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ORIGINAL ARTICLE

A Pilot Trial of SPACE (Supportive Parenting for Anxious Childhood Emotions) in Autism

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Abstract

Family accommodation describes changes parents make to their behavior, intended to alleviate their child's distress, which stems from a psychopathology. In anxiety, studies show that accommodation alleviates distress in the short term but is associated with increased symptom severity, greater functional impairment, poorer treatment outcomes, increased caregiver burden and disruption to family functioning longitudinally. Research shows high prevalence of family accommodation of anxiety in autism. While the most common treatments for anxiety in autism are cognitive-behavior therapy and pharmacology, research is limited and other approaches must be considered. Supportive Parenting for Anxious Childhood Emotions (SPACE) is a parent-based, manualized treatment for anxiety targeting family accommodation, which has been found to be acceptable and efficacious in treating childhood anxiety. This pilot trial examined the feasibility, acceptability, treatment-satisfaction, and preliminary efficacy of SPACE for anxiety in autism. Parents of 15 autistic children (ages 6–10 years) with at least average cognitive abilities exhibiting high levels of anxiety participated in 13 weekly sessions of SPACE. Feasibility and acceptability were assessed through enrollment, attrition rates, and adverse events. Of 26 eligible families, 22 (84.62%) elected to participate, 15 of whom (68.18%) completed treatment. Parents rated the treatment as highly satisfactory. Anxiety symptom severity and family accommodation were significantly reduced following treatment, with 86.66% of participants showing reliable change post-treatment, and this reduction was preserved at 2-month follow-up. This study provides preliminary evidence that SPACE is feasible, acceptable, satisfactory, and produces improvement in anxiety in the autistic population. *Trial registration number*: NCT04747262 Date of registration: February 10, 2021

Keywords Autism · Anxiety · Family accommodation · Parent-based treatment

Introduction

Family Accommodation

Family accommodation describes changes in family members' (usually parents) behavior intended to help a relative (usually the child) who is dealing with psychopathology avoid or reduce distress related to the disorder [1]. These changes can involve modifications to family routines, active participation in the symptoms of the disorder, or facilitating avoidance related to the disorder. Research on family accommodation is rapidly expanding and, while most literature has focused on anxiety disorders (AD) and obsessive–compulsive disorder (OCD), studies have demonstrated its prevalence in other areas, including autism [2, 3], eating disorders, tic disorders, and posttraumatic stress disorder [1].

Studies have shown that family accommodation in AD and OCD is associated with more severe symptoms, greater functional impairment, poorer treatment outcomes, increased caregiver burden and disruption to family functioning [1, 4, 5]. The distress felt by the child due to anxiety may cause the parents to accommodate, which, in turn, alleviates the distress in the short term. Over time, however, accommodation facilitates the avoidance of anxiety, and the child increasingly relies on parental accommodation for regulation and coping. The child's anxiety symptoms are maintained or exacerbated by avoidance and independent

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coping is not strengthened or practiced, causing the child and family more distress and leading to further anxiety and accommodation. Thus, while accommodations may alleviate anxiety in the short term, they may maintain the anxiety over time and contribute to long term negative effects [1, 4].

Autism, Anxiety, and Family Accommodation

Autism is a neurodevelopmental disorder characterized by impairment in social communication and interaction, as well as restricted and repetitive behaviors, interests, or activities [6]. Studies have shown high comorbidity rates between autism, AD, and OCD, indicating that approximately 40% of autistic children will meet diagnostic criteria for AD, the most frequent being specific phobia (30%), OCD (17%), and social anxiety disorder (16%) [7]. Anxiety interferes with the lives of autistic children, impacting their ability to engage in activities and interact with their peers, and limits parents' ability to participate in activities or events with their child [8].

The prevalence of family accommodation of anxiety symptoms in autistic children with AD is high. Studies show that 97.5–100% of parents of autistic children with AD report engaging in different forms of accommodations of anxiety symptoms on a weekly to daily basis [9–11]. The most common types of accommodation reported in these studies were: providing the child reassurance, modifying family routine, modifying child's responsibilities or doing things that would normally be the child's responsibility, and avoiding situations that evoke anxiety. In line with the literature on AD and OCD, these studies showed that accommodation is associated with more severe anxiety symptoms, supporting the notion of targeting accommodation in the treatment of anxiety in autism.

Treating Anxiety in Autism

Common treatments for anxiety in autistic children include cognitive behavior therapy (CBT) e.g., [12–15], and medication e.g., [16, 17]. While evidence supports the efficacy of these treatments, research in this field remains scarce and limited (e.g., small sample sizes, lacking control groups) [14, 18]. Recent work supports the efficacy of school-based anxiety interventions for autistic children, though this work is in early stages and faces implementation-related challenges [19].

While some autism intervention studies have used family-centered CBT designed for typically developing children with no modifications e.g., [20, 21], others have tailored their treatment protocol to the autistic population e.g., [22–25]. Evidence shows that autism-modified protocols lead to superior outcomes compared to non-modified protocols e.g., [23, 26], with prominent modifications including: increased psychoeducation, use of visual aids, use of concrete tools, language and examples, highly structured sessions, incorporation of the child's special interests, increased parental involvement, and incorporation of social skills training [15, 16, 23, 27, 28].

Some research [10, 11] examined the relationship between family accommodation and treatment outcomes following CBT. This work has found higher baseline accommodation levels to be associated with higher post-treatment anxiety and likelihood treatment non-response, and that a decrease in accommodation post-treatment was associated with a decrease in anxiety levels. While these findings indicate that family accommodation relates to treatment outcomes, family accommodation has yet to be examined as a target in the treatment of anxiety in autism.

Despite encouraging findings regarding the efficacy of CBT in treating anxiety in autism, not all children respond to these treatments. In a recent study examining a modified CBT protocol for OCD in autistic children, only half of the participants classified as treatment responders [23]. Similarly, 50% of participants in a parent and child group CBT intervention showed clinically meaningful improvements [25]. Furthermore, literature shows that children with comorbid anxiety, OCD, and autism respond poorly to treatment compared with typically developing children [29], and that standard-term (12–14 weeks) and long-term ($\geq$ 16 weeks) interventions produce greater treatment gains than short-term ($\leq$ 12 weeks) interventions, suggesting that autistic children may need more time to understand, apply, maintain, and generalize strategies acquired in treatment [29]. It may also be that other factors, including child characteristics, such as cognitive functioning or autism symptomatology, and parent characteristics, such as parenting stress or family accommodation, affect maintenance of treatment gains over time [24, 30].

Significantly, most research on CBT for autistic children with anxiety focuses on children with low support needs and, while there is promising evidence on the use of CBT in this population, e.g., [28, 29, 31], no treatment protocol has established substantial empirical support [13, 18, 27]. More work is needed to establish evidence-based treatments for anxiety that are applicable across different phenotypes of autism.

CBT, while potentially efficacious, is a child-based treatment requiring active child participation and motivation. Similar to CBT in the general population, it is not viable when the child refuses or is too anxious to take part, or when developmental or communication problems make cognitive interventions difficult [32], perhaps explaining the focus in the literature on autistic children with low support needs. Given the above, it is necessary to consider other mediums of intervention for the treatment of anxiety in autism.

Additionally, evidence shows that parental involvement is a key component of CBT protocols modified for autism, such that larger effect sizes were found in treatments where parents were more involved [29]. In general, parent-mediated interventions in autism have been shown to be effective in reducing autism symptom severity and disruptive behaviors, as well as in fostering child adaptive functioning and social skills [33, 34]. The role of parents in intervention programs for autistic children is the subject of growing attention in the literature (for a comprehensive review, see [35]). While the success of such intervention programs may be influenced by factors such as parental stress and family environment [36], parent-mediated interventions are an important potential avenue for supporting autistic children with anxiety.

Supportive Parenting for Anxious Childhood Emotions

Supportive Parenting for Anxious Childhood Emotions (SPACE) is currently the only parent-based treatment for anxiety and OCD that focuses primarily on reducing family accommodation. By systematically monitoring and reducing family accommodation while increasing parental support of the child's ability to cope with anxiety, SPACE aims to reduce the child's anxiety symptoms [37]. SPACE does not entail active child participation and focuses on the parents' behaviors in relation to their child's anxiety symptoms, eliminating the need for child motivation and involvement, and expanding the treatment's applicability to a wide range of cases. SPACE is composed of eight parts with optional modules that can be utilized as necessary [5, 38, 39].

Studies have provided evidence for SPACE's feasibility, acceptability and efficacy in treating childhood AD and OCD [4, 5], and a recent randomized controlled non-inferiority trial showed that SPACE is as efficacious as CBT in anxiety treatment outcomes [32]. The research on SPACE is expanding. Recent work shows that SPACE is feasible, acceptable and satisfactory in a group setting [40], in treating avoidant/restrictive food intake disorder (ARFID) [41], and a single case study demonstrated the potential efficacy of integrated SPACE and CBT in treating agoraphobia and panic disorder in a young adult at risk for long-lasting, prohibitive dependence on parents [42].

The Current Study

This pilot study aimed to examine the feasibility, acceptability, and treatment-satisfaction of SPACE among parents of autistic children exhibiting anxiety. Secondary aims were to examine the treatment's preliminary efficacy in this population through its effect on anxiety symptoms and family accommodation. Based on the success of SPACE in the context of AD, OCD, and ARFID, the primary hypotheses were that SPACE would be feasible and acceptable to parents of autistic children exhibiting anxiety and that parents would find the treatment satisfactory. These outcomes were evaluated through enrollment, attendance, attrition, adverse events, and parents' satisfaction ratings. The secondary hypotheses were that following SPACE, anxiety symptoms and family accommodation would be reduced. Possible secondary outcomes, including child's autism symptom severity, adaptive functioning, and parenting stress, were explored.

Methods

Participants

Participants were parents of 15 autistic children ages 6–10 years (M = 7.76, SD = 1.25; 86.66% male) exhibiting anxiety. Parents were recruited through social media and through contacts and community partnerships of the Autism Child & Family Lab at the Hebrew University of Jerusalem.

Inclusion criteria were: (a) a recognized diagnosis of autism by the Ministry of Health, Social Security or the Ministry of Education, (b) age 6–10 years, (c) at least average cognition as per collected diagnostic reports, measured by a score of ≥ 75 on standardized cognitive assessments, (d) significant anxiety symptoms as measured by meeting the cutoff score of 25 on the Screen for Child Anxiety Related Emotional Disorders (SCARED) [43], and (e) any pharmacological treatment must be stable for at least three months with no change in dosage prior to and during treatment. Exclusion criteria were: (a) relevant neurological or medical conditions such as intellectual disability, and (b) concurrent psychosocial treatment for anxiety. Treatment for other co-occurring problems was permitted. There were no exclusion criteria for participating parents.

Parents of 70 children self-referred through the different recruitment platforms. Twenty-seven did not complete the compatibility check, seven because they could not provide the diagnostic reports necessary to meet inclusion criteria or they did not complete the screening questionnaire, and 20 because they were not interested after hearing information about the study or were not responsive. Two were excluded because they did not meet age inclusion criteria, two because they did not meet anxiety inclusion criteria, five because they did not meet inclusion criteria for cognitive functioning, and eight due to concurrent treatment for anxiety or frequent changes in pharmacological treatment. Of the 26 families meeting inclusion criteria, four families elected not to participate and seven did not complete the intervention (see Fig. 1). Table 1 summarizes characteristics and measures at baseline for study completers.

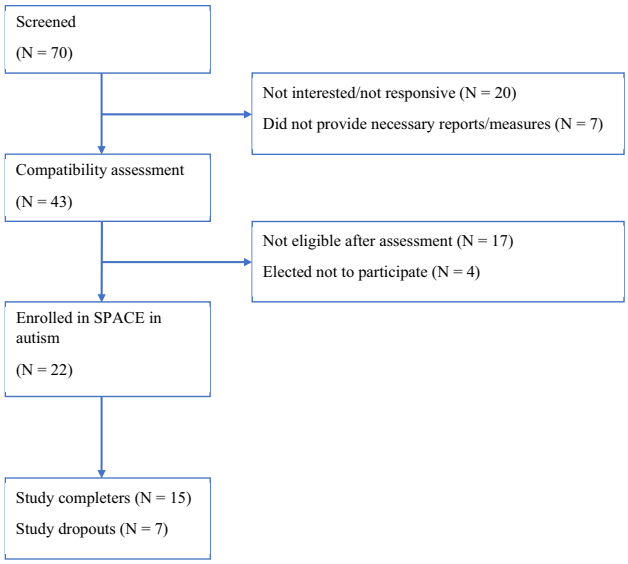


Fig. 1 Consort diagram of study enrollment and retention

Procedure

The study was approved by The Seymour Fox School of Education at the Hebrew University of Jerusalem's Ethics Committee and registered at ClinicalTrials.gov (Identifier: NCT04747262). Following initial screening and after providing written informed consent, participants were administered the measures at baseline. Parents were then contacted by telephone within one week after completion of the questionnaires and were scheduled to begin treatment. All treatments were conducted via video-conferences (Zoom), due to the COVID-19 pandemic and to allow for a broader geographic sample. In line with previous research on SPACE, no modifications to the protocol were necessary to allow for remote delivery [41]. Clinicians were trained in SPACE and underwent weekly supervision by a certified SPACE supervisor. Following the 13th and final treatment session, participants were administered the posttreatment measures. Participants were contacted two months after completion of the intervention for follow-up measures. At all time points, measures were administered through an online questionnaire distribution platform (Qualtrics XM) and trained research personnel assisted the children in completing questionnaires via video-conferences (Zoom) to ensure the assessment was standardized.

Measures

Autism Diagnosis

Autism diagnoses were established based on diagnostic reports provided by parents during screening. The reports were examined by an expert clinician to verify that children met DSM-5 diagnostic criteria [6] and that cognitive functioning was average or above based on standardized psychological tests administered as part of the diagnostic assessment.

Autism Symptom Severity

Childhood Autism Spectrum Test (CAST) [44]. The CAST is a parent-report, 37-item yes or no questionnaire used to screen for autism by measuring difficulties and preferences in social communication skills. A total score is calculated using 31 key items, while six items act as control questions on general development and are not scored. Items receive either an autism-positive response and a score of 1, or an autism-negative response and a score of 0, such that higher scores indicate greater difficulties in social communication skills (range 0–31). A score of 15 acts as a cutoff, with cut-point sensitivity of 100%, specificity of 97%, and positive predictive value of 50% [45]. Test–retest reliability has been found to be good, with a Spearman's' rho correlation of 0.82 [46], and stability of scores around the screen cut-off point is moderate, with a Spearman's rho correlation of 0.67 [47]. In the present sample, internal consistency was $\alpha = 0.73$. The CAST was administered to parents at baseline, posttreatment, and follow-up.

Anxiety

Screen for Child Anxiety Related Emotional Disorders (SCARED) [48]. The SCARED is a 41-item screening questionnaire that assesses childhood anxiety symptoms with both parent-report and self-report versions. Each item on the SCARED is scored on a 3-point Likert-type scale from 0 to 2, such that higher scores indicate greater levels of anxiety, with the total score ranging from 0 to 82. A total score ≥ 25 suggests the presence of an AD, with 25 serving as the clinical cutoff score both in the general population and in autistic samples [43, 49]. The SCARED also yields scores for five subscales, with different clinical cutoff scores for each subscale: panic/somatic symptoms (13 items, range 0–26, cutoff = 7), generalized anxiety (nine items, range 0–18, cutoff = 9), separation anxiety (eight items, range 0–16, cutoff = 5), social anxiety (seven items, range 0–14, cutoff = 8) and school avoidance (four items, range 0–8, cutoff = 3). The SCARED is a valid and reliable tool for measuring anxiety in autistic populations, with internal consistency of 0.90 for parent report and 0.92 for child report [43]. In the present study, internal consistency was $\alpha = 0.88$ for parent report and $\alpha = 0.88$ for child report. Both parent and child report versions of the SCARED were administered at baseline, posttreatment, and follow-up.

Table 1 Sample characteristics and measures of study completers at baseline; N = 15

Age in years	
M (SD)	7.76 (1.25)
Sex	
% male (n)	86.66% (13)
Anxiety presentation	% above clinical cutoff score on SCARED subscales (n)
Panic/somatic symptoms (range 0–26, clinical cutoff = 7)	46.66% (7)
GAD (range 0–18, clinical cutoff = 9)	80.0% (12)
Separation anxiety (range 0–16, clinical cutoff = 5)	86.66% (13)
Social anxiety (range 0–14, clinical cutoff = 8)	86.66% (13)
School avoidance (range 0–8, clinical cutoff = 3)	40% (6)
	% (n)
Other diagnoses	
ADHD	33.33% (5)
Anxiety	26.67% (4)
Marital status	
Married	86.66% (13)
Divorced	13.33% (2)
Participating parent education level (1 missing)	
High school education with diploma	7.14% (1)
Bachelor's or equivalent level	35.71% (5)
Master's or higher level	57.14% (8)
Non-participating parent education level (1 missing)	
High school education without diploma	7.14% (1)
Professional training	14.29% (2)
Bachelor's or equivalent level	35.71% (5)
Master's or higher level	42.86% (6)
Family characteristics	
Number of children in the household, M (SD)	2.73 (1.03)
Total number of families with at least one sibling with other neurodevelopmental condition (e.g., autism, ADHD, anxiety)	5
	M (SD)
Autism symptom severity	
CAST (range 0–31)	16.28 (3.99)
Anxiety symptom severity	
SCARED—parent report (range 0–82, clinical cut off = 25)	39.66 (5.42)
SCARED—child report (1 missing, range 0–82, clinical cut off = 25)	28.92 (7.29)
PRAS-ASD (range 0–75)	39.66 (9.96)
Family accommodation	
FASA—parent report (range 0–36)	16.13 (6.80)
FASA—child report (2 missing, range 0–36)	15.76 (7.56)
Adaptive Functioning (ABAS-II)	
GAC (M = 100, SD = 15)	66.0 (16.0)
Parenting stress (PSI-SR)	
Total (range 36–180)	98.8 (19.61)

Abbreviations: *SCARED* Screen for Child Anxiety Related Emotional Disorders, *GAD* general anxiety disorder, *ADHD* attention-deficit/hyperactivity disorder, *CAST* Childhood Autism Spectrum Test, *PRAS-ASD* Parent-Rated Anxiety Scale for Youth with Autism Spectrum Disorder, *FASA* Family Accommodation Scale-Anxiety, *ABAS-II* Adaptive Behavior Assessment System-Second Edition, *GAC* General Adaptive Behavior Composite score, *PSI-SR* Parenting Stress Index Short Form

Parent-Rated Anxiety Scale for Youth with Autism Spectrum Disorder (PRAS-ASD) [50]. The PRAS-ASD is a parent-rated 25-item measure of anxiety in autistic youth, developed due to the fact that scales for measuring anxiety in the general population, like the SCARED, rely on the verbal expression of children and therefore are less reliable in cases of language and cognitive delays. Each item on the PRAS-ASD is rated on a 4-point Likert-type scale, with higher scores indicating higher levels of anxiety (range 0–75). This recently developed scale demonstrated good discriminant validity, convergent validity (correlation of 0.83 with the SCARED), internal consistency ($\alpha = 0.93$), excellent item response theory reliability across a wide range of scores with low standard errors, and test–retest reliability (0.88 at time 2 and 0.86 at time 3), proving that it is a reliable and valid tool for measuring anxiety in autistic youth [50]. In the current study, the PRAS-ASD was delivered alongside the SCARED as a complementary measure of anxiety that is specific to the autistic population. In the present sample, internal consistency was $\alpha = 0.90$ and convergent validity with the SCARED was $r_p = 0.73$. The PRAS-ASD was administered to parents at baseline, posttreatment, and follow-up.

Family Accommodation

Family Accommodation Scale-Anxiety (FASA) [51]. The FASA is a 13 item self-report rating scale measuring family accommodation of childhood anxiety symptoms. Each item on the FASA is scored on a 5-point Likert-type scale. The FASA yields an overall accommodation score composed of nine items measuring frequency of accommodation (range 0–36), and subscale scores for two types of accommodation: active participation in symptoms (Participation; five items, range 0–20) and modification of family routines and schedules (Modification; four items, range 0–16), with higher scores representing greater accommodation. One additional item assesses parental distress caused by accommodation, with scores ranging from 0 to 4 and higher scores indicating greater distress, and three items measure short-term consequences of negative child responses to not being accommodated, with total scores ranging from 0 to 12, and higher scores indicating more severe negative child responses. The FASA is the most widely used measure of family accommodation of childhood anxiety and has established psychometric properties, with items showing high internal consistency in clinical anxiety samples (overall accommodation $\alpha = 0.88$, participation $\alpha = 0.80$, modification $\alpha = 0.85$, consequence $\alpha = 0.87$) [52], and satisfactory internal consistency in autistic samples (participation $\alpha = 0.83$, modification $\alpha = 0.89$, distress $\alpha = 0.70$, consequence $\alpha = 0.76$) [9]. In the present sample, internal consistency was $\alpha = 0.88$ for overall accommodation, $\alpha = 0.79$ for participation, $\alpha = 0.80$ for modification, and $\alpha = 0.68$ for consequence subscales. The FASA was administered to parents at baseline, posttreatment, and follow-up.

Family Accommodation Scale-Anxiety—Child Report (FASA-CR) [52]. The FASA-CR is a modified version of the FASA for use with children. The FASA-CR yields the same scores as the FASA and is scored the same way: overall accommodation score (nine items, range 0–36), participation subscale (five items, range 0–20), modification subscale (four items, range 0–16), distress subscale (one item, range 0–4), and consequences subscale (three items, range 0–12). Three additional items on the FASA-CR assess children's thoughts and beliefs regarding family accommodation (e.g., 'when my parent helps me in this way, I feel less anxious'). Internal consistency for the FASA-CR has been found to be acceptable to good in clinical anxiety populations (overall accommodation $\alpha = 0.85$, participation $\alpha = 0.75$, modification $\alpha = 0.73$, consequence $\alpha = 0.86$) [52]. In the present study, internal consistency was $\alpha = 0.87$ for overall accommodation, $\alpha = 0.77$ for participation, $\alpha = 0.75$ for modification, and $\alpha = 0.50$ for consequence subscales. The FASA-CR was administered to children at baseline, posttreatment and follow-up.

Feasibility and Acceptability

Feasibility and acceptability of the treatment were assessed through the number of eligible families who elected to enroll in the study, the percentage and total number of sessions attended by parents, the number of families who dropped out of the study, and the frequency of adverse events and effects related to the study.

Satisfaction

Client Satisfaction Questionnaire (CSQ-8) [53]. The CSQ-8 is an eight-item questionnaire that assesses satisfaction with treatment services on a 4-point Likert-type scale. Total scores range from 8 to 32 with higher scores indicating greater satisfaction. A high degree of internal consistency for the CSQ-8 has been found ($\alpha = 0.93$) [53]. In the current study, internal consistency was $\alpha = 0.81$. Parents were administered the CSQ-8 posttreatment.

Other Measures

Adaptive Behavior Assessment System-Second Edition Parent Form (Ages 5–21; ABAS-II) [54, 55]. The ABAS-II Parent Form (Ages 5–21) is a comprehensive norm-referenced self-report rating scale used for measuring adaptive behaviors and skills in children. The ABAS-II consists of 232 items, each rated on a 4-point Likert-type scale with higher scores indicating better adaptive functioning (range 0–696). The ABAS-II Parent Form yields scores in the following

domains: communication (24 items, range 0–72), use of community resources (23 items, range 0–69), academic functional skills (23 items, range 0–69), daily living skills (25 items, range 0–75), health and safety (22 items, range 0–66), leisure (22 items, range 0–66), self-care (24 items, range 0–72), self-direction (25 items, range 0–75), social (23 items, range 0–69), and work (only for individuals ≥ 17; 21 items, range 0–63). These domains are combined into a general adaptive behavior composite score (GAC) and three composites: conceptual (communication, functional academics, self-direction), social (leisure, social), practical (self-care, daily living skills, use of community resources, health and safety). Domain scores have a norm-referenced mean of 10 and standard deviation of 3, while composite scores have a norm referenced mean of 100 and standard deviation of 15. Reported average internal consistency estimates range from 0.98 to 0.99 for the GAC, from 0.95 to 0.98 for composite scores, and from 0.86 to 0.93 for the domains. For the 5–12 age range, corrected test–retest reliabilities were ≥ 0.87 for domain scores and composites. Validity is supported in age-difference sensitivities (i.e., increased scores for each domain as age increases) and concurrent validity is supported in moderate to strong correlations with other measures of adaptive functioning (e.g., Vineland Adaptive Behavior Scales) [54]. In the present study, internal consistency was $\alpha = 0.98$ for the GAC. The ABAS-II was administered to parents at baseline, posttreatment and follow-up.

Parenting Stress Index Short Form (PSI-SR) [56]. The PSI-SR is a self-report, 36-item index of parenting-related stress. Each item is scored on a 5-point Likert-type scale, with higher scores indicating greater parenting stress (range 36–180). Alongside a total stress score, the PSI-SR yields three subscale scores, each composed of 12 items (range 12–60): parental distress (PD), measuring distress caused by the burdens and restrictions of childcare and personal stressors (e.g., depression, conflict with partner); parent–child dysfunctional interaction (P-CDI), assessing parents' negative perception of their interactions with the child and the degree to which the child does not meet their expectations; and difficult child (DC), measuring parent's views of the child's self-regulatory functioning. It also includes a defensive responding scale (DR; seven items, range 7–35), which assesses if the parent is trying to deny or minimize problems. The PSI-SR has established psychometric properties, with internal consistency of $\alpha = 0.95$ for the total stress score [57] and $\alpha = 0.74$–0.88 for the different subscales [58]. In the present study, internal consistency was $\alpha = 0.93$ for the total stress score. The PSI-SR was administered to parents at baseline, posttreatment and follow-up.

Demographic Questionnaire Participants completed a demographic questionnaire prior to beginning the intervention, which provided information regarding the child's sex, age, diagnoses, siblings, educational environment, medical history and tests, and use of pharmacological treatments, services, and therapies. The demographic questionnaire also provided information regarding parents' marital status and level of education, as well as stress factors in the family history.

Intervention

SPACE consisted of 12 weekly, 60-min sessions conducted with parents (for more detail on the protocol see Table 2 and [5, 37]. The SPACE protocol was previously translated to Hebrew for earlier studies, following standard procedures, including back-translation, at which point cultural adaptations were deemed unnecessary [40]. An additional introductory session was incorporated into the protocol to allow for more in-depth familiarity with the parents, a better understanding of the child's autism presentation and anxiety symptoms, and increased psychoeducation on both conditions, resulting in 13 weekly sessions overall. Fidelity of intervention delivery was assessed during supervision of clinicians following treatment sessions, ascertaining that the intervention was in adherence with the protocol.

SPACE aims to improve the child's anxiety through the modification of parents' responses to the child's symptoms. Clinicians guide parents in systematically reducing their accommodations and increasing their supportive responses to the child's anxiety. SPACE defines supportive responses as any parental response that conveys both acceptance of the child's distress and confidence in the child's ability to cope with and tolerate the distress (e.g., 'I understand how hard it is for you, but I know you can handle it'). Parents are first introduced to the concept of supportive statements and are guided to practice using these frequently with their child. Next, parent and therapist map the accommodations parents have been providing of the child's anxiety and parents monitor their accommodation during the week. Together with the clinician, parents select targets accommodations to modify based on criteria defined in the protocol: the target is accommodation-oriented, related to the child's anxiety, poses a significant problem (i.e., interferes with the child's daily functioning or with the parent's ability to adhere to their own routines and schedules), and is a recurring problem, which the parents are motivated to work on. Then, the clinician guides the parents in developing detailed plans for how parents will reduce the accommodations. SPACE also includes modules addressing common difficulties regarding improving collaboration between parents, recruiting and engaging supporters, and dealing with the child's response to reduced accommodation, including distress, anger and aggression [4, 5, 37].

Table 2 An outline of the SPACE program [5, 37]

Part	Title	Content
1	Introduction and setting the stage for parent work	Psychoeducation on anxiety; Introducing rationale for parent work; Introducing main treatment goals and concepts: to treat childhood anxiety by reducing family accommodation and increasing supportive responses
2	Introducing parental support	Increasing supportive responses to child anxiety by expressing acknowledgement and acceptance of the child's emotional experience and conveying confidence in child's ability to cope with anxiety
3	Charting accommodation	Mapping and monitoring family accommodation
4	Choosing a target accommodation	Selecting a target accommodation to modify
5	Formulating a plan	Formulating a detailed plan for reducing accommodation of anxiety symptoms
6	Informing the child	Informing child of the parents' plan
7	Reducing accommodation	Implementing the plan Monitoring implementation and troubleshooting
8	Additional targets, summary, and termination	Selecting a second target, implementing, and monitoring a second plan; Assessing treatment gains; Discussing additional goals; Treatment termination and discussion of future exacerbations
	Modules (optional)	Recruiting and engaging supporters Dealing with extreme disruptive behavior Dealing with threats of self-injury or suicide Improving collaboration between parents

Data Analysis

Analyses were conducted in R (version 4.0.1). Sociodemographic characteristics of the sample were examined first. Feasibility and acceptability were established by calculating the percent and number of families who elected to participate, the percent and total number of sessions attended by parents, the number of families who dropped out of the study, and the frequency of adverse events related to the study. Satisfaction was rated posttreatment by parents. Repeated measures ANOVA tests were used to compare baseline, posttreatment, and follow-up scores on study variables and partial eta squared was calculated to assess effect sizes [59]. At baseline, one child did not complete the SCARED and two children did not complete the FASA-CR. At posttreatment, one participant did not complete the ABAS-II, four children did not complete the SCARED, and six children did not complete the FASA-CR. At follow-up, three participants did not complete the SCARED and the FASA parent report, four participants did not complete the PRAS-ASD, CAST, and PSI-SR, five participants did not complete the ABAS-II, and seven children did not complete the SCARED and the FASA-CR. Following ANOVA methodology, cases with missing data were dropped during the relevant analyses.

To assess effects of the intervention on individual participants, the reliable change index (RCI) for the SCARED parent-report total score was calculated, comparing changes in participants' scores from baseline to posttreatment and follow-up. The RCI was calculated for every participant using the Jacobson method [60, 61]. This method divides the difference between post and pre intervention scores by the standard error of the measure, which is based on the measure's norms, and considers a change of 1.96 or higher to be reliable and not attributed to measurement error. Available norms of the SCARED specific to the autistic population were used [43].

Results

Feasibility, Acceptability and Treatment Satisfaction

Of 26 eligible families, 22 (84.62%) elected to participate in the trial. Of these, 15 (68.18%) completed all 13 weekly treatment sessions. Of the families who dropped out, one completed three treatment sessions, three completed four treatment sessions, one completed five treatment sessions, and one completed six treatment sessions before discontinuing participation. All families who discontinued the intervention reported personal and family-related reasons and did not report any adverse events or effects related to treatment. This trial took place during the global COVID-19 pandemic, which caused interference for families and likely contributed to the slightly elevated attrition rates, compared to other clinical trials for the treatment of anxiety in autism [21–23].

Due to the instability characterizing the time frame of the study stemming from changing COVID-19 pandemic restrictions (e.g., schools closing, quarantines, lockdowns) and the flexibility allowed by the intervention format (video conferences), sessions were frequently rescheduled. Clinicians and parents showed flexibility regarding scheduling, resulting

in all study completers receiving 13 sessions with a gap of no more than two weeks between sessions. In extenuating circumstances (e.g., ongoing illness or quarantine of parent, child, or siblings), the clinician and parents were in touch via phone between sessions to allow for continuity and preservation of commitment to the study. Of the families who completed the treatment, one family reported an increase in child depressive thoughts and moods during and immediately after treatment, and one family reported increased but manageable tantrums and heightened anxiety during treatment. Parents rated the treatment as highly satisfactory (CSQ-8: M = 28.4, SD = 3.29, out of a maximum score of 32). Most parents (66.66%) provided a score of at least 29 and two parents (13.33%) provided the maximum score of 32.

Few modifications to the SPACE protocol were necessary. As noted above, an extra session was added in the beginning of the treatment to allow for increased familiarity with families and longer psychoeducation regarding anxiety, with an emphasis on differentiating between autism and anxiety symptomatology. This session was conducted in the form of a semi-structured interview, allowing parents to elaborate on the child's anxiety and autism presentations and clinicians to direct the intervention based on this information. In addition, two families found the use of visual aids helpful when informing the child of the parents' plan to reduce the target accommodation, incorporating a communication board in their announcement. The intervention was delivered according to the guidelines laid out in the protocol, targets were selected in accordance with the SPACE protocol criteria and strategies for reducing the accommodations were similar to those implemented in SPACE in the non-autistic population [38, 39]. No additional modifications were deemed necessary for delivery to the autistic population.

Clinical Outcomes

Table 3 summarizes clinical characteristics at baseline, posttreatment and follow-up. Three participants did not complete follow-up measures, such that N = 12 for final analyses. Anxiety symptom severity, based on the parent SCARED, was significantly reduced from baseline (M = 39.66, SD = 5.42) to posttreatment (M = 23.93, SD = 8.61), and this reduction was maintained at follow-up (M = 22.67, SD = 8.07), $F(2,22) = 29.24$, $p < 0.001$, $\eta_p^2 = 0.727$ (see Fig. 2). Anxiety symptom severity based on the PRAS-ASD (N = 11 due to missing data) was also significantly reduced from baseline (M = 39.66, SD = 9.96) to posttreatment (M = 28.06, SD = 13.97), and this reduction was maintained at follow-up (M = 24.18, SD = 15.2), $F(2,20) = 14.86$, $p < 0.001$, $\eta_p^2 = 0.598$. Anxiety symptom severity based on the SCARED child report (N = 8 due to missing data) was also significantly reduced from baseline (M = 28.92, SD = 7.29) to posttreatment (M = 16.90, SD = 6.96), and this reduction was maintained at follow-up (M = 21.63, SD = 7.89), $F(2,14) = 12.76$, $p < 0.001$, $\eta_p^2 = 0.646$. A moderate association was found between the parent and child report SCARED total score, $r_p = 0.58$.

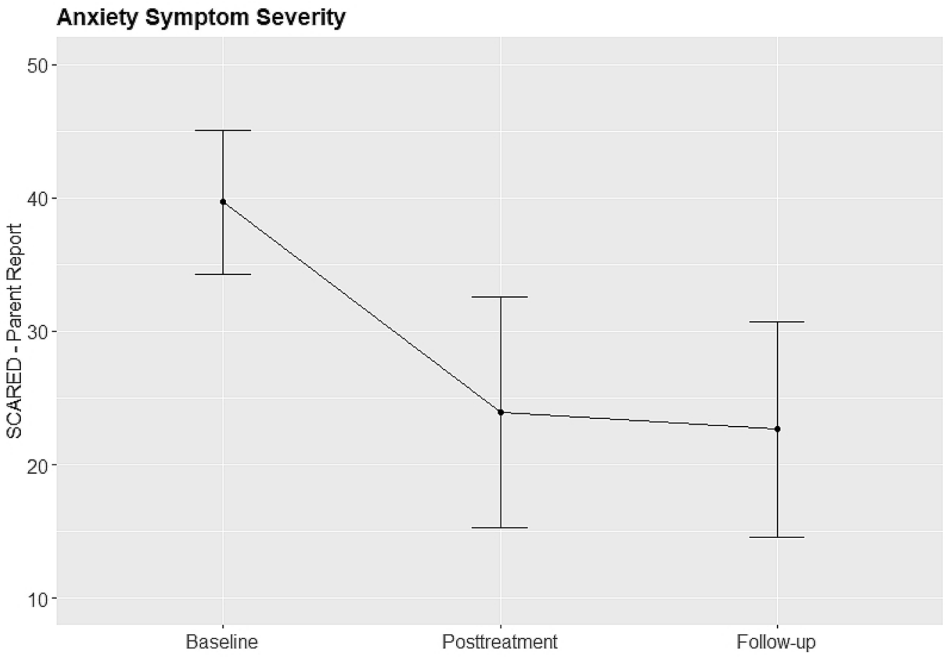
Based on parent report, 13 participants (86.66%) demonstrated a 1.96 reliable decrease at post-treatment, and eight participants (53.33%) no longer met the clinical cutoff score on the SCARED. At follow-up, of the 12 participants whose data was available, 11 (91.66%) demonstrated a decrease at the 1.96 level, and nine (75%) no longer met the clinical cutoff. None of the participants demonstrated a reliable 1.96 increase of anxiety symptoms. Table 4 summarizes the percent and number of participants who met clinical cutoff scores on the different subscales of the SCARED at baseline, posttreatment and follow-up. Figure 3 shows anxiety symptom severity (based on parent report) at the three time points for all study completers.

Overall family accommodation based on parent report was significantly reduced from baseline (M = 16.13, SD = 6.80) to posttreatment (M = 9.8, SD = 5.0), and this reduction was maintained at follow-up (M = 7.75, SD = 4.9), $F(2,22) = 11.47$, $p < 0.001$, $\eta_p^2 = 0.51$ (see Fig. 2). Similar trends were found in the FASA participation (baseline: M = 10.8, SD = 4.46; posttreatment: M = 7.07, SD = 3.06; follow-up: M = 5.67, SD = 3.63; $F(2,22) = 6.71$, $p = 0.005$, $\eta_p^2 = 0.379$) and modification (baseline: M = 5.33, SD = 2.85; posttreatment: M = 2.73, SD = 2.25; follow-up:

Table 3 Outcome measures for treatment completers at baseline, posttreatment and follow-up (N = 12)

	Baseline		Posttreatment		Follow-up		*F*	*df*	*p* value	η_p^2
	M	SD	M	SD	M	SD				
Anxiety symptom severity- parent rated										
SCARED total	39.66	5.42	23.93	8.61	22.67	8.1	29.24	2, 22	<0.001	0.727
Family accommodation- parent rated (FASA)										
Participation	10.8	4.45	7.06	3.05	5.67	3.63	6.71	2, 22	0.005	0.379
Modification	5.33	2.84	2.73	2.25	2.08	1.62	11.52	2, 22	0.003	0.511
Overall	16.13	6.80	9.8	5.0	7.75	4.90	11.47	2, 22	<0.001	0.51

SCARED Screen for Child Anxiety Related Emotional Disorders, *FASA* Family Accommodation Scale-Anxiety



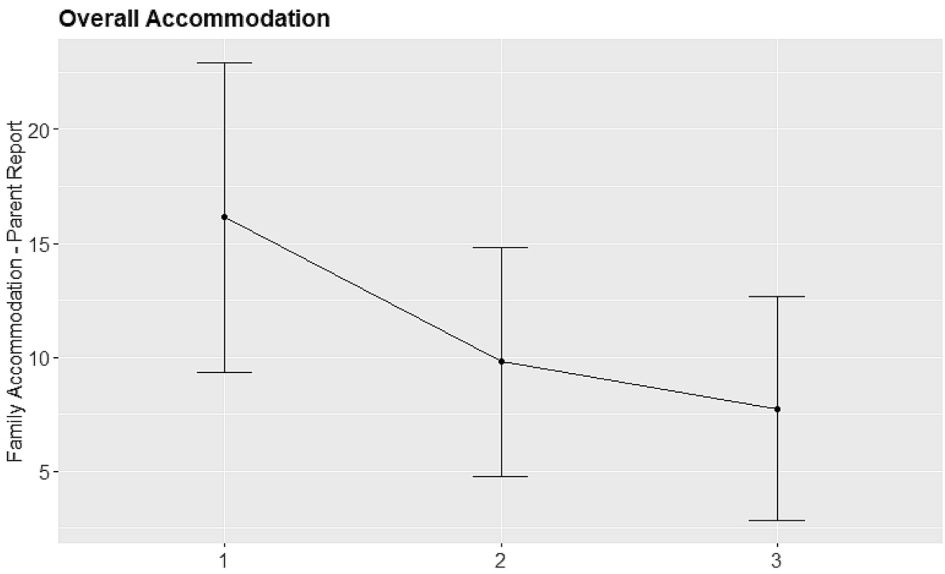


Fig. 2 Anxiety symptom severity and overall family accommodation at baseline, posttreatment and follow-up, N = 12

Abbreviations: SCARED, Screen for Child Anxiety Related Emotional Disorders

Table 4 The percent and number (n) of participants who met the clinical cutoff scores on the SCARED at baseline, posttreatment and follow-up, based on parent report

	Total	Panic/somatic	GAD	Separation anxiety	Social anxiety	School avoidance
Baseline (N = 15)	100% (15)	46.66% (7)	80.0% (12)	86.66% (13)	86.66% (13)	40% (6)
Posttreatment (N = 15)	46.66% (7)	6.66% (1)	26.66% (4)	66.66% (10)	46.66% (7)	33.33% (5)
Follow-up (N = 12)	25.0% (3)	16.66% (2)	33.33% (4)	50.0% (6)	41.66% (5)	33.33% (4)

SCARED Screen for Child Anxiety Related Emotional Disorders, *GAD* general anxiety disorder

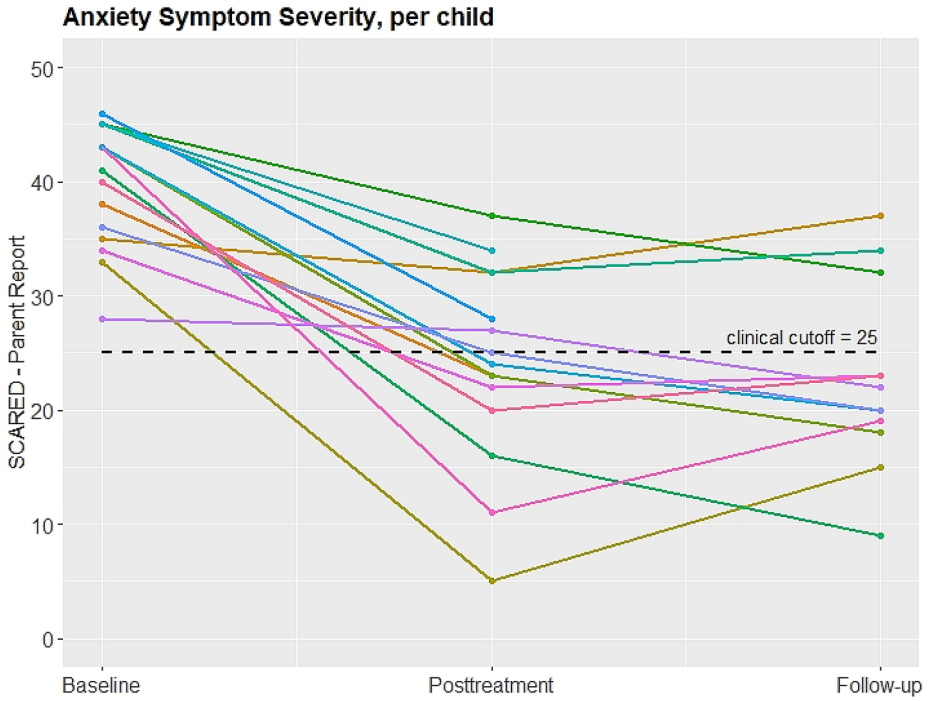


Fig. 3 Anxiety symptom severity at baseline, posttreatment and follow-up for study completers. Each participant (N = 15) is represented by a separate line. The dashed line represents the clinical cutoff score of the SCARED (25). For participants who did not complete follow-up measures, baseline and posttreatment scores are shown (n = 3)

Abbreviations: SCARED, Screen for Child Anxiety Related Emotional Disorders

M = 2.08, SD = 1.62; $F(2,22) = 11.52$, $p = 0.003$, $\eta_p^2 = 0.511$) subscales.

Overall family accommodation on the FASA-CR (N = 7 due to missing data) was significantly reduced from baseline (M = 15.76, SD = 7.56) to posttreatment (M = 8.0, SD = 7.85), and this reduction was maintained at follow-up (M = 4.88, SD = 2.85), $F(2,12) = 11.107$, $p = 0.002$, $\eta_p^2 = 0.649$. The FASA-CR participation subscale was significantly reduced between baseline (M = 9.38, SD = 5.18) and posttreatment (M = 5.55, SD = 4.90), but follow-up (M = 2.88, SD = 1.96) did not significantly differ from baseline or posttreatment, $F(2,12) = 7.85$, $p = 0.007$, $\eta_p^2 = 0.567$. The FASA-CR modification subscale was significantly reduced from baseline (M = 6.38, SD = 3.17) to posttreatment (M = 2.44, SD = 3.60), and this reduction was maintained at follow-up (M = 2, SD = 1.6), $F(2,12) = 12.47$, $p = 0.001$, $\eta_p^2 = 0.675$. Weak to moderate associations were found between parent and child reports on the FASA (overall accommodation: $r_p = 0.40$; participation: $r_p = 0.32$; modification: $r_p = 0.44$).

Secondary Outcomes

Secondary outcomes of the child's autism symptom severity and adaptive functioning, as well as parenting stress were examined at posttreatment and follow-up. No significant differences were found on the CAST (N = 11 due to missing data; baseline: M = 16.28, SD = 3.99, posttreatment: M = 14.90, SD = 4.33; follow-up: M = 13.74, SD = 4.66; $F(2,20) = 1.46$, $p = 0.26$), the ABAS-II GAC (N = 10 due to missing data; baseline M = 66, SD = 16.0; posttreatment M = 66.5, SD = 12.08; follow-up: M = 70.3, SD = 12.66; $F(2,18) = 1.04$, $p = 0.38$), or the PSI-SR (N = 11 due to missing data; baseline: M = 98.8, SD = 19.61; posttreatment: M = 95.06, SD = 17.99; follow-up: M = 92.91, SD = 25.57; $F(2,20) = 1.72$, $p = 0.21$).

Discussion

This pilot study examined the feasibility, acceptability, treatment-satisfaction, and preliminary efficacy of SPACE, a parent-based treatment for childhood anxiety, in children with autism. As hypothesized, the treatment was feasible, as evidenced by the high enrollment rate among eligible families, the high attendance rates, and the absence of adverse events. SPACE was also found to be highly satisfactory by parents, who were the active participants in treatment. Parent satisfaction is of high importance, as the treatment is parent-guided and parents are instructed to make changes to their own behavior, while the child does not meet with the clinician.

Results also support the hypothesis that SPACE can significantly improve clinical anxiety outcomes in children with autism. We found a significant reduction in anxiety symptom severity following treatment, which was maintained at two months follow-up, with more than half of the children showing reliable change and no longer meeting the clinical cutoff

score on the screening questionnaire following treatment. Family accommodation was also significantly reduced following treatment, a reduction that was sustained at follow-up. Possible secondary outcomes on child autism symptom severity, adaptive functioning and parenting stress were explored, but no significant changes were found in these variables following treatment. All of the above results should be interpreted in light of the small sample size. While these findings are promising and provide preliminary evidence for the efficacy of SPACE in autism, randomized trials with larger samples are necessary to establish efficacy.

This open clinical trial is the first to implement SPACE outside the neurotypical population. In line with literature on implementation of anxiety treatments for anxiety in autistic populations, we found minor modifications useful, including additional psychoeducation and use of visual aids e.g., [23]. An important aspect of the extended psychoeducation was discussing the child's autism and anxiety presentation with the parent and differentiating between anxiety and autism symptomatology. The additional session dedicated to these goals was essential, as the aim was to target anxiety symptoms. Participants in the current study who were not receiving concurrent parent-guided therapies benefitted from the opportunity to discuss the child's autism, a factor that should be considered when treating comorbid conditions of autism. In terms of visual aids, some participants reported that the use of a communication board to inform the child of the plan to reduce accommodation was helpful. While this was not incorporated as an essential element of the intervention, it may be useful for certain families and should be taken into consideration when implementing SPACE in this population. This study provides evidence for the feasibility and acceptability of implementing SPACE in autism with few modifications.

In the current study, due to the exceptional pandemic-related context, clinicians exhibited flexibility regarding the scheduling of the sessions, which was enabled by the video format of treatment sessions. While in this context flexibility was essential, it may not be ideal or feasible in other treatment settings, such as community clinics. Participants' capacity to commit to treatment in a consistent and regular fashion is essential for treatment success, and when participants are simultaneously coping with multiple areas of difficulty, such as comorbid psychopathologies, the level of support and guidance necessary to enable participants to fully commit to the course of treatment should be taken into consideration.

One feature of SPACE which helped overcome this issue is the 'recruiting and engaging supporters' module [5, 37], which was frequently incorporated into treatment sessions. Most participants responded positively to the opportunity to enlist supporters, whether family members (grandparents, siblings), friends, or the child's teachers, and engaging supporters improved the participants' sense of capability and commitment to carrying out changes. The notion of supporters was new to some participants and could be beneficial outside the context of anxiety as well, as parents of autistic children face various challenges and the act of including others in the process of managing these difficulties is not trivial. SPACE is informed by work in the area of non-violent resistance interventions (NVR), where the use of supporters is a common treatment component [62, 63].

Another aspect with potential relevance outside of the context of anxiety is supportive responses. Participants in the current study reported that learning and implementing supportive responses helped them feel more confident dealing with the child's anxiety and less anxious of the child's reactions to their reduced accommodation. Participants were instructed to use supportive responses in contexts where the child experiences difficulty, and though only anxiety-related circumstances were targeted in the current study, supportive responses may help parents of autistic children cope in other challenging day-to-day situations.

While this study utilized a standard-term intervention (13 weeks; 12 weeks of SPACE + one additional psychoeducation session), it is unclear if a longer intervention would be more beneficial in the context of anxiety in autism. While the literature suggests that autistic children experience difficulty generalizing skills acquired in treatment [24, 30] and require more time to understand and apply new skills [29], findings in the current study were mixed. Some participants may have benefited from a longer intervention, in particular when only one accommodation was targeted during the course of treatment and when improvements were reported only regarding the targeted accommodations. However, most participants reported an overall improvement in the child's emotion regulation and ability to tolerate anxiety, as reflected by significant drops in anxiety symptom severity (see Fig. 3). It may be that, while some autistic children take time to generalize new skills, others can quickly adjust to new rules and routines instituted by parents, so that the parent's announcement of reducing accommodation set a precedent for the child to follow in other contexts as well. Future work should examine possible child characteristics (e.g., autism symptom severity, cognitive functioning, adaptive functioning) that could explain this difference and contribute to the ability to modify interventions to better support this heterogenic population.

This is the first clinical trial to target the reduction of family accommodation in the context of autism. While our focus was primarily on anxiety symptomatology, future work should examine the mechanism of family accommodation as a potential avenue for intervention for core autism symptoms. Specifically, it has been shown that family accommodation of restricted and repetitive behaviors (RRBs) follows similar patterns as family accommodation of anxiety and

OCD symptoms [2, 3], suggesting that accommodation-reducing interventions may also be helpful in managing maladaptive RRBs.

Limitations and Future Directions

Results of this study should be interpreted in light of its limitations, which include a small sample size along with missing child-report data, a high attrition rate due to external circumstances, and the absence of a control condition. Collecting child data was challenging as some children did not respond positively to video conferences, which an in-person clinical setting may have helped. Additionally, demographic information pertaining to socioeconomic status was limited, not allowing for the examination of other factors that could have influenced treatment outcomes. Another context for these findings is the inclusion criteria and sample characteristics. Given the pilot nature of this work, we enrolled a relatively homogenous sample. All participants were between 6 and 10 years old with average or above cognitive functioning, and were primarily males (86.66%). Due to the combination of the small sample size and the heterogeneity of autism, we wanted to control for additional variability that would have been added by a wide age range. Therefore, future work should examine the generalizability of these findings to more heterogeneous samples and other age groups. Given the evidence on SPACE in a wider age range [32], there is reason to believe SPACE in autism can be implemented in older children, but more research is necessary to examine the feasibility of SPACE in younger populations as well as in populations with varying developmental or cognitive abilities. Additionally, this study did not include direct assessments of anxiety, instead relying on parent-report measures. Finally, results should also be interpreted in the context of an open study, such that some improvements may be attributed to the passage of time or other factors. A randomized controlled trial would more comprehensively assess the efficacy of SPACE in autism.

Summary

Family accommodation refers to the phenomenon in which parents make changes to their own behavior to alleviate their child's distress, which stems from their psychopathology. In anxiety disorders, family accommodation has been shown to associate with greater symptom severity and functional impairment, poorer treatment outcomes, increased caregiver burden and disruption to family functioning. SPACE is a parent-mediated, manualized treatment for anxiety targeting family accommodation shown to be acceptable and efficacious in treating childhood anxiety. This pilot study was the first to utilize SPACE with parents of autistic children who exhibit high levels of anxiety. Of 26 eligible families, 22 (84.62%) elected to participate, 15 of whom (68.18%) completed treatment. Parents rated the treatment as highly satisfactory. Anxiety symptom severity and family accommodation were significantly reduced following treatment, with 86.66% of participants showing reliable change in anxiety symptom severity post-treatment, and this reduction was preserved at 2-month follow-up. This study provides evidence for the feasibility, acceptability, and treatment-satisfaction of SPACE in autism, along with its potential to improve clinical outcomes. Future work should examine this intervention in controlled studies and investigate the possibility of using family accommodation as a means to support autistic children and their families in the context of core autism symptoms.

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Author Contributions JK and EL conceptualized the study. SR conducted the intervention, with supervision from YS. MP coordinated data collection from parents and children. SR led manuscript preparation, which all authors contributed to. All authors reviewed and approved the manuscript.

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Data Availability Data available upon reasonable request.

Declarations

Competing interests EL receives royalties on books, including books about SPACE treatment. SR delivered the intervention to nine of the families and clinical supervision was provided by YS.

Ethical Approval Approval was obtained from the ethics committee of The Seymour Fox School of Education at the Hebrew University of Jerusalem (proposal number: 2020Y).

Informed Consent Written informed consent was obtained from all participants included in the study.

References

1. Shimshoni Y, Shrinivasa B, Cherian A, Lebowitz E (2019) Family accommodation in psychopathology: a synthesized review. Indian J Psychiatry 61:93. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_530_18
2. Feldman I, Koller J, Lebowitz ER, Shulman C, Ben Itzchak E, Zachor DA (2019) Family accommodation in autism spectrum disorder. J Autism Dev Disord 49:3602–3610. https://doi.org/10.1007/s10803-019-04078-x
3. Koller J, David T, Bar N, Lebowitz ER (2021) The role of family accommodation of RRBs in disruptive behavior among children

with autism. J Autism Dev Disord 52:2505–2511. https://doi.org/10.1007/s10803-021-05163-w
4. Lebowitz ER (2013) Parent-based treatment for childhood and adolescent OCD. J Obsessive-Compuls Relat Disord 2:425–431. https://doi.org/10.1016/j.jocrd.2013.08.004
5. Lebowitz ER, Omer H, Hermes H, Scahill L (2014) Parent training for childhood anxiety disorders: the SPACE program. Cogn Behav Pract 21:456–469. https://doi.org/10.1016/j.cbpra.2013.10.004
6. American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders, 5th edn. American psychiatric association, Washington
7. van Steensel FJA, Bögels SM, Perrin S (2011) Anxiety disorders in children and adolescents with autistic spectrum disorders: a meta-analysis. Clin Child Fam Psychol Rev 14:302–317. https://doi.org/10.1007/s10567-011-0097-0
8. Adams D, Emerson LM (2021) The impact of anxiety in children on the autism spectrum. J Autism Dev Disord 51:1909–1920. https://doi.org/10.1007/s10803-020-04673-3
9. Adams D, Emerson LM (2020) Family accommodation of anxiety in a community sample of children on the autism spectrum. J Anxiety Disord 70:102192. https://doi.org/10.1016/j.janxdis.2020.102192
10. Frank HE, Kagan ER, Storch EA, Wood JJ, Kerns CM, Lewin AB, Small BJ, Kendall PC (2020) Accommodation of anxiety in youth with autism spectrum disorder: results from the TAASD study. J Clin Child Adolesc Psychol 51:219–229. https://doi.org/10.1080/15374416.2020.1759075
11. Storch EA, Zavrou S, Collier AB, Ung D, Arnold EB, Mutch PJ, Lewin AB, Murphy TK (2015) Preliminary study of family accommodation in youth with autism spectrum disorders and anxiety: incidence, clinical correlates, and behavioral treatment response. J Anxiety Disord 34:94–99. https://doi.org/10.1016/j.janxdis.2015.06.007
12. Lang R, Regester A, Lauderdale S, Ashbaugh K, Haring A (2010) Treatment of anxiety in autism spectrum disorders using cognitive behaviour therapy: a systematic review. Dev Neurorehabil 13:53–63. https://doi.org/10.3109/17518420903236288
13. Sharma S, Hucker A, Matthews T, Grohmann D, Laws KR (2021) Cognitive behavioural therapy for anxiety in children and young people on the autism spectrum: a systematic review and meta-analysis. BMC Psychol 9:151. https://doi.org/10.1186/s40359-021-00658-8
14. Vasa RA, Keefer A, McDonald RG, Hunsche MC, Kerns CM (2020) A scoping review of anxiety in young children with autism spectrum disorder. Autism Res 13:2038–2057. https://doi.org/10.1002/aur.2395
15. Wichers RH, van der Wouw LC, Brouwer ME, Lok A, Bockting CLH (2022) Psychotherapy for co-occurring symptoms of depression, anxiety and obsessive-compulsive disorder in children and adults with autism spectrum disorder: a systematic review and meta-analysis. Psychol Med. https://doi.org/10.1017/S0033291722003415
16. Moree BN, Davis TE (2010) Cognitive-behavioral therapy for anxiety in children diagnosed with autism spectrum disorders: modification trends. Res Autism Spectr Disord 4:346–354. https://doi.org/10.1016/j.rasd.2009.10.015
17. Nadeau J, Sulkowski ML, Ung D, Wood JJ, Lewin AB, Murphy TK, May JE, Storch EA (2011) Treatment of comorbid anxiety and autism spectrum disorders. Neuropsychiatry 1:567–578. https://doi.org/10.2217/npy.11.62
18. White SW, Oswald D, Ollendick T, Scahill L (2009) Anxiety in children and adolescents with autism spectrum disorders. Clin Psychol Rev 29:216–229. https://doi.org/10.1016/j.cpr.2009.01.003
19. Perihan C, Bicer A, Bocanegra J (2022) Assessment and treatment of anxiety in children with autism spectrum disorder in school settings: a systematic review and meta-analysis. School Ment Health 14:153–164. https://doi.org/10.1007/s12310-021-09461-7
20. Bischof NL, Rapee RM, Hudry K, Bayer JK (2018) Acceptability and caregiver-reported outcomes for young children with autism spectrum disorder whose parents attended a preventative population-based intervention for anxiety: a pilot study. Autism Res 11:1166–1174. https://doi.org/10.1002/aur.1963
21. Driscoll K, Schonberg M, Stark MF, Carter AS, Hirshfeld-Becker D (2020) Family-centered cognitive behavioral therapy for anxiety in very young children with autism spectrum disorder. J Autism Dev Disord 50:3905–3920. https://doi.org/10.1007/s10803-020-04446-y
22. Cook JM, Donovan CL, Garnett MS (2019) Parent-mediated cognitive behavioural therapy for young children with high-functioning autism spectrum disorder and anxiety: a randomized control trial. Early Child Dev Care 189:119–134. https://doi.org/10.1080/03004430.2017.1303684
23. Jassi A, Fernández de la Cruz L, Russell A, Krebs G (2021) An evaluation of a new autism-adapted cognitive behaviour therapy manual for adolescents with obsessive–compulsive disorder. Child Psychiatry Hum Dev 52:916–927. https://doi.org/10.1007/s10578-020-01066-6
24. Storch EA, Arnold EB, Lewin AB, Nadeau JM, Jones AM, Nadai ASD, Mutch PJ, Selles RR, Ung D, Murphy TK (2013) The effect of cognitive-behavioral therapy versus treatment as usual for anxiety in children with autism spectrum disorders: a randomized, controlled trial. J Am Acad Child Adolesc Psychiatry 52:132-142.e2. https://doi.org/10.1016/j.jaac.2012.11.007
25. Weiss JA, Viecili MA, Bohr Y (2015) Parenting stress as a correlate of cognitive behavior therapy responsiveness in children with autism spectrum disorders and anxiety. Focus Autism Dev Disabil 30:154–164. https://doi.org/10.1177/1088357614547808
26. Wood JJ, Kendall PC, Wood KS, Kerns CM, Seltzer M, Small BJ, Lewin AB, Storch EA (2020) Cognitive behavioral treatments for anxiety in children with autism spectrum disorder: a randomized clinical trial. JAMA Psychiat 77:474–483. https://doi.org/10.1001/jamapsychiatry.2019.4160
27. White SW, Simmons GL, Gotham KO, Conner CM, Smith IC, Beck KB, Mazefsky CA (2018) Psychosocial treatments targeting anxiety and depression in adolescents and adults on the autism spectrum: review of the latest research and recommended future directions. Curr Psychiatry Rep 20:82. https://doi.org/10.1007/s11920-018-0949-0
28. Ung D, Selles R, Small BJ, Storch EA (2015) A systematic review and meta-analysis of cognitive-behavioral therapy for anxiety in youth with high-functioning autism spectrum disorders. Child Psychiatry Hum Dev 46:533–547. https://doi.org/10.1007/s10578-014-0494-y
29. Perihan C, Burke M, Bowman-Perrott L, Bicer A, Gallup J, Thompson J, Sallese M (2020) Effects of cognitive behavioral therapy for reducing anxiety in children with high functioning ASD: a systematic review and meta-analysis. J Autism Dev Disord 50:1958–1972. https://doi.org/10.1007/s10803-019-03949-7
30. Griffiths DL, Farrell LJ, Waters AM, White SW (2017) Clinical correlates of obsessive compulsive disorder and comorbid autism spectrum disorder in youth. J Obsessive-Compuls Relat Disord 14:90–98. https://doi.org/10.1016/j.jocrd.2017.06.006
31. Sukhodolsky DG, Bloch MH, Panza KE, Reichow B (2013) Cognitive-behavioral therapy for anxiety in children with high-functioning autism: a meta-analysis. Pediatrics 132:e1341–e1350. https://doi.org/10.1542/peds.2013-1193
32. Lebowitz ER, Marin C, Martino A, Shimshoni Y, Silverman WK (2020) Parent-based treatment as efficacious as cognitive-behavioral therapy for childhood anxiety: a randomized noninferiority study of

supportive parenting for anxious childhood emotions. J Am Acad Child Adolesc Psychiatry 59:362–372. https://doi.org/10.1016/j.jaac.2019.02.014
33. Gosling CJ, Cartigny A, Mellier BC, Solanes A, Radua J, Delorme R (2022) Efficacy of psychosocial interventions for autism spectrum disorder: an umbrella review. Mol Psychiatry 27:3647–3656. https://doi.org/10.1038/s41380-022-01670-z
34. Rojas-Torres LP, Alonso-Esteban Y, Alcantud-Marín F (2020) Early intervention with parents of children with autism spectrum disorders: a review of programs. Children 7:294. https://doi.org/10.3390/children7120294
35. Conrad CE, Rimestad ML, Rohde JF, Petersen BH, Korfitsen CB, Tarp S, Cantio C, Lauritsen MB, Händel MN (2021) Parent-mediated interventions for children and adolescents with autism spectrum disorders: a systematic review and meta-analysis. Front Psychiatry. https://doi.org/10.3389/fpsyt.2021.773604
36. Oono IP, Honey EJ, McConachie H (2013) Parent-mediated early intervention for young children with autism spectrum disorders (ASD). Evid-Based Child Health Cochrane Rev J 8:2380–2479. https://doi.org/10.1002/ebch.1952
37. Lebowitz ER, Omer H (2013) Treating childhood and adolescent anxiety: a guide for caregivers. Wiley, Hoboken
38. Lebowitz ER, Majdick JM (2020) SPACE, parent-based treatment for childhood and adolescent anxiety: clinical case illustration. J Cogn Psychother 34:107–118. https://doi.org/10.1891/JCPSY-D-19-00028
39. Lebowitz ER, Shimshoni Y (2018) The SPACE program, a parent-based treatment for childhood and adolescent OCD: the case of Jasmine. Bull Menninger Clin 82:266–287. https://doi.org/10.1521/bumc.2018.82.4.266
40. Dekel I, Dorman-Ilan S, Lang C, Bar-David E, Zilka H, Shilton T, Lebowitz ER, Gothelf D (2021) The feasibility of a parent group treatment for youth with anxiety disorders and obsessive compulsive disorder. Child Psychiatry Hum Dev 52:1044–1049. https://doi.org/10.1007/s10578-020-01082-6
41. Shimshoni Y, Silverman WK, Lebowitz ER (2020) SPACE-ARFID: a pilot trial of a novel parent-based treatment for avoidant/restrictive food intake disorder. Int J Eat Disord 53:1623–1635. https://doi.org/10.1002/eat.23341
42. Raila HE, Julian MM, Lebowitz ER, Silverman WK (2021) Separating from the mothership: a coordinated individual and parent-based approach to severe agoraphobia in a young adult. Cogn Behav Pract 28:422–434. https://doi.org/10.1016/j.cbpra.2020.06.004
43. Stern JA, Gadgil MS, Blakeley-Smith A, Reaven JA, Hepburn SL (2014) Psychometric properties of the SCARED in youth with autism spectrum disorder. Res Autism Spectr Disord 8:1225–1234. https://doi.org/10.1016/j.rasd.2014.06.008
44. Scott FJ, Baron-Cohen S, Bolton P, Brayne C (2002) The CAST (childhood asperger syndrome test). Autism 6:9–31. https://doi.org/10.1177/1362361302006001003
45. Williams J, Scott F, Stott C, Allison C, Bolton P, Baron-Cohen S, Brayne C (2005) The CAST (childhood asperger syndrome test): test accuracy. Autism 9:45–68. https://doi.org/10.1177/1362361305049029
46. Williams J, Brayne C (2006) Screening for autism spectrum disorders: what is the evidence? Autism 10:11–35. https://doi.org/10.1177/1362361306057876
47. Allison C, Williams J, Scott F, Stott C, Bolton P, Baron-Cohen S, Brayne C (2007) The childhood asperger syndrome test (CAST): test–retest reliability in a high scoring sample. Autism 11:173–185. https://doi.org/10.1177/1362361307075710
48. Birmaher B, Brent DA, Chiappetta L, Bridge J, Monga S, Baugher M (1999) Psychometric properties of the screen for child anxiety related emotional disorders (SCARED): a replication study. J Am Acad Child Adolesc Psychiatry 38:1230–1236. https://doi.org/10.1097/00004583-199910000-00011
49. Lohr WD, Daniels K, Wiemken T, Williams PG, Kelley RR, Kuravackel G, Sears L (2017) The screen for child anxiety-related emotional disorders is sensitive but not specific in identifying anxiety in children with high-functioning autism spectrum disorder: a pilot comparison to the achenbach system of empirically based assessment scales. Front Psychiatry 8:138. https://doi.org/10.3389/fpsyt.2017.00138
50. Scahill L, Lecavalier L, Schultz RT, Evans AN, Maddox B, Pritchett J, Herrington J, Gillespie S, Miller J, Amoss RT, Aman MG, Bearss K, Gadow K, Edwards MC (2019) Development of the parent-rated anxiety scale for youth with autism spectrum disorder. J Am Acad Child Adolesc Psychiatry 58:887-896.e2. https://doi.org/10.1016/j.jaac.2018.10.016
51. Lebowitz ER, Woolston J, Bar-Haim Y, Calvocoressi L, Dauser C, Warnick E, Scahill L, Chakir AR, Shechner T, Hermes H, Vitulano LA, King RA, Leckman JF (2013) Family accommodation in pediatric anxiety disorders. Depress Anxiety 30:47–54. https://doi.org/10.1002/da.21998
52. Lebowitz ER, Scharfstein L, Jones J (2015) Child-report of family accommodation in pediatric anxiety disorders: comparison and integration with mother-report. Child Psychiatry Hum Dev 46:501–511. https://doi.org/10.1007/s10578-014-0491-1
53. Larsen DL, Attkisson CC, Hargreaves WA, Nguyen TD (1979) Assessment of client/patient satisfaction: development of a general scale. Eval Program Plann 2:197–207. https://doi.org/10.1016/0149-7189(79)90094-6
54. Harrison PL, Oakland T (2003) Adaptive behavior assessment system, 2nd edn. The psychological corporation, San Antonio
55. Oakland T, Harrison PL (2008) Adaptive behavior assessment system-II: clinical use and interpretation, 1st edn. Elsevier, Burlington
56. Abidin RR (1995) Parenting stress index. Psychological Assessment Resources, Odessa
57. Reitman D, Currier RO, Stickle TR (2002) A critical evaluation of the parenting stress index-short form (PSI-SF) in a head start population. J Clin Child Adolesc Psychol 31:384–392. https://doi.org/10.1207/S15374424JCCP3103_10
58. Haskett ME, Ahern LS, Ward CS, Allaire JC (2006) Factor structure and validity of the parenting stress index-short form. J Clin Child Adolesc Psychol 35:302–312. https://doi.org/10.1207/s15374424jccp3502_14
59. Richardson JTE (2011) Eta squared and partial eta squared as measures of effect size in educational research. Educ Res Rev 6:135–147. https://doi.org/10.1016/j.edurev.2010.12.001
60. Jacobson NS, Truax P (1992) Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. Methodological issues & strategies in clinical research. American Psychological Association, Washington, pp 631–648
61. Bauer S, Lambert MJ, Nielsen SL (2010) Clinical significance methods: A comparison of statistical techniques. J Pers Assess. https://doi.org/10.1207/s15327752jpa8201_11
62. Omer H (2011) The new authority: family, school, and community. University Press, Cambridge
63. Omer H (2004) Nonviolent resistance: a new approach to violent and self-destructive children. Cambridge University Press, Cambridge