COPING, CONTEXT AND FAMILY MENTAL HEALTH WITHIN CBT FOR AUTISTIC CHILDREN

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Abstract

Autistic children experience elevated emotional-behavioural difficulties; links have been identified between these struggles and parent distress. Although parent-involved cognitive behavioural therapy (CBT) helps many autistic children improve overall emotional distress, there is a critical lack of understanding as to the role of children's coping ability within this process, and the systemic factors that may impact change. To address this gap, this dissertation investigated the impact of family and child moderators of coping skill change within CBT for autistic, school-age children. Data was pooled from three related CBT interventions administered to 186 autistic children ages 8 – 13 years and their families, from 2013 – 2021.

In Study 1, Exploratory Item Factor Analysis was conducted with pre-treatment data to investigate the dimensionality of the ERSSQ-P. A multidimensional structure with three factors was identified as the most appropriate fit, comprised of a 10-item subscale within the emotion regulation domain (*Coping*: *a child's ability to modulate distressing feelings in stressful contexts*), and two subscales within the social communication domain (*Initiating and Interacting*). Validity for the subscales was confirmed based on associations with measures of emotion regulation, depression and social communication.

Study 2 used the Coping subscale and multilevel modeling to investigate how pre-treatment child and family factors impact coping skill change for autistic children across three timepoints, and whether these relationships varied according to treatment type (*individual vs. small group*). Results indicated that on average, all children experienced the same, small level of improvement in coping ability, regardless of treatment type. However, pre-treatment systemic factors (child depression, restricted interests and repetitive behaviours, parent distress, family stress related to child behaviour) were related to lower initial coping ability, suggesting that children experiencing higher levels of difficulties at the beginning of treatment were also likely to finish the program at a relatively lower skill level. Although these relationships do not appear to be a barrier to statistical

improvement, meaningful change may require longer than 10 weeks. Greater support for parents may also be warranted. Overall, findings present preliminary, yet practical considerations for clinicians and community agencies that can assist with targeted, strength-based treatment planning.

Keywords

Autism, Child, Families, Coping, Emotion Regulation, CBT, Depression

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Publication Disclosure

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Language Statement

There is an ongoing debate regarding the use of identity-first (“autistic”) vs. person-first (“individual with autism”) language within the autism community. Among parents of autistic children in the United Kingdom and the United States, research generally indicates support for identity-first language (Kenny et al., 2016; Taboas et al., 2023). Given that greater use of identity-first terminology also has the potential to increase understanding and inclusivity within health and mental health care provision for autistic children and their families, this dissertation uses identity-first language throughout.

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Chapter 1: Introduction

Currently, more than 50% of autistic children without an intellectual disability, experience impairment due to emotional-behavioural difficulties. In addition to struggles with social interaction, restricted interests and sensory sensitivities (American Psychiatric Association, 2013), co-occurring diagnoses of depression and anxiety are frequent (Hudson et al., 2019; von Klitzing et al., 2014; White et al., 2014; White et al., 2009), with symptoms of both conditions linked to reactive responses such as irritability, anger and oppositionality (Ambler et al., 2015; Mazzone et al., 2013; Patel et al., 2017; White et al., 2014). Given the high prevalence of internalizing and externalizing difficulties experienced by autistic youth, emotion regulation (ER) has emerged as a transdiagnostic treatment target (McLaughlin et al., 2011; Seymour et al., 2014; Weiss et al., 2018). ER can be broadly defined as a child's ability to adapt how they experience and respond to an emotion within a particular context (Gross, Sheppes, & Urry, 2011). Gross's processing model of ER (1998) conceptualizes how goal-directed strategies are used to alter the impact of an emotion, such as selecting and making adjustments to the environment, re-directing attention, and adjusting thoughts or behaviour; Gross (2015) later extended the model to highlight the importance of intrinsic emotional awareness (i.e. recognition and interpretation of one's own emotions). Prevalence estimates indicate that about half of autistic individuals experience significant difficulty recognizing and understanding their emotional experience (Kinnaird et al., 2019), with some evidence suggesting that autistic children use coping strategies such as re-framing and problem-solving less frequently than non-autistic peers (Mazefsky et al., 2014; Samson et al., 2014).

In fact, little is known about autistic children's coping ability. Although broadband measures of ER are common, characterization of the construct of "coping" has been inconsistent across studies. The concepts of ER and coping are proposed to differ in that one engages in coping when faced

with stressful situations, whereas the processes involved in ER can occur in both positive and negative situations (Lazarus & Folkman, 1984). Measurement issues include overlap between descriptions of ER and coping, definition of coping subtypes, and item quality (e.g., combining multiple coping strategies within one item; symptoms of psychopathology overlapping with coping strategies; Compas et al., 2001; 2017). For example, a few studies with autistic children report positive associations between symptoms of depression and maladaptive coping (Pouw et al., 2013; Rieffe et al., 2011). However, in one study, maladaptive coping was represented by broad subtypes of psychopathology (e.g., internalizing, externalizing), while the other used cognitive response styles (e.g., rumination, catastrophizing, self-blame). Moreover, although coping strategies are essentially the building blocks of cognitive behavioural therapy (CBT), only a handful of studies have examined coping ability within the intervention literature on CBT for school-age autistic children. Findings from Norris et al. (2023) indicate significantly greater improvements in parent-reported coping skills for autistic children who received 16 weeks of CBT programming compared to children in the treatment as usual condition; child-report did not indicate significant differences. Sofronoff et al. (2017) reported clinically significant improvement at 10 weeks post-treatment on responses to only one of two hypothetical scenarios assessing children's knowledge of 'ER strategies'; Weiss et al. (2018) administered the same scenarios at post-treatment for the same 10-week CBT-based intervention, and found no significant improvement on either task.

Importantly, studies have only recently begun to consider a family systems framework to more fully explain difficulties with regulation and coping for autistic children. Systemic theories, exemplified by Sameroff's transactional regulation model (2010) and Bronfenbrenner's social-ecological model (1977), propose that the development of self-soothing is influenced by biological factors, relational experiences, and a child's interpretation of those experiences. The family plays a central role in providing 'other'-regulatory experiences: Parents, as key figures, model the

expression of positive and negative emotions, as well as methods for resolving conflict (Cox & Paley 1997; Minuchin, 1988; Gottman et al., 2013). For parents of autistic children, a large body of evidence underscores the relationship between parental distress and child behavioural difficulties *(*Yorke et al., 2018). Systemic theories further suggest that children's ability to cope in adverse situations is shaped by other-regulatory experiences across a range of contexts, including interactions with peers, at school, and in the community (Sameroff, 2010; Bronfenbrenner, 1977). Social-motivation theory by Crick and Dodge (1994) and Eisenberg et al. (1996), describes a sequence in which a child's motivation to engage in social interaction is influenced by the ability to self-regulate, the intensity of the emotional experience, and expectations of consequences. In other words, as the frequency of negative experiences beyond a child's coping ability increases, the likelihood of reactive behaviour, negative consequences, and negative future expectations are also likely to increase. These theories are consistent with research on adverse childhood experiences for both autistic and non-autistic children (e.g., bullying victimization, parental divorce, household income insecurity; family mental illness; neighborhood violence; racial discrimination; Hoover & Kaufman, 2018), with findings indicating that greater numbers of adverse childhood experiences are associated with poorer co-occurring mental health and health outcomes (Berg et al., 2016; Hoover & Kaufman, 2018). Moreover, evidence suggests that autistic children and adolescents experience significantly greater victimization, social isolation and feelings of anger than non-autistic peers (Rieffe et al., 2011), as well as a tendency to focus on cues that reinforce a negatively valenced perspective (Embregts & van Nieuwenhuijzen, 2009).

It is currently unclear whether child and family characteristics affect coping ability specifically within CBT intervention for autistic children. More generally, a few child characteristics have been linked to less overall improvement following CBT: higher pre-treatment intolerance of uncertainty, restricted interests and repetitive behaviours, somatic symptoms, externalizing behaviours,

difficulties in family/social relationships, and younger age (Keefer et al., 2017; Storch et al., 2021; Cervin et al., 2023). According to a recent meta-analysis by Wichers et al. (2023), family-involvement within CBT predicts greater gains than for non-family involved programs; individually-delivered CBT may be associated with a significantly greater treatment effect than for group delivery, however, only according to clinician ratings (parent and child-rated effects were non-significant). Despite evolving understanding of the prevalence of autism for girls (Lai et al., 2015), there is no available evidence regarding gender as a predictor of treatment outcomes for autistic children (Wood-Downie et al., 2021). Findings from meta-analyses of experimental studies suggest that autistic girls and boys may demonstrate differences according to social communication and interaction (greater ability for girls) and restricted interests and repetitive behaviours (lower severity for girls), but not according to insistence on sameness behaviour (Wood-Downie et al., 2021; Lai et al., 2022; Edwards et al., 2024).

Given the extensive body of intervention literature focused on parent education and training within treatment for autistic children (Klinger et al., 2020), it is surprising that clinical trials have not shifted to a model that seeks to unravel variation in treatment response within the context of systemic factors. Moreover, although coping strategies are essentially the building blocks of CBT, little evidence is available as to the relationship between coping ability and treatment for autistic children. Given that studies consistently report that a third of children experience minimal change or no benefit following CBT (van Steensel & Bögels, 2015; Weiss et al., 2018), this is a particularly critical gap. The overall aim of this dissertation was therefore to investigate how systemic factors impact coping ability within parent-involved CBT for autistic, school-age children. Study 1 used Exploratory Item Factor Analysis to investigate the dimensionality of a single-factor ER measure frequently used in clinical CBT trials; a multi-dimensional structure was extracted, including a 10-item Coping subscale which was validated, then used in the second study. Study 2 used a quasi-experimental design and multi-level modeling to examine whether coping ability

changes as a function of pre-treatment child-level (*age, gender, restricted interests and repetitive behaviours, social communication/interaction, depression)* and family-level factors (*parent gender, parent distress*, *family stress [conflict], family stress [child-behaviour])*, and whether these relationships were moderated by therapy type (*individual vs. group*). By addressing these gaps, this dissertation seeks to provide practical guidelines that will assist clinicians to tailor treatment that maximizes both child and family strengths, while minimizing barriers to care (Lai et al., 2020).

Chapter 2: Study 1 -- A coping subscale for autistic children: Revisiting the dimensionality of the emotion regulation and social skills questionnaire.

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A coping subscale for autistic children: Revisiting the dimensionality of the emotion regulation and social skills questionnaire

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ABSTRACT

Background: Autistic children often struggle with emotion regulation and social interaction. Brief measures of a child's coping skill needs are valuable in community mental health settings, where time and resources are limited. However, the construct of coping is often not clearly defined and varies widely within emotion regulation measures, limiting clinical utility. This study aimed to clarify the dimensionality of the Emotion Regulation and Social Skills Questionnaire – Parent (ERSSQ-P), a single-factor, parent report measure developed to assess social-emotional competence in autistic children.

Method/Results: Exploratory Item Factor Analysis was conducted with a multi-site, pre-treatment sample of parent-reported data for 186 autistic children (M_{age} = 9.77 years, SD = 1.32). A three-factor solution was identified as the most appropriate fit, across domains of emotion regulation (*Coping*: a child's ability to modulate distressing feelings in stressful contexts) and social competence (*Initiating*: ability to appropriately initiate interactions with other children; *Interacting*: overall ability to engage in and maintain social interactions). Sum score internal consistency was good for Coping and Initiating (α = .84/ω = .84; α = .87/ω = .90), and acceptable for Interacting (α = .75/ω = .73). Validity for the subscales was confirmed based on associations with measures of emotion regulation, depression and social communication.

Conclusions: The revised structure of the ERSSQ-P targets separate areas where strengths and needs may occur for autistic children, with the potential to assist clinicians to improve assessment and treatment tailoring to meet the specific emotional, social and behavioral needs of children in their care.

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1. Introduction

Emotion regulation (ER; "the activation of a goal to modify the unfolding emotional response"; Gross, 2015, pp.11), is considered a key factor in a child's ability to achieve meaningful social connections (Eisenberg et al., 2001; Eisenberg et al., 2010). Yet little is known about the relationship between ER and social skills in autistic children, who struggle with over or under expression of emotionality, in addition to significant difficulties with social interaction (American Psychiatric Association, 2013; Gross & Thomson, 2007; Weiss, 2014). Almost two decades ago, both Crick and Dodge (1994) and Eisenberg et al. (1996) proposed that a child's motivation to pursue social goals – and the valence of the strategies used to do so – are affected by the intensity of the child's emotionality, their ability to modulate emotional responses, and their expectations of the consequences to their emotional responses. Autistic children experience high rates of depression and anxiety (Hudson et al., 2019; von Klitzing et al., 2014; pp. 2, 1222; White et al., 2014; White et al., 2009), and report more negative emotions than non-autistic peers, with less frequent use of cognition-based regulation strategies such as re-appraisal or problem-solving (Bos et al., 2018; Embregts & van Nieuwenhuijzen, 2009; Mazefsky et al., 2014; pp. 0, 1237; Rieffe et al., 2011; Samson et al., 2014); moreover, autistic children and adolescents are at greater risk of experiencing negative friendship interactions, social isolation, and bullying (Holden et al., 2020; Maïano et al., 2016; Mayes et al., 2013; Moseley et al., 2020; Park et al., 2020; Pouw et al., 2013; Segers & Rawana, 2014).

A few studies with very young autistic children (ages ~ 3 – 7 years) suggest that foundational levels of ER ability may have protective implications for social skill development. For example, Reyes et al. (2020) found that greater ER ability was associated with greater prosocial behavior and fewer problems with peers, although negative emotionality was not related to any measures of social competence. Similarly, Berkovits et al. (2017) found that greater ER ability at baseline predicted a small increase in social skills 10 months later. Weiss et al. (2018) reported a positive correlation between parent-reported ER ability and adaptive behavior (a composite measure of items assessing social skill, leadership, and prosocial behaviors in the school context) for school-age autistic children who had received 10 weeks of cognitive behavior therapy, and in treatment-seeking autistic youth, research shows an association between greater self-reported emotion dysregulation and lower social competence (Joshi et al., 2018).

1.1. ER Measurement

Findings supporting the link between ER and social competence are promising, but there is little consensus across studies regarding the measurement of ER for autistic children. That is, from one measure to another, a label of 'emotion regulation' or 'emotion dysregulation' could represent two completely different latent constructs, even though both terms are often used interchangeably to describe directionality (i.e. poor emotion regulation/high dysregulation). For example, baseline results from Berkovits et al. (2017) show only a moderate correlation ($r = -.46$) between the emotion regulation subscale of the *Emotion Regulation Checklist* (ERC-ER; Shields & Cicchetti, 1997) and the Dysregulation Profile of the *Child Behavior Checklist* (CBCL-DP; Althoff et al., 2010), but a strong correlation between the CBCL-DP and the lability/negativity (L/N) subscale of the ERC ($r = .79$). These examinations of convergent validity suggest that although the CBCL-DP is clearly related to the ERC-ER, which focuses on appropriate expressions of empathy and positive emotion, the overall "dysregulation" focus of the CBCL-DP more closely parallels the ERC-L/N, which assesses symptoms of emotional reactivity and mood swings (often described as 'negative emotionality'; Berkovits et al., 2017; Reyes et al., 2020). Similarly, findings from both the development of the *Emotion Dysregulation Inventory* (EDI; Mazefsky et al., 2018), and from a recent confirmatory factor analysis of the CBCL-DP (Keefer et al., 2020), suggest that "dysregulation" in autistic children may be best conceptualized as a measure of the intensity of negative mood states and reactivity. In the *Behavior Rating Inventory of Executive Function-2nd Edition* (BRIEF-2; Gioia et al., 2015), however, aspects of emotional reactivity and negative mood states are key to the "emotional control" subscale, which forms part of a composite measure labeled 'the emotion regulation index' (BRIEF-2-ERI). Further, the BRIEF-2-ERI scoring follows the same format as the dysregulation scales discussed above (i.e., higher scores indicate greater impairment), but for the ERC-ER, higher scores indicate greater ability.

Although these parent-report questionnaires provide measures of overall ER impairment, this is done without examining the specific coping strategies that may underlie overall difficulties with regulation. In developmental research (with non-autistic children), there has been little agreement across studies as to the characterization of "coping" due to significant overlap with descriptions of emotion regulation (for review, see Compas et al., 2017). Compas et al. (2017) argue that a critical difference between the constructs of coping and emotion regulation is *stress*: coping comprises the thoughts and behaviors necessary to adjust a response when negative events occur (Lazarus & Folkman, 1984), but the processes of emotion regulation, which include coping, occur daily during both negative *and* positive experiences. The authors also highlight measurement issues that have persisted in emotion regulation and coping research for the last 20 years related to defining subtypes of coping and item quality, such as the inclusion of multiple strategies within one item, and overlap between coping strategies and symptoms of psychopathology (also see Compas et al., 2001).

Only a few measures that explore specific coping strategies have been used in studies with autistic children (Weiss, 2014) such as the *Coping Scale* (Kochenderfer-Ladd & Skinner, 2002; Wright et al., 2010), the *Emotion Regulation Questionnaire* (ERQ; Gross & John, 2003), and the *Cognitive Emotion Regulation Questionnaire* for children (CERQ-k; Garnefski et al., 2007). All three are child-report measures. The Coping Scale examines the use of approach and avoidant coping strategies across six factors (*approach*: problem-solving, seeking social support; *avoidant*: distraction, trivializing, externalizing, internalizing). Children are asked to consider all items in the context of a difficult social interaction ("Imagine that a child was being mean to you by calling you bad names or hitting and pushing you. What would you do?"). The ERQ examines the use of cognitive reappraisal and expressive suppression strategies; the CERQ-k assesses a set of nine cognitive factors, across coping strategies considered adaptive (e.g., positive reappraisal, acceptance) and maladaptive (e.g., rumination, catastrophizing, self-blame).

Research with these measures suggests that the type of coping strategies an autistic child engages in may play a protective role in the development of depression. Pouw et al. (2013) found that for school-age autistic children, greater use of approach (*problem-solving/seeking support*) and avoidant (*distraction/trivializing*) coping strategies was associated with fewer symptoms of depression; greater use of maladaptive (*internalizing/externalizing*) coping strategies was linked to greater symptoms of depression. Similarly, Rieffe et al. (2014) found that greater use of avoidant coping strategies over time was associated with fewer symptoms of depression, for both autistic and non-autistic children. In a study using the CERQ-k, Rieffe et al. (2011) observed that for 11-year-old autistic children, a one-unit increase in depression predicted a small increase in reported use of maladaptive coping strategies, and a small decrease in use of adaptive coping strategies. Samson et al. (2015) adapted the ERQ to allow parents to report as well as autistic youth (ages 8 – 20 years); results suggest that autistic youth may use less re-appraisal than non-autistic peers, with links to greater expression of negative emotionality.

1.2. The emotion regulation and social skills questionnaire-parent

Given findings above indicating a link between coping skill use and mental health for autistic youth, a brief assessment of a child's coping needs may be particularly valuable in community mental health settings, where time and resources are limited (Schoenwald et al., 2008). The *Emotion Regulation and Social Skills Questionnaire-Parent* (ERSSQ-P; Beaumont & Sofronoff, 2008), a single-factor parent-report measure, differs from the other measures in that it was developed for a cognitive behavioral, social-emotional regulation program for autistic children (The Secret Agent Society [SAS]; Beaumont & Sofronoff, 2008), in order to measure change in social emotional competence according to specific skills taught within the program (e.g., problem-solving, cognitive re-appraisal, distraction and emotion recognition). The measure includes 27 items assessing a child's ability to engage in effective coping across stressful contexts (e.g., home, school, when losing a game), to demonstrate emotion awareness and understanding, and to engage in key aspects of social interaction such as initiating and maintaining both conversation and play. The total score of the ERSSQ-P is used as a primary outcome measure in all clinical trials of SAS, including variations adapted from the original group version for school, parent-directed and individual therapist delivery; post-treatment findings consistently indicate large effects for overall improvement (Beaumont & Sofronoff, 2008; Beaumont et al., 2015, 2021; Einfeld et al., 2018; Sofronoff et al., 2017; Weiss et al., 2018), with high reported internal reliability ($\alpha = .88–.90$; Butterworth et al., 2014; Weiss et al., 2018).

There are a number of reasons that the ERSSQ-P may not be solely unidimensional in nature. First, although the ERSSQ-P was developed with the expectation that the latent pattern structure would consist of separate social and emotional factors, Beaumont and Sofronoff (2008) report that the original exploratory factor analysis indicated only a single factor was appropriate. The high Cronbach's α values reported for the measure seem to provide evidence confirming unidimensionality, however, α can be misleading with high numbers of items and small sample size: holding the average inter-item correlation constant, α increases as the number of items increases, and a large number of items in one factor may result in a high α value that masks wide variation and/or weak correlations among items (Hayes & Coutts, 2020; Kalkbrenner, 2021). Further, given the small size of the original sample ($n = 49$), the likelihood of extracting a strong factor structure would have been unlikely without the benefit of a sample at least two to three times the size if mean coefficient loadings were lower than.6, which would not be unusual (de Winter et al., 2009). Second, examination of convergent validity to date has focused only on correlations with the *Social Skills Questionnaire* (SSQ, Spence, 1995; $r = .86$, Butterworth et al., 2014; $r = .69$, Sofronoff et al., 2017), yet depending on the publication, terminology used to describe ERSSQ-P outcomes shifts from "emotion regulation and social skills" (Sofronoff, Silva, & Beaumont, 2017; Temkin et al., 2022; Weiss et al., 2018), to "near' social skill transfer" (Beaumont et al., 2021; Beaumont et al., 2019), to "social skills use" (Beaumont et al., 2019), leaving some confusion as to the exact construct being measured. In sum, a new exploration of the factor structure of the ERSSQ-P with a larger clinical sample is warranted given that the latent structure of the measure and specific clustering of the 27 items of the ERSSQ-P remains unclear. Importantly, re-evaluation could allow for improved understanding of *how* children experience improvement in socio-emotional regulation skills – whether in domains of social competence, emotion regulation or aspects of both.

1.3. The current study

Given that the ERSSQ-P has been used a primary outcome measure in a number of clinical trials in both research and community settings (Beaumont, Rotolone, & Sofronoff, 2015; Beaumont, Walker, Weiss, & Sofronoff, 2021; Beaumont & Sofronoff, 2008; Einfeld et al., 2018; Sofronoff, Silva, & Beaumont, 2017; Temkin et al., 2022; Weiss et al., 2018), there is a need to clarify the structure and psychometrics of the measure. The aims of this study were to use a relatively large, clinically-representative sample from treatment-seeking autistic children and their families to: (1) undertake exploratory factor analysis of the ERSSQ-P, to examine whether a multidimensional structure underlies the measure; (2) assess internal consistency and convergent validity for the indicated model of best fit, as well as any potential bias due to effects related to child age, gender or household income.

Method

2.1. Overview

Data were previously collected from 2013 to 2021, during baseline research processes for three larger Canadian studies evaluating improvement in emotion regulation and social functioning in relation to SAS program participation for autistic children. All studies were led by the same principal investigator. Studies included two randomized controlled trials of SAS adapted for individual therapist

delivery (*SAS: Operation Regulation* [SAS-OR]; Beaumont, 2013; Weiss et al., 2018), administered within a university-based context from 2013 to 2016 and 2017–2020, and a community feasibility trial of a group SAS program (C-SAS), administered from 2020 to 2021 across seven Canadian agencies providing specialized support for families of autistic children. Families were recruited for the larger studies from internal waitlists, referrals from community healthcare providers, and postings on autism community websites. Interested parents completed a telephone intake and a brief online survey; once preliminary eligibility was established, informed consent was obtained (for SAS-OR this involved a visit to the university for a first research appointment; for C-SAS, a member of the research team called the primary caregiver to review study procedures in detail, before the parent provided a digital signature via a secure online consent form). Parents provided copies of the child's original diagnostic report and completed an in-house demographics survey, as well as the measures outlined below. All measures were completed online through Qualtrics. The current study was approved by the York University Research Ethics Board.

2.2. Participants

Inclusion criteria for the larger studies required: (a) A diagnosis of autism (including previous DSM-IV subtypes) from a qualified, regulated health professional; SAS-OR_A also specified scores above cutoff on either the *Social Communication Questionnaire* (>14; Rutter, Bailey, & Lord, 2003) or the *Social Responsiveness Scale – 2nd Edition* (SRS-2: Total T-score >59; Constantino & Gruber, 2012); (b) age 8–12 (SAS-OR_A) or 8–13 years (SAS-OR_B/C-SAS); (c) parent report of significant child difficulties with emotion regulation; (d) IQ scores > 79 via the Matrix reasoning and Vocabulary subtests of the *Wechsler Abbreviated Scale of Intelligence, 2nd Edition* (*WASI-II;* Wechsler, 2011*)*, or for C-SAS, no indication of intellectual disability according to parent report or therapist screening, and adequate language skills to attend the program. Both SAS-OR cohorts also required (e) absence of behaviors that would indicate a safety concern for participation, and (f) child motivation to participate in the intervention. Although these last two criteria were not formally defined for C-SAS, agency clinicians needed to consider both factors when assessing participants for group fit (and were ultimately responsible for final decisions regarding participation).

Due to the retrospective nature of this study, gold standard confirmation of autism diagnoses was not possible, however, all participants either provided evidence of an autism diagnosis at time of study registration or were required to do so as part of their eligibility to receive publicly-funded community agency services. Given that only the SRS-2 was available to re-confirm children's diagnoses across all three samples, per recommendations indicating caution interpreting cut-off scores within community-based samples (Aldridge, Gibbs, Schmidhofer, & Williams, 2012), participants were excluded only if Total T-scores were ≤ 57, and both the Social Communication/Interaction Composite and the Restricted and Repetitive Behaviors subscale were below clinical threshold (T-scores < 60).

Table 1. Sample characteristics (C-SAS, SAS-OR_{AB}, Combined)

	Sample		
	C SAS n = 80	SAS-OR_{AB} n = 106	Combined N = 186
Age	*M (SD)*	*M (SD)*	*M (SD)*
Child	9.86 (1.26)	9.70 (1.36)	9.77 (1.32)
Parent	42.37(5.59)	43.81 (5.16)	43.2 (5.38)
Autism Severity			
SRS-2 Total[a]	72.6 (8.52)	73.6 (8.35)	73.2 (8.41)
Child Gender	**n (%)**	**n (%)**	**n (%)**
Female	16 (20)	15 (14.2)	31 (16.7)
Male	64 (80.0)	91 (85.8)	155 (83.3)
Child Racial/Ethnic Identity[b]		n = 92	N = 172
White	53 (66.3)	71 (77.2)	124 (72.1)
Multi-ethnic	14 (17.5)	6 (6.5)	20 (11.6)
Asian	7 (8.8)	7 (7.6)	14 (8.1)
Black	2 (2.5)	-	2 (1.2)
Other	4 (5)	8 (8.7)	12 (7.0)
Parent Relationship to Child			
Mother	75 (93.8)	89 (84)	164 (88.2)
Father	5 (6.3)	17 (16)	22 (11.8)
Family Stress	n = 78		N = 184
Child Management - Yes[c]	43 (55.1)	49 (46.2)	92 (47.4)
Household Income[d]	n = 72	n = 93	n = 165
$49,999 or less	11 (15.3)	4 (4.3)	15 (9.1)
$50,000 - $99,999	17 (23.6)	23 (24.7)	40 (24.2)
$100,000 - $149,999	14 (19.4)	16 (17.2)	30 (18.2)
$150,000 or more	18 (25)	31 (33.3)	49 (29.7)
Prefer not to answer	12 (16.7)	19 (20.4)	31 (18.8)

Note: Reduced sample sizes are noted for items with missing responses. [a] SRS-2 Total = Social Responsiveness Scale - 2nd Edition, Total T Score. [b] Categories follow recommendations by Roberts et al. (2020). [c]Parents were asked to indicate if "child management issues" were currently a source of stress for their family (yes/no). [d] Gross household income.

Overall Sample Characteristics & Exclusions

2.3. Sample characteristics

In total, the ERSSQ-P was completed by parents of 195 autistic children across the three studies. For the current study, data from both SAS-OR cohorts were combined (non-significant results from X^2 and T-test comparisons between SAS-OR_A and SAS-OR_B are detailed in Supplementary Data, Table S1). Nine participants were excluded for the following reasons: missing responses for more than two items within the ERSSQ-P ($n = 2$); an SRS-2 Total T-score ≤ 57 with T-scores for one or both of the SRS-2-SCI and SRS-2-RRB < 60 ($n = 7$; SRS-2 Total: $M = 54.86$, $SD = 2.12$; SRS-2-SCI: $M = 55$, $SD = 4.55$; SRS-2-RRB: $M = 54.14$, $SD = 6.67$). Table 1 provides a summary of the descriptive characteristics for C-SAS, SAS-OR_{AB}, and for the overall combined sample ($N = 186$); non-significant results from X^2 and T-test comparisons between C-SAS and SAS-OR_{AB} can be found in Table S2.

The C-SAS and SAS-OR_{AB} groups only differed significantly in terms of male parent participation, with fewer fathers completing study questionnaires for C-SAS ($n = 5$ vs. $n = 17$; $p = .04$). Sample differences in racial and ethnic diversity did not reach statistical significance (X^2 (4) = 8.35, $p = .08$), however more parents in the community sample identified their children as multi-ethnic ($n = 14$ vs. $n = 6$). In the overall combined sample, children eligible to receive treatment were primarily male (83.3 %), White (72.1 %), about age 10 years ($M = 9.77$, $SD = 1.32$), and experienced a moderate level of autism symptom severity ($M = 73.2$, $SD = 8.41$). Across all study groups, parents indicated that they identified with female gender when reporting as mothers, and male gender, when reporting as fathers (no other options were endorsed). Approximately half of parents (47.4 %) indicated that they experienced family stress from child management-related issues. Mothers provided the majority of responses (88.2 %), with a mean age of 43.2 years reported across all parents ($SD = 5.38$), and 47.9 % indicating a household income at or above $100,000 CAD per year. Only 9 % reported income of less than $50,000 CAD; this statistic should be interpreted with caution, given that a notable proportion of the sample (18.8 %) declined to answer.

2.4. Measures

Parents from all three samples completed *The Emotion Regulation and Social Skills Questionnaire-Parent* (ERSSQ-P; Beaumont & Sofronoff, 2008); a 27-item parent-report measure developed to assess social-emotional competence in autistic children. Items are rated on a 5-point scale (0 – *'never'* to 4 – *'always'*), with higher scores indicating greater overall ability to regulate emotions and adaptively navigate social situations. In the combined sample for the current study, internal consistency for the unidimensional scale was $\alpha = .86$.

The Social Responsiveness Scale, Second Edition (SRS-2; Constantino & Gruber, 2012) was also completed by parents in all three samples. The SRS-2 is a 65-item parent-report measure designed to assess the severity of autism symptomatology. The measure contains four subscales within a Social Communication/Interaction Composite score (SRS-2-SCI: Social Awareness, Social Cognition, Social Communication, Social Motivation), a subscale for Restricted and Repetitive Behaviors (SRS-2-RRB; previously labeled "autistic mannerisms" in the original version of the SRS), and an overall Total Score. Items are rated on a 4-point Likert scale (0 – *'not true'* to 3 – *'almost always true'*); T-scores > 59 indicate clinical impairment. Three descriptive ranges of autism symptoms indicating clinical severity are provided: 'mild' (60 – 65), 'moderate' (66–75) and 'severe' (≥ 76). Storch et al. (2021) report good internal consistency in school-age, treatment-seeking autistic children for both the composite SCI score and the RRB subscale (ages 7 – 13, $\alpha = 0.87$ and $\alpha = 0.86$ respectively). The SRS-2-SCI T-score was used to assess convergent validity, as a measure of social competence; we predicted that extracted subscales focused on social content would be negatively correlated with the SRS-2-SCI.

Emotion regulation measures for validity testing were available according to the study sample. Parents participating in SAS-OR_A and SAS-OR_B *completed The Emotion Regulation Checklist* (ERC; Shields & Cicchetti, 1997), a 24-item parent-report measure that assesses the frequency of children's emotional behaviors on a 4-point Likert scale (1 – *'rarely/never'* to 4 – *'almost always'*), via two subscales: The lability/negativity subscale (ERC-L/N) assesses rigidity, impulsivity, emotional reactivity and negative peer interactions; higher scores indicate greater overall struggles with negative emotionality and mood lability. The emotion regulation (ERC-ER) subscale assesses appropriate expressions of empathy and positive emotion; higher scores indicate greater ability. In a small sample of young autistic children (ages 3 – 7 years, with receptive language age $>$ 24 months), Reyes et al. (2020) found poor to acceptable internal consistency for the subscales (ERC-L/N: $\alpha = 0.62$; ERC-ER: $\alpha = 0.77$). Within the SAS-OR_{AB} sample, internal consistency for the subscales was good to acceptable (ERC-L/N: $\alpha = .84$; ERC-ER: $\alpha = .71$). We predicted that extracted subscales focused on emotion regulation content would be negatively correlated with the ERC-L/N, and positively correlated with the ERC-ER.

Parents participating in C-SAS completed the *Emotion Dysregulation Inventory* (EDI; Mazefsky et al., 2018), a parent-report measure developed to assess the severity of autistic children's struggles with negative mood and reactivity via two subscales, Dysphoria (6 items; anhedonia, sadness, nervousness) and Reactivity (8 items; explosive outbursts, difficulty calming, rapid escalation, intense/extreme/inappropriate emotionality). Items are rated on a 5-point Likert scale (0 – "*not at all*"' to 4 – "*very severe*"). For both subscales, higher scores indicate greater dysregulation. Internal consistency estimates for Dysphoria and Reactivity within the C-SAS sample were very good: $\alpha = .88$ and $\alpha = .89$, respectively. We predicted that extracted subscales focused on emotion regulation content would be negatively correlated with both the EDI-Dysphoria and Reactivity subscales.

Parents participating in SAS-OR_A and SAS-OR_B also completed the *Behavior Assessment Scale for Children - Parent* (Reynolds & Kamphaus, 2004, 2015), a parent-report that assesses children's internalizing and externalizing behaviors. For the current study, Depression subscale T-scores were used as a secondary measure of convergent validity, given the literature indicating a negative association between depression symptoms and adaptive coping skill use for autistic children (Pouw et al., 2013; Rieffe et al., 2014). Parents from SAS-OR_A completed the 2nd edition (BASC-2), and parents from SAS-OR_B completed the 3rd edition (BASC-3); both versions of the Depression scale contain 13 items, with two items adjusted in the updated version. As the publisher's manual indicates

Results

the two versions are almost indistinguishable ($r = .98$ in the general combined norm samples; Reynolds & Kamphaus, 2015), they are treated as such for the current study (BASC2/3-Dep). The BASC2/3-Dep is rated on a 4-point scale (1 - "*never*" to 4 - "*almost always*"); higher scores indicate greater difficulties, with T-scores ≥ 70 indicating clinical severity. Fredrick et al. (2022) found good internal consistency across five BASC-2 subscales, including depression, in a sample of autistic children ages 6 – 12 years (range reported: $\alpha = .81 - .88$).

3. Analysis

All analyses were conducted using RStudio and SPSS V.28. To identify the latent factor structure of the ERSSQ-P, a series of exploratory item factor analyses (EIFA) were run using the exploratory class of the *mirt* package (Chalmers, 2012), which is based on multidimensional item response theory, a probabilistic, non-linear approach to modeling responses to individual scale items, allowing for the identification of relationships between observed and latent variables (Immekus et al., 2019). Although less common as a factor extraction method, EIFA has recently been used within clinical and educational psychology (Belvederi Murri et al., 2020; Sukhawaha et al., 2016), due to particular suitability for exploratory work assessing multidimensionality with non-linear, Likert-scale data (Chalmers, 2012).

3.1. Model fit and selection

EIFA models were estimated using the Metropolis-Hastings Robbins-Monro algorithm, with quasi-Monte Carlo integration to assist with stability, and an oblimin (i.e. oblique) rotation to allow for correlations between factors (Browne, 2001; Chalmers, 2012). Model fitting was performed by first calculating a polychoric correlation matrix, which was applied to a scree plot. Possible options for the number of factor solutions were examined via three fit indices (Hu & Bentler, 1999): (1) root-mean-square error of approximation (RMSEA: values <.05 indicate close fit, <.08 considered acceptable); (2) comparative fit index (CFI: values >.90 indicate acceptable fit, >.95 indicate good fit); (3) standardized root mean square residual (SRMR: <.08 considered acceptable). We then compared models via χ^2 likelihood ratio tests (Chalmers, 2012). For model selection, we considered the strength of coefficients and contribution to communality, the presence of complex (cross-factor) loadings (Beavers et al., 2019; Schönrock-Adema, Heijne-Penninga, Van Hell, & Cohen-Schotanus, 2009), and whether the model made conceptual sense (Norris & Lecavalier, 2010). We followed recommendations to assess the "practical usefulness" of coefficients (i.e. statistically significant and with enough salience to allow interpretation - some evidence suggests this falls between |.30| and |.40|; Watkins, 2018). Our cut-off level for salience was .38, calculated for $p < .01$ with the formula $\frac{5.152}{\sqrt{N-2}}$ (Norman & Streiner, 2008). To ensure a factor was appropriately identified, at least three items were expected to load saliently and uniquely on that factor (Costello & Osborne, 2005; Tabachnick & Fidell, 2001). For the best fitting model, coefficients alpha and omega (Zhang & Yuan, 2016; McNeish, 2018; Savalei & Reise, 2019) were used to estimate internal consistency for subscale sum scores[1] with only the salient items included from each factor. Convergent validity was evaluated via Spearman's correlations between the subscale sum scores and subscales of the ERC, EDI, BASC-2/3, and SRS-2; associations with gender, age and household income were also examined.

4. Results

4.1. Model fit and selection

Following participant exclusions, less than 1 % of the data for the ERSSQ-P was missing, therefore we replaced the missing 5 responses with the rounded group mean for each respective questionnaire item. Inter-item polychoric correlations ranged from.01 to.66. Analysis of the scree plot indicated that based on eigenvalue calculations, a three or four-factor model would provide an appropriate solution for the data; we ran fit statistics for four EIFA models in order to examine additional solutions relating to the current unidimensional ERSSQ-P, and the 2-factor solution from the authors' original hypothesis (Table 2). Results indicated that the unidimensional model provided a poor fit across all indices. The 2-factor model was borderline acceptable according to RMSEA and SRMR (=.08 rather than <.08), a poor fit according to CFI (.78), but provided a solution that was a significant improvement over the unidimensional model by likelihood ratio test ($p < .001$). In comparison, both the 3- and 4-factor models met acceptable fit thresholds for all indices, and likelihood ratio tests indicated that each model sequentially improved over the previous one. Therefore both 3- and 4- factor models were examined in full.

Review of pattern coefficients indicated that the 4-factor model (detailed in Table S3) was likely over-factored. Although three items loaded saliently on Factor 4, the third item (Item 25: "apologizes when has done something wrong"; $\lambda = .38$) did not make conceptual sense when considered in the context of the first two items, which focused only on aspects of emotion awareness (Item 1: "aware of own thoughts/feelings"; Item 2: "identifies others' feelings from expressions"). Factor 2 and Factor 3 were each strongly loaded by three items that conceptually made sense for each factor (Factor 2: starting/maintaining conversation; Factor 3:

[1] Widaman & Revelle (2022) showed that sum scores and factor scores can be used interchangeably for examinations of validity; they further note that sum scores are preferable when there is variation in factor loadings as "the use of the same, unit compositing weights across samples helps ensure that apples are compared to apples, even if they have some blemishes." (p.9)

Table 2. Fit statistics

Table 2
Fit statistics for four exploratory item factor analysis models.

	RMSEA	RMSEA		SRMR	CFI	χ^2 (df)	p
Factors		95% CI					
1	.116	.11	.13	.116	.458		
2	.079	.07	.09	.079	.776	435.8	< .001
3	.056	.04	.07	.066	.900	136.06	< .001
4	.047	.03	.06	.061	.939	72.89	< .001

appropriately initiating play/conversation), however Item 18 "starts conversation with other children", complexly loaded across both factors (λ = .57, λ = .50, respectively). Overall, the extracted solution was weak.

The 3-factor model (Table 3) provided a more reasonable fit. Factor 1 was saliently loaded by 10 items (range: λ = .47 −.82, M =.62) characterizing a child's ability to modulate distressing feelings in stressful contexts, including the use of cognitive problem-solving strategies. Factor 2 was loaded by the same 3 items as extracted in the previous model (range: λ =.66 −.97, M =.88), characterizing a child's ability to appropriately initiate interactions with other children, such as play and conversation.

Factor 3 was loaded by 8 items characterizing a child's overall ability to engage in and maintain social interactions, including necessary skills such as emotion awareness, understanding, and social problem-solving (range: λ =.40 −.74, M =.53). Item 18 again complexly loaded across both Factor 2 and Factor 3 (λ = .66 and λ = .40, respectively). In this case, however, Item 18 made conceptual sense for both factors when considered in the context of each group of items; since Factor 3 contained an additional 7 unique items and was correlated with Factor 2 (r = .40), the complex loading would not be considered to affect identification requirements for the scale. Seven items, including Item 25, did not saliently load onto any of the three factors (range based on highest loading: λ = .26 −.37). Given these results, the 3-Factor solution was retained, with the 7 items omitted. Factor 1 was labeled "Coping", Factor 2, "Initiating", and Factor 3, "Interacting".

Table 3. Results for a 3-factor model extracted by EIFA

Item	Factors			h^2
	F1 Coping λ	F2 Initiating λ	F3 Interacting λ	
4. controls anger - school	**0.59**	-0.13	0.16	0.45
5. controls anger - home	**0.82**	0.06	-0.07	0.64
6. temper tantrums	**0.72**	0.06	-0.18	0.44
7. controls anxiety - school	**0.47**	-0.20	0.28	0.41
8. controls anxiety - home	**0.52**	0.00	0.08	0.31
9. uses strategies to deal - sadness/disappointment	**0.54**	0.11	0.17	0.42
10. thinks about different ways of responding	**0.61**	-0.03	0.29	0.60
11. considers consequences	**0.61**	-0.12	0.16	0.49
23. copes effectively - mistakes	**0.75**	0.10	-0.02	0.56
24. copes effectively - losing	**0.55**	0.02	0.00	0.31
16. invites others to play - friendly	0.04	**0.97**	-0.05	0.92
17. asks if can play - friendly	0.05	**1.00**	-0.02	0.99
18. starts conversation	-0.11	**0.66**	**0.40**	0.72
19. maintains conversation	-0.28	0.29	**0.49**	0.38
20. talks about topics of interest - others'	-0.13	0.18	**0.49**	0.29
1. aware thoughts/feelings - others'	0.11	0.09	**0.40**	0.23
2. identifies feelings from expressions - others'	0.11	-0.08	**0.49**	0.28
12. chooses appropriate solutions - social problems	0.31	0.02	**0.64**	0.67
13. deals successfully - social problems	0.11	0.08	**0.74**	0.66
14. recognizes conversation boring - for others	0.02	-0.07	**0.62**	0.38
3. aware thoughts/feelings - own	0.26	0.13	0.16	0.15
15. makes embarrassing comments - for others	0.23	-0.10	0.37	0.24
21. deals effectively - bullying, teasing	0.37	0.00	0.36	0.37
22. recognizes sarcasm, teasing - others	0.05	0.08	0.31	0.13
25. apologizes - hurt another's feelings	0.37	0.24	-0.01	0.20
26. asks for help	0.28	0.10	0.08	0.12
27. tries new tasks/activities	0.33	0.12	0.10	0.17
Rotated SS Loadings	4.76	2.73	3.08	

Note. N = 186. h^2 = communality. Salient factor loadings (λ >/=.38), are in bold. Items 6 and 15 were reverse-scored. Due to the oblique rotation, coefficients are considered similar to standardized partial regression coefficients (rather than direct item-factor correlations) and can be equal to or greater than |1.00|. Adapted from "Appendix B: Emotion Regulation and Social Skills Questionnaire" by R. Beaumont, & K. Sofronoff, 2008, Journal of Child Psychology and Psychiatry, 49(7), p. 753 https://doi.org/10.1111/j.1469–7610.2008.01920.x © 2008 by Beaumont & Sofronoff

Discussion

4.2. Ratings distribution

Review of the ratings distribution across items revealed that parents identified relatively stronger child ability related to Initiating (*often/always*: item range = 26 – 45 %, *M* = 37 %), in comparison to Interacting (*often/always*: item range = 1 – 29 %, *M* = 14 %) and Coping (*often/always:* item range = 3 – 35 %, *M* = 17%). Item ratings for Initiating also identified, on average, fewer severe needs (*never/rarely:* item range = 19 – 22 %, *M* = 20 %) in comparison to item ratings for both Interacting (*never/rarely:* item range = 22 – 88 %, *M* = 39 %) and Coping (*never/rarely:* item range = 26 – 77 %, *M* = 42 %). The average distribution of moderate (*sometimes*) ratings across items was similar for Initiating, Interacting and Coping (43 %, 47 % and 40 %, respectively).

4.3. Internal consistency

Sum score internal consistency for the 10-item Coping and 3-item Initiating subscales was good (Coping: α = .84 [95 % CI:.80,.87]; ω = .84 [95 % CI:.79,.87])[2]; Initiating: α = .87 [95 % CI:.84,.90]; ω = .90 [95 % CI:.87,.92]). Estimates were acceptable for the 8-item Interacting subscale (α = .75 [95 % CI:.70,.81]; ω = .73 [95 % CI:.61,.80]).

4.4. Convergent validity

Spearman's correlations (Table 4) indicated that all three latent constructs were distinct: Coping demonstrated a small correlation with Interacting (r_s=.33, 95 % CI [.19.46]), but was not associated with Initiating (r_s=.06, 95 % CI [−.09,.20]). Initiating and Interacting were moderately correlated (r_s=.51, 95 % CI [.39,.61]). No significant associations were observed between any of the subscales and child age or gender, however, a very small positive relationship was observed between Coping and household income (r_s=.19, 95 % CI [.01,.35]).

All significant associations between the three subscales and measures assessing convergent validity were in the expected directions. In line with the literature reviewed, Coping showed primarily moderate to strong significant correlations with ER-related measures, with the strongest relationship observed between Coping and the ERC-L/N (r_s= −.73, 95 % CI [−.81, −.62]), and the smallest with the ERC-ER (which is scored in the same direction such that higher scores indicate greater ability: r_s=.34, 95 % CI [.16,.51]). Coping was moderately related to symptoms of depression (r_s = −.53, 95 % CI [−.66, −.37]), and showed a small relationship with the SRS-2-SCI (r_s= −.34, 95 % CI [−.47, −.20]).

Initiating and Interacting showed some similarity in patterns of association. Both subscales were associated with the SRS-2-SCI as expected, with a smaller effect for Initiating (r_s= −.38 vs. r_s= −.58). Both subscales showed small associations with the ERC-ER; neither was associated with symptoms of depression, nor with reactivity (Table 4). Interacting showed additional small associations with the ERC-L/N and EDI-Dysphoria (r_s= −.25, r_s= −.27; *p's* < .001).

5. Discussion

The goal of this study was to clarify the dimensionality of the ERSSQ-P within a clinically representative sample of school-age, autistic children with identified difficulties managing distressing feelings. Exploratory item factor analysis provided evidence that the original single-factor structure was a poor fit; a multidimensional latent structure with three factors was identified as the most appropriate fit, comprised of a 10-item subscale within the ER domain (Coping), and two subscales within the social communication domain (Initiating – 3 items; Interacting – 8 items). Seven items did not load saliently on any one factor. Two of these items may have been affected by wording combining more than one concept (e.g., 'deals effectively with bullying and teasing'; 'recognizes when others are being sarcastic or teasing'); moreover, in addition to a lack of systematic clustering, the low communality estimates of the remaining five items (all <.20) indicated that they did not provide a meaningful contribution any of the factors, whether considered alone or in combination. Recent work with Item Response Theory models indicates that if the strength of psychometric properties can be preserved, shortened measures should be considered to reduce burden for patients, participants and families (Haroz et al., 2020). Given these considerations, the seven weak-performing items were omitted from the revised structure in order to allow for clearer estimation of the constructs (Robinson et al., 1997). Our newly extracted subscales provide initial evidence of psychometric validity, while improving the utility of the ERSSQ-P to measure strengths and needs across the distinct domains of ER and social competence. Results are in line with broader findings indicating a relationship between ER and social competence in young autistic children (Berkovits et al., 2017), and partially supported by social-emotional processing theory proposing that a child's ability to modulate the intensity of distressing emotions goes hand-in-hand with their motivation to engage in, and maintain social interactions (Crick & Dodge, 1994; Eisenberg, 1996). Validation results for the Coping subscale were particularly strong, with tests of convergent validity between Coping and the ERC subscales mirroring findings by Berkovits et al. (2017) for relationships observed between the ERC and the CBCL-DP. Results indicate that among ER measurement tools, Coping measures a similar construct to the ERC-L/N and the EDI-Reactivity, two dysregulation-focused scales centered around negative behaviors, intense moods, and extreme reactivity. Likewise, a score indicating severity on all three scales would indicate a need for support developing coping skills. However, Coping takes a strength-based (rather than deficit-based) approach to measurement and is unique in the inclusion of items assessing the use of

[2] Percentile bootstrap confidence intervals for ω were calculated using ci.reliability from the MBESS package for R (Kelley, 2019)

Table 4. Spearman's correlations with extracted subscale sum scores

Table 4
Spearman's correlations with ERSSQ-P subscale sum scores.

				Sum Scores		
Variable	*n*	*M (SD)*	Range	1	2	3
1. Coping	186	17.0 (5.5)	0–33	1		
2. Initiating	186	6.6 (2.4)	0–12	.06	1	
3. Interacting	186	13.4 (3.5)	4–22	.33**	.51**	1
4. Child age	186	9.77 (1.32)	8–13	.14	-.03	-.02
5. Child gender	186	1.17 (.37)	1–2	.00	-.04	-.01
6. Income	134	2.34 (1.05)	1–4	.19*	.04	.13
4. ERC L/N	105	36.8 (6.6)	23–55	-.73**	-.09	-.25*
5. ERC ER	105	22.9 (3.7)	15 – 32	.34**	.43**	.38**
6. EDI Reactivity	80	14.0 (5.7)	0–27	-.57**	.09	-.19
7. EDI Dysphoria	80	5.2 (5.1)	0–19	-.50**	-.04	-.27*
8. BASC2/3 Dep[a]	104	68.0 (14.5)	43–114	-.53**	-.11	-.18
9. SRS 2 SCI[a]	186	73.8 (9.0)	54–90	-.34**	-.38**	-.58**

*p*p < .05. **<.05.p ≤ . **001 (2-tailed). a T-scoresChild gender coded 1 = male, 2 = female. Income coded 1 = "$49 K or less", 2 = "50 K - $99,999", 3 = "100 K - $149,999", 4 = "150 K or more" (option 5 "prefer not to answer was omitted for this analysis). ERC-L/N = Emotion Regulation Checklist – Lability/Negativity Subscale. ERC-ER = Emotion Regulation Checklist – Emotion Regulation Subscale. EDI = Emotion Dysregulation Inventory. BASC2/3 – Dep = Behavior Assessment System for Children 2nd nd or 3rd rd Edition – Depression Subscale. SRS-2- SCI = Social Responsiveness Scale 2nd nd Edition – Social Communication & Interaction Composite.

problem-solving strategies, as well as coping ability within common distressing situations such as losing a game or making mistakes. For both research and clinical purposes, the Coping subscale may be helpful as a standardized measurement tool for assessing change in ability during CBT-based interventions. Moreover, the opportunity to measure Coping may assist clinicians to focus on the positive abilities the parent and child would like to see, rather than primarily on the difficult ones.

The small associations observed between the ERC-ER and all three extracted subscales highlight the extent to which the measures explore distinct but related constructs. The lack of a relationship between Initiating and Coping is somewhat unexpected; however, both Initiating and Interacting were appropriately correlated with the SRS-2-SCI, indicating convergent validity with a measure of broad social competence. It may be that the difference in results is again explained by the problem-solving content in Coping: in this case, related to items focused on higher order skills that may be underdeveloped (i.e., 'thinks about different ways of responding to a problem situation before reacting'; 'considers consequences of own behavior before acting'). School-age autistic children have been shown to engage in fewer initiations to play and spend less time interacting during play than non-autistic peers (Corbett et al., 2010; Wainscot et al., 2008); although a minority do report meaningful friendships with social reciprocity, evidence indicates that autistic children who report greater social skill may also experience increased bully victimization (Rowley et al., 2012). These findings underscore the importance of understanding not only *how* a child engages with peers, but whether their coping skills are adequate to manage difficult situations.

Coping was significantly, negatively related to symptoms of depression, which is consistent with research showing links between autistic children's use of adaptive coping skills and lower symptoms of depression (Pouw et al., 2013; Rieffe et al., 2011, 2014). However, given that the association between depression symptoms and Coping only explained about 28% of the variance, there is likely a more complex relationship to investigate within a microsystemic context (i.e., in line with recent intervention studies with non-autistic youth that considered the contribution of family, peer and demographic factors; Rivers et al., 2022; Spence et al., 2016, 2020; pp. 7, 1325). Pouw et al. (2013) showed that measures of social functioning (negative friendship: conflict, dominance, jealousy, betrayal; victimization: bullying behavior by others) and coping strategy use (both adaptive and maladaptive) explained 52% of the variance in depression for autistic children; however, even though 'social functioning' overlaps with aspects of social competence, both represent distinctly different constructs. A systematic review of the effect of social skills interventions on mood for autistic youth reported that four studies assessed symptoms of depression, yet only two reported significant improvements at post-treatment despite improvement in social skills across all studies (Rumney & MacMahon, 2017); recent work by Smith & White (2020) suggests that the relationship between social skill and depression may in fact be non-linear for autistic youth, moderated by social motivation and mediated by loneliness.

5.1. Limitations

First, while the latent variables extracted from the ERSSQ-P clearly fall within two theoretical domains, there are still questions as to the final definition of the social subscales. Given the complex loading of Item 18, neither Initiating nor Interacting can be analyzed or interpreted as unidimensional subscales as they only function together. As confirmatory factor analysis was beyond the scope of our study due to sample size, for future work, it would be useful to test both a 2-factor model and 3-factor model from the reduced 20-item set, to assess whether uniting Initiating and Interacting could resolve the complex loading issue. However, reliability analyses for both subscales indicated that removing any items would only reduce α estimates. Second, although the combined sample increased external validity by increasing sample size and improving racial and ethnic diversity for the EIFA, the majority of participants were White; additionally for the validity analyses, since only the SRS-2 was available for the complete sample, other analyses were completed with about half the sample size (n = 80 – 105). Therefore the generalizability of findings to all autistic children without intellectual

disability might be limited. Third, we observed a very small positive association between income and Coping, suggesting that greater income may slightly increase parent perceptions of children's coping ability (though only to about 4 % of the variance). Future research should consider taking into account its potential relation with income.

5.2. Implications

Currently, more than 50 % of autistic children without intellectual disability experience impairment from emotional-behavioral difficulties (Antshel & Russo, 2019; Brookman-Frazee et al., 2018; Hendren et al., 2018; Hill et al., 2014; Lecavalier et al., 2019). While the original single-factor version of the ERSSQ-P provided a broadband assessment of socio-emotional ability, the revised structure allows for understanding of three specific areas where strengths and needs may occur across the domains of emotion regulation and social competence. The improved psychometrics of this revised structure further suggest that the ERSSQ-P has potential for use in standardized outcome measurement in both research and clinical settings for autistic children — beyond current use related solely to SAS interventions. The research-to-practice gap remains an ongoing concern for the implementation of evidence-based interventions in community settings (Williams & Beidas, 2019, pp. 12960). However, with the clarified utility of the ERSSQ-P, clinicians may be more likely to administer the measure, and ultimately better able to understand how to tailor treatment to meet the specific socio-emotional needs of autistic children.

CRediT authorship contribution statement

Karen R. Black: Conceptualization, Methodology, Formal Analysis, Writing – Original Draft, Review & Editing, **Meng-Chuan Lai:** Writing – Review & Editing, Supervision, **Mary E. Desrocher:** Writing – Review & Editing, Supervision, **Vivian Lee:** Investigation, Writing – Review & Editing, **Teresa Sellitto:** Investigation, Writing – Review & Editing, **Nisha Vashi:** Investigation, Writing – Review & Editing, **Jonathan A. Weiss:** Conceptualization, Data Curation, Writing – Review & Editing, Supervision, Resources, Funding Acquisition.

Conflict of Interest

The authors report no conflicts of interest.

Data availability

The authors do not have permission to share data.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.rasd.2023.102167.

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Chapter 3: Study 2 – Child and family predictors of coping skill change within CBT for autistic children

Coping strategies feature prominently within CBT programs for both autistic and non-autistic children (Cervin et al., 2023). Generally, such strategies include recognition of signs of emotion in the body, identifying activities for behavioural activation or distraction (e.g. listening to music), practicing slow breathing, learning to re-frame extreme thoughts, and steps to assist with problem-solving (Beidas et al., 2010). Although meta-analyses and systematic reviews of CBT interventions for autistic children show improvement related to symptoms of anxiety, depression , and emotion dysregulation (Beck et al., 2020; Wichers et al., 2023), there is currently limited, and inconclusive evidence as to how CBT impacts a child's coping ability (Norris et al., 2023; Sofronoff et al., 2017; Weiss et al., 2018). From a systemic perspective, a child's ability to self-soothe develops in the context of biological factors (genetics, neurobiology, temperament), family processes, experiences with others, and the child's interpretation of their experiences (Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2006; Sameroff, 2010). Within the micro-context of the family, reciprocal regulatory experiences occur between the child and each family member (Minuchin, 1985); caregivers model modes of emotional communication and expression

(Sameroff, 2000; Ting & Weiss, 2017), and how to resolve conflict among family members (Cox & Paley 1997, Minuchin, 1988). Results from a recent meta-analysis underline the importance of caregiver involvement in CBT for autistic children, showing significantly greater improvement in child anxiety symptoms for family-based CBT compared to non-family based CBT (g = −1.18 vs. g = −0.32; Wichers et al., 2023). Yet research examining how correlates within the family system may impact both treatment response and coping ability for autistic children remains limited, despite understanding that caregivers are essential to child skill development (Lai et al., 2020), and continued calls to include both child and family factors within intervention research designs (Klinger et al., 2020; Spence et al., 2020; Storch et al., 2021; Weiss et al., 2018).

Parent and Family Factors Associated With Treatment Outcomes

There is considerable evidence of correlations between parent mental health, family stress, and child functioning that lends credence to the systemic understanding of treatment change. For families of autistic children for instance, research shows associations between family conflict and increased child emotionality (i.e. symptoms of worry and depression), and between child presence during conflict and greater daily child behaviour problems (Kelly et al., 2008). For both autistic and non-autistic children, greater numbers of adverse childhood experiences – including parental divorce, household income insecurity and family mental illness -- are associated with poorer child health and mental health outcomes, and greater likelihood of unmet healthcare needs (Berg et al., 2016, 2018), with some evidence indicating that autistic children and youth are more than 2.5 times as likely to experience family mental illness than non-autistic peers (Berg et al., 2016, 2018). There is also a large body of evidence documenting the relationship between caregiver depression and stress, and both internalizing and externalizing behaviour in autistic children (Lecavalier, 2006; Lecavalier et al., 2019; Yorke et al., 2018; Schwartzman et al., 2021). For example, in an Australian study, half of parents of autistic children in middle school reported clinically significant stress, as well as greater child autism symptomology, internalizing symptoms,

and poorer social skills when compared to parents of younger children (McStay et al., 2014). In Pakistan, higher parent stress was predicted by greater child autism symptom severity and lower parenting self-efficacy (Batool & Khurshid, 2015), with no gender differences noted across parent ratings. In the United States, one study showed a small but significant association between low family adaptability (i.e. how well a family can problem-solve, compromise and work flexibly together), and greater maternal depression, which in turn was associated with greater behaviour problems for autistic youth at 3-year follow-up (Baker et al., 2011). Greater parental stress has also been associated with lower gains in educational and behavioural functioning for young autistic children receiving high-intensity early intervention services (Osborne et al., 2007), and in a recent qualitative study, parents diagnosed with major depression described feeling helpless to manage repeated episodes of their autistic child's suicidal ideation, anger and distress (Schnabel et al., 2020).

In line with systemic theories, there is some evidence that parent-involved CBT programs for autistic children may have benefits for both parents and children, even though protocols for learning and practice are centered around the child. For example, Frank et al., (2022) found that two parent-involved CBT programs for child anxiety were associated with significantly greater reductions in family accommodation (e.g., reassurance, facilitating avoidance behaviour, reducing expectations) compared to treatment as usual; pre-treatment measures of parental accommodation also predicted post-treatment child anxiety, although effect sizes for the relationship were small (βs = .03 - .06). The CBT programs in the study were both delivered as individual therapy, with one (Behavioral Interventions for Anxiety in Children with Autism; BIACA, Wood et al., 2009) including weekly 45-minute psychoeducation sessions for parents, and the other (Coping Cat; Kendall & Hedtke, 2006) including two parent sessions for psychoeducation and skills learning, followed by 15-minute check-ins at the end of each child session. Maughan and Weiss (2017) examined relationships between parent and child changes following

individually-delivered, parent-involved CBT (with the parent in attendance as co-facilitator); findings indicated small to moderate associations for post-treatment change in negative parenting and overall emotion regulation, and improvement in child internalizing symptoms, with no significant associations between change in parenting variables and child externalizing symptoms.

Child-Level Factors Associated With Treatment Outcomes

Depression may also be a key factor to consider with respect to autistic children's own coping ability. Some evidence suggests that the overall struggles with ER experienced by many school-age autistic children may be linked to symptoms of depression, and partially explained by underdeveloped skill with coping strategies such as re-appraisal or problem-solving (Bos et al., 2018; Embregts & van Nieuwenhuijzen, 2009; Rieffe et al., 2011; Samson et al., 2014). Correlational results from Study 1 (Black et al., 2023), suggest that greater coping ability among school-age autistic children is related to fewer symptoms of depression; similarly, for autistic adolescents, greater use of coping strategies such as reappraisal and acceptance has been associated with fewer symptoms of depression and anxiety (Mazefsky et al., 2014). Others have found that both school-age autistic children and their non-autistic peers report frequent use of 'maladaptive' coping (e.g., rumination), with greater use associated with greater symptoms of depression (Pouw et al., 2013; Rieffe et al., 2011). In related research with a sample of autistic youth aged 8 – 20 years, younger age was associated with less use of reappraisal as a coping strategy, and less use of reappraisal was associated with greater expression of negative emotionality (Samson et al., 2015).

Only a few child-level characteristics have been specifically associated with treatment change following CBT for autistic children. Some evidence suggests that participants experience less change as a function of younger age, greater pre-treatment externalizing symptoms, autism symptoms (measured via the total score of the SRS-2 or the RRBs subscale), physical (somatic) symptoms, and difficulties within family and social relationships (Cervin et al., 2023; Storch et al.,

2021). Regarding the last three variables, results were derived from pooled data across five randomized controlled studies, however, only child-level predictors were included in the analysis, and the authors point out that coping ability was not considered as a moderator (Cervin et al., 2023). It is also important to consider gender differences for autistic children given increased awareness of the prevalence of autism for girls (Lai et al., 2015). However, to our knowledge, no studies have examined gender as a predictor of treatment outcomes for autistic children (Wood-Downie et al., 2021). General evidence from age and IQ-matched samples indicates no difference between autistic girls and boys according to total symptom severity measured via the SRS-2 (Rodgers et al., 2019; May et al., 2014; Solomon et al., 2014), although evidence from a meta-analysis of 16 studies suggests that autistic girls and adolescents show significantly greater social communication and interaction skill in comparison to autistic boys (Wood-Downie et al., 2021). Small, but statistically significant differences from semi-structured interview data suggest lower restricted interests and repetitive behaviours for girls, with higher compulsions and self-injurious behaviours, and no difference in insistence on sameness behaviour (for review, see Lai et al., 2022). Edwards et al. (2024) found similar results in their meta-analysis of 25 studies (no difference for insistence on sameness behaviour, lower restricted interests and stereotyped behaviour for girls), however, the sample included a combination of children, adolescents and adults and the authors were unable to control for age or to analyze the sample by subgroups.

Two Related CBT Programs (SAS:OR / SAS:SG)

Two related, parent-involved CBT programs developed for autistic children provide a unique opportunity to examine how child and family factors contribute to improvement in child coping ability. Both the *Secret Agent Society: Operation Regulation* (SAS:OR; Beaumont, 2013) and the *Secret Agent Society Small Group Program* (SAS: SG; Beaumont & Sofronoff, 2008) use similar spy-themed activities to teach a set of ten core concepts related to emotion regulation across 10 weekly sessions: 1) Detecting emotions in others, 2) detecting one's own emotions, 3) rating

degrees of emotions, 4) mindful awareness, 5) using relaxation activities to reduce distressing emotions, 6) linking thoughts to feelings and behaviour, 7) changing thoughts, 8) accepting thoughts, 9) strategies for social problem-solving, 10) understanding and responding to bullying. SAS:OR provides individual therapy sessions with the parent in attendance as co-facilitator, and SAS:SG delivers therapy sessions in a small group setting for three to six children, with a separate parent group. Both formats have shown similar large effect sizes for improvements in emotion regulation in school-age autistic children (Beaumont et al., 2015; Beaumont & Sofronoff, 2008; Weiss et al., 2018), even though the core concepts are delivered with different approaches to parent involvement (e.g., parents join every session in SAS:OR; in SAS:SG parents attend their own group), in a different sequence (e.g., learning to change thoughts in Session 3 for SAS:SG vs. Session 7 for SAS:OR), at a different intensity (i.e. repetition of concepts across more sessions in SAS:OR than for SAS:SG), and minor procedural differences (e.g. both versions are delivered over 10 weeks, however, SAS:OR children receive 10 therapy sessions while in SAS:SG, children receive 9 therapy sessions, with only parents attending an initial 120-minute session). SAS:SG is described as a social skills program, and includes dedicated sessions for parent psychoeducation about the origins of problem behaviour, and basic parenting strategies; for children, additional activities are included that specifically focus on fostering positive interactions with peers (e.g., how to talk and play in friendly and inclusive ways with others). In contrast, SAS:OR does not incorporate a dedicated social skills component, and involves the parent as a co-facilitator within child sessions, but without an explicit focus on parent psychoeducation (a weekly page of tips is provided, but these are typically not reviewed in session as the focus is on child needs). However, during individual sessions, depending on the skill and training of the therapist, and needs of the parent-child dyad, interactions between parent and child can be gently supported in session as they arise.

Currently, there is a notable lack of evidence examining the specific role of coping ability within CBT-based programs for autistic children; no research is available as to the impact of systemic factors on change in coping ability. By addressing these gaps, this research is intended to improve clinician ability to plan treatment according to 'person-environment fit' (i.e., minimizing barriers and maximizing potential for development by considering needs of both caregivers and children; Lai et al., 2020). In light of this goal, the current quasi-experimental study examined the effect of pre-treatment child-level (*age, gender, restricted interests and repetitive behaviours, social communication/interaction, depression),* and family-level factors (*parent gender, parent distress*, *family stress [conflict], family stress [child-behaviour])*, on change in coping ability over time, and whether relationships between predictors and coping ability differed according to therapy type (*individual vs. group*).

Research Questions and Hypotheses

1. How do child and family factors impact change in coping ability following CBT for school-age autistic children?
    a. Hypothesis: Change in coping ability was predicted to decrease as a function of younger age, greater child pre-treatment symptom severity, greater parental distress, and family stress. There was no a-priori hypothesis related to child or parent gender given current limited evidence.
2. How does therapy type moderate the relationships between child and family pre-treatment factors and changes in coping ability?
    a. Hypothesis: Due to the exploratory nature of the question, no a-priori hypothesis was specified.

Method

Participants

Similar to methodology by Spence et al. (2020) and Cervin et al. (2023), data was retrospectively pooled from three related studies evaluating emotion regulation outcomes in relation to SAS program participation for autistic children. All studies were led by the same principal investigator. Studies included two randomized controlled trials of SAS (*SAS: Operation Regulation* [SAS-OR]; Beaumont, 2013) adapted for individual therapist delivery and administered within a university-based context during 2013 - 2016 (Weiss et al., 2018) and 2017 - 2020, and a non-randomized community-based feasibility and effectiveness trial of a small group SAS program (SAS:SG), administered during 2020 – 2021 across seven Canadian agencies providing specialized support for families of autistic children. SAS:SG was delivered in both in-person and virtual formats. Families were recruited for all studies from internal waitlists, referrals from community healthcare providers, and postings on autism community websites. Interested parents completed a telephone intake and a brief online survey; once preliminary eligibility was established, informed consent was obtained (for SAS-OR this involved a visit to the university for a first research appointment; for SAS:SG, a member of the research team called the primary caregiver to review study procedures in detail, before the parent provided a digital signature via a secure online consent form). Parents provided copies of the child's original diagnostic report and completed an in-house demographics survey, as well as the measures outlined below. All measures were completed online through Qualtrics. The current study was approved by the York University Research Ethics Board.

Interventions

SAS: SG (Group Therapy)

Training. Group therapy clinicians (n=15) participated in a 16-hour, standardized online training program delivered live by the SAS program developer over four half days in September, 2020; an

additional brief series of self-guided training videos were completed by all clinicians in January, 2021 when upgrades were launched by the developer, including a switch to digitized support materials for all groups (all physical kit pieces such as plastic tokens and the board game were moved online).

Treatment. Children each received nine weekly 90-minute group sessions, with 45-minute parent groups delivered separately; the first session lasted for 120 minutes and was delivered only to parents. Both child and parent sessions covered the same content to assist parents in providing support for children's home practice, however parent groups were run from an educational perspective including psychoeducation and trouble-shooting. Each session began with agenda setting, followed by a progress update (i.e. review of child homework practice and skills learned the previous week), teaching and practice of new concepts through a spy-themed workbook, role-play, planning for home practice with computer activities, and positive reinforcement. Children exchanged plastic or virtual tokens for a reward at the end of each session.

SAS: OR (Individual Therapy)

Training. Graduate-level clinicians (n=14) participated in a full-day (8-hour) training workshop covering all 10 sessions, as well as related CBT theory and concepts. Clinicians also each reviewed 10 session videos prior to the training day, and delivered one mock session to a senior PhD student before seeing their first SAS:OR client. Weekly supervision was provided by post-doctoral fellows or senior PhD students overseen by a clinical psychologist.

Treatment. Children each received one 90-minute, and nine weekly 60-minute individual therapy sessions, delivered by a graduate-level therapist on-site at York University (all sessions occurred prior to COVID-19). The child's primary caregiver attended all sessions and was actively encouraged to provide support for their child both in and out of session (i.e. home practice of new skills and positive reinforcement). Each session began with agenda setting, followed by a progress update (i.e. review of homework practice and skills learned the previous week), teaching and practice of new concepts through a spy-themed workbook, role-play and computer-based

activities, planning for home practice, and positive reinforcement throughout with points exchanged for a reward at the end of the session.

Measures

Primary Outcome

Coping. Parents from all three studies completed *the Emotion Regulation and Social Skills Questionnaire-Parent* (ERSSQ-P; Beaumont & Sofronoff, 2008), a 27-item parent-report measure developed to assess overall social-emotional competence in autistic children. As discussed in Study 1 (Black et al., 2023), a 10-item Coping subscale was extracted, measuring a child's ability to modulate distressing feelings in stressful contexts. Items are rated on a 5-point scale (0 – *'never'* to 4 – *'always'*), then summed, with higher scores indicating greater coping ability. In the combined sample for the current study (n = 175), internal consistency for this Coping subscale at pre-treatment was α = .84; additional reliability estimates are detailed in Table 6. In all studies, questionnaires were completed at pre-treatment (T1), post-treatment (T2, 3 months) and follow-up (T3, 6 months); post-treatment questionnaire completion occurred within 12-14 weeks after the last session; follow-up completion occurred within 12 – 14 weeks post-treatment.

Table 5. Reliability estimates for Coping by therapy type and timepoint

	T1			T2			T3		
	n	*α*/ω	*m (sd)*	*n*	*α*/ ω	*m (sd)*	*n*	*α*/ ω	*m (sd)*
Individual	106	.84/.83	17.27 (5.4)	89	.88/.87	20.80 (5.7)	77	.90/.90	21.14 (5.8)
Group	69	.84/.84	17.47 (5.8)	60	.86/86	20.25 (5.6)	55	.86/.85	20.72 (5.7)

Child Predictors

Social Communication/Interaction (SRS-2-SCI) and Restricted Interests & Repetitive Behaviors (SRS-2-RRBs). *The Social Responsiveness Scale, Second Edition* (SRS-2; Constantino & Gruber, 2012) was completed by parents in all three samples. The SRS-2 is a 65-item parent-report measure designed to assess the severity of autism symptomatology. The

measure contains four subscales related to social competence (Social Awareness, Social Cognition, Social Communication, Social Motivation); totals from these four subscales are summed together to create a Social Communication/Interaction Composite score (SRS-2-SCI). The Restricted Interests and Repetitive Behaviors subscale provides a symptom measure characterizing overall severity of behavioural rigidity, insistence on sameness, intense interests and repetitive behaviour. Items are rated on a 4-point Likert scale (0 – *'not true'* to 3 – '*almost always true'*). Raw scores are converted to T-scores according to age and gender norms provided by the developer; higher severity indicates greater impairment. Storch al. (2021) report strong internal consistency for school-age, treatment-seeking autistic children for both the SCI and RRB subscales (ages 7 – 13 years, α = 0.87/.86).

Child Depression. As there was no common measure of depression symptoms available across the pooled studies, a harmonized measure of child depression was created (Table 6). Harmonization is the process of transforming similar items measured slightly differently across studies to have "logically equivalent response scales" (Hussong et al., 2013). Parents of group therapy participants completed subscales from the Persistent Depression (Dysthymia) and Major Depressive Episode subscales of the *Child and Adolescent Symptom Inventory - 5th Edition* (CASI-5; Gaddow & Sprafkin, 2013); the depression subscale of the *Behavior Assessment Scale for Children - Parent* (BASC2/3; Reynolds & Kamphaus, 2006; 2015) was completed by parents of individual therapy participants (SAS-OR_A: BASC-2; SAS-OR_B: BASC-3). Both the BASC and CASI-5 are rated on a 4-point Likert scale (BASC2/3: 1 - *'never'* to 4 - *'almost always'*; CASI-5: 0 – *'never' to 3 – 'very often'*). BASC2/3 ratings were re-coded to match the CASI-5 scale, with a total of eight conceptually similar items from the BASC2/3 matched to six items from the CASI-5. As illustrated in Table 6, the mean was calculated in the event that two BASC items matched to one CASI-5 item. Raw data was used from both measures; a sum score was calculated from the six harmonized items for each participant, with higher scores indicating greater severity. Internal

consistency for the harmonized depression measure for the combined sample was acceptable (α = .79).

Table 6. Harmonization of child depression measures (BASC 2/3 & CASI-5)

Harmonized item		**BASC-2**	**BASC-3**	**CASI-5**
Sad		Is sad	Is sad	Is depressed for most of the day
Negative/Nothing works out		Is negative about things	Is negative about things	Feels that things never work out
Talks about death/suicide	**Mean of item a & b*	[a]Says, "I want to die or I wish I were dead" [b]Says, "I want to kill myself."	[a]Says, "I want to die or I wish I were dead." [b]Says, "I want to kill myself."	Talks about death or suicide
Feels Worthless/Guilty		Says, "I hate myself."	Says, "I hate myself."	Feels worthless or guilty
Low self-esteem	**Mean of item a & b*	[a]Says, "Nobody likes me." [b]Says "I don't have any friends"	[a]Says, "Nobody likes me." [b]Says "I don't have any friends"	Has little confidence, feels inferior to others, or is very self-conscious
Easily annoyed/irritable		Easily annoyed by others	Is irritable	Is touchy or easily annoyed by others

Parent/Family Predictors

Parent distress. Severity of parent distress was measured via the total score of *the Depression, Anxiety and Stress Scales - 21* (DASS-21; Antony et al., 1998), a 21-item self-report for adults, which is frequently used in clinical intervention trials. The measure includes three subscales (depression, anxiety, stress); work by Henry & Crawford (2005) showed that the subscales measure aspects of these individual constructs while also loading onto a general measure of psychological distress via a total severity score. Items are rated on a 4-point Likert scale (*0 'did*

not apply to me at all' - 3 'applied to me very much or most of the time'), then summed across subscales to create the total score. Higher scores indicate greater difficulties; raw symptom scores were used. In the current sample, internal consistency for the total distress score was excellent (α = .91).

Family stress – conflict. Within the demographic survey, parents were asked to provide yes/no responses to a number of sources of family stress. Responses to 'family conflict' were included as a predictor in the model (yes = 1; no = 0).

Family stress – child behaviour (family stress-CB). Within the demographic survey, parents were asked to indicate if "child management issues" were currently a source of stress for their family. Responses were included as a predictor in the model (yes = 1; no = 0).

Analysis

A 2-level mixed effects growth model was fit to examine 1) how child and family pre-treatment factors impact child coping ability and 2) whether relationships differed as a function of treatment type. Multilevel modeling is ideal for the analysis of clinical data: The design allows for flexible specification of complex data structures, and analyses may be conducted without replacement of missing items when determined to be missing at random, allowing for sample size to be preserved regardless of participant attrition (Finch, 2014; Bliese, 2016; Jain et al., 2007; O'Haire et al., 2015; Shek & Ma, 2011). Analyses were completed with both R Studio (RStudio Team, 2023) and SPSS V.28. Time was dummy coded to examine the mean linear change at each timepoint, with pre-treatment coded as the reference level (*T1 = 0*). Time, therapy type (*Individual = 0, Group = 1),* and all child and family predictors were entered as fixed effects at Level 1. At Level 2, repeated measurements of child coping ability were nested within sites (six community agencies that delivered SAS-SG, and two university cohorts that delivered SAS-OR). The two SAS-OR cohorts were treated as separate sites and given unique indicators to account for random variation across cohort years. All continuous predictors were grand-mean centered, in

order to reduce multicollinearity (Bauer & Curran, 2005). An intent-to-treat approach was used for the analysis such that data was included from all families who completed consent to participate, regardless of the number of sessions attended, or program completion. As less than 1% of the item-level data for Coping was missing (n=3 at pre-treatment, n=2 at post-treatment, and n=1 at follow-up) the group mean for each respective item was used. All other missing data was handled within the multilevel modeling procedure. Skewness and kurtosis estimates for normality were examined by therapy type, and for the combined sample, and were found acceptable for all variables (> -2.0 or < 2.0), as were variance inflation estimates (<1.54), indicating that multicollinearity was not an issue (Hair et al., 2022).

First, an unconditional growth model was specified by regressing coping on time, with a random intercept to account for between-site variability. Diagnostic plots of Level 1 residuals were fit and visually inspected; the model was determined to meet assumptions of linearity, normality and homogeneity of variance (Chanen et al., 2009; Hox, Moerbeek, and Van de Schoot, 2017). Next, a series of conditional growth models was run: At the first stage, all predictors were added to the model together, with the addition of family income as a control variable given results from Study 1 (Black et al., 2023) indicating a small, positive association between family income and coping ability. At the second stage, all possible two- and three-way interactions between significant predictors were added and examined one at a time. To retain the simplest fit for the data, predictors and interaction terms that were non-significant and provided a marginal contribution to the model (intercept = <.03) were removed one at a time. Models with two interaction terms outside this criteria (*time*child gender; time*family stress-CB*) were compared via likelihood ratio test, which showed that the complex model did not fit significantly better than the simpler one (X^2 (4) =2.04, p=.73), therefore the simpler version was retained. Finally, significant interactions were probed to confirm interpretation of marginal means via the *emmeans* package (RStudio: Lenth, 2023).

Results

Sample Characteristics

Inclusion criteria, exclusions and characteristics for the original sample (n = 186) are detailed in Black et al. (2023; Table 1). Data from two additional participants was included from the larger dataset, as the respondents had items missing from the full ERSSQ-P that were critical to the validity of the exploratory analysis in Study 1, but did not impact the final Coping subscale used in the current study. Group data from one community agency (n = 12 participants) was excluded as child and parent sessions were delivered over 19 weekly sessions rather than 10 weeks for all other agencies. Another agency delivered parent sessions with less frequency than others (3 sessions of 2 hours each; n = 10 participants), however, this data was retained as children still received the 9 weekly group sessions, and an examination of sample means with and without these participants (i.e., according to overall sample, gender and therapy type) showed no notable differences. One additional group therapy participant was excluded due to an influential outlier at pre-treatment for Coping (> 2.5 SD above the mean per boxplots and Cook's distance plot), as well as null ratings across measures of child depression, dysphoria and reactivity. The final sample included 175 participants. Characteristics are summarized by child gender in Table 7.

Overall, mothers provided the majority of child ratings, with 12% of ratings for boys completed by fathers, and ratings for girls only available from one father. 48.4% of parents indicated that they experienced family stress from child behaviour issues, and 19.2 % from family conflict. The majority of participants were boys, with girls representing 9% of individual therapy, and 10% of group therapy participants. Autism symptoms as measured by the Social Responsiveness Scale, 2nd edition (SRS-2; Constantino & Gruber, 2012) were significantly higher for girls than for boys for the social-communication and interaction composite, the restricted interests and repetitive

behaviours subscale, and for the total score. There were no significant mean differences between autistic boys and girls according to age, IQ, parent age, severity of parent distress, or coping ability across all three timepoints or child depression. There were also no significant gender differences between children in proportions of racial/ethnic diversity, family income level, or family stress (conflict or child behaviour). In the combined sample, there was a significant difference at pre-treatment between therapy types for child depression, such that the mean for individual therapy was slightly higher than for group therapy (Individual: M= 6.30 SD=3.22; Group: M=4.09 SD=3.12; p <.001).

Table 7. Sample descriptives by child gender

	Girls	*Boys*	Combined		
	n = 32	*n =143*	N = 175	X^2 *(df)*	*p*
	n (%)	**n (%)**			
Therapy Type [a]				3.08 (1)	.08
Individual	15 (47%)	91 (64%)			
Group	17 (53%)	52 (36%)			
Family Stress [b]		n = 141			
Child Behaviour (yes)	18 (56%)	66 (47%)		.93 (1)	.34
Family Conflict (yes)	7 (22%)	26 (18%)		.18 (1)	.67
Household Income [c]	n = 22	n = 103		.88 (2)	.65
$49,999 or less	3 (14%)	10 (10%)			
$50,000 - $99,999	5 (23%)	33 (32%)			
$100,000 +	14 (64%)	60 (49%)			
Child Racial/Ethnic Identity[d]	n = 29	n = 132		.785 (1)	.38
Diverse	6 (21%)	38 (29%)			
White	23 (79%)	94 (71%)			
Parent Gender[e]					
Mother	31 (97%)	122 (85%)		-	-
Father	1 (3%)	21 (15%)			
	m (sd)	***m (sd)***	***M (SD)***	***t (df)***	***p***
Child Age	9.53(.95)	9.8(1.4)	9.78 (1.31)	1.55(63.85)	.13
Parent Age	41.83(5.61)	43.59(5.19)	43.27(5.30)	1.68(167)	.10
	n = 15	n = 89	N = 104		
IQ	105.13(14.7)	103.28(14.7)	103.55 (14.68)	-.45(102)	.65
SRS-2					
Total	76.91(9.71)	72.60(7.85)	73.39 (8.36)	-2.68(173)	**.008**
RRB	78.69(9.32)	73.15(8.53)	74.16 (8.92)	-3.26(173)	**.001**
SCI	75.88 (10.19)	71.79(7.96)	72.54 (8.53)	-2.12(39.89)	**.04**
Child Depression [f]	5.67(3.41)	5.37(3.35)	5.43 (3.35)	-.45(173)	.65
Parent Distress[g]	12.83(8.51)	10.77(8.23)	11.14 (8.30)	-1.26(171)	.11
Coping T1	17.39(4.68)	17.43(5.36)	17.42 (5.23)	.04(171)	.97
	n = 24	n = 124	N = 148		
Coping T2	21.38(4.78)	20.36(5.80)	20.53 (5.64)	-.80(146)	.42

	Girls	*Boys*	Combined		
	n = 32	*n =143*	N = 175	X^2 *(df)*	*p*
	n = 21	n = 121	N = 142		
Coping T3	21.28(6.19)	20.65(5.38)	20.75 (5.50)	-.48(128)	.63

Note: All parents indicated their children identified with either female or male gender (no other options were endorsed). Reduced sample sizes are noted. [a] Individual Therapy = 0 / Group Therapy = 1. [b]Parents responded to each Family Stress variable separately (yes = 1 / no = 0). [c]Gross household income. [d] Categories collapsed from Black et al. (2023) due to minimum cell requirements. [e]All parents indicated that they identified with female gender when reporting as mothers, or male gender when reporting as fathers, with no other gender options endorsed; there were insufficient respondent numbers for a formal X^2 analysis (i.e. fathers of female children). IQ = Wechsler Abbreviated Scale of Intelligence, 2nd Edition (WASI-II) – data only available for children who participated in SAS:OR. SRS-2 Total = Social Responsiveness Scale - 2nd Edition Total T Score. SRS-2-RRB = Restricted Interests and Repetitive Behaviours Subscale T Score. SRS-2-SCI = Social Communication and Interaction Composite T Score. [f]Harmonized measure (BASC 2/3 and CASI-5). [g]Depression, Anxiety and Stress Scale – 21 (DASS-21) Total Score.

Specifying the unconditional growth model

An unconditional growth model was specified by regressing coping on time, with participants nested within sites. Calculation of the intraclass correlation coefficient (ICC) showed that only 1% of the variation in coping score ratings over time was explained by differences between sites. Overall, the unconditional model explained 7.7% of the total variation in coping score ratings over time (R^2; Snijders & Bosker, 2012). Results indicated that without taking family and child predictors into account, at pre-treatment, the average estimated coping score was $\hat{\gamma}_{00}$= 17.71 (SE = .55, 95% CI: 16.63 - 18.79); at T2, coping scores increased by an average of 3.28 points (SE = .70, 95% CI: 1.91 – 4.66), with an additional increase of .03 points at T3 ($\hat{\gamma}_{20}$= 3.31 SE = .73, 95% CI: 1.88 – 4.73).

Multilevel growth model predicting change in coping ability

The multivariate growth model included nine predictors for simple effects (*therapy type, child gender, child age, SRS-2-RRBs, child depression, parent gender, parent distress, family stress-CB and income*), with four interaction terms (*therapy type*time [T2+T3], therapy type*child gender, therapy type*child age, and child gender*family stress-CB*), along with a random effect nesting participants within sites. Results indicated that the multivariate model explained 34% of the total variance in coping score ratings over time (R^2= .34), with a significant effect for change over time. Complete results are detailed in Table 8. Taking into account the contribution of all

predictors in the model, at pre-treatment, the average coping score was $\hat{\gamma}_{00}$= 18.72 (SE = 1.16, 95% CI: 16.34 – 21.10). Coping scores significantly increased by an average of 3.42 points at T2 (SE = .77, 95% CI: 1.91 – 4.93), with an additional increase of .07 points at T3 ($\hat{\gamma}_{20}$= 3.49 SE = .80, 95% CI: 1.91 – 5.07). Pre-treatment coping scores for group therapy were significantly lower than for individual therapy by 2.14 points (SE = 1.02, 95% CI: -4.54 – -.13), however therapy types did not significantly differ in terms of change over time (Figure 1). No significant interactions emerged between time and any child or family predictors.

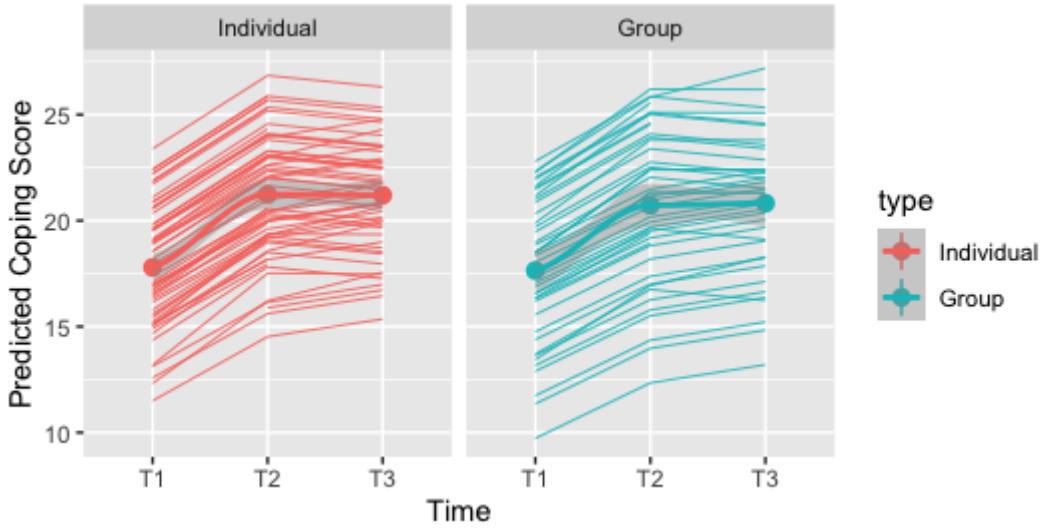

Figure 1. Multilevel growth model: Coping predicted by Time and Therapy Type

Simple slopes: predictors. Both child and family variables predicted lower mean coping ability at pre-treatment. For child variables, small effects were identified for restricted interests and repetitive behaviours and child depression, such that for each one point increase in RRBs and child depression, coping scores decreased by .13 and .49 points respectively (both p <.001). For family variables, each one point increase in parent distress predicted a decrease in coping scores by .11 points (p =.002); in families reporting child behaviour stress (vs. no child behaviour stress) coping scores were significantly lower by 1.47 points (p = .02), and father ratings of child coping scores were significantly lower than mother ratings by 1.8 points (p =.02).

Table 8. Multilevel growth model predicting change in coping ability

Fixed Effects	*Estimates*	*CI*	*p*	*df*
(Intercept)	18.72	16.34 – 21.10	**<0.001**	38.39
T2	3.42	1.91 – 4.93	**<0.001**	299.94
T3	3.49	1.91 – 5.07	**<0.001**	299.85
Type [Group]	-2.34	-4.54 – -0.13	**0.039**	14.51
Child Gender [Girls]	-1.93	-5.01 – 1.16	0.220	286.57
Child Age	0.29	-0.22 – 0.80	0.260	300.31
SRS2-RRB	-0.13	-0.19 – -0.06	**<0.001**	300.14
Child Depression	-0.49	-0.68 – -0.30	**<0.001**	295.86
Parent Relationship [Father]	-1.74	-3.25 – -0.23	**0.023**	303.75
Parent Distress (DASS-21)	-0.11	-0.18 – -0.04	**0.001**	288.16
Famstress-CB [Yes]	-1.47	-2.70 – -0.24	**0.019**	262.93
Income [$50K-$99K]	-0.45	-2.47 – 1.57	0.661	275.55
Income [$100K+]	0.51	-1.48 – 2.50	0.612	230.77
T2 × Type [Group]	-0.38	-2.76 – 2.00	0.752	300.31
T3 × Type [Group]	-0.13	-2.60 – 2.33	0.914	300.81
Type [Group] × Child Gender [Girls]	4.23	1.05 – 7.41	**0.009**	171.51
Type [Group] × Child Age	1.14	0.31 – 1.98	**0.007**	208.03
Child Gender [Girls] × Famstress-CB [Yes]	3.15	0.03 – 6.26	**0.048**	287.59
Random Effects				
σ^2	19.97			
$\tau_{00\ site}$	0.20			
ICC	0.01			
Observations / N_{site}	328 / 8			

Note: SRS-2-RRB = Restricted interests and repetitive behaviours (Social Responsiveness Scale - 2nd Edition). Household income < $50K = 0; Famstress-CB = Family stress (child behaviour) DASS-21 = Total score, depression, anxiety & stress scale.

Interaction effects. Results also revealed three significant interactions. First, probing of contrasts indicated that for children in group therapy, coping ability was 4.23 points higher at pre-treatment for girls than for boys (SE = 1.62, 95% CI: 0.94 – 7.52; *Figure 2*); in families reporting

child behaviour stress, coping ability was also higher for girls (3.15 points, SE = 1.58, 95% CI: .22 – 6.31; *Figure 3*). Finally, each additional year of child age predicted higher pre-treatment coping ability by 1.14 points for group therapy (SE = .41, 95% CI: 0.31– 1.98), but not for individual therapy.

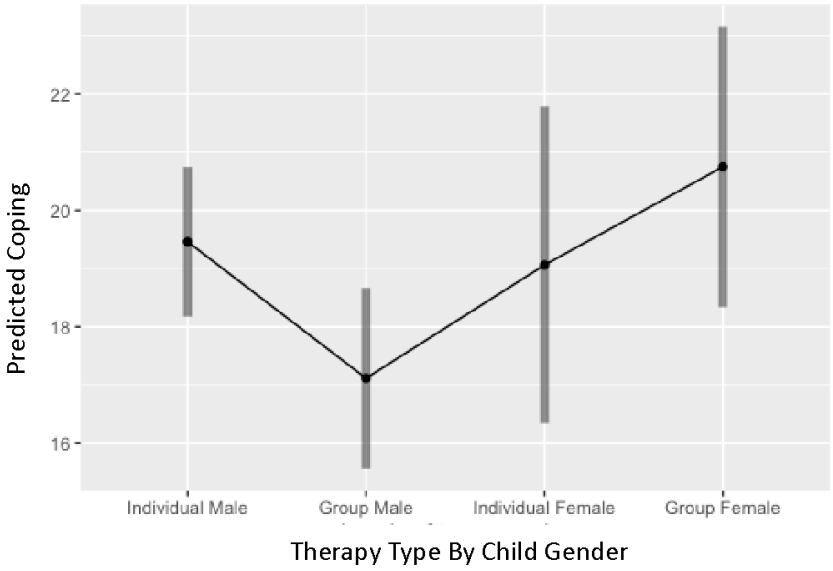

Figure 2. Coping at T1 predicted by child gender & therapy type

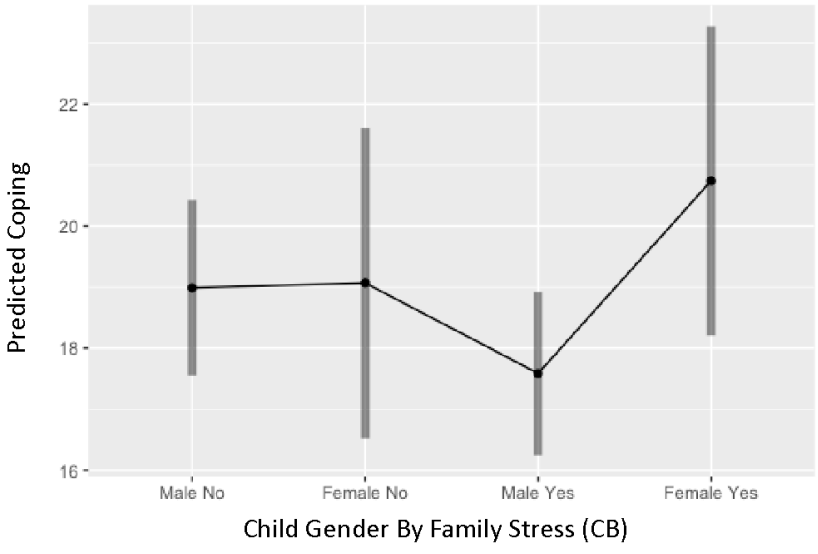

Figure 3. Coping at T1 predicted by child gender & family stress (child behaviour)

Discussion

Our findings provide a unique contribution to the evidence base on coping ability for autistic children. Results from our quasi-experimental study indicate that a pooled sample of school-age autistic children showed improved coping ability after receiving 10 weeks of therapy via a digital media-focused treatment program rooted in CBT principles. This effect occurred -- and was maintained at six-month-follow-up -- regardless of whether the program was delivered via in-person individual therapy (with a targeted focus on emotion regulation, and a parent in attendance as co-facilitator) or via small-group therapy in-person or online (with a targeted focus on social skills, and separate psychoeducation sessions for parents). Surprisingly, the change in children's coping ability across timepoints was unrelated to either child or family factors. However, symptoms of child depression, restricted interests and repetitive behaviours (RRBs), parent distress, father ratings and family stress related to child behaviour were all associated with lower pre-treatment child coping ability. These results suggest that the presence of higher levels of one of more of these factors may have contributed to some children both beginning and finishing their respective program at a relatively lower coping ability level than others – even though participation in either program was associated with the same average increase in ability. Moreover, although the increase in parent-rated coping scores was statistically significant, the actual change may not have been experienced as meaningful given the effect size, and that pre-treatment mean coping scores were also relatively low. These findings help to explain evidence from the RCT of SAS-OR_A (Weiss et al., 2018) indicating that at post-treatment, there was no significant change in children's ability to apply their knowledge ER strategies during a scenario task, and that 33% of children (n = 18) met clinical criteria for minimal change, no improvement, or worsening (CGI-Improvement; Guy, 1976).

As discussed in Study 1 (Black et al., 2023), use of the newly derived Coping subscale allowed for a unique focus on some of the typical skills practiced in CBT-based interventions (i.e. use of problem-solving strategies, ability to calmly navigate common distressing situations such as losing a game or making mistakes). It is important to recognize that these are higher-order skills that require time and repetition before generalization occurs. Both quantitative results and visual plotting suggest that for both types of therapy, the 10-week end point may have occurred just as children began to show improvement. Some evidence suggests that longer length of treatment and greater session frequency may contribute to better outcomes for autistic children (Klinger et al., 2020); a recent pooled study of anxiety-specific CBT for autistic children described a treatment length of 16 weeks across four of the five RCTs (Cervin et al., 2023), in comparison to the 10 week treatment participants received in the current study. Evidence from one 16-week study (Norris et al., 2022) indicates improvements in coping ability over time according to both parent and child report (measured via a 3-item scenario based on fearful situations specific to each child, adjusted at each timepoint and rated on a 7-point likert scale: "*when your child is [worrying about how people feel about them]*, *how well are they able to help themselves feel less upset?*). Child-report showed no difference between CBT and treatment as usual (Norris et al., 2022). It may be that the lack of significantly different coping improvement across CBT and TAU conditions reflects children's positive experience of receiving empathetic weekly support and attention regardless of condition; in fact, a similar small improvement is indicated in parent-reported results for the treatment-as-usual group.

Cervin et al.(2023) report attenuated treatment response for participants with high parent-reported autism symptoms and difficult family and social relationships. In contrast, we found no relationship between autism symptoms and post-treatment change, and at pre-treatment, results only showed lower coping ability in relation to RRBs. The difference in findings may be partially explained by study design: we examined the RRB and SCI symptom scales separately (vs. the

Total SRS-2 symptom score), and the Coping subscale targeted dimensions of a specific skill set rather than dimensions of symptoms related to anxiety. Cervin et al. (2023) also note that parental anxiety and accommodation of child anxiety may account for a large proportion of the variance in their findings, in which only child-level factors were measured. In terms of parent and family factors in the current study, father ratings and family stress related to child behaviour each contributed the strongest effects to lower ratings of child coping ability at pre-treatment. Findings are in line with previous evidence indicating a relationship between parenting stress, child behavioural difficulties and lower self-efficacy for both fathers and mothers of autistic children (Strauss et al., 2022). It is also possible that parents perceive the kind of behavioural problems their children experience differently. For example, some evidence suggests that mother and father stress levels may be differentially predicted by specific child behavioural problems: Davis and Carter (2008) found that overall stress levels did not significantly differ between parents of autistic toddlers, but father stress was predicted by child externalizing behaviour, and mother stress was predicted by children's regulatory difficulties (which included eating, sleeping and self-regulation). Given that items in the Coping scale assess "tantrum" behaviour, as well as ability to modulate angry behaviour at home and at school, it may be that the lower father ratings of child coping ability reflect a similar sensitivity to externalizing behaviour. However, further research is warranted given the small sample of fathers in the study. Moreover, it is important to consider that in general, parents are likely to begin therapy programs for their children while in a state of stress, yet within parent-involved programs, there is little focus on supporting parents to improve their own well-being (Turner-Brown et al., 2019; Brian et al. 2022); high demands are often placed on parents in regards to attendance, skill learning and practice (Kaminski et al., 2008; Rovane et al., 2020), with little attention paid to a parent's own experience of distress. Greater family adaptability has been associated with reduced maternal depression regardless of autistic children's behaviour problems (Baker et al., 2011), suggesting that supporting families under stress to focus on strengths and flexibility could have beneficial effects for both parents and

children. Recent studies of brief parent support programs based in acceptance and commitment therapy (ACT) are promising in this regard, showing post-intervention improvements in parental stress, depression, family distress, anxiety and various indicators of well-being (Juvin et al., 2022; Lunsky et al., 2018; Maughan et al., 2023). Evidence also suggests that self-compassion may be an important mechanism of change for parental well-being (Neff & Faso, 2015).

Finally, our combined sample of 32 girls provided an important opportunity to examine gender differences and similarities in a treatment-seeking group of school-age autistic children; one not currently available in the literature. Findings suggest that during primary school years, many autistic girls do experience significant, measurable difficulties in social-communication, as well as in restricted interests and repetitive behaviours, and that for treatment-seeking autistic girls, these difficulties may in fact occur at a greater intensity than for boys. Our results also differ in some aspects from evidence reviewed by Lai et al. (2022). For example, we found no gender difference for IQ (rather than lower for girls), and autism symptom severity for girls was statistically higher across all subscales of the SRS-2 (Total, SCI, RRBs), with only girls' symptom scores for RRBs and SCI exceeding the recommended T-score threshold for severe difficulties (>76). However, mean differences between genders for each subscale were small, and there was no significant interaction between gender and either RRBs or SCI within the multilevel growth model. It may be that school-age autistic girls experience a relatively greater intensity of restricted interests and behavioural rigidity, however, according to our findings, this does not serve as a barrier to improvement in coping ability, although skill acquisition may require a greater number of therapy sessions to foster meaningful development. Findings from the current study are in line with evidence from interviews with autistic women and their mothers regarding childhood experiences (Hamdani et al., 2023; Fowler & O'Connor, 2021). For example, in terms of restricted interests and repetitive behaviours, it is possible that elevated ratings for girls reflect behavioural rigidity more than motor behaviours ("she's highly motivated to be engaged on *her* terms"; Hamdani et

al., 2023, pp. 7; "mothers of younger girls spoke about their daughter's desire for control", Fowler & O'Connor, 2021, pp. 281). Results also point to relatively higher coping ability for girls compared to boys in families experiencing stress related to child behaviour. Given that items in Coping assess ability to modulate emotional responses across both school and home, it may be that for girls, efforts to blend in or to avoid bullying victimization in one environment (i.e., school) occur by modeling behaviour observed in peers and adults, rather than internalizing actual understanding of how to process, reduce or tolerate upsetting thoughts and feelings. Qualitative evidence related to school-age experiences of adult autistic women suggests that some autistic girls may appear 'quiet' or regulated in the school environment, while experiencing depressed, anxious or reactive behaviour with limited ability to cope in other settings (Fowler & O'Connor, 2021; Hamdani et al., 2023).

Limitations

Our study has several limitations. First, although the combined sample improved external validity by increasing overall sample and diversity related to gender and ethnic diversity, participants were still predominantly White, male, affluent (gross family income >100K), with parents indicating English as the child's primary language. The number of fathers who completed ratings was also very small. Therefore, generalizability of findings to autistic children beyond this group may be limited. Second, similar to recent work in the field (Cervin et al., 2023; Lunsky et al., 2021; Sofronoff et al., 2017), we used pooled data from related CBT-based programs where the core components were the same across comparators, even though aspects of overall protocols differed, and therapy programs were delivered to participants at multiple sites. Although we were not able to measure or control for all possible confounds due to the pooling, results showed that the use of nesting in our model appropriately controlled for the variance in coping skill ratings that occurred due to a small proportion of differences in ratings between sites. Ultimately, matching discrepancies are inevitable within clinical research seeking to unravel these types of complex

questions, and they also occur in randomized controlled trials comparing individual and group-based CBT for youth (James et al., 2015; Gates et al., 2017). Third, we investigated changes in coping ability using the Coping subscale as our outcome measure, without also examining outcomes for the Interacting subscale. It may be that additional improvement in coping ability occurred within ratings of items aggregated to the Interacting subscale (e.g., chooses appropriate solutions to social problems; deals appropriately with social problems), however, change on these items would also realistically require children to first attain the skills addressed in Coping (e.g., thinks about different ways of responding; considers consequences before responding; uses strategies to deal with sadness and disappointment). Further, the remaining items in the Interacting subscale – aspects of emotion recognition and understanding in others (see Study 1,Table 3) – although related, are more closely related to social cognition than to the process of Coping. Fourth, due to constraints in the measures available across samples, we used a harmonized measure of child depression. Despite best efforts to retain core concepts in line with DSM-5 criteria, multiple items were omitted from the final measure from both the original CASI-V and both original versions of the BASC due to difficulties matching language, which may have resulted in an underestimate of child symptoms. That said, the predictive relationship between the harmonized depression measure and Coping (in the context of the full multilevel model), and the correlation between the BASC-2/3 and pre-treatment Coping in Study 1 were similar, suggesting that the harmonization appropriately reflected the level of depression symptoms in the combined sample. Finally, the inclusion of a waitlist comparison group (i.e. splitting the sample from the RCT for SAS-OR_A) could have strengthened the study design. However, data collection for children first randomized to the waitlist condition in SAS-OR_A only occurred at two timepoints to ensure that all children participating in the study received access to treatment within a reasonable time period.

Consequently, the waitlist data could not be included in multilevel analyses examining change across three timepoints.

Conclusion

Coping strategies are essential to CBT, yet little evidence is available as to whether coping ability changes as a function of treatment for autistic children, or how child and family factors moderate outcomes. Our results suggest that autistic children can begin to increase coping ability via participation in either individual or group-based parent-involved CBT programs; however, meaningful skill acquisition may require longer treatment duration than 10 weeks. Moreover, greater contribution of factors such as child depression, restricted interests and repetitive behaviours, parent distress and family stress related to child behaviour indicated the likelihood of lower initial coping ability. In such cases, children have more to learn regarding overall coping skill learning, which may also require a greater length of treatment before meaningful change occurs. Given that community-based service is often limited to treatment length of 8 – 10 sessions, additional sessions focusing on repetition of concepts may be needed in order to foster skill generalization. As such, it will be important for future research to investigate dose-response relationships specific to coping skill learning within CBT for autistic children. Additionally, our results indicate that rather than focusing solely on increasing the intensity of behaviour-focused parental involvement within sessions, there is an important opportunity to investigate the benefit of embedding early support sessions for parents with the potential to reduce stress, improve both parent and child capacity to learn new skills, and increase overall family well-being.

Chapter 4: General Discussion

Key Findings

The research in this dissertation addressed several gaps within the autism literature. Study 1 identified inconsistencies within measurement of constructs for ER and coping, and revealed that a measure of social-emotional competence commonly used within CBT trials for autistic school-age children may provide greater clinical utility when distilled into specific dimensions of coping and social skills. Study 2 provided a novel contribution to the limited evidence on coping skill change within CBT for autistic children, by examining the impact of child and family characteristics on treatment outcome, and the potential moderating effect of treatment type (individual vs. group). The use of pooled data from three related studies of CBT-based programs for autistic school-age children allowed for analyses that addressed the paucity of information regarding gender differences in the context of treatment. Results showed significant mean gender differences in SCI and RRBs (i.e., greater difficulties for girls), and no difference according to age, IQ, symptoms of depression, or coping ability. Notably, results revealed that family stress related to child behaviour moderated the relationship between pre-treatment coping ability and gender (i.e. higher coping ability for girls compared to boys in this context). Use of the newly derived coping subscale showed that on average, participation in either parent-involved individual or group-based CBT was related to a similar, small improvement in coping ability for all children in the study. Given that children's coping ability appeared to be in the beginning stages of change as treatment ended, programming longer than 10 weeks may be needed before children are able to successfully apply their skills within stressful situations. Systemic factors did not significantly impact changes in coping ability. However, at pre-treatment, lower child coping ability was predicted by higher child depression, restricted interests and repetitive behaviour, parental distress, family stress related to child behaviour, and ratings provided by fathers. Results indicated that the presence of one of more of these factors may have contributed to some children both beginning and finishing their respective program at a relatively lower ability level

than others – even though participation in either program was associated with the same average increase in coping ability. Overall findings suggest that for autistic children experiencing factors associated with lower initial coping ability, multiple adjustments to programming may be required to foster independent coping skill use and generalization across contexts.

Clinical and Research Implications

The ability to cope with adverse experiences may be a critical asset in the development of resilience for autistic children. Resilience is characterized by the ability to adapt to challenges despite adversity ("ordinary magic"; Masten, 2011). In line with results from this dissertation showing that both child and family factors contribute to differences in coping ability for autistic children, resilience is thought to emerge via a complex interplay of personal strengths and social-ecological supports that result in positive developmental outcomes in the face of exposure to risk (Fergus & Zimmerman, 2005, Polizzi & Lynn, 2021). Research with autistic adolescents and adults describes common struggles involving problem-solving, low self-esteem, self-harm, suicidality, and co-occurring mental health difficulties related to high numbers of adverse experiences (Lai, 2023; Lai et al., 2023; O'Connor et al., 2024). Yet evidence suggests that for some autistic adults, use of adaptive coping strategies such as problem-solving and re-appraisal moderates the relationship between stress and well-being (Muniady et al., 2023a), and that increased use of adaptive coping such as problem-solving and acceptance predicts greater well-being over time (Muniady et al. 2023b). Similarly, longitudinal findings from studies with non-autistic individuals indicate that high vs. low resilience may be related to greater use of adaptive regulation strategies (for review, see Polizzi & Lynn, 2021). In research with non-autistic youth with adverse experiences, factors such as high maternal warmth, family cohesion, a positive home environment and youth self-confidence have been found to buffer against externalizing and internalizing symptoms, including depression (Bowes, Maughan, Caspi, Moffitt, &

Arseneault, 2010; Askeland et al., 2020). In sum, these findings suggest the possibility that by providing therapeutic support focused on improving coping ability during the latency period -- at both the individual and family level – there is potential to increase autistic children's resilience.

As discussed in Study 2, for some school-age autistic girls, RRBs may present as behavioural rigidity or "stickiness" around preferred topics and activities. Clinicians may find it helpful to consider that while aspects of these behaviours may impede social inclusion and require intervention, they may also provide an opportunity to identify important interests that can be incorporated directly into therapy. Evidence shows greater improvement in mental health outcomes for CBT-based programming with aspects adapted to the individual interests of autistic children in comparison to standard CBT and treatment as usual (Wood et al., 2020); moreover, focusing on an autistic child's interests which may have previously been dismissed as odd or "obsessive" (see O'Connor et al., 2024), or strengths that may have been overlooked by peers, may lead to improvements in perceived self-competence and acceptance. Both are factors that have been linked to the development of resilience for non-autistic children (Fergus & Zimmerman, 2005). This is an important avenue for future research, although these factors currently remain unexplored within the developmental autism literature. Additionally, a strengths-based approach to CBT has the potential to increase motivation to practice the use of adaptive coping in the face of distressing experiences. Greater support to build these skills in childhood may lead to increased capacity to cope when encountering day-to-day experiences highlighted as particularly stressful for autistic women and adolescents, such as differing interests, unpredictability, and social mis-understandings (O'Connor et al., 2024).

Results from this dissertation indicate that parent-involved CBT programs show promise as a means to pro-actively improve or bolster coping skills for autistic children, yet research suggests that access remains limited. For example, in Ontario, clinicians report limited knowledge or

comfort providing CBT for autistic children (Roudbarani et al., 2023), and parents report struggles enrolling their children in CBT programs offered through community agencies (Fearing, 2024). Drahota et al. (2023) found that due to knowledge limitations, community service providers for autistic youth in the United States used CBT about half as frequently as teaching, applied behavioural analysis, and antecedent-focused strategies (i.e. changing the environment to prevent a behaviour from occurring). Wood et al. (2024) argue that university-based efficacy trials are disconnected from the needs of community practitioners: implementation requirements may not be feasible, or access to affordable training may be unavailable. Given these gaps in access and training, it may be helpful for clinicians to consider that our findings provide preliminary evidence that for school-age autistic children, a parent-involved, manualized program that includes CBT-based content (i.e., focused on practice of a common set of skills intended to change thoughts, feelings and behaviour), is likely to provide the same relative benefit for skill-learning related to coping, whether delivered individually, or via a group social skills format. Clinicians seeking to expand their knowledge and competence with flexible tailoring of individually-delivered CBT to the needs of autistic children may benefit from exploring a recent resource for free training and evidence-based content guidance developed through the National Institute for Mental Health and UCLA (MEYA, Modular Evidence-Based Practice for Youth with Autism; meya.ucla.edu; Wood & Wood, 2017; Wood et al., 2024). For autistic children who experience higher symptoms of depression, restricted interests and repetitive behaviours, parent distress and family stress related to child behaviour, clinicians should also consider that a time-limited 10-week program may only be a starting point in the process of fostering meaningful coping ability. Increased session frequency and longer overall program length have been associated with improved treatment outcomes in CBT (Klinger et al., 2020). However, the additional commitment that increased session frequency would require (e.g. twice weekly) may

present a barrier to service for many families. Financial constraints within community agencies may also lead to choices of group programs with shorter program session lengths in order to reach more families on the waitlist. It is therefore important for future studies to examine adaptations to existing CBT programs according to content. That is, which components are critical to the development of coping skills for autistic children? Although no research has examined specific components to date, there is some evidence suggesting the benefits of adding socio-emotional support for parents within CBT. Results from two RCTs of behaviour-based parenting training suggest that the addition of a 4-hour ACT intervention may contribute to greater improvement in parent depression symptoms compared to training alone (Hahs et al., 2019; Whittingham et al., 2016). The inclusion of only a psychoeducation module may not be sufficient to provide a benefit: No changes in depression or caregiver burden were reported by parents of autistic children who participated in a culturally-adapted, behavioural parent training program with a module on stress reduction and depression awareness, despite a large, post-treatment increase in perceived efficacy related to the use of behavioural management strategies (Magaña et al., 2017). It may be that parents experienced a particular benefit from additional ACT intervention due to the experiential component; that is, parents were supported to actively practice stress reduction techniques such as mindfulness and cognitive defusion, rather than participating as passive learners.

Additionally, research from trauma-informed care and family therapy models suggests that including emotion coaching in CBT could contribute to improved child and family outcomes. Although the specific term ‘emotion coaching’ refers to a module within Emotion Focused Family Therapy (EFFT; LaFrance et al., 2019), the general concept also features prominently in the Attachment Regulation and Competency model (ARC; Blaustein & Kinniburgh, 2018), another parent-involved therapeutic model developed for youth with complex mental health needs. Emotion coaching describes a framework of common components involving emotion labeling and

validation. Currently, autism-specific adaptations within CBT involve increasing a child's skill labeling emotions in others – in contrast, emotion coaching focuses on supporting a child to identify and label their own feelings. Parents learn to acknowledge and sensitively diffuse a child's heightened emotions through the use of mirroring and validation, before engaging in problem-solving; in turn, the child develops greater ability to express and tolerate distressing feelings. The overall process also includes support for parents to increase attunement to their own emotional and self-care needs. A recent case study of a stand-alone emotion coaching intervention (delivered virtually) showed post-treatment improvements in family functioning, parent self-efficacy and child internalizing and externalizing symptoms (Smith et al., 2023). In sum, emotion coaching may be a useful additional component to CBT, providing a discrete set of skills that parents can learn with minimal psychoeducation, modeling and follow-up support. For families with greater mental health needs who participate in CBT, the additional component shows promise as a means to extend and support the development of autistic children's coping skills, and their capacity for resilience.

Conclusion

This dissertation provides a novel extension to the limited literature on coping ability within CBT for autistic children. Results show that autistic children may begin to increase coping ability via participation in either individual or small-group parent-involved CBT-based programs, whether the focus is on emotions or social skills. These findings highlight that a wider range of treatment options may be available for clinicians who have limited knowledge of CBT for autistic children and provide initial guidelines to consider in case referral is needed, given that some social skills programs do not contain CBT-content (i.e. a common set of skills changing thoughts, feelings and behaviour to help children modulate feelings of distress in stressful situations). However, for autistic children who experience higher symptoms of depression, restricted interests and repetitive behaviours, parent distress and family stress related to child behaviour, coping ability

may only begin to improve at the close of a 10-week program. It may also be helpful for clinicians to consider that for some school-age autistic girls, RRBs may present as an intense behavioural rigidity or “stickiness” around preferred topics and activities. Additionally, there may be benefits in exploring adaptations to CBT that include additions for parents focused on experiential practice of stress-reduction, self-compassion, and emotion coaching for children. Taken together, these findings present preliminary, yet practical considerations for clinicians and community agencies that can assist with targeted treatment planning. In the end, we have a responsibility to not only increase the availability of mental health services for autistic children and their families, but to increase service focused on identifying strengths and building resilience.

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Appendix

Table S1. Results from X^2 and T-test comparisons (SAS-OR$_A$/SAS-OR$_B$)

	SAS-OR$_A$	SAS-OR$_B$			
	M(SD)		t	df	*p (2-tailed)*
Child age	9.7(1.3)	9.6(1.5)	.43	104	.67
BASC-2/3[a]					
Depression	67.1(15.2)	68.4(11.3)	-.47	102	.64
SRS-2[a]					
Total	74.3(8.9)	72.5(7.4)	1.06	104	.29
RRBs	74.5(9.8)	73.1(7.7)	.77	104	.27
SCI	73.6(8.9)	72.1(7.6)	.87	104	.44
ERC					
L/N	36.5(6.0)	37.2(7.6)	-.51	103	.61
ER	23.0(3.7)	22.7(3.8)	.37	103	.71
ERSSQ					
Total	49.4(10.5)	48.6(9.92)	.39	104	.70

[a] T-scores. SAS-OR$_A$ = *Secret Agent Society: Operation Regulation, Cohort 1(2013 – 2016)*. SAS-OR$_B$ = *Secret Agent Society: Operation Regulation, Cohort 2 (2017 – 2020).* ERC-L/N = Emotion Regulation Checklist – Lability/Negativity Subscale. ERC-ER = Emotion Regulation Checklist – Emotion Regulation Subscale. BASC-2/3 = Behavior Assessment System for Children 2nd or 3rd Edition. SRS-2 = Social Responsiveness Scale 2nd Edition. RRBs = Restricted and Repetitive Behavior subscale. SCI = Social Communication & Interaction composite. ERSSQ Total = Emotion Regulation and Social Skills Questionnaire – Total Score.

Table S2. Results from X^2 and T-test comparisons (CSAS/SAS-OR_{AB})

Item	X^2 *(df)*	*p (2-tailed)*
Child Gender	1.12 (1)	.29
Informant Relationship	4.19 (1)	.04
Household Income	6.77 (4)	.15
Child Racial/Ethnic Identity	8.35 (4)	.08
	t (df)	
Child Age	-.84(184)	.40
Parent Age	1.78(178)	.08
SRS-2[a]		
Total	.78(184)	.44
RRB	.35(184)	.73
SCI	1.12(184)	.26
ERSSQ		
Total	-.84(184)	.40

[a] T-scores. SRS-2 = Social Responsiveness Scale 2nd Edition. RRBs = Restricted and Repetitive Behavior subscale. SCI = Social Communication & Interaction composite. ERSSQ Total = Emotion Regulation and Social Skills Questionnaire – Total Score.

Table S3. Four-factor model coefficient loadings, extracted by EIFA

	Factors				
Item	F1	F2	F3	F4	h^2
ERSSQ1	-0.05	0.07	-0.05	**0.79**	.59
ERSSQ2	-0.02	-0.12	0.04	**0.83**	.67
ERSSQ3	0.19	0.15	-0.08	0.31	.21
ERSSQ4	**0.69**	-0.13	-0.02	0.00	.48
ERSSQ5	**0.78**	0.03	-0.05	-0.03	.58
ERSSQ6	**0.65**	0.04	-0.10	-0.11	.38
ERSSQ7	**0.63**	-0.20	0.07	0.02	.44
ERSSQ8	**0.58**	-0.04	0.12	-0.05	.33
ERSSQ9	**0.58**	0.15	-0.06	0.12	.44
ERSSQ10	**0.76**	-0.03	0.09	0.04	.63
ERSSQ11	**0.73**	-0.11	0.02	-0.04	.52
ERSSQ12	**0.52**	0.06	0.19	0.27	.57
ERSSQ13	0.37	0.12	0.29	0.28	.50
ERSSQ14	0.22	-0.12	0.37	0.30	.36
ERSSQ15	0.29	-0.15	0.22	0.26	.28
ERSSQ16	-0.02	**0.96**	0.01	-0.02	.93
ERSSQ17	-0.01	**0.98**	0.05	-0.01	.99
ERSSQ18	0.01	**0.57**	**0.50**	0.07	.83
ERSSQ19	-0.06	0.14	**0.79**	-0.03	.71
ERSSQ20	0.07	0.09	**0.60**	0.05	.44
ERSSQ21	**0.45**	0.06	-0.01	0.25	.37
ERSSQ22	0.06	0.06	0.12	0.31	.17
ERSSQ23	**0.77**	0.11	-0.11	-0.06	.57
ERSSQ24	**0.59**	0.03	-0.06	-0.06	.32
ERSSQ25	0.18	0.36	-0.35	**0.38**	.36
ERSSQ26	0.32	0.06	-0.08	0.15	.17
ERSSQ27	0.28	0.12	0.00	0.15	.15
Rot. SS Loadings	5.63	2.60	1.74	2.11	

Table S4. Polychoric correlation matrix for Coping

	4	5	6	7	8	9	10	11	23	24
ERSSQ4	1	.								
ERSSQ5	.50	1								
ERSSQ6	.32	.66	1							
ERSSQ7	.78	.28	.24	1						
ERSSQ8	.25	.54	.31	.41	1					
ERSSQ9	.35	.44	.29	.25	.28	1				
ERSSQ10	.45	.49	.32	.36	.39	.60	1			
ERSSQ11	.38	.50	.41	.39	.33	.32	.68	1		
ERSSQ23	.43	.56	.37	.39	.44	.44	.47	.39	1	
ERSSQ24	.28	.25	.35	.32	.23	.35	.41	.28	.50	1

Table S5. Polychoric correlation matrix for Interacting and Initiating

	1	2	12	13	14	16	17	18	19	20
ERSSQ1	1									
ERSSQ2	.60	1								
ERSSQ12	.29	.40	1							
ERSSQ13	.30	.31	.78	1						
ERSSQ14	.30	.34	.32	.42	1					
ERSSQ16	.14	.01	.23	.30	.06	1				
ERSSQ17	.15	.05	.20	.30	.14	.94	1			
ERSSQ18	.23	.21	.33	.42	.27	.63	.70	1		
ERSSQ19	.08	.13	.18	.24	.23	.34	.38	.66	1	
ERSSQ20	.13	.20	.24	.25	.34	.29	.30	.44	.53	1

Note: Subscales overlap on Item 18.