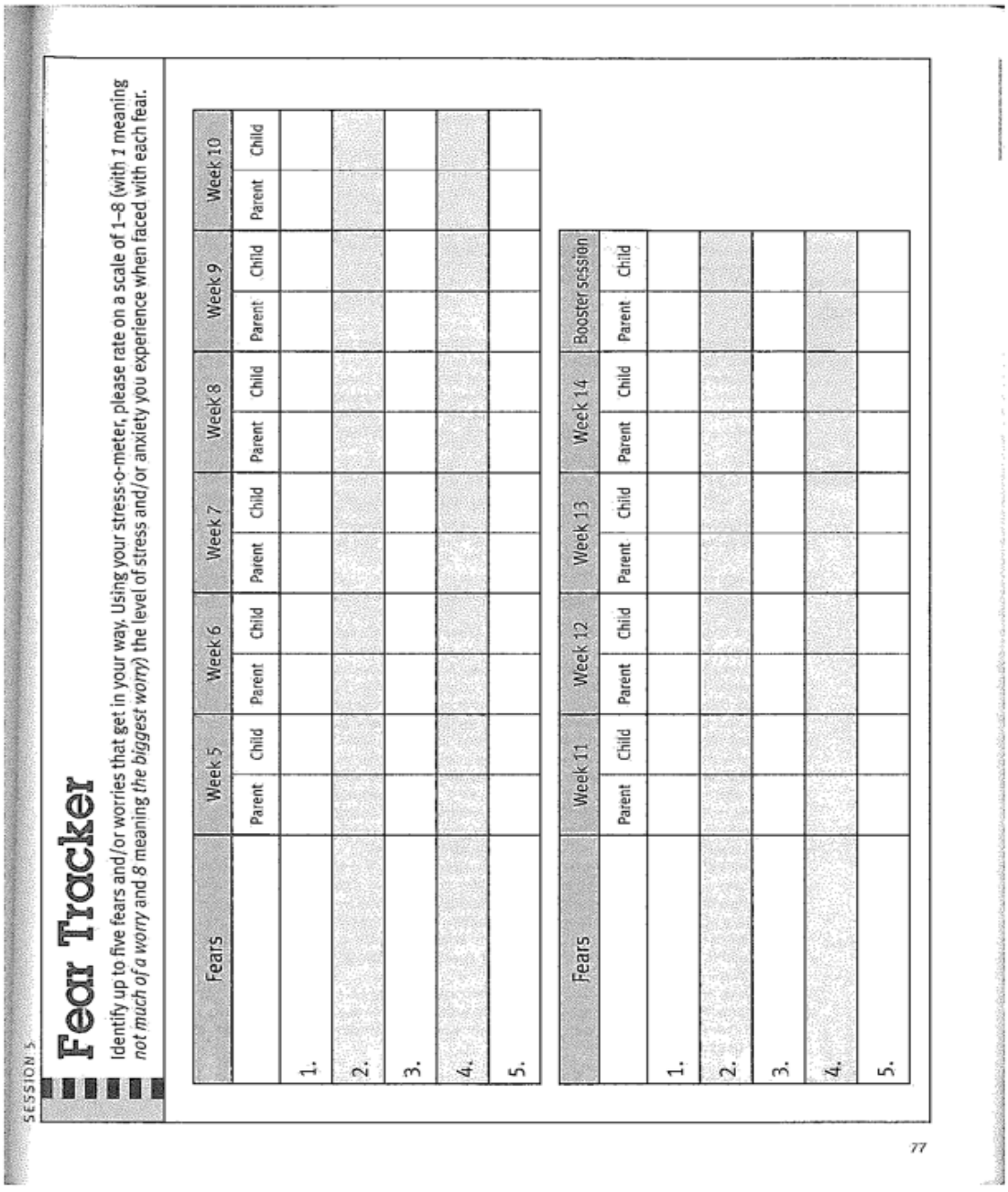
Appendix D: Tracking Sheet for Individual Treatment Targets



SESSION 5

Fear Tracker

Identify up to five fears and/or worries that get in your way. Using your stress-o-meter, please rate on a scale of 1–8 (with *1* meaning *not much of a worry* and *8* meaning *the biggest worry*) the level of stress and/or anxiety you experience when faced with each fear.

Fears	Week 5		Week 6		Week 7		Week 8		Week 9		Week 10	
	Parent	Child	Parent	Child	Parent	Child	Parent	Child	Parent	Child	Parent	Child
1.												
2.												
3.												
4.												
5.												

Fears	Week 11		Week 12		Week 13		Week 14		Booster session	
	Parent	Child	Parent	Child	Parent	Child	Parent	Child	Parent	Child
1.										
2.										
3.										
4.										
5.										

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*Originally published in: Reaven, J., Blakeley-Smith, A., Nichols, S., & Hepburn, S. (2011). Facing Your Fears: Group Therapy for Managing Anxiety in Children with High-Functioning Autism Spectrum Disorders. Paul Brookes Publishing Company, Baltimore. Reproduced with permission of the author.

Appendix E: Homework Completion and Parent Skills Ratings

TREATMENT ADHERENCE RECORD

Complete for Weeks 1-14:
* Planned home practice completed this week (e.g., worksheet(s) &/or exposure step):
_____
_____
* Completed? □ Yes □ No □Partially(explain) _____
* Parent Involvement/monitoring: □ Yes □ No □ Partially (explain) _____
*Comments (barriers identified, details of practice): _____
* Other home practice (exposures, relaxation, etc.) reported to have been completed this week:
□ Yes □ No Comments:_____

Complete for Weeks 7-14:
* Number of exposures completed: 1 2 3 4 5 6 7 Other:_____
* Highest level on stress-o-meter reported: _____

Complete for weeks 7-14: Execution of In-Session Exposure Step or Role-Play by Parent
*Step: _____
* □ In vivo □ Role play □ Other: _____

*Rating for level of support required by parent to implement in-session exposure practice (check box):

□	Leader *modeled a large portion* of the in-session exposure with parent in supportive role	E.g., parent scribes for child, interacts with child during exposure but does not actively lead it, expresses uncertainty about what to do, asks for help, struggles to follow exposure plan
□	Parent *required heavy support* and/or *some modeling* to implement in-session exposure	E.g., leader may have modeled a portion of the exposure, parent requires *frequent prompting/ support to set up* the practice (e.g., picking appropriate exposure step/setting up/using rewards etc.) *AND* requires *continued support to implement exposure practice* (e.g., coaching child on helpful thoughts/deep breathing/length of time for exposure/titrating the exposure/using stress-o-meter etc.)
□	Parent *required moderate support* and *some leader involvement* to implement in-session exposure	E.g., leader provides support/ coaching for parent, parent requires *some support/prompts to set up* the practice (e.g., picking appropriate exposure step/setting up/using rewards etc.) *AND some support/prompts to implement exposure practice* (e.g., coaching child on helpful thoughts/ deep breathing/length of time for exposure/titrating the exposure/using stress-o-meter etc.)
□	Parent *required some minor support* or reminders from leaders to implement in-session exposure	E.g., *parents are mostly independent in coaching/leading exposure practice with some minor reminders from leaders in a supportive capacity* (e.g., actively brainstorming with leaders for step, minor support provided for things like pacing and titrating of exposure steps, or prompts to check in on stress-o-meter ratings throughout the practice)
□	Parent effectively executed in-session exposure *independently with leader supervision (as needed)*	E.g., parents may have received some ideas/input from leaders regarding steps that they could work on and the parent used that information as well as their own information based on what the child did that week at home to come up with and implement an exposure practice largely independently

Appendix F: BAPQ

You are about to fill out a series of statements related to personality and lifestyle.

For each question, circle that answer that best describes how often that statement applies to you.

Many of these questions ask about your interactions with other people. Please think about the way you are with most people, rather than special relationships you may have with spouses or significant others, children, siblings, and parents. Everyone changes over time, which can make it hard to fill out questions about your personality. Think about the way you have been the majority of your adult life, rather than the way you were as a teenager, or times you may have felt different than normal.

You must answer each question, and give only one answer per question. If you are confused, please give it your best guess.

---

1 – Very rarely	2 – Rarely	3 – Occasionally
4 – Somewhat often	5 – Often	6 – Very Often

Questions:

1. I like being around other people	1 2 3 4 5 6
2. I find it hard to get my words out smoothly	1 2 3 4 5 6
3. I am comfortable with unexpected changes in plans	1 2 3 4 5 6
4. It's hard for me to avoid getting sidetracked in conversation	1 2 3 4 5 6
5. I would rather talk to people to get information than to socialize	1 2 3 4 5 6
6. People have to talk me into trying something new	1 2 3 4 5 6
7. I am ''in-tune'' with the other person during conversation***	1 2 3 4 5 6
8. I have to warm myself up to the idea of visiting an unfamiliar place	1 2 3 4 5 6
9. I enjoy being in social situations	1 2 3 4 5 6
10. My voice has a flat or monotone sound to it	1 2 3 4 5 6
11. I feel disconnected or ''out of sync'' in conversations with others***	1 2 3 4 5 6
12. People find it easy to approach me***	1 2 3 4 5 6
13. I feel a strong need for sameness from day to day	1 2 3 4 5 6
14. People ask me to repeat things I've said because they don't understand	1 2 3 4 5 6
15. I am flexible about how things should be done	1 2 3 4 5 6
16. I look forward to situations where I can meet new people	1 2 3 4 5 6
17. I have been told that I talk too much about certain topics	1 2 3 4 5 6
18. When I make conversation it is just to be polite***	1 2 3 4 5 6
19. I look forward to trying new things	1 2 3 4 5 6
20. I speak too loudly or softly	1 2 3 4 5 6
21. I can tell when someone is not interested in what I am saying***	1 2 3 4 5 6
22. I have a hard time dealing with changes in my routine	1 2 3 4 5 6
23. I am good at making small talk***	1 2 3 4 5 6
24. I act very set in my ways	1 2 3 4 5 6

25. I feel like I am really connecting with other people	1 2 3 4 5 6
26. People get frustrated by my unwillingness to bend	1 2 3 4 5 6
27. Conversation bores me***	1 2 3 4 5 6
28. I am warm and friendly in my interactions with others***	1 2 3 4 5 6
29. I leave long pauses in conversation	1 2 3 4 5 6
30. I alter my daily routine by trying something different	1 2 3 4 5 6
31. I prefer to be alone rather than with others	1 2 3 4 5 6
32. I lose track of my original point when talking to people	1 2 3 4 5 6
33. I like to closely follow a routine while working	1 2 3 4 5 6
34. I can tell when it is time to change topics in conversation ***	1 2 3 4 5 6
35. I keep doing things the way I know, even if another way might be better	1 2 3 4 5 6
36. I enjoy chatting with people ***	1 2 3 4 5 6

***Casual interaction with acquaintances, rather than special relationships such as with close friends and family members.

* Originally published in: Hurley, R. E., Losh, M., Parlier, M., Reznick, J. S., & Piven, J. (2007). The Broad Autism Phenotype Questionnaire. *Journal Of Autism And Developmental Disorders, 37*(9), 1679-1690. doi:10.1007/s10803-006-0299-3. Reproduced with permission of the author.

Appendix G: Demographics

Demographic Information Form (Intake)

Child Information

1. What is your child's age (years)? _____

2. What is your child's gender? □ Male □ Female □ Other (explain): _____

3. What is your child's ethnicity? □ African/Black □ Asian □ Caucasian/White
□ Latino/a □ First Nations/Inuit/Metis
□ Other: _____

4. What is the primary language your child speaks? _____
5. What additional languages does your child speak? _____

6. Do you receive funding from the BC Ministry of Children and Family Development Autism Funding Program? □ Yes □ No

7. Does your child take any prescription medications regularly?
□ Yes □ No (if Yes, please list)_____
_____
_____

8. Does your child participate in any type of therapy or tutoring program? (Please describe)
_____
_____
_____
_____

9. Has your child participated in any treatment for anxiety previously or currently? (Please describe and approximate number of treatment sessions)
_____
_____
_____
_____

10. Which adult in the child's life is most responsible for coordinating programming/school decisions etc. for the child? □ Name: □ Both Equally_____

11. Does your child attend school or are they homeschooled? _____

Parent Information

1. Please indicate your relationship to this child:
□ Biological Parent □ Adoptive Parent □ Step-Parent □ Other: _____

2. What is your gender? □ Male □ Female □ Other (explain): _____

3. In what year were you born? _____

4. What is the highest level of education you have completed?
1 2 3 4 5 6 7 8 9 10 11 12 | 13 14 | 15 16 | 17+
(Elementary school) (High school) (College) (University) (Grad.)

5.) What is the primary employment status for the child's parents (please check only one per parent)
*Parent's Name:*_____
□ Unemployed □ Homemaker □ Employed Full-time □ Employed part-time □ Student
□ Other: _____
*Other Parent's Name*_____
□ Unemployed □ Homemaker □ Employed Full-time □ Employed part-time □ Student
□ Other: _____

Family Information

1. How many children (including this child) live in the home? _____

2. Is there more than one child in your family that has been diagnosed with ASD?
□ Yes □ No How many: _____What age(s)? _____ When were they diagnosed? _____

3. If you are raising this child with another adult, what is that adult's relationship to the child?
□ Biological Parent □ Adoptive Parent □ Step-Parent □ Other: _____

4. What is your family's annual income?
□ Below $30,000 □$31,000-$50,000 □ $51,000-$70,000 □ $71,000-$90,000
□ Over $90,000

Intervention Review Form – Post Group

1b. Have there been any changes to your child's medication (e.g., dosage changes, medication stopped, new medication started) while they have been in the Facing Your Fears group?
□ No □ Yes (please describe)
_____
_____

2b. Has your child participated in any type of therapy or tutoring program while participating in the Facing Your Fears group? □ No □ Yes (please describe)
_____
_____

3b. Has your child participated in any treatment for anxiety while participating in the Facing Your Fears group? □ No □ Yes (please describe)
_____
_____

4b. Additional comments: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Intervention Review Form – Booster Session

1c. Have there been any changes to your child's medication (e.g., dosage changes, medication stopped, new medication started) since Week 14 of the Facing Your Fears group?
□ No □ Yes (please describe)

_____
_____

2c. Has your child participated in any type of therapy or tutoring program since Week 14 of the Facing Your Fears group? □ No □ Yes (please describe)

_____
_____

3c. Has your child participated in any treatment for anxiety since Week 14 of the Facing Your Fears group? □ No □ Yes (please describe)

_____
_____

4c. Additional comments: _____
_____
_____
_____
_____
_____
_____
_____