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**THE ACCEPTABILITY AND FEASIBILITY OF VIRTUAL PARENT  
ACCEPTANCE AND COMMITMENT THERAPY GROUPS: A FEASIBILITY  
STUDY**

by  
Abigail Elizabeth Moretti

A Thesis

Submitted to the  
Psychology Department  
College of Science and Mathematics  
In partial fulfillment of the requirement  
For the degree of  
Master of Arts in Clinical Psychology  
at  
Rowan University  
May 26, 2022

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## **Abstract**

Abigail Elizabeth Moretti

### **THE ACCEPTABILITY AND FEASIBILITY OF VIRTUAL PARENT ACCEPTANCE AND COMMITMENT THERAPY GROUPS: A PILOT STUDY**

2021-2022

Christina Simmons, Ph.D., BCBA-D  
Masters of Arts in Clinical Psychology

Parents of children with autism spectrum disorder (ASD) experience higher rates of anxiety, depression, and poor overall well-being, particularly when their child also engages in challenging behavior (e.g., self-injury, aggression, property destruction). Acceptance and commitment therapy (ACT), which encourages psychological flexibility and attending to the present moment, is particularly suited for this population because parents of children with ASD experience high stress levels and difficulty with adaptive coping. The aim of the current study is to examine the feasibility and acceptability of implementing virtual ACT groups with parents of children with ASD and co-occurring challenging behavior. Participants attended an in-person intake interview, six virtual ACT group sessions, and two individualized parent training sessions to learn behavior management techniques and to practice implementing behavioral intervention when faced with treatment challenges. Participants included 10 parents across three different groups; however, only 6 completed all post-study measures. Results demonstrate that there was an increase in psychological flexibility over the course of the study and that participants perceived the groups and the treatment challenge to be highly acceptable. However, the high attrition rate suggests that participating in six virtual group sessions may not be feasible for parents of children with ASD and challenging behavior.

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## **Chapter 1**

### **Introduction**

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in reciprocal social communication and restricted, repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). The current prevalence estimate for ASD in the United States is approximately 1 in 44 children 8 years of age (Maenner et al., 2021). Challenging behavior (e.g., self-injurious behavior, property destruction, aggression) often co-occurs with ASD and can have a potential negative impact on the child's and their caregiver's quality of life (Antonacci et al., 2008; Soke et al., 2016). Research suggests that the prevalence of at least one form of challenging behavior in children with ASD can range from 82% (Murphy et al., 2009) to 93.70% (McTiernan et al., 2011). However, these estimates are high as they often include any topography of behavior considered challenging. The prevalence of more severe forms of behavior (e.g., self-injurious behavior) in children with ASD is about 1 in 3 (Soke et al., 2016). Challenging behavior can result in serious concerns for the child's health and safety, such as severe self-injurious behavior causing physical injury that may include tissue damage, concussions, or loss of eyesight (Cantin-Garside et al., 2021; Soke et al., 2016). Additionally, challenging behavior can result in over-reliance on medication and difficulty accessing services due to the severity of the behavior (Antonacci et al., 2008). Challenging behavior can also create additional difficulties with peer interactions, often resulting in exclusion and social isolation for the child (Ludlow et al., 2011). In a study by Ludlow et al. (2011), parents of children with ASD and co-occurring challenging behavior reported that one of the most difficult aspects of their child's challenging

behavior was the social implications of the behavior for their child, including concerns about peers' adverse reactions to their child's challenging behavior.

For parents, their child's challenging behavior can often be unpredictable and difficult to physically and emotionally manage, can potentially impact the safety and emotional well-being of parents and siblings, and can result in a perceived lack of support from others (Ludlow et al., 2011; Soke et al., 2016). In one study conducted by Gorlin and colleagues (2016), parents of children with ASD reported experiencing severe isolation, with some parents indicating that they often do not physically leave their home due to their child's needs. Additionally, Ludlow et al. (2011) found that parents of children with ASD considered judgments from others (e.g., community members, extended family) in response to their child's challenging behavior to be one of the most difficult aspects of parenting a child with challenging behavior. As a perceived lack of social support has been significantly correlated with increased parental stress in parents of children with ASD (Robinson & Weiss, 2020), it is conceivable that, when confronted with challenging situations, parents' perception of judgment from others (e.g., parent thinking "Everyone will think I'm a bad parent") could lead to increased anxiety, fear of social stigma, and decreased confidence in their parenting abilities (Gould et al., 2018). Further, Weiss et al. (2012) found that lower levels of psychological acceptance, or the ability for individuals to accept events as they occur without attempting to unnecessarily change them (Hayes et al., 2006), in response to their child's challenging behavior strongly predicted lower parental mental health. In other words, attempts to control aspects of their child's behavior that are outside of a parent's control (e.g., a child's repetitive self-stimulatory behavior) predicted greater mental health concerns in parents

of children with ASD. Additionally, research suggests that parents of children with ASD and co-occurring challenging behavior experience high psychological distress (Benson, 2006) and lower health-related quality of life (Lee et al., 2009). Specifically, parents of children with ASD have significantly higher stress and lower adaptive coping skills than parents of children with no known disabilities (Lee et al., 2009; Hayes & Watson, 2013).

Challenging behavior is frequently treated with behavioral interventions that target the function, or environmental effect that reinforces the behavior. Functional analysis procedures, adapted from procedures first described by Iwata et al. (1982/1994), are often implemented to systematically identify the function of the challenging behavior. Behavioral functions can be grouped as *positive reinforcement* where the challenging behavior is reinforced with access to a desired stimulus, such as attention or tangible items and *negative reinforcement* where the challenging behavior is reinforced by removal of an aversive stimulus, such as escape from a demand or from social interaction (Hanley et al., 2003). Functions can also be grouped as *socially-mediated*, wherein positive or negative reinforcement is delivered by another individual and *automatic*, wherein the behavior produces access to positive or negative reinforcement that is not controlled by another individual, such as access to sensory stimulation or escape from an aversive sensation (Newcomb & Hagopian, 2018). Research demonstrates that implementing a functional analysis to inform treatment increases positive treatment outcomes irrespective of target behavior, indicating the importance of determining the function of a behavior before implementing behavioral treatment (Campbell et al., 2003; Heyvaert, et al., 2014). Although functional analysis is the gold standard approach to determining behavioral function, procedures have been developed to determine function

by observing the environmental effect of the behavior (Anderson & Long, 2002; Neef & Peterson, 2007), and by conducting indirect assessments in the form of interviews or rating scales (Gadaire, et al., 2021; Tarbox et al., 2009).

Some of the most frequently cited interventions in the extant literature for decreasing challenging behavior rely on the behavioral principle of differential reinforcement wherein a behavior different from the target challenging behavior is reinforced, such as an appropriate alternative behavior or an incompatible behavior (Brosnan & Healy, 2011; Newcomb & Hagopian, 2018). Functional communication training (FCT) is a specific differential reinforcement procedure that teaches an individual an appropriate communicative response that produces the same maintaining source of reinforcement as the challenging behavior while the challenging behavior is placed on extinction (i.e., does not produce access to the reinforcer; Carr & Durand, 1985; Tiger et al., 2008). For example, to reduce the occurrence of challenging behavior maintained by access to a tangible item, FCT might include reinforcing the individual saying “my turn, please” as an alternative communicative response that produces access to the desired item, while the challenging behavior does not result in access to the item.

Although behavioral treatments are largely effective at reducing challenging behavior (Brosnan & Healy, 2011; Campbell, 2003; Heyvaert, et al., 2014; O’Brien et al., 2021), these treatments are often conducted in highly controlled settings and/or with trained implementers (Heyvaert et al., 2014; Newcomb & Hagopian, 2018). Parent training is often used to facilitate the transfer of treatment effects to the child’s natural environment (i.e., generalization). By teaching parents how to correctly implement the same behavioral treatments that were successful in reducing challenging behavior within

the clinical context, the likelihood that the treatment effects transfer to the natural environment is increased (Matson et al., 2009). A meta-analysis by Kaminski et al. (2008) found that behavioral treatment programs that trained parents to implement the behavioral treatment and to practice implementing the treatment with their child resulted in better treatment outcomes (e.g., lower rates of challenging behavior) than treatment programs that did not include parent training. Further, the literature demonstrates that parents are able to implement behavioral treatments with high procedural fidelity and treatment effects maintain over time when parent training is conducted both in person (Maughan et al., 2005) and via telehealth (Blackman et al., 2020).

Although the literature demonstrates that parent training is effective in maintaining treatment effects after clinical intervention has ended, parents and other caregivers may inconsistently or incorrectly implement the behavioral intervention in the home environment, often resulting in resurgence of the challenging behavior. Resurgence refers to the recurrence of a previously extinguished behavior (Epstein, 1983; Ringdahl & St. Peter, 2017). More specifically, after a behavior is placed on extinction and replaced by an alternative behavior, such as in FCT, not reinforcing the alternative behavior can result in the reemergence of the original behavior (Winterbauer & Bouton, 2010). Inconsistent implementation of behavioral interventions, or omission errors, occur when a desired behavior such as functional communication is not reinforced according to the treatment schedule (St. Peter Pipkin et al., 2010). Omission errors can result in the relapse of challenging behavior because, without consistent reinforcement of desired behaviors, challenging behavior may reemerge to achieve the maintaining source of reinforcement. Incorrect implementation of behavioral interventions, or commission errors, occur when

the occurrence of challenging behavior is reinforced rather than the desired behavior (St. Peter Pipkin et al., 2010). Commission errors can result in relapse of challenging behavior because the behavior that previously contacted extinction in the clinical setting now resulted in access to reinforcement. Resurgence that was originally demonstrated with laboratory animals (e.g., da Silva et al., 2008; Lieving & Lattal, 2003; Rawson et al., 1977; Sweeney & Shahan, 2015) has been extended to demonstrate relapse of child behavior following behavioral treatment (e.g., Liggett et al., 2018; Sullivan et al., 2020; Volkert et al., 2009). The resurgence of challenging behavior due to omission and commission errors could conceivably impact parents' confidence in their abilities to manage their child's behavior because a behavior that was previously reduced during clinical intervention is reemerging when the treatment is now implemented by the parent. In a 2017 review, Kestner and Peterson found that although implementing behavioral treatment with high fidelity is important for maintaining treatment effects, it is often unrealistic for parents to do so perfectly in the natural environment. Thus, interventions should aim to teach parents how to decrease the likelihood of resurgence despite errors in treatment implementation (Mitteer et al., 2018).

A different type of reemergence of challenging behavior, referred to as renewal, occurs when a previously reinforced behavior reemerges with a change of context (Bouton, 2002; Podlesnik et al., 2017). For example, when challenging behavior that originally occurred with a parent is treated by a therapist, introducing the parent to treatment can lead to an immediate increase in behavior (i.e., renewal) due to the change in context alone. Research originally demonstrating renewal in laboratory studies with animal participants (e.g., Berry et al., 2014; Bouton et al., 2011) has been extended to

human participants to demonstrate renewal of challenging behavior with a change of context (e.g., Cohenour et al., 2018; Kelley et al., 2015; Saini et al., 2018). Although renewal may be associated with high rates of challenging behavior, the rate of challenging behavior tends to decrease over time. Findings from Muething et al. (2020) demonstrate that, on average, rates of previously extinguished challenging behavior were highest in the first session after a change in context and tended to decrease in subsequent sessions. However, despite these findings, parents could potentially perceive themselves as the reason why their child's previously extinguished challenging behavior is reemerging (e.g., thinking "I'm not good enough to implement the intervention"; Gould et al., 2018), leading to higher levels of parental stress that could then result in more omission and commission errors and increased rates of challenging behavior.

Because the literature demonstrates that parents of children with challenging behavior are more likely to experience psychological distress (e.g., Benson, 2006), it is conceivable that the resurgence and renewal of challenging behavior in the natural environment could negatively impact parents' psychological well-being. This negative effect on parents' well-being could contribute to a decrease in fidelity with which parents' implement the behavioral intervention, leading to continued increases in challenging behavior. Further, behavioral treatments are more effective when parents are trained to implement them in the natural environment (Kaminski et al., 2008), suggesting that parents need to be prepared (e.g., emotionally, physically, psychologically) to implement their child's behavioral treatment despite the potential for resurgence and renewal. Thus, integrating parental well-being into the goals of the child's treatment by targeting parental self-confidence, anxiety, and stress could increase the likelihood that



parents implement the behavioral interventions correctly and consistently, therefore maintaining low rates of challenging behavior following behavioral intervention.

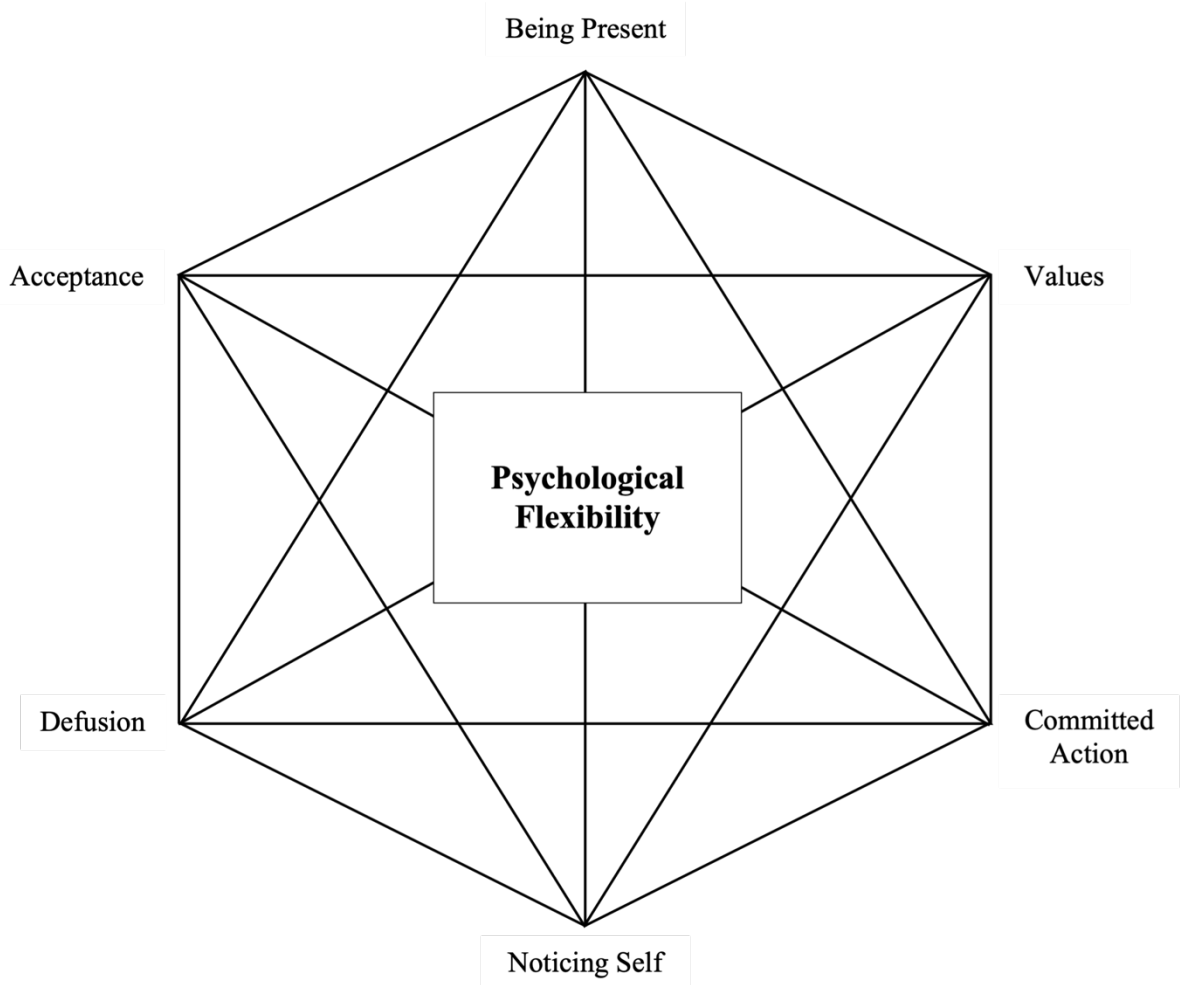
However, despite the potential benefits of targeting parental well-being within a child's behavioral treatment, a systematic review conducted by Brookman-Frazee et al. (2006) found that only 5% of intervention programs for children with ASD specifically targeted parental needs and their well-being. These findings highlight a clear need to increase the acknowledgment and incorporation of parental well-being within behavioral treatments.

One intervention approach for addressing psychological well-being for parents of children with ASD who engage in co-occurring challenging behavior is acceptance and commitment therapy (Cameron et al., 2020). Acceptance and commitment therapy (ACT) is a mindfulness and acceptance-based intervention that aims to increase psychological flexibility, which refers to the ability of an individual to experience the present moment without defense or judgement while taking committed actions to move towards their chosen values (Hayes et al., 2004). Psychological flexibility is developed through the combination of six psychological processes conceptualized in the ACT hexaflex model: acceptance, defusion, being present, self-as-context, values, and committed action (Hayes et al., 2012). See Figure 1 for a visualization of the ACT hexaflex model. Further, ACT utilizes mindfulness techniques to increase the focus on the present moment and reduce attempts to control negative external factors, therefore increasing the likelihood that the parent is able to effectively respond to their child's behavior in the moment (Gould et al., 2018). This intervention is particularly suited to address the needs of parents of children with ASD who engage in co-occurring challenging behavior because this framework teaches parents to identify their parenting values (e.g., "I value my child's development

and well-being”; Cameron et al., 2020), accept that there are aspects of their child’s behavior that are outside their control, and practice self-compassion (i.e., being kind and understanding to the self, especially in difficult times; Yadavaia et al., 2014). These skills in turn encourage parents to respond to their child’s challenging behavior in a way that is in accordance with their values (e.g., “I am going to ignore this behavior because it is what is best for the development of my child”; Brassell et al., 2016). Teaching parents value-driven responses to their child’s behavior, such as not responding to the challenging behavior to remain in accordance with their values despite the challenges, could conceivably increase psychological flexibility, decrease parental stress, and increase treatment fidelity when implementing their child’s behavioral treatment at home.

**Figure 1**

*ACT Hexaflex Model*



*Note.* Adapted from Hayes et al. (2012)

The literature supports ACT as an effective intervention to decrease psychological distress in parents of children with ASD. A review of the literature conducted by Byrne et al. (2020) demonstrated that ACT is effective in decreasing reported stress, depression, and anxiety in parents, including parents of children with neurodevelopmental disabilities. Additionally, results from Blackledge and Hayes (2006) suggest that participating in a 14-hour ACT workshop over two days that focused on parental distress was effective in increasing psychological well-being (e.g., reduced scores on measures of general distress, depression, and stress) of parents of children with ASD. Further, according to Hahs et al. (2019), implementing brief ACT sessions (i.e., two 2-h group workshop sessions) with parents of children with ASD increased psychological flexibility and overall well-being (e.g., decreased scores on measures of depression and negative self-evaluation). Researchers have demonstrated the efficacy of ACT at increasing psychological well-being in parents of children with ASD when delivered in groups (Blackledge & Hayes, 2006; Corti et al., 2018; Fung et al., 2018; Hahs et al., 2019; Lunsky et al., 2018) and individually (Gould et al., 2018). Gould et al. (2018) adapted individualized ACT sessions for parents of children with ASD by including psychoeducation related to parenting a child with ASD and specifically incorporating examples of stressors related to parenting a child with ASD into teaching ACT principles. Results of this study demonstrate that implementing six 90-min individualized sessions of ACT with parents of children with ASD increased overt, value-driven responses to their child's behavior, which maintained over time. For example, a participant with a value of promoting their child's autonomy significantly increased the frequency of behaviors that fulfilled this value, such as allowing their child to walk around the neighborhood without

supervision (Gould et al., 2018). As children are part of a family system and effective treatment requires extending treatment effectiveness outside of the clinical context, addressing parental needs in conjunction with their child's behavioral treatment is important to increase positive outcomes for both the child and their family (Brassel et al. 2016). Further, Yi and Dixon (2021) examined the factors associated with increasing parental adherence to behavioral parent training for parents of children with ASD. Preliminary results with 14 families of children with ASD demonstrated that the combination of a 30-min ACT session during the initial meeting and simply sending parents weekly messages regarding an ACT-based activity (e.g., "Throughout the week, when things get busy or hectic, try to focus on the present moment by taking a few deep breaths", p. 68) increased their productivity in asynchronous training modules and overall progress within the parent training curriculum. These findings suggest that even extremely brief ACT sessions can increase parental involvement in parent training in comparison to a control group that did not engage in any ACT sessions.

Although ACT has shown promising results in increasing overall parental well-being for parents of children with ASD, barriers still exist to providing necessary parental support. First, parental support interventions can compete with parents' already busy schedules. Frequently cited barriers to engaging in sessions for parental support include organizing childcare for siblings, competing parent work schedules and fitting in sessions around other commitments (Mytton et al., 2014; Preece et al., 2016). These barriers to parent involvement in treatment, in addition to time spent travelling to sessions, associated travel costs, lost wages, and access to reliable transportation (Moffatt & Eley, 2010; Williams & Sanchez, 2011), all may contribute to inequality of supports delivered

to low-income families. Further, Raulston et al. (2019) indicated that scheduling flexibility is important for increasing engagement in parent training programs designed to increase parental support. Implementing parental support interventions virtually could mitigate many of these barriers to allow more families to access the benefits of parental support in addition to their child's behavioral treatment.

Though limited, there is some literature on the implementation of ACT virtually with parents of children with ASD. Cameron et al. (2020) provided a description of a protocol to support behavioral practitioners in incorporating ACT principles into telehealth-based services for children with ASD and their families. Andrews et al. (2021) incorporated a 2-h virtual individual ACT session into telehealth-based behavioral parent training (Andrews et al., 2021). This study found that parents demonstrated mastery of the implementation of behavioral management strategies after only three total sessions, including the brief ACT intervention. This study also reported that parents demonstrated a decrease in perceived stress scores; however, results were mixed such that stress scores only decreased for participants reporting moderate to high stress scores. To date, only one study has described the implementation of ACT for parents of children with ASD and co-occurring challenging behavior in a virtual group format. Pennefather et al. (2018) examined the feasibility of a 3-week synchronous group training intervention that included teaching parents about both applied behavior analytic (ABA) principles for managing their child's challenging behavior and ACT principles to assist in reducing parental stress. Participants met once per week for 3 weeks in a virtual group of two to four other parents. Sessions included instruction on ABA principles, instruction on stress reduction (e.g., meditation) based on ACT principles, and opportunities for group

discussion. Participants demonstrated an increased knowledge of ABA behavioral management strategies and reported an increase in their child's prosocial behaviors. However, overall parental stress and the use of stress coping strategies did not significantly change over the course of the intervention.

Despite reported benefits of ACT, previous literature on virtual ACT groups has examined the incorporation of some ACT principles into behavioral parent training with child behavioral outcomes as the primary outcomes and parental well-being (i.e., perceived stress) as secondary outcomes. Although it is important to examine the effect of ACT principles on child behavioral outcomes, there is a dearth of literature examining (a) whether parents find virtual ACT group sessions alone feasible and acceptable outside of the context of parent training and (b) whether participating in multiple virtual group sessions that teach ACT principles through the lens of parenting a child with challenging behaviors is associated with improved parental well-being for this population. Examining the implementation and effectiveness of the full ACT protocol alone via virtual modalities on parental well-being is important prior to recommending its incorporation into behavioral parent training. The current study examined the feasibility and acceptability of implementing a 6-week virtual group ACT intervention with parents of children with ASD with co-occurring challenging behavior. Further, we pilot tested a treatment challenge where participants practiced implementing skills learned in behavioral parent training with a confederate whose behavior presented challenges that may be encountered in the natural environment (i.e., reemergence of challenging behavior) as an applied method to measure persistence with implementing behavioral management strategies that may be influenced by ACT. Outcomes included the feasibility

of the 6-week virtual group ACT intervention, acceptability of both the ACT intervention and the treatment challenge, changes in parental well-being, and parental procedural fidelity in implementing behavioral intervention during the treatment challenge.

Although previous studies have combined ACT principles with behavioral parent training in a virtual individual (e.g., Andrews et al., 2021) and virtual group (e.g., Pennefather et al., 2018) format, the current study extends the literature by implementing a full ACT protocol alone rather than select ACT principles. Further, the current study specifically focuses on parents' perceived feasibility and acceptability of the intervention, and examines well-being outcomes as the primary outcome variables. In addition we assess the use of the treatment challenge as an applied method for measuring the effects of ACT for parents of children with ASD and co-occurring challenging behavior by exposing parents to the reemergence of challenging behavior in a controlled environment. The feasibility and acceptability of this treatment challenge could inform whether skills learned through the ACT intervention (e.g., committed action, acceptance) maintain when parents are confronted with challenging situations, and could be used in future research as an alternative way to measure the effects of the ACT intervention beyond self-report measures. Finally, the virtual group format has the potential to mitigate access barriers to intervention addressing parental well-being in parents of children with ASD.



## **Chapter 2**

### **Method**

#### **Participants**

Participants included 10 parents of school-aged children (i.e., ages 5-12 years) with ASD and co-occurring challenging behavior (e.g., aggression, property destruction). Participants include those who attended at least one ACT group session. Individuals who were determined ineligible at phone screening, dropped out before the intake interview, or dropped out before the start of group sessions were not included in the final participant sample; however, they were included in results related to feasibility. Demographic information of individuals who participated in the intake interview but dropped out before the start of group sessions is separately presented in Tables 1 and 2 for comparison.

To encourage a representative sample of participants (e.g., diverse racial, socioeconomic, gender, sexual orientation identities), participants were recruited from a variety of sources, including flyers distributed to 36 local agencies serving children with ASD and their families, 13 local pediatricians, 135 schools, 26 community centers, and digital flyers posted to 43 social media pages. Individuals could participate if they were at least 18 years of age, had a child with a diagnosis of ASD or educational eligibility of Autism who engaged in challenging behavior as indicated by parent self-report, spoke English, had access to a device with internet and video capability, could commit to travelling to Rowan University a total of three times, could commit to 9 weeks of participation, and had not received extensive ABA-based parent training. After a phone

screening with the first author to determine eligibility, participants then participated in initial intake interviews (procedures described below).

The majority of the participant sample identified as female (90%,  $n = 10$ ), white (80%,  $n = 8$ ), and non-Hispanic/Latino (90%,  $n = 9$ ), with 10% ( $n = 1$ ) of participants identifying as multiracial and 10% ( $n = 1$ ) identifying as Black or African American. The mean age of participants was 40 years old (range, 31-51 years; median, 39.5 years). The majority of participants had children who identified as male (54.5%,  $n = 6$ ) and the mean age of participants' children was 7 years old (range, 5-11 years; median, 6 years). See Table 1 for additional participant demographics, Table 2 for additional child demographics, and Table 3 for child behavioral information.

**Table 1***Participant Demographics*

Variables	Included in Sample <i>n</i> (%) <i>n</i> = 10	Not Included in Sample <i>n</i> (%) <sup>1</sup> <i>n</i> = 3
Gender		
Female	9 (90)	3 (100)
Male	1 (10)	0 (0)
Racial/Ethnic Identity		
White	8 (80)	2 (66.7)
Black/African-American	1 (10)	1 (33.3)
Multiracial	1 (10)	0 (0)
Ethnic Identity		
Hispanic/Latino	1 (10)	0 (0)
Non-Hispanic/Latino	9 (90)	3 (100)
Household Income		
<\$10,000	1 (10)	0 (0)
\$10,000-\$24,000	2 (20)	0 (0)
\$25,000-\$49,000	1 (10)	0 (0)
\$50,000-\$74,000	0 (0)	0 (0)
\$75,000-\$99,000	0 (0)	1 (33.3)
\$100,000-\$149,000	5 (50)	0 (0)
>\$150,000	1 (10)	2 (66.7)
Education		
Some high school, no diploma	1 (10)	0 (0)
High school or equivalent	0 (0)	0 (0)
Some college, no diploma	1 (10)	0 (0)
Associate's degree/certificate	2 (20)	0 (0)
Bachelor's degree	4 (40)	1 (33.3)
Master's degree	2 (20)	1 (33.3)
Doctorate degree	0 (0)	1 (33.3)
Employment*		
Full-time job	3 (30)	1 (33.3)
Full-time caregiver <sup>a</sup>	3 (30)	1 (33.3)
Part-time job	3 (30)	1 (33.3)
Multiple jobs	1 (10)	0 (0)
Work is fairly insecure	1 (10)	0 (0)
Full-time student <sup>a</sup>	1 (10)	0 (0)
Don't do paid work <sup>a</sup>	2 (20)	1 (33.3)

*Note.* \*Participants could select all that applied. <sup>1</sup>Participants were not included in sample

due to dropping out of study before starting group sessions. <sup>a</sup>Coded as not doing paid

work to create a dichotomous variable for analysis

**Table 2***Demographics of Participants' Children*

Items	Included in Sample <i>n</i> (%) <i>n</i> = 11	Not Included in Sample <i>n</i> (%) <sup>1</sup> <i>n</i> = 4
Children in Household		
1	2 (20)	1 (33.3)
2	3 (30)	2 (66.7)
3	3 (30)	0 (0)
4	2 (20)	0 (0)
Other Adults in Household		
0	1 (10)	0 (0)
1	7 (70)	3 (100)
2	1 (10)	0 (0)
>2	1 (10)	0 (0)
Relationship to Child		
Biological parent	9 (90)	2 (66.7)
Adoptive parent	0 (0)	1 (33.3)
Grandparent	1 (10)	0 (0)
Child's Gender		
Female	5 (45.5)	1 (25)
Male	6 (54.5)	3 (75)
Child Educational Placement		
Mainstream classroom, no support	1 (9.1)	2 (50)
Mainstream classroom, with support	4 (36.4)	0 (0)
Part-time inclusion/Part-time special education classroom	1 (9.1)	0 (0)
Self-contained special education classroom	4 (36.4)	1 (25)
Specialized school placement	1 (9.1)	1 (25)
Child Comorbid Diagnoses*		
None	2 (18.2)	0 (0)
Anxiety	2 (18.2)	0 (0)
ADHD	6 (54.5)	4 (100)
Communication disorder	4 (36.4)	1 (25)
Depression	1 (9.1)	0 (0)
Feeding/Eating disorder	1 (9.1)	1 (25)
Intellectual disability	0 (0)	1 (25)
Learning disability	1 (9.1)	1 (25)
Oppositional defiant disorder	2 (18.2)	0 (0)
Other	2 (18.2)	2 (50)

*Note.* Some participants had two children with ASD and co-occurring challenging behavior and provided demographic information for both. Data are reflective of 11 children in the included sample and 4 children in the not-included sample. \*Participants could select all that applied.

<sup>1</sup>Participants were not included in the sample due to dropping out of study before starting group sessions.

**Table 3***Child Behavioral Information*

Child	Adaptive Behavior Score	Maladaptive Behavior Category	Topography of Challenging Behavior	Prioritized Behavioral Function	Child Communication Strategy
Child 1	58	Elevated	Physical aggression	Tangible	Some gestural, some verbal
Child 2	73	Elevated	Physical aggression	Tangible	Verbal
Child 3	85	Clinically Significant	Refusal behaviors	Escape	Verbal
Child 4	*	Clinically Significant	Physical aggression	Attention	Non-verbal
Child 5	69	Clinically Significant	Physical aggression	Escape	Verbal
Child 6	64	Elevated	Physical aggression	Tangible	Verbal
Child 7	79	Clinically Significant	Verbal aggression	Tangible	Verbal
Child 8	88	Average	Refusal behaviors	Escape	Some gestural, some verbal
Child 9	73	Elevated	Physical Aggression	Tangible	Some gestural, some verbal
Child 10	76	Average	Negative Vocalizations	Escape	Some gestural, some verbal
Child 11	84	Elevated	Refusal behaviors	Escape	Verbal

*Note.* Data are not in the order of participants to promote participant anonymity. \*Score not included due to administration error.

To encourage participation of individuals who may not have had access to a stable Internet connection for the virtual ACT groups, researchers offered a mobile hotspot on an as-needed basis. No participants requested the mobile hotspot. Additionally, researchers offered childcare while participants attended the intake interview, parent training, and the treatment challenge to mitigate potential socioeconomic barriers to participation. Two participants accessed childcare during the study.

Participants were compensated for their time in the form of a virtual Visa gift card following completion of all study measures required of their group. Participants each received a \$30 gift card at the completion of the study.

## **Procedures**

### ***Intake Measures***

Researchers met with each participant in-person to obtain informed consent, collect parent and child demographic data, gather information about their child's challenging behavior, and administer pre-intervention measures of well-being. Parent demographic information collected included age, gender, race/ethnicity, household income, educational attainment, number of children residing in the household, and preferred mode of contact (e.g., email, text, phone call). Child demographic information collected included age, gender, race/ethnicity, educational placement, and diagnoses. As part of the intake interview, researchers administered measures to parents to characterize their child's behavior. These measures included the Functional Assessment Interview (FAI), the Motivation Assessment Scale (MAS), the Questions About Behavioral Function (QABF), and the Vineland Adaptive Behavior Scales, Second Edition (Vineland-II). Participants with more than one child with ASD and co-occurring

challenging behavior completed demographic information and child behavioral measures for both children, but prioritized the child with more severe challenging behavior for the parent training sessions. Researchers also administered measures to parents assessing mental health variables. These measures included three surveys from the National Institutes of Health (NIH) Toolbox Emotion Domain and the Acceptance and Action Questionnaire (AAQ-2).

**Functional Assessment Interview (O'Neill et al., 1997).** This 9-part structured interview gathers information about the child's challenging behavior from the perspective of the caregiver. Data collected included (a) description of challenging behavior; (b) potential ecological variables that may affect the behavior (e.g., eating routines, sleep cycle); (c) events and situations that predict occurrences of the behavior; (d) description of the child's play habits; (e) the environmental effect of the behavior; (f) information about the consequences of the behavior; and (g) the primary methods the child uses to communicate. The interview provides information about potential antecedents that evoke, and consequences that maintain, the challenging behavior to aid a clinician in hypothesizing the function of the behavior. See Appendix A for a copy of the FAI. If the parent reported that the child engaged in multiple topographies of challenging behavior (e.g., both aggression and self-injury) that did not occur within the same environmental context (e.g., aggression occurs when a preferred item is restricted and self-injury occurs when attention is diverted), then parents were asked to complete the following two measures of behavioral function separately about each topography. Parents were then asked to prioritize the topography that was of greatest concern to address during parent training.



**Motivation Assessment Scale (Durand & Crimmins, 1988).** This 16-item self-report measure is designed to identify situations in which challenging behavior is most likely to occur from a caregiver's perspective. Respondents are asked to rate descriptions of when the challenging behavior occurs (e.g., "Does the behavior occur following a request to perform a difficult task?") on a 7-point scale ranging from 0 (Never) to 6 (Always). Item scores are summed to hypothesize potential functions of the behavior (i.e., sensory, escape, attention, tangible) such that higher scores suggest greater evidence for that function. See Appendix B for a copy of the MAS.

**Questions About Behavioral Function (Matson & Vollmer, 1995).** This 15-item self-report measure is designed to hypothesize potential function(s) of the child's challenging behavior from the caregiver's perspective. Individuals are asked to rate descriptions of when challenging behavior is likely to occur (e.g., "Engages in the behavior because there is nothing else to do.") on a 4-point scale ranging from 0 (Never) to 3 (Often). Items are summed to hypothesize potential functions of the behavior (i.e., attention, escape, non-social, physical, tangible) such that higher scores suggest greater evidence for that function. See Appendix C for a copy of the QABF. After scoring both the MAS and QABF, we determined the hypothesized function(s) of the child's challenging behavior(s). If there was more than one strong hypothesis, we asked participants to prioritize the context that is most difficult to manage to be targeted in subsequent parent training.

**Vineland-II (Sparrow et al., 2005).** This assessment is designed to assess an individual's adaptive behavior (e.g., daily functioning skills). Researchers administered the caregiver rating form to parents to assess their child's functioning in three main

adaptive behavior domains: Communication, Daily Living Skills, and Socialization. Scores are normed to the child's age and will be used in the current study to identify the child's adaptive functioning and maladaptive behavior categories. Higher adaptive behavior scores are indicative of higher adaptive functioning. Maladaptive behavior categories include average, elevated, and clinically significant.

**NIH Toolbox General Life Satisfaction Survey.** This 10-item self-report measure assesses an individual's satisfaction with their life experiences, specifically their general feelings and attitudes about their life. Individuals are asked to rate statements (e.g., "I have what I want in life) on either a 5- or 7-point scale ranging from "Strongly Disagree" to "Strongly Agree". Higher scores indicate higher life satisfaction (NIH, 2016). This measure was administered at three timepoints both via paper and pencil (i.e., at intake interview) and via the Qualtrics® survey platform (2022; i.e., after ACT group sessions and after the treatment challenge). See Appendix D for a copy of the measure.

**NIH Toolbox Perceived Stress Survey.** This 10-item self-report measure assesses an individual's perception of the stressors in their life and their ability to cope with those stressors. Individuals are asked questions regarding the predictability of life's stressors and their ability to control or manage the stressors (e.g., "How often have you found that you could not cope with all the things you had to do?") on a 5-point scale ranging from "Never" to "Very Often". Higher scores indicate higher levels of perceived stress (NIH, 2016). This measure was administered at three timepoints both via paper and pencil (i.e., at intake interview) and via the Qualtrics® survey platform (2022; i.e., after ACT group sessions and after the treatment challenge). See Appendix E for a copy of the measure.

**NIH Toolbox Self-Efficacy Survey.** This 10-item self-report measure assesses an individual’s perception of their own abilities to problem solve and function in the face of external stressors. Individuals are asked to rate statements regarding their ability to manage life problems or stressors (e.g., “I am confident that I could deal efficiently with unexpected events”) on a 5-point scale ranging from “Never” to “Very Often”. Higher scores indicate a higher level of perceived self-efficacy (NIH, 2016). This measure was administered at three timepoints both via paper and pencil (i.e., at intake interview) and via the Qualtrics® survey platform (2022; i.e., after ACT group sessions and after the treatment challenge). See Appendix F for a copy of the measure.

**The Acceptance and Action Questionnaire (Bond et al., 2011).** This 7-item self-report measure is designed to assess and monitor psychological flexibility. Individuals are asked to rate statements (e.g., Worries get in the way of my success) on a 7-point scale ranging from 1 (Never True) to 7 (Always True) such that lower scores indicate higher psychological flexibility. As the literature has demonstrated the AAQ-2’s sensitivity in identifying changes (Shari et al., 2019), the AAQ-2 was administered to participants as baseline probes before starting the virtual ACT groups and weekly while participating in the virtual ACT groups. This measure was administered both via paper and pencil (i.e., at intake interview) and via the Qualtrics® survey platform (2022; i.e., subsequent baseline probes before starting ACT, after ACT group sessions, and after the treatment challenge). See Appendix G for a copy of the measure.

### ***Virtual Parent ACT Groups***

Participants were asked to virtually attend six ACT group sessions occurring once per week, scheduled at a mutually-agreed upon time conducive to participants’ schedules

(e.g., during school hours, evenings). Group sessions lasted a mean of 75 min (range, 51 min to 90 min; median, 82 min). Group sessions were conducted using WebEx, a HIPAA compliant platform (Cisco WebEx, 2016). Sessions were recorded for future analysis; only researchers had access to session recordings to maintain participant confidentiality.

Participants were placed into three groups of four participants based on shared availability. Once four participants demonstrated overlapping availability after completing intake interviews, the first group began ACT sessions. This procedure was repeated for Group 2 and Group 3; however, two participants who were scheduled for Group 3 dropped out before the start of Group 3's sessions and, due to low recruitment rates and study time constraints, we proceed with two participants in Group 3. The current study used a nonconcurrent multiple baseline design to systematically introduce each group into ACT sessions to visually demonstrate the effect of ACT on psychological flexibility such that a change in behavior occurs following ACT introduction (Watson & Workman, 1981). Whereas a concurrent multiple baseline design would evaluate participants' baseline scores at the same time, a nonconcurrent multiple baseline design allows researchers to evaluate participants' baseline scores at different times (i.e., consecutively, not concurrently; Carr, 2005). Researchers randomized the number of baseline AAQ-2 datapoints required for each group to strengthen the nonconcurrent multiple baseline design such that baseline data points were determined randomly and not based upon response patterns (e.g., Raiff et al., 2021). Group 1 required three baseline AAQ-2 measurements before starting ACT sessions, Group 2 required five baseline AAQ-2 measurements, and Group 3 required four baseline AAQ-2 measurements.

Sessions occurred as scheduled if at least two participants could attend a given session; researchers rescheduled the session if two or more participants could not attend and advance notice was provided. If advance notice was not provided, the session proceeded with the participants who did attend. Researchers recorded participant attendance and number of sessions rescheduled as a measure of feasibility. The primary facilitator for all ACT sessions was a clinical psychology doctoral student (the author) and the co-facilitator was an undergraduate research assistant. In preparation of facilitating virtual ACT sessions, both facilitators attended an online training in ACT and reviewed print resources on ACT and ACT specific to parents of children with ASD. The ACT sessions for this intervention were adapted from the ACT for Parents of Children with Autism Manual (Gould & Coyne, 2016), with adaptations made to account for the virtual implementation format and the focus on parents of children with challenging behavior. The manual was adapted for virtual implementation by providing each participant with printed materials for all six sessions prior to the first ACT session such that internet access was not needed to participate outside of sessions; the facilitator utilizing the screen share function of WebEx to display materials to participants (e.g., a copy of an in-session handout to complete); and choosing activities that could be implemented virtually (e.g., guided meditations). Facilitators addressed confidentiality, technological troubleshooting, and other aspects of participation (e.g., use of video) at the beginning of the first session and on an as-needed basis. Facilitators structured sessions based on the Gould and Coyne (2016) manual. For example, once participants virtually entered the session, the facilitator led a mindfulness exercise, reviewed the at-home work from the previous week, engaged participants in discussions surrounding session topics,

and incorporated practice exercises before reviewing the at-home practice to be completed for the subsequent session. At the end of each session, the facilitator reminded participants via email to fill out the AAQ-2 via the Qualtrics® survey platform (2022) before the next session. See Table 4 for a session-by-session outline. Facilitators sent weekly reminders to attend session and complete at-home assignments via email.

**Table 4**

*Session-By-Session Outline of ACT Group Sessions*

Session Topic	Homework Assignment
Session 1. Initial Interview	Collect baseline data on parenting behaviors identified during session
Session 2. Mindfulness	Incorporate mindfulness into daily life and track instances
Session 3. Defusion	Incorporate defusion exercises into daily life and track instances
30 Session 4. The Matrix	Collect data on behaviors that move them towards their values and away from their values
Session 5. Committed Actions	Collect data on committed actions taken
Session 6. Self-Care	Incorporate self-care into daily life

*Note.* Adapted from Gould & Coyne (2016)

After completion of the ACT sessions, participants were asked to complete a 13-item anonymous online survey, developed by the researchers, about their experience with the ACT parent groups to assess acceptability (i.e., social validity) and feasibility. Participants were asked to rate statements about the acceptability of ACT sessions (e.g., “The virtual ACT group sessions were convenient for my schedule.”) on a 5-point Likert scale ranging from “Strongly Agree” to “Strongly Disagree” and to explain why they chose that response. Additionally, participants were asked about what factors impacted their attendance. If participants attended the majority of sessions (i.e., four or more sessions), participants were asked to indicate factors that encouraged their attendance (e.g., “The date and time of the sessions worked well for my schedule”). If participants did not attend the majority of sessions (i.e., attended fewer than four sessions), participants were asked to indicate barriers that impacted their attendance (e.g., “Unexpected events regarding myself or other family members”). See Appendix G for a copy of the measure. Participants were also asked to complete the three NIH Toolbox Emotional Domain measures via the Qualtrics® survey platform (2022) after the final virtual ACT session.

Outcome measures of the feasibility of the virtual ACT groups included the number of sessions attended, number of sessions rescheduled, number of home practice assignments completed, and responses to the feasibility question on the social validity survey administered after the completion of ACT sessions (i.e., I attended most group sessions [at least 4 out of 6 sessions]). Home practice assignments were marked as completed if the participant discussed their at-home practice during session; they were



not evaluated on their correctness to encourage discussion of challenges with the assignments during session.

### ***Behavioral Skills Training***

Participants were asked to participate in individual parent training sessions located at the Rowan University Center for Behavior Analysis after completing the virtual ACT sessions. Sessions consisted of one 1-h session of individualized behavior skills training (BST; Parsons et al., 2012). The author provided psychoeducation about behavioral function and the specific hypothesized function(s) of their child's challenging behavior, didactic instruction on the behavioral intervention package demonstrated to reduce challenging behavior maintained by the hypothesized function(s), and modeling of intervention components with an undergraduate research assistant.

Training sessions were individualized using information collected during the intake interview on their child's specific topography of challenging behavior and hypothesized functions of the behavior (e.g., property destruction has resulted in receiving attention in the past). When children's challenging behavior or behaviors were hypothesized to be maintained by multiple sources of reinforcement, we targeted the behavior and context that parents prioritized as the greatest concern. For children whose challenging behavior was hypothesized to be maintained by a socially-mediated source of reinforcement (i.e., reinforcement delivered by another person), the intervention consisted of FCT and extinction (Tiger et al., 2008) and a multiple schedule. For example, if the child's aggression served a tangible function, FCT included teaching the child an appropriate communicative response, such as "My turn, please", that resulted in access to the desired item while placing the challenging behavior on extinction (e.g., the

challenging behavior does not result in access to the desired item). We also incorporated a multiple schedule as a way to signal specific times when the child's appropriate communicative response resulted in access to the reinforcer and periods of extinction. This procedure was selected to promote generalization of the intervention to participants' real-life experiences where the reinforcer could not be accessed all the time (Fisher et al., 1998). A two-sided colored bracelet served as the discriminative stimulus to signal when the appropriate communicative response would result in access to the reinforcer; it was turned to white to signal that the reinforcer was available and turned to red to signal that the reinforcer was not available, even when the child emitted the appropriate communicative response. No child's challenging behavior was hypothesized to be maintained by automatic reinforcement.

Researchers developed an individualized procedural fidelity checklist outlining specific intervention skills for the parent to demonstrate when managing their child's challenging behavior. See Appendix J for an example procedural fidelity checklist. Training also included practice trials where the parent practiced implementing FCT and extinction using situations they reported during the intake interview, the virtual group sessions, and/or during the training session. The participant practiced implementing the procedures with a confederate acting as their child. The facilitator provided corrective feedback following each trial. Data were collected on the number of practice trials it took the participant to reach mastery (i.e., 100% correct implementation).

### ***Treatment Challenge***

After the completion of parent training, participants individually engaged in a "treatment challenge" at the Rowan University Center for Behavior Analysis to

implement the skills they learned during parent training. The purpose of the treatment challenge was to measure the participants' ability to maintain treatment fidelity with implementing the skills taught during parent training when the child's behavior does not immediately respond to treatment (i.e., presents challenges). Treatment challenges have been used to assess resurgence of challenging behavior in the literature when treatment fidelity errors are introduced by therapists (Volkert et al., 2009). The treatment challenge consisted of five 5-min sessions during which an undergraduate research assistant (i.e., the confederate), role-played the specific child's challenging behavior, with brief breaks between sessions. Within each session, researchers presented the establishing operation (i.e., environmental variable that increases the effectiveness of a stimulus as a reinforcer) as many times as possible. For example, a parent implementing FCT was instructed to remove access to reinforcement (e.g., restrict access to a tangible item). Contingent upon appropriate child behavior, the parent had the opportunity to provide reinforcement (e.g., access to a tangible item) for 20 s, then was instructed to remove access to reinforcement to begin a new trial. The confederate simulated challenging behavior that persisted despite correct implementation of the behavioral treatment (e.g., renewal) at a variable ratio of one challenge to every two establishing operations presented to assess whether parents remained committed to using skills learned during parent training and the ACT intervention (i.e., persisting in the face of challenge). See Appendix K for an example of challenges presented. Challenges included the confederate continuing to simulate challenging behavior despite the parent correctly implementing the treatment procedures and increasing the intensity of the challenging behavior as the parent implemented extinction (i.e., extinction burst; Lerman & Iwata, 1995). For example, if the target

behavior was maintained by access to a tangible item and the participant correctly provided the desired item in response to the correct functional communication response, the confederate would continue to simulate the challenging behavior to assess whether the participant would persist in implementing the intervention with fidelity, which, in this example, would be not responding to the confederate's behavior.

An undergraduate research assistant trained in data collection collected data on participant implementation of procedures through a one-way observation mirror. The author also observed through the one-way mirror and communicated with the confederate via Bluetooth headset worn by the confederate to signal when to engage in challenging behavior that persists despite correct implementation. Researchers assessed the data collected to identify the number of steps in the individualized procedural fidelity checklist that participants implemented correctly during each session. Researchers calculated a total procedural fidelity percentage (i.e., number of correct steps/number of opportunities) for each treatment challenge session and calculated an overall procedural fidelity percentage for the entirety of the treatment challenge. Sessions were recorded for future analysis; only researchers had access to session recordings to maintain participant confidentiality. Inter-observer agreement (IOA) was calculated for 33% of sessions for participant's procedural fidelity. Inter-observer agreement between primary and secondary coders was 89% for participant's procedural fidelity.

At the end of the treatment challenge, participants were asked to fill out the three surveys from the NIH Toolbox Emotion Domain and an anonymous online survey, developed by researchers, on their experience with the treatment challenge, all via the Qualtrics® survey platform (2022). This 8-item survey asked respondents to rate

statements about the acceptability of the treatment challenge (e.g., “The treatment challenge simulated a realistic environment for me to practice my skills.”) on a 5-point Likert scale ranging from “Strongly Agree” to “Strongly Disagree”. Respondents also indicated why they chose their response and offered suggestions for future improvement through open-response questions. See Appendix H for a copy of the measure.

### **Data Analysis**

Trends in the data were explored using IBM® SPSS® Statistics v.28 and R (R Core Team, 2020). The current study is exploratory research with the intent of examining the feasibility and acceptability of implementing virtual ACT groups with parents of children with ASD whose children engage in challenging behavior. Additionally, due to the small sample size, the study is not powered to evaluate the effect of ACT on treatment fidelity and mental health outcomes; the statistical analyses described below were used to examine exploratory trends in the data.

Feasibility of virtual ACT groups was assessed using descriptive statistics (i.e., percentage, mean, range) on measures of attrition, number of sessions attended, number of sessions rescheduled, and number of homework assignments completed. We conducted statistical analyses to evaluate the influence of selected variables on feasibility outcomes (i.e., number of sessions attended and number of homework assignments completed;  $\alpha = .05$ ). Pearson correlations were calculated to examine associations between discrete variables (i.e., age, perceived stress scores at baseline, self-efficacy scores at baseline, general life satisfaction scores at baseline, number of children in household, child age, and child adaptive behavior scores) and feasibility outcomes. T-tests were used to evaluate the association between categorical variables with two groups

(i.e., employment status) and feasibility outcomes. Analyses of variance (ANOVAs) were used to evaluate the association between categorical variables with more than two groups (i.e., child maladaptive behavior category) and feasibility outcomes.

Acceptability of both virtual ACT groups and the treatment challenge were assessed using descriptive statistics (i.e., overall mean and range, item means and ranges) of the social validity questionnaire (i.e., higher scores indicated higher acceptability). Participant data were included in the analysis if they completed all post-study measures, irrespective of the number of ACT sessions attended ( $n = 6$ ). Further, qualitative data from the social validity questionnaire were thematically analyzed to determine specific areas of strength and areas for improvement within the study design. Thematic analysis included extracting qualitative responses, separating the data into meaningful groupings, coding using the “in vivo” approach (i.e., using verbatim phrases from participants), and delineating the relevant themes that occurred across participants (Castleberry & Nolen, 2018; Glaser & Strauss, 1967). After relevant themes were identified and a comprehensive codebook was created defining each theme, an undergraduate research assistant coded 33% of participant responses to assess IOA. Inter-observer agreement between primary and secondary coders was 100% for the virtual ACT group social validity and 100% for the treatment challenge social validity.

To evaluate the effect of the ACT intervention on parental mental health variables, we used a mixed modeling analysis. In the first model, we examined the effect of the ACT intervention on AAQ-2 scores by assessing the change in scores over time while controlling for individual differences in baseline scores. In the second model, we examined the effect of the ACT intervention on general life satisfaction scores by

assessing the change in scores from pre-test to post-test while controlling for individual differences in baseline scores. This model design was repeated to examine the effect of the ACT intervention on perceived stress scores (model 3), and self-efficacy scores (model 4) for participants who attended the majority of the virtual group sessions. As there was only one participant who did not attend the majority of the virtual group sessions but filled out all post-survey measures, changes in NIH Emotion Domain scores from pre-test to post-test were assessed using linear regressions for this participant.

Additionally, we also utilized mixed model analyses to assess whether any variables (i.e., age, income, employment, number of children in household, child age, child behavior function, child educational placement, presence of a comorbid diagnosis in addition to ASD, child adaptive behavior score, child maladaptive behavior category, and NIH Emotion Domain scores at baseline) predicted the relationship between the ACT intervention and changes in scores on the AAQ-2 for participants who attended the majority of virtual group sessions. Model comparisons were conducted between each predictor model (e.g., association between baseline perceived stress scores and change in AAQ-2 scores over time) and the baseline model (e.g., change in AAQ-2 scores over time) to reduce overfitting (Lever et al., 2016). See Rodgers (2010) for more detailed information on model comparisons. Variables were further analyzed if model comparison statistics (i.e., AIC, BIC, and Bayes factors) suggested that the addition of the predictor was appropriate for the model analysis (Fife & Mendoza, 2021; see Table 5 for model comparison outcomes). Significance was then calculated using Satterthwaite's degrees of freedom method (via lmerTest package; Kuznetsova et al., 2017). The literature suggests

that Satterthwaite's method is an appropriate approximation of significance for small-sample sizes (Kuznetsova et al., 2017; Luke, 2017).



**Table 5***Outcomes of Model Comparison Analyses*

Variables Further Analyzed			
	AIC	BIC	Bayes Factor
Income			
Full	194.695	206.517	2.761
Reduced	198.415	208.548	0.362
Employment			
Full	194.019	205.841	3.871
Reduced	198.415	208.548	0.258
Group Number			
Full	190.113	203.624	11.732
Reduced	198.415	208.548	0.085
Children in Household			
Full	195.972	207.794	1.458
Reduced	198.415	208.548	0.686
Child Age			
Full	198.315	210.137	0.452
Reduced	198.415	208.548	2.213
Child Educational Placement*			
Full	190.337	202.159	24.400
Reduced	198.415	208.548	0.041
Child Behavioral Function*			
Full	185.693	199.204	106.913
Reduced	198.415	208.548	0.009
Comorbid Diagnoses*			
Full	191.757	203.579	11.996
Reduced	198.415	208.548	0.083
Child Maladaptive Behavior Category*			
Full	186.418	199.929	74.400
Reduced	198.415	208.548	0.013
Baseline General Life Satisfaction Score*			
Full	195.773	207.595	1.611
Reduced	198.415	208.548	0.621
Variables Not Further Analyzed			
	AIC	BIC	Bayes Factor
Age			
Full	200.005	211.827	0.194
Reduced	198.415	208.548	5.151
Baseline Perceived Stress Score			
Full	199.340	211.162	0.271
Reduced	198.415	208.548	3.695
Baseline Self-Efficacy Score			
Full	199.271	211.093	0.280
Reduced	198.415	208.548	3.569

*Note.* Model comparison was not conducted for child adaptive behavior score due to missing data

preventing a comparison. \*Variables found to have statistically significant associations with

AAQ-2 scores in further analyses

Outcomes of the treatment challenge were assessed using descriptive statistics (i.e., frequency, mean, range). We conducted statistical analyses to evaluate the influence of selected variables on treatment challenge outcomes (i.e., procedural fidelity percentage, omission error percentage, commission error percentage;  $\alpha = .05$ ). Participant data were included in the analysis if they completed all post-study measures ( $n = 6$ ). Pearson correlations were calculated to examine associations between variables (i.e., number of sessions attended, number of homework assignments completed, and number of trials to mastery) on mean procedural fidelity percentage across the treatment challenge sessions. We also calculated ANOVAs to evaluate the association between categorical variables with more than two groups (i.e., child behavior function) and procedural fidelity percentage.

## **Chapter 3**

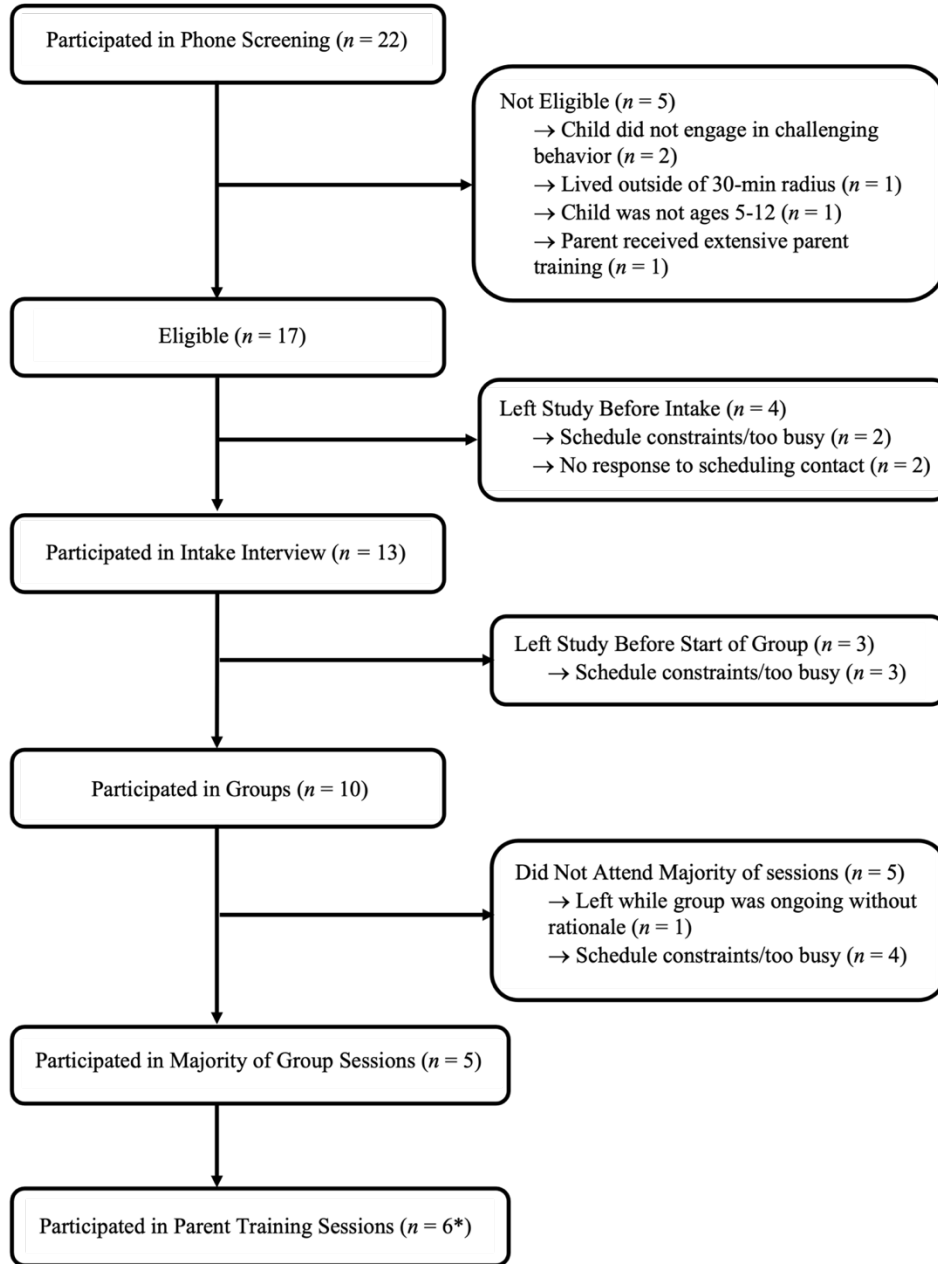
### **Results**

#### **Feasibility Outcomes**

Of the 17 individuals identified as eligible for the present study, 11 stopped participating prior to the final assessment measures (64.7%), while 12 did not complete all study procedures (70%). See Figure 2 for the consort chart detailing when participants left the study. A total of 10 participants attended at least one virtual group session, and six participants completed all post-study measures.

**Figure 2**

*Consort Chart*



*Note.* \*One participant did not attend the majority of sessions but participated in parent training sessions.

The five participants who attended the majority of group sessions (i.e., at least four group sessions) indicated that the following factors encouraged their attendance of the virtual ACT groups (participants could select all that applied): the date and time of the sessions worked well for their schedules (100%), the sessions being virtual (80%), interest in session content (80%), and connection with facilitators (80%). Only one participant completed all post-study procedures after not attending the majority of group sessions (i.e., attended fewer than four sessions). This participant indicated that the following factors hindered their attendance of the virtual ACT groups: unexpected events regarding their child, unexpected events regarding themselves or other family members, and high levels of stress.

Across the three groups, participants attended a mean of 3.75 sessions out of 6 (range, 1-6) and completed a mean of 2.75 homework assignments out of 5 (range, 0-5). In Group 1, Participant 1 and Participant 2 attended only session 2, and both Participant 3 and Participant 4 attended all six group sessions. In Group 2, Participant 5 attended only session 1, Participant 6 attended 3 sessions (sessions 2, 3, and 4), and both Participant 7 and Participant 8 attended all six group sessions. In Group 3, Participant 9 attended 5 group sessions (all except session 6) and Participant 10 attended 3 group sessions (sessions 2, 3, and 4). Only two sessions were rescheduled across all three groups due to two or more participants communicating in advance that they could not attend. Results indicate that there is a moderate, positive correlation between their child's adaptive behavior score and both the number of sessions participants attended ( $R = .706, p = .02$ ) and the number of homework assignments completed ( $R = .709, p = .02$ ), such that higher adaptive behavior scores were associated with more sessions attended and more

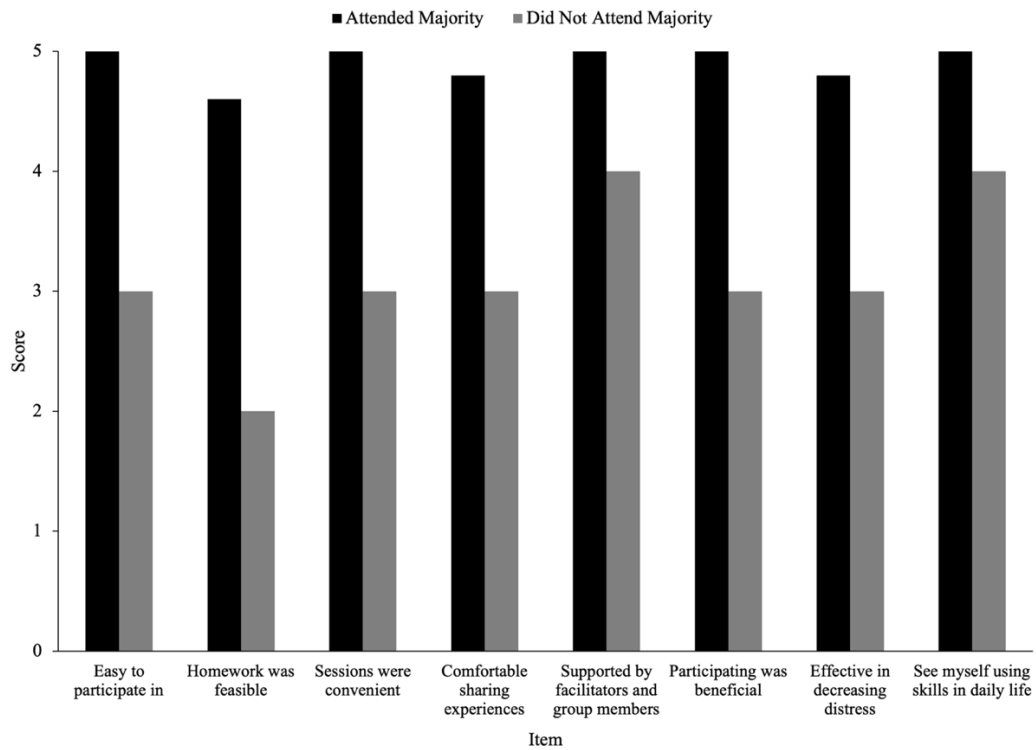
homework assignments completed. Results also demonstrated a moderate, positive correlation between self-efficacy scores at baseline and the number of sessions attended ( $R = .623$ ,  $p = .04$ ), such that higher self-efficacy at baseline was associated with more sessions attended. No other variables analyzed showed a significant association with feasibility outcomes.

### **Acceptability Outcomes**

Participants rated the virtual ACT groups as highly acceptable, with participants who attended the majority of sessions reporting a mean social validity score of 4.9 out of 5 (range, 4.75-5). As previously mentioned, only one participant who did not attend the majority of the virtual ACT group sessions completed all post-study measures. This participant rated the groups as moderately acceptable, with a mean social validity score of 3.1 out of 5. See Figure 3 for mean scores of each item.

**Figure 3**

*Virtual ACT Groups Social Validity Mean Item Scores*



*Note.* Only one participant who did not attend the majority of sessions completed the social validity measure.

5 = Strongly Agree, 4 = Agree, 3 = Neither Agree nor Disagree, 2 = Disagree, 1 = Strongly Disagree

Thematic analysis results indicate that participants perceived groups as, in order of salience, (a) safe, non-judgmental, and comfortable spaces ( $f = 29$ ; "...helped me say things out loud that I can't always say to friends and family); (b) providing helpful skills and strategies that assisted in improving well-being ( $f = 13$ ; "I've been able to use the things that I've learned to help me decrease stress when a challenge arises"); and (c) being easier to attend due to the virtual format ( $f = 7$ ; "Virtual made it a lot easier to make the sessions"). Participants also identified some areas for improvement in future virtual ACT groups ( $f = 5$ ), including adding more group members, grouping participants based on similar characteristics (e.g., child age), and having more frequent accountability checks. See Table 6 for breakdown of all themes.



**Table 6**

*Virtual Act Group Social Validity Thematic Analysis*

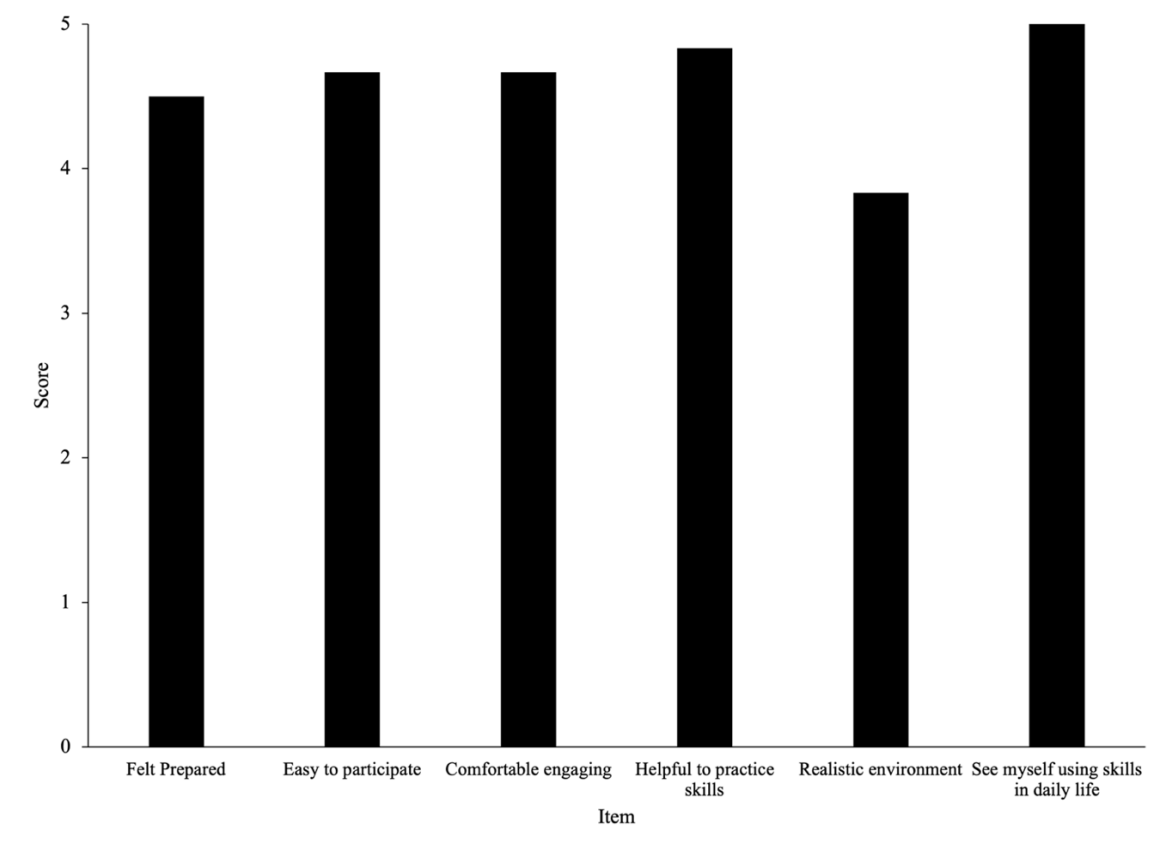
Theme	Overall <i>f</i>
1. Groups were safe, non-judgmental, and comfortable spaces	29
2. Learned helpful skills/strategies that assisted in improving well-being	13
3. Benefits of virtual format	7
4. Group activities and homework were clear and relevant	7
5. Potential improvements for future virtual ACT groups	5
6. Homework was an extra “to-do” in schedule	2
7. Some barriers to attendance	2

*Note.* *f* = frequency of mention across all open-response questions

Participants also rated the treatment challenge as highly acceptable, with a mean social validity score of 4.58 out of 5 (range, 3.83-5). See Figure 4 for mean scores of each item. Thematic analysis results indicate that participants reported that, in order of salience, (a) the treatment challenge was helpful for practicing strategies in different scenarios ( $f = 23$ ; “The treatment challenge was wonderful and gave me a really good strategy to work with”); (b) they felt prepared for the treatment challenge ( $f = 14$ ; “Participants were very prepared”); and (c) the study team assisted in creating a comfortable environment ( $f = 9$ ; “Everyone was awesome though and the [confederate] who did it with me definitely made me feel less anxious”). However, they also reported that the treatment challenge could not fully simulate real-life scenarios ( $f = 6$ ; “I would say it isn’t exactly like real life and at home practice will definitely be needed to help with actual behavior change with myself and daughter”) and indicated potential improvements for future treatment challenges ( $f = 5$ ), including having the format be more continuous and naturalistic, conducting sessions in-home, adapting materials for different learning styles, and having a follow-up to check-in on progress.

**Figure 4**

*Treatment Challenge Social Validity Mean Item Scores*



*Note.* 5 = Strongly Agree, 4 = Agree, 3 = Neither Agree nor Disagree, 2 = Disagree, 1 = Strongly Disagree

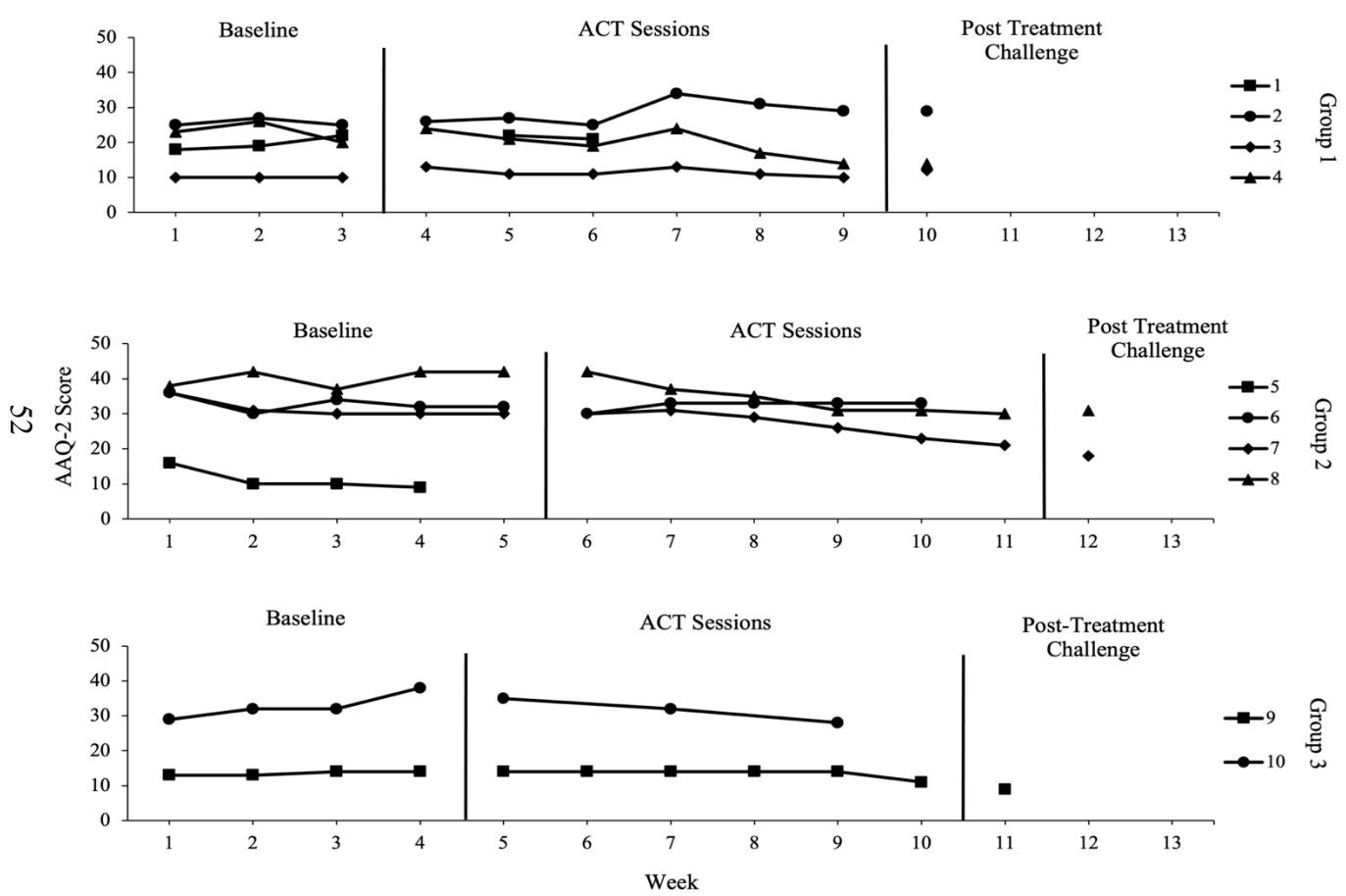
## Virtual ACT Group Outcomes

### *ACT Group Outcomes*

Across the three groups, from baseline through the end of the ACT intervention, results suggested that there was a significant decrease in AAQ-2 scores (i.e., greater psychological flexibility) for participants who attended the majority of virtual group sessions, such that we observed a mean decrease of 1.12 points per week over the course of the study ( $\beta = -1.12$ ,  $SE = 0.42$ ,  $p = 0.05$ ). Results also indicated that this significant decrease in AAQ-2 scores continued when the post-treatment challenge data were included, as there was a mean decrease of 1.14 points each week from baseline to post-treatment challenge ( $\beta = -1.14$ ,  $SE = 0.38$ ,  $p = 0.04$ ). For participants who did not attend the majority of virtual group sessions, we observed a mean increase of 0.71 points in AAQ-2 scores per week from baseline through the end of the ACT intervention, though this change was not significant ( $\beta = 0.71$ ,  $SE = 0.57$ ,  $p = 0.32$ ). See Figure 5 for a graph of individual participant AAQ-2 scores across each group.

**Figure 5**

*AAQ-2 Scores Across Groups*



We also observed significant trends in association between the following variables and AAQ-2 scores over the course of the study for participants who attended the majority of virtual group sessions: child behavioral function, child educational placement, presence of a comorbid diagnosis in addition to ASD, child maladaptive behavior category, and general life satisfaction scores at baseline.

For child behavioral function, we observed that there was a mean difference of 12.79 points in AAQ-2 scores between participants whose child's behavior had a tangible function and those whose child's behavior had an attention function ( $\beta = 12.79$ ,  $SE = 3.16$ ,  $p = 0.002$ ), such that those with a tangible function had higher AAQ-2 scores (i.e., lower psychological flexibility). There were no significant associations observed between tangible and escape functions or escape and attention functions.

For child educational placement, we observed a mean difference of 8.47 points in AAQ-2 scores between participants whose child was in a mainstream classroom with support and those whose child was in a self-contained special education classroom ( $\beta = -8.47$ ,  $SE = 2.90$ ,  $p = 0.01$ ), such that participants whose children were in self-contained special education classrooms had lower AAQ-2 scores (i.e., higher psychological flexibility).

For child diagnosis, we observed a mean difference of 9.12 points in AAQ-2 scores between participants whose children were only diagnosed with ASD and participants whose children were diagnosed with at least one comorbid disorder ( $\beta = 9.12$ ,  $SE = 3.447$ ,  $p = 0.02$ ). Results demonstrated that participants whose children were diagnosed with at least one comorbid disorder in addition to ASD had higher AAQ-2 scores (i.e., lower psychological flexibility).

For child maladaptive behavior category, we observed a mean difference of 11.60 points in AAQ-2 scores between participants whose child's behavior was categorized as "Elevated" and those whose child's behavior was categorized as "Average" ( $\beta = 11.60$ ,  $SE = 2.69$ ,  $p = 0.001$ ), such that participants whose child's behavior was categorized as "Elevated" had higher AAQ-2 scores (i.e., lower psychological flexibility). There were no significant associations observed between "Average" and "Clinically Significant" categories or "Elevated" and "Clinically Significant" categories.

For general life satisfaction scores at baseline, we observed that, for each 1 unit increase in baseline general life satisfaction scores, AAQ-2 scores decreased by a mean of 1.09 points ( $\beta = -1.09$ ,  $SE = 0.17$ ,  $p = 0.007$ ), such that participants with higher general life satisfaction at baseline demonstrated higher psychological flexibility over the course of the study.

No other variables analyzed (i.e., age, income, employment status, child age, number of children in household, child adaptive behavior score, perceived stress score at baseline, and self-efficacy score at baseline) appeared to have a significant association with AAQ-2 scores over the course of the study.

### ***Emotion Domain Measures Outcomes***

For participants who attended the majority of virtual group sessions, we observed a decrease in perceived stress scores, an increase in self-efficacy scores, and an increase in general life satisfaction scores across timepoints (i.e., baseline, post-ACT intervention, post-treatment challenge). For perceived stress scores, we observed a statistically significant change such that perceived stress scores decreased by 4.20 points across the study ( $\beta = -4.20$ ,  $SE = 1.35$ ,  $p = 0.02$ ). For self-efficacy scores, we observed a mean

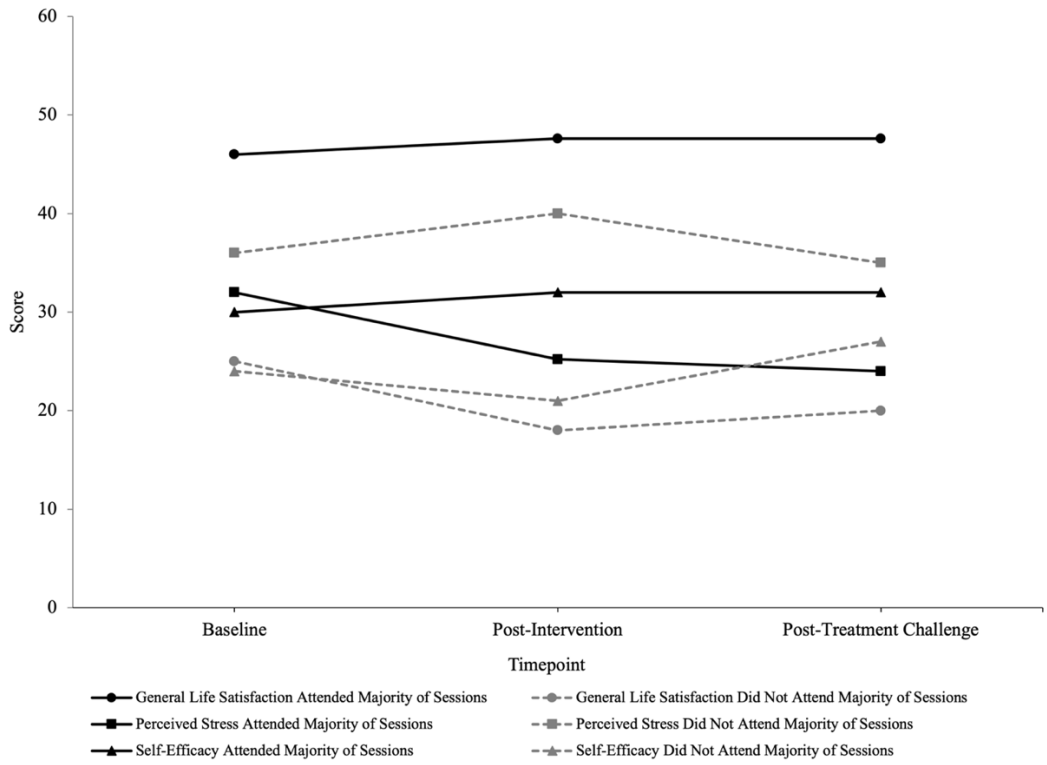
increase of 1.00 point. Though self-efficacy did increase across the study, this change was not statistically significant ( $\beta = 1.00, SE = 0.79, p = 0.27$ ). For general life satisfaction scores, we observed a mean increase of 0.80 points. Again, though general life satisfaction did increase across the study, this change was not statistically significant ( $\beta = 0.80, SE = 1.45, p = 0.61$ ).

For the one participant who did not attend the majority of virtual group sessions but did complete all post-study measures, we observed a 0.5 decrease in perceived stress scores ( $t = -0.19, p = 0.88$ ), a 1.5 increase in self-efficacy scores ( $t = 0.58, p = 0.67$ ), and a 2.5 point decrease in general life satisfaction scores ( $t = -0.96, p = 0.51$ ) across timepoints (i.e., baseline, post-ACT intervention, post-treatment challenge). See Figure 6 for mean participant perceived stress scores, self-efficacy scores, and general life satisfaction scores across timepoints.



**Figure 6**

*Mean NIH Emotion Domain Scores Across Timepoints*



*Note.* Only one participant who did not attend the majority of sessions completed the post-intervention and post-treatment challenge measures.

### ***Treatment Challenge Outcomes***

During the initial parent training session, participants required a mean of 6.17 trials (range, 3-11) to reach mastery in implementing the behavior management strategies. During the treatment challenge, participants' total mean procedural fidelity was 87.65% (range, 75.37%-96.80%). Participants made a mean of 15.67 (range, 5-33; median, 14) total errors in implementation across the five, 5-min treatment challenge sessions. Of these errors, 7.09% were omission errors (range, 0%-30.43%, median 0%), 58.44% were commission errors (range, 34.78%-88.89%; median, 51.05%), and 34.47% were incorrect implementation of specific procedural fidelity steps (range, 3.03%-60%; median, 37.39%). Incorrect implementation errors included phrasing the instruction as a question instead of a statement (e.g., "Can we please turn on the water?") and not signaling to the confederate when access to the reinforcer was available or unavailable (e.g., not turning the bracelet to red after 20 s of reinforcement). No variables analyzed showed a significant association with procedural fidelity percentage.

## **Chapter 4**

### **Discussion**

The current study examined the feasibility and acceptability of virtual parent ACT groups for parents of children with ASD and co-occurring challenging behavior. The study also incorporated in-person parent training sessions to teach parents behavioral management strategies for their child's challenging behavior and a treatment challenge to provide participants an opportunity to integrate the skills learned during the virtual ACT intervention during scenarios simulating treatment challenges, such as the reemergence of challenging behavior when parents are introduced into behavioral treatment.

Both the low recruitment return rate despite extensive recruitment efforts and the high attrition rate that we observed suggest that committing to a 9-week intervention (i.e., intake interview, six virtual ACT group sessions, two parent training sessions) was not feasible for many participants. Though recruitment materials were widely distributed, only a small number of parents took the initial step of reaching out to schedule a phone screening. This low recruitment return rate suggests that parents may have viewed the potential commitment as infeasible, and could have found it difficult to prioritize their own mental health needs over their other responsibilities. This hypothesis may also explain the high attrition rate we observed in this study, as barriers to engaging in parental support activities, including organizing childcare and fitting in sessions around other commitments, such as work, parental responsibilities, child therapy sessions (e.g., behavioral therapy, speech-language therapy), and extracurricular activities may have impacted participants' perception of being able incorporate another activity into their schedules (Mytton et al., 2014; Preece et al., 2016). In the current study, parents reported similar barriers to participation (e.g., doctor's appointments scheduled during session

time), along with unexpected life events such as a death in the family, health concerns requiring medical care, and a child being admitted to a residential program. Though most of these barriers to attendance are not unique to parents of children with ASD, parents of children with ASD and co-occurring challenging behavior may experience certain conflicting factors at a higher frequency, such as hospitalization due to injury from engaging in challenging behavior. Further, children with ASD may have more frequent medical appointments due to comorbid physical and psychological concerns (Matson & Goldin, 2013), have more frequent therapy appointments (Cummings et al., 2015), and may require parental support during extracurricular activities (Must et al., 2015). Thus, parents of children with ASD may face additional barriers to participation in parental support activities and may need increased support for accessing services to increase their well-being. Ultimately, though the use of virtual modalities was meant to make the intervention more accessible to parents and increase scheduling flexibility, weekly virtual ACT group sessions are still an extra activity for parents to incorporate into their already busy schedules, and the commitment to 9 weeks of active participation in the current study may have been overwhelming.

Further, specific to the current study, Group 1's sessions occurred over the holiday season. The holidays can be a stressful time for many parents, but may be particularly stressful for parents of children with ASD due increased child dysregulation (e.g., break in typical routines, sensory overstimulation; Schaaf et al., 2011) and the possibility of judgement from others during family and public events (Ludlow et al., 2011). As such, the increased stress of the holidays may have contributed to some participants not attending the majority of sessions after committing to participating in the

study. Additionally, for many participants, there was a gap in time between their initial phone screening, the intake interview, and the first group session due to the slow rate of recruitment. The gap in time between committing to participate in the study and starting the study procedures may have contributed to the high attrition rate as schedules and life situations may have changed by the time the virtual group sessions were set to start and impacted parents' abilities to incorporate study procedures into their schedules. Further, we observed that some participants were not able to attend consecutive sessions, resulting in a change in the group dynamic when they could attend. Though their addition was beneficial for increasing the number of other parent participants, participants who consistently attended may have been less comfortable sharing challenges with someone with whom they had not developed a consistent connection. Conversely, participants who could only attend some sessions may have felt disconnected with the rest of the group due to the dynamic that was created in their absence, which may have impacted their attendance at future sessions.

However, despite the high attrition rate, we found that, for participants who completed all study procedures, the intervention was feasible, highly acceptable, and had positive outcomes on parental well-being. Of the participants who attended the majority of the virtual group sessions, 83% attended all six virtual ACT group sessions and 80% completed all homework assignments, suggesting that the sessions and homework were feasible to incorporate into their schedules. Further, the finding that parents endorsed the virtual format and flexible scheduling as factors that increased their attendance supports the point in the literature that virtual modalities can increase intervention accessibility (Moffatt & Eley, 2010).

With regard to acceptability, participants rated both the virtual ACT groups and the in-person treatment challenge as highly acceptable as evidenced by high scores on social validity measure items and positive feedback via open-response questions. Specifically, the most salient theme regarding the virtual ACT groups was that participants perceived the groups to be safe, non-judgmental, and comfortable spaces to discuss parenting challenges supports our prediction that administering ACT in a group format would increase parental perception of social support. In a group format, parents were able to connect with others with similar experiences and express parenting challenges in a space that provided validation and support. For instance, in one group a parent of an older child was able to validate the experiences of a parent of a younger child while also providing advice for expectations as their child grows and resources they may consider. As demonstrated in both the literature (e.g., Ludlow et al., 2011) and experiences shared in the current study, parents of children with ASD and co-occurring challenging behavior may have limited opportunities to interact with other parents who understand their situation and its unique benefits and challenges. Thus, a group intervention that provides this opportunity may increase validation, feelings of belonging, and overall well-being. Results of this study extend the current literature on the virtual implementation of ACT for parents of children with ASD by documenting parents' qualitative perspectives of the acceptability of a group-based intervention that focuses primarily on improving parental well-being.

Thematic analysis of open-ended responses regarding the treatment challenge partially supports the hypothesis that participants would report feeling prepared to engage in the treatment challenge and perceive the treatment challenge to be realistic.

Participants did report feeling prepared for the treatment challenge and indicated that the procedures, directions, and expectations were clearly explained. However, though participants reported that they appreciated confederates simulating real-life situations to the best of their ability, results indicated that the treatment challenge was not perceived as realistic. This finding is unsurprising as confederates simulating the challenging behavior of children with ASD in a clinical space is not necessarily representative of participants' real-life experiences with their child where competing variables are present (e.g., siblings, parental responsibilities) or of the intensity of the challenging behaviors (e.g., injury, property destruction). Although the treatment challenge was not consistently perceived as simulating a realistic environment, participants reported that the treatment challenge was helpful for practicing the behavior management strategies in different scenarios. Further, the high procedural fidelity demonstrated by participants supports our prediction that the ACT intervention which taught psychological flexibility would influence persistence with implementing behavior management strategies despite challenges. The treatment challenge was meant to simulate the reemergence of challenging behavior despite accurate implementation of the behavior management strategies taught in the parent training session (i.e., renewal). The high procedural fidelity demonstrated by participants suggests that participants may have used ACT principles (e.g., value-driven behavior and committed action) to persist through the challenges and implement the behavior management strategies with fidelity. These results demonstrate that the treatment challenge may be a feasible, applied method to measure psychological flexibility after the ACT intervention. Future research should compare treatment fidelity with a group receiving the ACT intervention and a control group to assess whether the

treatment challenge is sensitive enough to detect differences between groups. Future researchers and clinicians may consider incorporating a similar treatment challenge into parent training on behavioral interventions to prepare parents for the reemergence of challenging behavior that is likely to occur in the home environment.

Despite the benefits of the in-person treatment challenge, previous literature on behavioral parent training in conjunction with ACT principles (e.g., Andrews et al., 2021; Pennefather et al., 2018) implemented the behavioral parent training virtually and did not present opportunities for hands-on practice when faced with challenges. As these prior studies observed low attrition rates (i.e., 30% in Pennefather et al., 2018), the in-person component of the behavioral parent training sessions and the treatment challenge may have contributed to the high attrition rate observed in the current study. In other words, the in-person components after the flexibility afforded by virtual modalities in the ACT group sessions may have impacted parents' perceived ability to incorporate the remaining study procedures into their busy schedules, as evidenced by the finding that only 60% of participants completed the treatment challenge. For participants who dropped out of the study before attending the intake interview, the prospect of even one in-person session may have been perceived as daunting and infeasible, and could have contributed to their decision to end their participation in the study before starting any study procedures. Similarly, participants who ended their participation after the one in-person intake session may have considered the prospect of two additional in-person sessions at the conclusion of the study as infeasible. Future research may consider replicating the virtual ACT group intervention of the current study with all virtual procedures (i.e., intake assessment,



parent training, treatment challenge) to assess whether an entirely virtual procedure would decrease attrition.

Results also suggested that the virtual ACT group intervention had positive outcomes for parents in the areas of psychological flexibility and overall well-being. First, participants who attended the majority of virtual group sessions showed a significant increase in psychological flexibility over the course of the study, whereas participants who did not attend the majority of sessions demonstrated a decrease in psychological flexibility. Because increasing psychological flexibility is the main tenant of ACT (Hayes et al., 2004), this finding suggests that the current study's 6-week virtual ACT group intervention was effective in producing positive treatment outcomes, especially given the observed differences between participants who attended the majority of sessions and those who did not. This increase in psychological flexibility across the course of the current study both supports the current literature on the positive treatment outcomes for parents of children with ASD (e.g., Hahs et al., 2019) and extends the literature to include positive treatment outcomes for parents of children with ASD and co-occurring challenging behavior when implemented in a virtual, group format.

Results also demonstrated possible predictors of psychological flexibility scores. Specifically, having higher general life satisfaction at baseline, their child's behavior having an attention function rather than an escape or tangible function, their child being placed in a self-contained special education classroom rather than a general education classroom, their child not having a comorbid diagnosis, and their child's behavior being categorized as "Average" rather than "Elevated" may be associated with higher participant psychological flexibility. However, due to the small sample in the current

study, future analysis with a larger sample is needed to explore whether these variables are true predictors of psychological flexibility for parents of children with ASD and co-occurring challenging behavior.

Results also indicate that participants reported significantly lower stress over the course of the study. This finding supports those reported in Andrews et al. (2021) and Pennefather et al. (2018) that the virtual implementation of ACT with parents of children with ASD is effective in decreasing parental stress. Results also extend the literature by demonstrating a reduction in stress following a virtual ACT intervention alone rather than ACT principles incorporated into virtual parent training. The significant decrease in parental stress may have been related to learning ACT principles in a group format, particularly the increased social support, validation, and lack of judgment that the groups provided. Previous literature has demonstrated that a lack of perceived social support (e.g., Robinson & Weiss, 2020) and judgment from others (e.g., Ludlow et al., 2011) are associated with increased levels of parental stress; thus, teaching parents strategies to increase psychological flexibility while providing access to social support and validation from others with similar experiences may have contributed to parents' perception of decreased stress over the course of the study. Additionally, this finding provides further support that a virtual group format has positive treatment outcomes for parents of children with ASD and co-occurring challenging behavior. Decreased parental stress has the potential to contribute to more positive parent-child interactions (Brassel et al. 2016) and, ultimately, greater treatment adherence (Yi & Dixon, 2021).

Interestingly, results also demonstrated an increase in participant perceived self-efficacy over the course of the study; however, this change was not statistically

significant. The non-significant change in perceived self-efficacy may be related to the length of the study, as parents may not have had enough time to consistently incorporate the skills and strategies from both the ACT intervention and the treatment challenge to observe significant changes in their perceived ability to manage challenging situations. Future research should examine whether longer-term implementation of the strategies learned in the current intervention would result in a more significant increase in perceived self-efficacy. Despite the non-significance of results, the trend of increasing self-efficacy suggests that the intervention was beneficial for improving parental well-being. Increased self-efficacy may have been influenced by learning ACT principles in a group format. Principles of ACT, such as value-based behavior and committed action, encourage parents to respond to their child's behavior in a way that is in accordance with their values while promoting acceptance and self-compassion (e.g., Brassell et al., 2016), which may have increased parental perception of their ability to manage challenging situations with their child. Further, results demonstrate that participants perceived the group format to provide social support and accountability when learning about how to apply ACT principles to challenging situations. As such, participants may have been more motivated to incorporate ACT principles into their daily life due to the increased accountability of reporting back to a group and observing others describe their use of ACT principles, thereby increasing the frequency in which they used the skills in challenging situations and improving their self-perception of their ability to manage future challenges.

Participants also described potential improvements to the intervention, including adding more group members, grouping participants based on similar characteristics, and

having more frequent accountability checks. Having more participants per group and grouping participants based on similar characteristics could increase the benefits of a group format by fostering stronger connections between group members, which could potentially increase consistent attendance at group sessions. In other words, if parents identified a deeper connection with others in the group based on sharing experiences relevant to their child's current developmental stage or severity of behavior, then they might have made the group sessions more of a priority each week or personally held each other accountable. Future research should explore whether the inclusion of accountability checks and external reinforcement (e.g., contingency management strategies, check-ins via text message), similar to those used to increase adherence to programs designed to increase health outcomes (e.g., Raiff et al., 2020) could assist parents of children with ASD and co-occurring challenging behavior with prioritizing attendance and homework completion, which could potentially lead to increased parent outcomes.

Further, participants indicated that the treatment challenge could also be improved by providing materials in different formats for individuals with different learning styles and incorporating maintenance sessions. Participants also suggested that they might benefit from participating in the treatment challenge at-home, which corroborates the finding that participants reported the treatment challenge to be somewhat unrealistic. Conducting the treatment challenge in participants' homes could still provide the opportunity for the parent to practice implementing behavioral management strategies with a confederate, with the added benefit of practicing in the natural environment to potentially increase the likelihood of the strategies generalizing to that setting. Future research may consider the feasibility and acceptability of the current intervention with the

addition of an in-home treatment challenge to assess differences in procedural fidelity of implementing behavioral management strategies in challenging situations and consider measuring maintenance of treatment effects in the home environment.

Overall, the current study suggested that although a 6-week, virtual ACT group intervention with in-person components may not have been feasible for some parents, individuals who did participate in the full intervention and parent training experienced positive outcomes and were highly satisfied. This supports the literature on the positive outcomes of ACT interventions for parents of children with ASD, and extends the literature to include the virtual implementation of a group ACT intervention alone with parents of children with ASD and co-occurring challenging behavior.

### **Limitations**

There are some limitations to the current study that warrant mention. First, the sample size limits the generalization of results. Further, the current study was not powered to examine predictors of intervention outcomes, which would have been useful for understanding who benefitted most from this intervention and informing future recruitment targets. Additionally, this small sample size affected the size of the groups as, with the high attrition rate, each of the three groups did not have more than two members who consistently attended. With a larger sample size, we may have been able to add more participants to the groups to maintain the desired number of four participants per group when participants were unable to attend specific sessions or left the study. A goal of the group format was to expose participants to multiple other parents with similar experiences, therefore having only one other person consistently in the group may have

impacted outcomes if the parent felt that they did not connect with the other group member.

Additionally, the majority of the outcome measures we collected were self-report. Though parental self-report measures are important to examine, the change in variables may have been due to an inflated perception of change due to participating in the study and may not maintain when they are no longer an active participant. Further, though the rapport and connection made with the facilitator was reported as beneficial by participants, this connection may have impacted participants' self-report of their improved well-being by wanting to present positively to the facilitator.

Further, the use of the nonconcurrent multiple baseline design was a limitation as we were unable to control for extraneous variables (e.g., time) while examining the effect of the ACT intervention on parental well-being. As such, external variables may have affected the outcomes of the current study, not the ACT intervention alone. Or, conversely, the external variables may have decreased the effectiveness of the ACT intervention (e.g., holidays impacting attendance). Future research should examine the effect of the virtual ACT group intervention on parental well-being using a stronger research design (e.g., concurrent multiple baseline design, group design) to assess whether the findings of the current study are replicated.

Another limitation of the current study is that the sample was not fully representative of the population of parents of children with ASD or of the population of children with ASD. First, the sample was largely white and female, despite wide recruitment efforts across the community. The prevalence of ASD is fairly similar across racial and ethnic groups (Maenner et al., 2021), therefore, the demographics of the

current sample are under-representative of families from historically marginalized racial and ethnic groups and affect the generalizability of the findings to the larger population of parents of children with ASD. Finally, the majority of participants in the current study were of higher socioeconomic status, with 60% of participants reporting household incomes above the national median (\$67, 251; Shrider et al., 2021) and no participants requiring the mobile hotspot for consistent internet connectivity during the virtual group sessions. Parents of children with ASD from lower socioeconomic backgrounds may have additional stressors (e.g., financial stressors) that could contribute to higher stress levels, suggesting that they might benefit the most from parental support activities. The overrepresentation of white participants from higher socioeconomic backgrounds suggests that there may have been variables in the current study acting as barriers for a more diverse sample. Future research should examine these barriers and adapt the intervention to increase accessibility and assess whether the positive treatment outcomes replicate with more diverse individuals.

Additional limitations of the current study are that there were no maintenance checks after the completion of the study to assess whether the positive treatment outcomes persisted over time or measures of generalization to the natural environment. Though we observed positive outcomes and high procedural fidelity for participants who completed all study procedures, we did not examine whether participants continued to benefit from the intervention or used the skills learned from both the ACT intervention and the treatment challenge to manage challenging situations with their child.

## **Future Directions**

Future research should attempt to examine barriers to participating in a virtual group intervention targeting parental well-being. The researchers' difficulty with recruitment and high attrition rate demonstrate that the intervention and training were not prioritized by parents or that procedures were not feasible for all parents. Future research should examine barriers that may prevent parents from participating in virtual ACT group sessions, and adapt the intervention to increase the feasibility and accessibility for the individuals who could benefit the most.

Similarly, future research should examine whether a shorter duration of the same intervention (e.g., 3-week intervention vs. 6-week intervention) could be just as effective in demonstrating positive treatment outcomes and acceptability while possibly increasing feasibility. This shorter duration was demonstrated in previous research (e.g., Pennefather et al., 2018), though the intervention was not primarily focused on the ACT intervention. Results of the current study suggest that committing to a 6-week virtual ACT intervention with some in-person participation may have been overwhelming for some individuals, and it would be interesting to examine whether a shorter commitment would decrease barriers to participation.

Finally, future research should replicate the current study to examine whether the intervention results in positive treatment outcomes and high perceived acceptability with a larger sample of individuals. More data on the outcomes of a virtual, group-based ACT intervention could inform whether these groups should be offered to parents on a larger scale. Further, future research should examine the combination of the current intervention for parents of children with ASD and co-occurring challenging behavior with the child's



behavioral treatment. Though there is literature demonstrating the positive impact of ACT for parents of children with ASD on behavioral treatment outcomes (e.g., Andrews et al., 2021), to date no study has included the addition of a virtual, group ACT-focused intervention for this population while the child is receiving behavioral treatment. This future research could assist in determining the utility of the virtual, group-based ACT intervention for parents of children with ASD and co-occurring challenging behavior when combined with child behavioral treatment, which could encourage parents to prioritize their own mental health and well-being during an already scheduled commitment. Integrating parental well-being within their child's behavioral treatment could contribute to greater access to mental health support as parents are already seeking out and prioritizing services for their child and may be inclined to consider their own well-being if perceived as related to their child's treatment outcomes. The addition of parental well-being interventions into a child's behavioral treatment could inform future guidelines in the field of ABA and increase positive treatment outcomes for both children with ASD and their families.

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## Appendix A

### Functional Assessment Interview Form—Young Child

O'Neill, R. E., Horner, R. H., Albin, R. W., Sprague, J. R., Storey, J. R., & Newton, J. S. (1997). *Functional assessment and program development for problem behavior: A practical handbook* (2nd ed.). Brooks/Cole Publishing.

Child with Problem Behavior(s): \_\_\_\_\_ Date of Interview: \_\_\_\_\_

Age: \_\_\_\_\_ Yrs \_\_\_\_\_ Mos \_\_\_\_\_ Sex: M F

Interviewer: \_\_\_\_\_ Respondent(s): \_\_\_\_\_

#### A. DESCRIBE THE BEHAVIOR(S)

1. What are the behaviors of concern? For each, define how it is performed, how often it occurs per day, week, or month, how long it lasts when it occurs, and the intensity in which it occurs (low, medium, high).

<u>Behavior</u>	<u>How is it performed?</u>	<u>How often?</u>	<u>How long?</u>	<u>Intensity?</u>
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- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

2. Which of the behaviors described above occur together (e.g., occur at the same time; occur in a predictable "chain"; occur in response to the same situation)?

B. DEFINE POTENTIAL ECOLOGICAL EVENTS THAT MAY AFFECT THE BEHAVIOR(S)

1. What medications does the child take, and how do you believe these may affect his/her behavior?
2. What medical complication (if any) does the child experience that may affect his/her behavior (e.g., asthma, allergies, rashes, sinus infections, seizures)?
3. Describe the sleep cycles of the child and the extent to which these cycles may affect his/her behavior.
4. Describe the eating routines and diet of the child and the extent to which these routines may affect his/her behavior.
5. Briefly list the child's typical daily schedule of activities and how well he/she does within each activity.

DAILY ACTIVITIES

<u>Activity</u>	<u>Child's Reaction</u>
6:00 am	
7:00 am	
8:00 am	
9:00 am	
10:00 am	
11:00 am	
12:00 pm	
1:00 pm	
2:00 pm	
3:00 pm	
4:00 pm	
5:00 pm	
6:00 pm	

7:00 pm

8:00 pm

9:00 pm

6 Describe the extent to which you believe activities that occur during the day are predictable for your child. To what extent does the child know what he/she will be doing and what will occur during the day (e.g., when to get up, when to eat breakfast, when to play outside)? How does your child know this?

7. What choices does the child get to make each day (e.g., food, toys, activities)?

C. DEFINE EVENTS AND SITUATIONS THAT PREDICT OCCURRENCES OF THE BEHAVIOR(S)

1. Time of Day: When are the behaviors most and least likely to happen?

Most likely:

Least likely:

2. Settings: Where are the behaviors most and least likely to happen?

Most likely:

Least likely:

3. Social Control: With whom are the behaviors most and least likely to happen?

Most likely:

Least likely:

4. Activity: What activities are most and least likely to produce the behaviors?

Most likely:

Least likely:

5. Are there particular situations, events, etc. that are not listed above that "set off" the behaviors that cause concern (particular demands, interruptions, transitions, delays, being ignored, etc.)?

6. What one thing could you do that would most likely make the problem behavior occur?

7. What one thing could you do to make sure the problem behavior did not occur?

D. DESCRIBE THE CHILD'S PLAY ABILITIES AND DIFFICULTIES

1. Describe how your child plays (With what? How often?).

2. Does your child have problem behavior when playing? Describe.

3. Does your child play alone? What does he/she do?

4. Does your child play with adults? What toys or games?

5. Does your child play with other children his/her age? What toys or games?

6. How does your child react if you join in a play activity with him/her?

7. How does your child react if you stop playing with him/her?



8. How does your child react if you ask him/her to stop playing with a toy and switch to a different toy?

E. IDENTIFY THE “FUNCTION” OF THE UNDESIRABLE BEHAVIOR(S)

1. Think of each of the behaviors listed in Section A, and define the function(s) you believe the behavior serves for the child (i.e., what does he/she get and/or avoid by doing the behavior?)

Behavior	What does he/she get?	Or	What exactly does he/she avoid?
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

2. Describe the child's most typical response to the following situations:

a. Are the above behavior(s) more likely, less likely, or unaffected if you present him/her with a difficult task?

b. Are the above behavior(s) more likely, less likely, or unaffected if you interrupt a desired event (eating ice cream, watching a video)?

c. Are the above behavior(s) more likely, less likely, or unaffected if you deliver a “stem” request/command/reprimand?

- d. Are the above behavior(s) more likely, less likely, or unaffected if you are present but do not interact with (ignore) the child for 15 minutes?
- e. Are the above behavior(s) more likely, less likely, or unaffected by changes in routine?
- f. Are the above behavior(s) more likely, less likely, or unaffected if something the child wants is present but he/she can't get it (i.e., a desired toy that is visible but out of reach)?
- g. Are the above behavior(s) more likely, less likely, or unaffected if he/she is alone (no one else is present)?

F. DEFINE THE EFFICIENCY OF THE UNDESIRABLE BEHAVIOR(S)

1. What amount of physical effort is involved in the behaviors (e.g., prolonged intense tantrums vs. simple verbal outbursts, etc.)?

2. Does engaging in the behaviors result in a "payoff (getting attention, avoiding work) every time?

Almost every time? Once in a while?

3. How much of a delay is there between the time the child engages in the behavior and gets the "payoff"?

Is it immediate, a few seconds, longer?

G. DEFINE THE PRIMARY METHOD(S) USED BY THE CHILD TO COMMUNICATE

1. What are the general expressive communication strategies used by or available to the child? (e.g., vocal speech, signs/gestures, communication books/boards, electronic devices, etc.) How consistently are the strategies used?

2. If your child is trying to tell you something or show you something and you don't understand, what will your child do? (repeat the action or vocalization? modify the action or vocalization?)

3. Tell me how your child expresses the following:

FUNCTIONS	GRAB & REACH	GIVE	POINT	LEAD	GAZE SHIFT	MOVE TO YOU	MOVE AWAY FROM YOU	HEAD NOD/HEAD SHAKE	FACIAL EXPRESSION	VOCALIZE	IMMEDIATE ECHO	DELAYED ECHO	CREATIVE SINGLE WORD	CREATIVE MULTI WORD	SIMPLE SIGNS	COMPLEX SIGNS	SELF-INJURY	AGGRESSION	TANTRUM	CRY OR WHINE	OTHER	NONE	
Requests an Object																							
Requests an Action																							
Protests or Escapes																							
Requests Help																							
Requests a Social Routine																							
Requests Comfort																							
Indicates																							
Illness																							
Shows You Something																							

Notes:

4. With regard to receptive communication ability:

a. Does the child follow verbal requests or instructions? If so, approximately how many? (List, if only a few).

b. Is the child able to imitate someone demonstrating how to do a task or play with a toy?

c. Does the child respond to sign language or gestures? If so, approximately how many? (List, if only a few.)

d. How does the child tell you "yes" or "no" (if asked whether he/she wants to do something, go somewhere, etc.)?

H. WHAT EVENTS, ACTIONS, AND OBJECTS ARE SUPPORTIVE OR PRESENT CHALLENGES TO THE CHILD

1. Describe the things that your child really enjoys. For example, what makes him/her happy? What might someone do or provide that makes your child happy?

2. What kinds of things have you or your child's care providers done to try and change the problem behaviors?

I. DEVELOP SUMMARY STATEMENTS FOR EACH MAJOR PREDICTOR AND/OR CONSEQUENCE

Distant Setting Event	Immediate Antecedent (Trigger)	Problem Behavior	Maintaining Consequences	Function
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## Appendix B

### Motivation Assessment Scale

Duran, V. M., & Crimmins, D. B. (1988). Identifying the variables maintaining self-injurious behavior. *Journal of Autism and Developmental Disorders, 18*, 99–117.  
<https://doi.org/DOI: 10.1007/BF02211821>

Name:

Rater:

Date:

Behavior Description:

Setting Description:

Instructions: The Motivation Assessment Scale is a questionnaire designed to identify those situations in which an individual is likely to behave in certain ways. From this information, more informed decisions can be made concerning the selection of appropriate reinforcers and treatments. To complete the Motivation Assessment Scale, select one behavior that is of particular interest. It is important that you identify the behavior very specifically. Aggression, for example, is not as good as a description as hits his sister. Once you have specified the behavior to be rated, read each question carefully and circle the number that best describes your observation of this behavior.

Never=0 Almost Never=1 Seldom=2 Half the Time=3 Usually=4

Almost Always=5 Always=6

1. Would the behavior occur continuously, if this person were left alone for long periods of time, for example, several hours?	0	1	2	3	4	5	6
2. Does the behavior occur following a specific task?	0	1	2	3	4	5	6
3. Does the behavior seem to occur in response to your talking to another person in the room?	0	1	2	3	4	5	6
4. Does the behavior ever occur to get a toy, food, or activity that this person has been told that he or she can't have?	0	1	2	3	4	5	6
5. Would the behavior occur repeatedly in the same way for very long periods of time if no one were around, for example rocking back and forth for over an hour?	0	1	2	3	4	5	6
6. Does this behavior occur when any request is made of this person?	0	1	2	3	4	5	6

7. Does the behavior occur whenever you stop attending to this person?	0	1	2	3	4	5	6
8. Does the behavior occur when you take away a favorite toy, food, or activity?	0	1	2	3	4	5	6
9. Does it appear to you that this person enjoys performing the behavior? (It feels, tastes, looks, smells, and sounds pleasing).	0	1	2	3	4	5	6
10. Does this person seem to do the behavior to upset or annoy you when you are trying to get them to do what you ask?	0	1	2	3	4	5	6
11. Does this person seem to do the behavior to upset or annoy you when you are not paying attention to them, for example, if you are sitting in a separate room, interacting with another person?	0	1	2	3	4	5	6
12. Does the behavior stop occurring shortly after you give this person the toy, food, or activity they requested?	0	1	2	3	4	5	6
13. When the behavior is occurring does this person seem calm and unaware of anything else going on around them?	0	1	2	3	4	5	6
14. Does the behavior stop occurring shortly after (one to five minutes) you stop working or making demands of this person?	0	1	2	3	4	5	6
15. Does this person seem to do the behavior to get you to spend some time with them?	0	1	2	3	4	5	6
16. Does this behavior seem to occur when this person has been told that they can't do something he or she had wanted to do?	0	1	2	3	4	5	6

	<u>Sensory</u>	<u>Escape</u>	<u>Attention</u>	<u>Tangible</u>
	<u>1.</u>	<u>2.</u>	<u>3.</u>	<u>4.</u>
	<u>5.</u>	<u>6.</u>	<u>7.</u>	<u>8.</u>
	<u>9.</u>	<u>10.</u>	<u>11.</u>	<u>12.</u>
	<u>13.</u>	<u>14.</u>	<u>15.</u>	<u>16.</u>
<u>Total Score</u>				
<u>Mean Score</u>				

<u>Relative</u>				
<u>Ranking</u>				

## Appendix C

### Questions About Behavioral Function

Matson, J. L., & Vollmer, T. R. (1995). *The Questions about Behavioral Function (QABF) user's guide*. Scientific Publishers.

Student's Name \_\_\_\_\_ Date: \_\_\_\_\_

Behavior: \_\_\_\_\_

Respondent: \_\_\_\_\_

Rate how often the student demonstrates the behaviors in situations where they might occur. Be sure to rate how often each behavior occurs, not what you think a good answer would be.

X = Doesn't apply    0 = Never    1 = Rarely    2 = Some    3 = Often

Score	Number	Behavior
	1.	Engages in the behavior to get attention.
	2.	Engages in the behavior to escape work or learning situations.
	3.	Engages in the behavior as a form of "self-stimulation".
	4.	Engages in the behavior because he/she is in pain.
	5.	Engages in the behavior to get access to items such as preferred toys, food, or beverages.
	6.	Engages in the behavior because he/she likes to be reprimanded.
	7.	Engages in the behavior when asked to do something (get dressed, brush teeth, work, etc.
	8.	Engages in the behavior even if he/she thinks no one is in the room.
	9.	Engages in the behavior more frequently when he/she is ill.
	10.	Engages in the behavior when you take something away from him/her.
	11.	Engages in the behavior to draw attention to himself/herself.
	12.	Engages in the behavior when he/she does not want to do something.
	13.	Engages in the behavior because there is nothing else to do.
	14.	Engages in the behavior when there is something bothering him/her physically.
	15.	Engages in the behavior when you have something that he/she wants.
	16.	Engages in the behavior to try to get a reaction from you.
	17.	Engages in the behavior to try to get people to leave him/her alone.
	18.	Engages in the behavior in a highly repetitive manner, ignoring his/her surroundings.



	19.	Engages in the behavior because he/she is physically uncomfortable.
	20.	Engages in the behavior when a peer has something that he/she wants.
	21.	Does he/she seem to be saying, “come see me” or “look at me” when engaging in the behavior?
	22.	Does he/she seem to be saying, “leave me alone” or “stop asking me to do this” when engaging in the behavior?
	23.	Does he/she seem to enjoy the behavior, even if no one is around?
	24.	Does the behavior seem to indicate to you that he/she is not feeling well?
	25.	Does he/she seem to be saying, “give me that (toy, food, item)” when engaging in the behavior?

Attention	Escape	Non-Social	Physical	Tangible
1. Attention	2. Escape	3. Self-stim	4. In pain	5. Access to items
6. Reprimand	7. Do something	8. Thinks Alone	9. When ill	10. Takes away
11. Draws	12. Not do	13. Nothing to do	14. Physical problem	15. You have
16. Reaction	17. Alone	18. Repetitive	19. Uncomfortable	20. Peer has
21. “Come see”	22. “Leave alone”	23. Enjoy by self	24. Not feeling well	25. “Give me that”
Total	Total	Total	Total	Total

## Appendix D

### NIH Toolbox General Life Satisfaction Survey (Ages 18+)

For use in Computerized Adaptive Tests and custom Fixed-length Forms

National Institute of Health. (2016). *NIH Toolbox scoring and interpretation guide for the iPad.*

Please respond to each question or statement by marking one box per row.

<b>Indicate how much you agree or disagree:</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Slightly disagree</b>	<b>Neither agree nor disagree</b>	<b>Slightly agree</b>	<b>Agree</b>	<b>Strongly agree</b>
In most ways, my life is close to perfect....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
If I could live my life over, I would change almost nothing.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
I am satisfied with my life	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
So far I have gotten the important things I want in life	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
My life situation is excellent.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

<b>Indicate how much you agree or disagree:</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
My life is going well	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>My life is just right</b> .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>I wish I had a different kind of life.....</b>	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
<b>I have a good life</b> .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>I have what I want in life.....</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

## Appendix E

### NIH Toolbox Perceived Stress Survey (Ages 18+)

National Institute of Health. (2016). *NIH Toolbox scoring and interpretation guide for the iPad.*

Please respond to each question or statement by marking one box per row.

<b>In the past month...</b>	<b>Never</b>	<b>Almost Never</b>	<b>Sometimes</b>	<b>Fairly Often</b>	<b>Very Often</b>
How often have you been upset because of something that happened unexpectedly?..... .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
How often have you felt that you were unable to control the important things in your life? ..... .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
How often have you felt nervous and “stressed”? ..... .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
How often have you felt confident about your ability to handle your personal problems? ..... .....	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
How often have you felt that things were going your way? .....	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

How often have you found that you could not cope with all the things that you had to do? ..... .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
How often have you been able to control irritations in your life? .....	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
How often have you felt that you were on top of things? ..... ...	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
How often have you been angered because of things that happened that were outside of your control? .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
How often have you felt difficulties were piling up so high that you could not overcome them? .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

## Appendix F

### NIH Toolbox Self-Efficacy Survey (Ages 18+)

National Institute of Health. (2016). *NIH Toolbox scoring and interpretation guide for the iPad.*

Please respond to each question or statement by marking one box per row.

<b>Please read the sentence and decide how true it is of you in general.</b>	<b>Never</b>	<b>Almost Never</b>	<b>Sometimes</b>	<b>Fairly Often</b>	<b>Very Often</b>
I can manage to solve difficult problems if I try hard enough..... .....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
If someone opposes me, I can find the means and ways to get what I want.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
It is easy for me to stick to my aims and accomplish my goals.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
I am confident that I could deal efficiently with unexpected events.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Thanks to my talents and skills, I know how to handle unexpected situations.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
I can solve most problems if I try hard enough..... .....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

I stay calm when facing difficulties because I can handle them.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
When I have a problem, I can find several ways to solve it.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
If I am in trouble, I can think of a solution..... .....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
I can handle whatever comes my way.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

## Appendix G

### The Acceptance and Action Questionnaire (AAQ-2)

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire – II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy, 42*, 676–688.  
<https://doi.org/10.1016/j.beth.2011.03.007>

#### AAQ-2

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Never true</b>	<b>Very seldom true</b>	<b>Seldom true</b>	<b>Sometimes true</b>	<b>Frequently true</b>	<b>Almost always true</b>	<b>Always true</b>

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



## Appendix H

### Social Validity Survey – ACT

1. The virtual group sessions were easy to participate in. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
2. The homework assignments were feasible to complete within my weekly schedule. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
3. The virtual group sessions were convenient for my schedule. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
4. I was comfortable sharing my experiences in my virtual group. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
5. I felt supported by the facilitators and other group members. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree

6. Participating in the virtual group sessions was beneficial for me. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
7. The virtual group sessions were effective in decreasing stress associated with parenting a child with autism with challenging behavior. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
8. I could see myself using skills and exercises learned in the virtual group sessions in my daily life. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
9. I attended most group sessions (at least 4 out of 6 sessions)
  - a. Yes
  - b. No
  
10. [If Yes to #9] What factors encouraged your attendance? [Select all that apply]
  - a. The sessions being virtual
  - b. The date and time of the sessions worked well for my schedule
  - c. I was interested in the session content
  - d. I connected with the other group members
  - e. I connected with the facilitators
  - f. High levels of stress
  - g. Other: \_\_\_\_\_
  
11. [If No to #9] What barriers impacted your attendance? [Select all that apply]
  - a. The date and time of the sessions did not work well for my schedule
  - b. I was not interested in the session content
  - c. I did not connect with the other group members
  - d. I did not connect with the facilitators
  - e. Unexpected events regarding my child
  - f. Unexpected events regarding myself or other family members
  - g. High levels of stress

h. Other: \_\_\_\_\_

12. Please describe your overall experience with participating in the virtual group sessions:

13. Feedback/suggestions for how future virtual group sessions could be improved:

## Appendix I

### Social Validity Survey – Treatment Challenge

1. I felt prepared for the treatment challenge after participating in parent training. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
2. The treatment challenge was easy to participate in (I understood what was expected of me). *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
3. I felt comfortable engaging in the treatment challenge with the therapist(s). *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
4. The treatment challenge was helpful for me to practice skills learned in parent training. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
  
5. The treatment challenge simulated a realistic environment for me to practice my skills. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree

6. I could see myself implementing the skills from the treatment challenge with my child in my daily life. *Please explain why you made your choice in the comment box.*
  - a. Strongly Agree
  - b. Agree
  - c. Neither Agree nor Disagree
  - d. Disagree
  - e. Strongly Disagree
7. Please describe your overall experience with the treatment challenge:
8. Feedback/suggestions for how future treatment challenge sessions could be improved:

## Appendix J

### Example Procedural Fidelity Checklist

Data Collector:

Session Number:

Date:

Procedural Steps	Correct	Incorrect	No opportunity
Parent signals that there is an opportunity to ask for tablet by turning the bracelet to white and saying “it’s on white”			
Parent presents cup of chocolate milk.			
If child says “chocolate milk please” appropriately, parent says “Okay, you can have chocolate milk” and provides access for 20s **appropriately = not screaming, crying, yelling			
If child does not say “chocolate milk please” appropriately, parent does not give access to milk and ignores (i.e., no disapproving looks, not saying anything to child) all challenging behavior			
If child says “chocolate milk please” appropriately but engages in challenging behavior immediately before the item is accessed, parent waits 2-seconds for no challenging behavior, then reminds child to request chocolate milk appropriately			
After providing access to the chocolate milk for 20s, parent removes the desired item and signals that there is not an opportunity to ask for chocolate milk by turning bracelet to red and saying “it’s on red”			
While bracelet is turned to red, parent ignores (i.e., no disapproving looks, not saying anything to child) challenging behavior <u>and</u> requests for chocolate milk and reminds child “it’s on red” <b>only after the first time the child asks</b> . Parent ignores requests after the reminder statement.			

All challenging behavior (hitting/throwing objects, screaming) is ignored *Scored once per trial (either Y or N)			
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## Appendix K

### Example of Challenges Presented During Treatment Challenge

	Session 1	Session 2	Session 3	Session 4	Session 5
Trial 1	Child asks appropriately	Child tries to grab cup off table without asking and, if grabs it, throws it	Child asks appropriately, then throws cup once given	Child engages in challenging behavior and tries to grab cup out of hand	Child engages in challenging behavior, then asks appropriately
Trial 2	Child does not ask appropriately and tries to grab cup out of parent's hand	Child asks appropriately	Child engages in challenging behavior, then asks appropriately	Child asks appropriately	Child asks appropriately, then engages in challenging behavior right before cup is given
Trial 3	Child engages in challenging behavior, then asks appropriately	Child asks appropriately, then engages in challenging behavior before cup is given	Child asks appropriately	Child asks appropriately, then engages in challenging behavior right before cup is given	Child engages in challenging behavior and tries to grab cup and throw it
Trial 4	Child asks appropriately, but won't give cup back after 20s	Child engages in challenging behavior, then asks appropriately	Child asks inappropriately and engages in challenging behavior	Child engages in challenging behavior while bracelet is on red	Child asks for cup appropriately while it's on red, then engages in challenging behavior
Trial 5	Child asks appropriately, then engages in challenging behavior right before cup is given	Child asks inappropriately and engages in challenging behavior, then asks appropriately	Child asks appropriately, then engages in challenging behavior right before cup is given	Child engages in challenging behavior, then asks appropriately	Child asks appropriately



Trial 6	Child engages in challenging behavior, then asks appropriately	Child asks appropriately while bracelet is on red, then engages in challenging bx	Child refuses to give cup back after 20s	Child asks appropriately	Child engages in challenging bx then asks appropriately
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*Note:* Text in red indicates when challenging behavior would persist or intensify despite correct implementation