

EMOTION REGULATION IN CHILDREN WITH AUTISM SPECTRUM DISORDER:
THE ROLE OF PARENT CO-REGULATION AND ITS RELATIONS WITH
EXTERNALIZING AND INTERNALIZING PROBLEMS

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Abstract

Children with autism spectrum disorder (ASD) often exhibit internalizing and externalizing problems, which may be explained by emotion regulation (ER) difficulties. Parent co-regulation (i.e., supporting their child's emotional development through scaffolding, and helping their child regulate emotions) may help improve child ER, and internalizing and externalizing problems. This study investigated the relationships amongst parent co-regulation, child ER, and internalizing and externalizing problems in a sample of 35 parents and school-aged children with ASD prior to an ER-focused Cognitive Behavior Therapy intervention. Active co-regulation strategies (e.g., prompting, redirection of attention), and scaffolding during an anxious situation were associated with parent-reported levels of internalizing problems. Although child ER did not emerge as a significant mediator or moderator, parent scaffolding and child ER were significant predictors of externalizing problems. Suggestions for future research on parent involvement in the emotional development of children with ASD are discussed, as well as implications for ER-focused interventions.

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Emotion Regulation in Children with Autism Spectrum Disorder: The Role of Parent Co-Regulation and Its Relations with Externalizing and Internalizing Problems

Individuals with Autism Spectrum Disorder (ASD) experience impairment in social interaction and communication (American Psychiatric Association, 2013), and often have externalizing (e.g., aggression, hyperactivity) and/or internalizing (e.g., anxiety, depression) mental health problems. Studies using large-scale survey and interview methods found that approximately 71-86% of children and adolescents with ASD suffer from clinically significant emotional difficulties (Ooi, Tan, Lim, Goh, & Sung, 2011; Totsika, Hastings, Emerson, Lancaster, & Berridge, 2011). Children and adolescents with ASD also have higher levels of psychopathology than typically developing children (Dickerson Mayes, Calhoun, Murray, Ahuja, & Smith, 2011) and those with intellectual disability (Brereton, Tonge, & Einfeld, 2006). As well, over half of children with ASD experience 4 or more externalizing and internalizing problems 3 times a week (Maskey, Warnell, Parr, Le Couteur, & McConachie, 2013). These externalizing and internalizing problems can significantly impact these children's quality of life and achievement, as well as the health and wellbeing of their families (Wood & Gadow, 2010). For example, one study found that the severity of psychiatric symptoms in children with ASD was negatively associated with social and school functioning (Gadow, DeVincent, & Schneider, 2008).

Emotion Regulation

The broad externalizing and internalizing difficulties outlined above may be explained by underlying deficits in emotion regulation (i.e., the set of processes that control emotions; Gross & Thompson, 2007; Mazefsky et al., 2013; Rieffe et al., 2011; Weiss, 2014). Children with ASD

tend to use more maladaptive emotion regulation strategies (e.g., venting, avoidance) in frustrating situations than typically developing matched controls (Jahromi, Meek, & Ober-Reynolds, 2012; Konstantareas and Stewart, 2006). In adolescence, both typically developing youth and those with ASD report similar levels of adaptive, voluntary forms of emotion regulation (e.g., problem solving, emotional control), but those with ASD reported higher levels of involuntary emotion regulation strategies that are generally considered to be maladaptive (e.g., rumination, intrusive thoughts, physiological and emotional arousal, mind going blank and numb) (Mazefsky, Borue, Day, & Minshew, 2014). Emotion regulation deficits are also found in adults with ASD (Samson, Huber, & Gross, 2012), suggesting that the difficulties with controlling emotions seen in childhood can also be observed later on in life.

Emotion regulation deficits in children with ASD are related to internalizing and externalizing symptoms (Rieffe et al., 2011). One study based on parent and self-report questionnaires found that involuntary forms of emotion regulation were related to higher levels of internalizing and externalizing problems, as well as symptoms of anxiety and depression in these children (Mazefsky et al., 2014). Taken altogether, current research indicates that many children with ASD have emotion regulation deficits and associated psychopathology (e.g., anxiety, depression, and anger). One limitation of previous studies on emotion regulation in children with ASD is that these largely relied on self-report (38%) or informant report (44%); fewer used naturalistic observation/behaviour coding (31%) or open-ended measures (13%); and only two (6%) of the studies explored correlates of emotion regulation (Weiss, Thomson, & Chan, 2014). Self-report in children with ASD may be problematic due to the lack of correspondence with parent report (Mazefsky, Kao, & Oswald, 2011; Meyer, Mundy, Van Hecke, & Durocher, 2006; White, Ollendick, Scahill, Oswald, & Albano, 2009) and with

physiological measures (Shalom et al., 2006), raising the question of the validity of self-report responses in this population. Alexithymia, which is the difficulty in understanding and verbalizing one's own emotions, may affect the ability of individuals with ASD to correctly report their ability to regulate emotions (Berthoz & Hill, 2005). Parent report is often used instead of children's self-report, but relying on one informant (e.g., parent report) for outcome and predictor variables can lead to overestimates of associations because of common method variance (Lindell & Whitney, 2001; Richardson, Simmering, & Sturman, 2009).

Individual and parental correlates of child psychopathology

Some research on the correlates of psychopathology in children with ASD focuses on individual characteristics (Baker, Seltzer, & Greenberg, 2011). These individual characteristics include factors such as autism severity, verbal IQ, and age (Mayes, Calhoun, Murray, & Zahid, 2011). Although statistically significant, these individual variables only explain a relatively small amount of variance in psychopathology (Gadow et al., 2008; Mayes et al., 2011; Sukhodolsky et al., 2008). In understanding the role of emotion regulation in internalizing and externalizing problems in children with ASD, it is important to start looking beyond individual factors.

Internalizing and externalizing problems in children with ASD have indeed been associated with several parental and family factors, including parenting style, maternal stress, expressed emotion, family history of psychopathology, and family adaptability. In a longitudinal study of typically developing children, positive parenting behaviours (e.g., parental warmth and support) observed when the child was 7 to 36 months of age, were associated with lower levels of child problem behaviours at ages 4 to 12 years (Boeldt et al., 2012). One study of children with developmental disabilities, aged 2.5 to 5 years of age, found that parent disciplining practices and parent-child attachment were associated with improvements in child self-control

(Lewallen & Neece, 2015). Similarly, Boonen and colleagues (2014) found that negative, controlling parenting (i.e., discipline and harsh punishment) was associated with externalizing behavior problems in children with ASD. Problem behaviors have also been associated with increased levels of maternal stress in pre-school and school-age children (Estes, Munson, Dawson, Koehler, Zhou, & Abbott, 2009; Totsika et al., 2011). Family factors such as family history of psychopathology (Gadow et al., 2008), high levels of expressed emotion (i.e., high criticism and/or emotional over-involvement; Greenberg, Seltzer, Hong, & Orsmond, 2006) and poorer family adaptability (i.e., the ability to respond to a stressor using strategies such as problem-solving, changing roles and responsibilities; Baker et al., 2011) have also been associated with increased behavioural problems in children with ASD.

Parents also play an important role in supporting the development of emotion regulation skills. From a theoretical perspective, Sameroff and Fiese's (2000) "ice-cream-cone-in-a-can" model describes development as a series of transactional relations between self-regulation and other-regulation over time. According to this model, a child progresses from relying on others to regulate their needs and emotions to being able to regulate themselves. For example, caregivers can help calm and soothe infants during painful or stressful situations (e.g., getting a vaccination), and as children develop, they are more able to regulate their own emotions and calm themselves down. The relationship between self- and other-regulation is "transactional" in that an individual's ability to self-regulate is influenced by how his or her caregiver helped them regulate earlier in life. In other words, the way a caregiver regulates a child's emotions may affect how the child later regulates his or her own emotions.

Parenting behaviours are also related to emotion regulation skills in children with and without ASD. In a study of typically developing school-aged children, researchers found that

parents with high levels of unsupportive responses to emotions rated their children as having poorer emotion regulation and more depressive symptoms (Sanders, Zeman, Poon, & Miller, 2015). Another study on typically developing children found that child emotion regulation moderated the association between maternal depression and child internalizing problems (Silk, Shaw, Forbes, Lane, & Kovacs, 2006). Silk and colleagues (2006) found that positively anticipating a reward during a waiting period (an adaptive emotion regulation strategy) was a protective factor against internalizing problems for children whose mothers had childhood-onset depression. In conducting research with parents of children with ASD, interviews revealed that many parents noticed that their emotions had an effect on their child's emotions and behaviours, and vice versa; a phenomenon that has been called "emotional transmission" between parent and child (Zhou & Yi, 2014). Further, a pilot study by Scarpa and Reyes (2011) studied 11 children with ASD aged 5 to 7 years of age and found that parents reported improved emotion regulation and shorter behavioural outbursts after their child with ASD participated in a modified Cognitive Behavior Therapy (CBT) program focusing on emotion regulation. Of interest, this program involved teaching parents how to help their young children cope, and parents' confidence in these abilities was related to child improvement, suggesting that parents help support children's emotion regulation. However, this study was limited by its use of one-tailed *t*-tests, small sample size, and parent-report. It measured parents' self-confidence in helping their children cope with anger and anxiety through one self-report question, without any direct observations of parent behaviour or clinician ratings. Child emotion regulation was also measured through a parent-report questionnaire, without the use of any child self-report measure or behavioural observation.

Parents are often involved in interventions focusing on anxiety in children and adolescents with high-functioning ASD (Reaven, 2010). Parents may serve as "co-therapists",

encouraging the child to use strategies in anxiety-provoking situations and helping with homework completion (Sofronoff, Attwood, & Hinton, 2005). Parents can also model courageous behaviours to give the child with ASD a concrete and visual way of learning adaptive coping strategies (Reaven, 2010). Parent involvement, such as parents' self-efficacy in helping their child deal with emotions, modeling, or helping their child to practice emotion regulation skills (Reaven, 2010; Sofronoff et al., 2005), is generally seen as beneficial in supporting the development of adaptive emotion regulation skills in children with ASD, but it is unclear what aspect of parenting behaviour is most important. It is also unclear how these parenting behaviours are related to children's mental health at different levels of child emotion regulation.

Parent co-regulation & child outcomes

Parent co-regulation is one way in which researchers have conceptualized parents' role in children's emotion regulation. It can be defined as a parent's support of their child's emotional development through motivational or emotional scaffolding, and using strategies to help their child regulate emotions (Gulsrud, Jahromi, & Kasari, 2010). As described by Hoffman, Crnic, and Baker (2006), motivational scaffolding includes parents' ability to initiate and sustain their child's enthusiasm for a task, and may be shown through praise and encouragement, persistence, redirection of the child's attention, or re-stating the goals of the task. Emotional scaffolding describes the parent's ability to make the task a positive experience for the child, which is demonstrated by maintaining sensitivity towards the child's emotions, sharing in the child's positive emotions, and valuing the child's participation in the task (Hoffman et al., 2006). Such emotional coaching is associated with lower child physiological stress and fewer externalizing problems in typically developing children and those with ASD (Hooven, Gottman, & Katz, 1995;

Wilson, Berg, Zurawski, & King, 2013). One advantage of exploring parent emotion co-regulation as a correlate of child emotion regulation and psychopathology is that it can be measured through behavioural observation (e.g., Loughheed, Hollenstein, Lichtwarck-Aschoff, & Granic, 2014).

Gulsrud and colleagues (2010) were the first to adapt a behavioural coding scheme to investigate co-regulation in mothers of toddlers with ASD (adapted from Grolnick, Bridges, & Connell, 1996), in a study of a 24-session joint attention intervention. Using this adapted coding scheme to code parent and child behaviour during 10-minute play periods at the end of each session, they found that co-regulation strategies used in mothers of typically developing toddlers (Grolnick et al., 1996) and those with ASD tended to be similar. One key difference was that mothers of typically developing toddlers shifted from using more physical and active co-regulation strategies (e.g. physical comfort, helping) to more passive strategies (e.g. verbal explanations), whereas mothers of toddlers with ASD continued to use physical and active strategies. Gulsrud and colleagues (2010) also incorporated a global rating scale of emotional and motivational scaffolding adapted from Maslin-Cole and Spieker's (1990) Maternal Scaffolding Coding System. Over the course of the intervention, mothers demonstrated improved co-regulation (i.e. higher ratings of global motivational and emotional scaffolding, higher frequency of more adaptive strategies such as redirection of attention), and this was also associated with improvements in toddler emotion regulation (i.e. less expressed negativity and avoidance).

Although the results of this study shed light on the associations between parent co-regulation and emotion regulation in toddlers, this relationship has yet to be investigated in school-age children with ASD. Thinking back to Sameroff and Fiese's (2000) "Ice-cream-cone-

in-a-can” model of emotional development, we would expect children’s self-regulation to be influenced by the assistance they obtain from others in regulating emotion. It is possible that the strength of the relationship between parent co-regulation and child emotion regulation changes in the school-age years, and/or that the co-regulation strategies used with toddlers are different than those used with older children with ASD.

Current Study

Most of the existing literature on parent co-regulation and emotion regulation in children with ASD has focused on younger children and toddlers (i.e. under 8 years of age), and although parents’ role in children’s emotional development is known to change as a child transitions from young childhood to adolescence (Reaven, 2010), there is a need to investigate parent co-regulation in school-age children to determine possible changes over development. To date, few studies have used behavioural coding to measure parent co-regulation in ASD research. Most importantly, there is a need to understand the mechanisms of why parent co-regulation might be related to child emotional and behavioural problems in youth with ASD.

To address this gap in the literature, my thesis focused on co-regulation in parents of children with ASD between 8 and 12 years of age. I used a multi-method approach including behavioural observation, parent interviews, and open-ended measures. My thesis attempted to answer three questions. First, what types of co-regulation strategies do parents of school-age children with ASD use? Second, what are the associations amongst parent co-regulation, child emotion regulation, and child externalizing and internalizing problems? Lastly, do child emotion regulation skills mediate or moderate the relationship between parent co-regulation and psychopathology in school-age children with ASD? In other words, is child emotion regulation a

mechanism that explains why parent co-regulation might be related to child internalizing and externalizing problems?

I hypothesized that parents of school-age children with ASD would use passive and active co-regulation strategies more often than vocal strategies, similar to the transition from active to passive strategies observed in mothers of toddlers without ASD. I also hypothesized that higher parent scaffolding and child emotion regulation would be associated with lower levels of child externalizing and internalizing problems. The current study also aimed to determine whether child emotion regulation can best explain the association between parent co-regulation and child psychopathology, based on two competing hypotheses. First, I tested the hypothesis that child emotion regulation mediates the relationship between parent co-regulation and child psychopathology. Mediation is when the relationship between parent co-regulation and child psychopathology is accounted for by an intermediate variable (e.g., child emotion regulation), essentially explaining the first relationship (Baron & Kenny, 1986; Hayes, 2013). Another possibility is that parent co-regulation has a role to play in determining child psychopathology, but that this effect is only present in the context of low levels of child emotion regulation, suggesting a moderating role for this intermediate variable (Farmer, 2012).

Method

Participants

All participants were from the Greater Toronto Area and were enrolled in a randomized controlled trial of CBT to improve emotion regulation in children with ASD, 8 to 12 years of age ($M = 9.60$, $SD = 1.26$). Data collection was based on the baseline data collection period including all children up until April 2015 ($N = 36$). Of these 36 participants, one was excluded due to incomplete data. The following inclusion criteria was used: (a) a confirmed ASD diagnosis from

available clinician reports or the *Autism Diagnostic Observation Schedule (ADOS*; Lord et al., 2000), as well as scores in at least the mild range for the *Social Communication Questionnaire (SCQ*; Rutter, Bailey, & Lord, 2003) and a minimum score of 15 on the *Social Responsiveness Scale, Second Edition (SRS-2*; Constantino & Gruber, 2012); (b) average intellectual functioning ($IQ > 80$)¹ on the two-subtest scale (FSIQ-2: vocabulary and matrix reasoning) of the *Wechsler Abbreviated Scale of Intelligence-2nd Edition (WASI-II*; Wechsler, 2011); (c) between the ages of 8 and 12 years; and (d) demonstrated willingness to attend research assessments and 10 weekly therapy sessions. The majority of parents in this sample were mothers (83%, $N = 29$). Further child characteristics are shown in Table 1.

Table 1

Child Characteristics

	<i>M (SD) or N (%)</i>	Range
Age	9.60 (1.26)	8.00-12.00
Gender (% male)	31 (89%)	--
IQ	103.49 (13.56)	79.00-140.00
ASD Symptomatology		
SCQ Total Score	21.55 (3.72)	14.00-29.00
SRS Total T Score	71.71 (8.75)	54.00-90.00

Measures

Child emotion regulation. To gain a more naturalistic measure of child emotion regulation ability (ER), I used two open-ended measures that have been used previously with children with ASD and found to be sensitive to changes pre- and post-intervention (Beaumont, Rotolone, & Sofronoff, 2015; Beaumont & Sofronoff, 2008; Sofronoff et al., 2005): *Dylan is Being Teased* (Attwood, 2004a) and *James and the Maths Test* (Attwood, 2004b). Both of these measures assess a child's knowledge of appropriate emotion regulation strategies when given

¹ One child with an overall IQ of 79 was included as a result of average scores on the Vocabulary subtest of the *WASI-II*

two hypothetical situations (See Appendices A and B). Children's verbal responses were written verbatim. Each appropriate strategy described was scored as one point, and the scores from the two measures were summed. Higher scores indicate a greater knowledge of appropriate strategies to use when experiencing anger or anxiety. The current sample had scores ranging from 0 to 14, with an average score of 3.94 ($SD = 3.64$).

Parent co-regulation. To measure parent co-regulation strategies, I used a behavioural coding scheme previously used with mothers of typically developing children (Grolnick et al., 1996) and children with ASD (Gulsrud et al., 2010), and acceptable inter-rater reliability ($k = .69$ to $.96$ and $k = .72$ to $.84$, respectively). The coding scheme is applied to parent and child behaviours during a standardized *Emotion Discussion Task* (Suveg et al., 2008), in which each dyad is asked to discuss a time when the child felt anxious, angry, and happy (five minutes per emotion). For the current study, co-regulation was coded on the two distressing emotions (anger and anxiety). This task has been used to assess parents' roles in the emotional development of children with anxiety disorders (Suveg et al., 2008). Using 30-second partial-interval recording, we created composite scores for parent co-regulation strategies. The three parent co-regulation composites include: vocal (i.e., vocal comfort, reassurance), active (i.e., prompting/helping, redirection of attention, physical comfort), and following (i.e., following the child's lead, emotion following). Our lab has obtained good inter-rater reliability across two raters with this co-regulation strategies coding scheme ($k = .89$). Table 2 lists definitions and examples of each co-regulation strategy.

Table 2

Parent Co-regulation Strategies Definitions, Adapted from Gulsrud et al., 2010

Behaviour	Definition
Vocal composite	
Vocal comfort	Parent initiates vocalizations to comfort the child's present emotional state (e.g., sshing, singing, sing-song voice, "It's okay...").
Reassurance	Parent reassures or encourages child surrounding frustrating or negative emotion discussion or emotions elicited by task (e.g., "It's okay. You can do it!", "It's okay we can talk about this together", "It's okay to feel...", "I know it's hard to talk about...").
Active composite	
Prompting/helping	Parent physically or vocally prompts and scaffolds child or helps think of a time that he/she was feeling specific emotion (e.g., "Do you remember what you did/said next?").
Redirection of attention	Parent directs the child's attention to the discussion topic in an adaptive way (e.g., redirects conversation if child is perseverating on negative aspects of the discussion or goes off topic).
Physical comfort	Parent initiates behaviors to comfort the child's present emotional state (e.g., hugs, kisses, offers a drink of water, rubs shoulder, touches hand).
Following composite	
Following the child's lead	Parent is sensitive to child's interests and responds to the child's initiations in the conversation letting the child direct conversation and which event they choose to discuss (e.g., Child: "And then we went for pizza." Mom: That's right, we did go for pizza...").
Emotion following	Parent's reflection, extension, or elaboration upon child's past or present emotional state (e.g., "I know you were frustrated when that happened...", "It seemed like you were feeling... when that happened.", "You seem anxious right now...").

For a measure of the quality of parent co-regulation, we also assigned global ratings for parent a) motivational and b) emotional scaffolding using a 5-point Likert scale (Gulsrud et al., 2010), ranging from 1 = "Parent exhibits characteristic ineffectiveness in scaffolding in a particular domain (e.g., emotional or motivational) – child's needs for scaffolding are not met" to 5 = "Parent meets the child's scaffolding needs almost the entire time; there may be a rare instance in which the parent misses a minor opportunity for scaffolding." Our lab has established inter-rater reliability for these global scaffolding scores ($k = .68$). Motivational scaffolding refers to parents' ability to help the child maintain enthusiasm toward the task, including praise and

encouragement, and redirecting attention back to the conversation topics. Emotional scaffolding is parents' ability to make the task a positive experience for the child, which includes valuing the child's participation in the task and maintaining sensitivity towards the child's emotions.

Child psychopathology. Externalizing and internalizing problems were measured via parent report on the *Behavior Assessment System for Children, Second Edition – Parent Rating Scales (BASC-2; Reynolds & Kamphaus, 2004)*, used previously to study emotional and behavioural problems in youth with ASD (Volker et al., 2010), and found to have high internal consistency ($\alpha = .81$ to $.94$) and test re-test reliability ($r = .88$ to $.91$) for the major indices in general and clinical samples (Reynolds & Kamphaus, 2004). Concurrent validity with the Achenbach System of Empirically Based Assessment Forms (Achenbach & Rescorla, 2001) ranged from moderate to high ($r = .53$ to $.83$; Reynolds & Kamphaus, 2004). Specifically, this study used the *BASC-2*'s Externalizing and Internalizing subscales, whose construct validity have been confirmed by factor analysis (Reynolds & Kamphaus, 2004). For the Internalizing subscale, 14 participants in the current sample (40%) scored in the At-Risk range, and 7 (20%) scored in the Clinically Significant range. For the Externalizing subscale, 8 participants (23%) scored in the At-Risk range, and 6 (17%) scored in the Clinically Significant range.

Procedures

The Research Ethics Board at York University approved data collection for this study. Participants were recruited through local autism service e-newsletters, website postings, and referrals from doctors in the community.

Inclusion criteria were examined through three screenings (semi-structured interview over the telephone, online questionnaires, and in-person). Participants first complete a telephone screening with a research assistant to confirm that their child has an ASD diagnosis and was

between 8 and 12 years of age. The assistant also explained the overall study procedure and asked about the child's difficulties with anxiety and/or anger. After the telephone screening, participants completed the *SCQ* (Rutter, Bailey, & Lord, 2003) and *SRS-2* (Constantino & Gruber, 2012) online. Participants then took part in an in-person screening, where informed consent was obtained from parents and assent from children. Researchers administered the *WASI-II* (Wechsler, 2011) with the child and evaluated the family's willingness to attend research assessments and therapy sessions.

After this screening process, participants completed child emotion regulation, parent co-regulation, and child psychopathology measures. Following the baseline data collection, participants were randomized into either the treatment immediately or wait list control group. Families were reimbursed for travel expenses, and each child was given a small prize (e.g. notebook, ball) at the end of each research testing appointment. All participants who met inclusion were included in the current study, regardless of their progress or involvement in subsequent treatment; the following data analyses are based on the baseline data collection.

Data analysis

All statistical analyses were performed using IBM SPSS version 21. Pearson product-moment correlations were calculated to examine the relationships among all predictor variables and child externalizing and internalizing problems. I tested the possibility of multiple mediators and moderators using the PROCESS macro (Hayes, 2013). Unlike traditional regression techniques (Baron & Kenny, 1986), the PROCESS macro examines mediator paths after accounting for the shared variance (i.e., the variance associated with multiple mediators), allowing for more independence among the predictor variables. As a path analysis-based tool, it also simultaneously tests various combinations of mediator and moderators (a conditional

process model; Hayes, 2013). In these analyses, I used PROCESS Model 4 for mediation and PROCESS Model 1 for moderation. To avoid violating normal distribution assumptions given the limited sample size, 1,000 bootstrap samples will be drawn as an estimation of direct and indirect effects (Farmer, 2012; Preacher & Hayes, 2008). Bootstrapping provided a confidence interval (CI) for the indirect effects, and mediations are considered statistically significant if the 95% CI does not contain zero (Preacher & Hayes, 2008). I also used mean centered products for moderation analyses, also analyzed with bootstrapping through the PROCESS macro. Child age and IQ were entered as covariates in all analyses.

Results

Parent co-regulation

Co-regulation strategies. As shown in Table 3, Following strategies were more frequently observed than Vocal ($t(35) = 20.81, p < .001$) and Active strategies ($t(35) = 4.39, p < .001$). The two most commonly observed co-regulation strategies were one Active form

Table 3

Descriptive Statistics for Parent Co-Regulation Strategies

Variables	Mean	Median	SD	Range
Vocal Composite	.73	.50	.82	0.00-3.00
Vocal Comfort	--	--	--	--
Reassurance	1.46	1.00	1.63	0.00-6.00
Active Composite	9.38	9.33	3.01	3.67-18.00
Prompting/Helping	22.71	23.00	5.25	9.00-30.00
Redirection of Attention	3.37	2.00	3.22	0.00-11.00
Physical Comfort	2.06	0.00	3.56	0.00-15.00
Following Composite	12.31	12.50	3.15	4.00-20.50
Following the Child's Lead	3.17	1.00	4.27	0.00-20.00
Emotion Following	21.46	23.00	5.44	5.00-29.00

(prompting/helping; $M = 22.71$, $SD = 5.25$), and one Following form (emotion following; $M = 21.46$, $SD = 5.44$). Vocal comfort was not observed in our sample, and reassurance was least observed ($M = 1.46$, $SD = 1.63$).

Parent scaffolding. Reliability for parent scaffolding was good across 30% of videos (motivational scaffolding, $k = .63$, $p < .001$; emotional scaffolding, $k = .70$, $p < .001$; mean overall scaffolding, $k = .67$, $p < .001$). Mean motivational scaffolding was correlated with mean emotional scaffolding across all conditions, $r(35) = .72$, $p < .001$, and for each emotion condition (r 's ranged from .58 to .70). As a result, the mean of the motivational and emotional scaffolding scores was calculated for each emotion condition.

Pearson correlations

Pearson product-moment correlations were conducted to investigate the relationships among all predictor variables and child externalizing and internalizing problems. As shown in Table 4, child internalizing problems had marginally significant associations with parent scaffolding in the anxious condition ($r(33) = -.33$, $p = .05$), active co-regulation strategies ($r(33) = -.32$, $p = .06$), and significant associations with child age and IQ. Child externalizing problems were significantly associated with parent scaffolding in both the angry and anxious conditions (p 's $< .01$), and were marginally significant with following co-regulation condition and with child emotion regulation ability. None of the specific co-regulation strategies were significantly related to internalizing or externalizing problems, although following the child's lead was marginally significant with externalizing problems ($r(33) = -.29$, $p = .09$), and physical comfort was marginally significant with internalizing problems ($r(33) = -.30$, $p = .08$).

Table 4

Correlations Among Potential Predictor and Dependent Variables

	Predictor Variables								Dependent Variables	
	2	3	4	5	6	7	8	9	Int. Prob.	Ext. Prob.
1. Child Age	-.28	.32 ⁺	-.24	-.21	.21	-.48**	.02	-.06	.47**	.23
2. Child IQ		-.15	.17	.12	.28	.05	.06	-.16	-.39*	-.31 ⁺
3. ASD Severity			-.20	-.14	-.07	<-.01	.25	-.21	.33 ⁺	.19
4. Scaffolding: Anxious				.91***	.05	.46**	.56**	.19	-.33 ⁺	-.53**
5. Scaffolding: Angry					.05	.39*	.35*	.20	-.21	-.50**
6. Co-regulation: Vocal						.09	-.06	-.27	.12	-.04
7. Co-regulation: Active							.17	.09	-.32 ⁺	-.14
8. Co-regulation: Following								.07	-.02	-.29 ⁺
9. Child ER									-.29	-.33 ⁺

⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Mediation and Moderation Analyses

Given the strong correlation between scaffolding in the angry and anxious conditions ($r(33) = .91$), a mean scaffolding score was calculated across conditions for the regression analyses involving externalizing problems as the dependent variable. The mean scaffolding score was correlated with externalizing problems ($r(33) = -.50$, $p = .002$), but not internalizing problems ($r(33) = -.27$, $p = .12$). Due to the non-significant associations between child internalizing problems and the parent co-regulation variables, the following mediation and moderation analyses focused on predictors of child externalizing problems.

Figure 1 displays the mediation analyses and the unstandardized coefficients of each pathway (PROCESS Model 4), after controlling for child age and IQ.

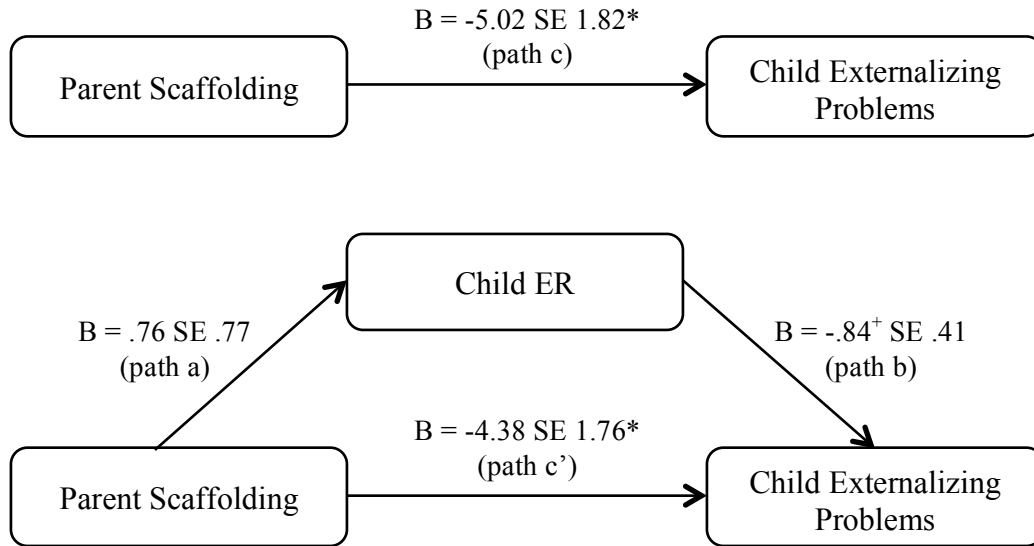


Figure 1. Mediation analysis of child emotion regulation

The overall model accounted for 38% of the variance in externalizing problems, $F(4, 29) = 4.47, p = .006$. As shown in Figure 1 (path c), the total direct effect of parent scaffolding was a significant predictor of externalizing problems, prior to entering the mediator variables, $t = -2.76, p = .01$, $CI = -8.74$ to -1.31 . The mediation results indicated that there was a non-significant total indirect effect for child ER, *point estimate* = $-.64$, $CI = -2.62$ - $.25$. The relation between parent scaffolding and child externalizing problems remained significant after entering in the mediators and control variables (path c'), $t = -2.49, p = .02$, suggesting that child ER does not function as a mediator of this relationship.

The same variables were then run treating child ER as a potential moderator of parent scaffolding on child externalizing problems. As shown in Table 5, the entire model was significant, accounting for 39% of the variance in externalizing problems, $F(5, 28) = 3.65$,

$p = .01$. Similar to the mediation analysis, parent scaffolding and child ER emerged as significant predictors of child externalizing problems. However, the interaction of parent scaffolding and child ER was not significant, indicating there was no significant moderation.

Table 5

Child Emotion Regulation as a Moderator of Externalizing Problems

Variable	<i>B</i>	<i>SE</i> <i>B</i>	<i>LLCI</i>	<i>ULCI</i>
Constant	73.85**	19.73	33.43	114.26
Child Age	.57	1.27	-2.04	3.18
Child IQ	-.20 ⁺	.12	-.43	.04
Parent Scaffolding	-4.60*	1.80	-8.27	-.92
Child ER	-.89*	.42	-1.75	-.03
Parent scaffolding x child ER	.53	.68	-.87	1.92

⁺ $p < .10$, * $p < .05$, ** $p < .01$

Discussion

Previous research on emotion regulation in children with ASD has largely relied on self-report or informant report (Weiss et al., 2014), but these methods are subject to response bias and are heavily influenced by the respondent's point of view. Using observational methods instead of self- or informant-report gave the current study more objective and in-depth information on parent co-regulation. This is also the first study to use observational methods to investigate parent co-regulation and emotion regulation in school-age children with ASD. As noted by Reaven (2010), parents' role in children's emotional development changes over the child's transition from young childhood to adolescence. Building upon previous observational methods, the current methodology employed a behavioural coding scheme used to examine co-regulation in mothers of toddlers with ASD (Gulsrud et al., 2010) and applied it to school-aged children. The current research provides new information on patterns of parent co-regulation later on in

children's development, as well as correlates of child emotion regulation ability, internalizing, and externalizing problems.

Parent Co-Regulation

Co-regulation strategies. Focusing on co-regulation composite scores, the current study found that parents of school-age children with ASD used significantly more passive co-regulation strategies (i.e., following) than active strategies. However, upon closer examination of the specific co-regulation strategies used, prompting and emotion following were commonly observed in this sample, suggesting that both active and passive strategies were frequently used. Although there is a lack of research on the frequency of co-regulation strategies in typically developing school-age children, Gulsrud and colleagues (2010) noted that mothers of toddlers with ASD used primarily physical and active co-regulation strategies, rather than transitioning to using more passive, verbal strategies found in mothers of toddlers without ASD. The authors suggested this may reflect mothers' sensitivity to their children's developmental needs, and our findings suggest that in being sensitive to their child's needs, mothers of school-age children with ASD use active and passive strategies (i.e., prompting and emotion following, respectively). These types of parent structuring and supportiveness are both adaptive responses to a child experiencing anger or anxiety (Cole, Dennis, Smith-Simon, & Cohen, 2009). In parents of typically developing children, parent structuring was associated with children generating more emotion regulation strategies to help a character stop feeling angry (Cole et al., 2009). In the Emotion Discussion Task, parents can help guide and structure a child's emotional experience by prompting and taking the lead of the discussion, helping the child to think of an event to discuss and asking the child to elaborate on aspects of an event. It is also possible that parents of children with more severe ASD symptomatology or lower IQ, who were not included in the current study,

would exhibit even more active co-regulation strategies than reported here, because of children's lesser ability to take lead of the emotional discussion and their greater need for prompting and guidance from their parents. Emotion following allows the child to direct the emotional discussion, and can help avoid emotional over-arousal. Hoffman (1983) argues that parent behaviours that are "somewhat but not overly arousing" are the best for instilling parental values and ideas. Due to the transactional nature of self- and parent-guided emotion regulation (Sameroff & Fiese, 2000), emotion following can help children internalize adaptive emotion regulation strategies that they can use on their own without their parent's assistance. It is important for parents to provide opportunities for children with ASD to practice self-directed emotion regulation so that they are more able to function on their own in environments without the presence of the caregiver.

Our sample also demonstrated very few vocal strategies (i.e., vocal comfort, reassurance), likely because these strategies are more developmentally appropriate for toddlers than school-age children, and more appropriate during expressions of child negativity (Gulsrud et al., 2010). Most participants (63%, $n = 22$) in the current study did not display any physical or verbal venting or tension release (e.g., kicking, yelling) during the *Emotion Discussion Task*, behaviours which may elicit vocal comfort or reassurance from parents, and which were observed far more often in the same task with preschool age children (Gulsrud, et al., 2010). Gulsrud and colleagues (2010) observed more parent vocal comfort and reassurance when children displayed physical or verbal negativity than when children did not display negativity. In contrast, no parent demonstrated vocal comfort strategies in our sample, and verbal reassurance strategies ranged from none to a high of six intervals, out of a possible 30 intervals (i.e., 0-20% of intervals). The current study also found that parent scaffolding was associated with parent co-

regulation strategies (i.e., Active, Following), as well as child outcomes (i.e., internalizing and externalizing problems). Parent scaffolding, which taps into parents' ability to respond sensitively to their child and maintain their child's persistence toward the task, is important in children's development of emotion regulation. Effective scaffolding teaches children how to discuss and regulate their emotions, and is related to emotion socialization (Bridges & Grolnick, 1995; Eisenberg, Cumberland, & Spinrad, 1998). In research on emotion socialization, parenting behaviours like showing sensitivity, warmth, and respect towards their child during emotional experiences were associated with emotion regulation (Eisenberg et al., 1998), regulatory physiology (Gottman et al., 1996), and externalizing problems (Wilson et al., 2013). The relationship between child emotion regulation and changes in motivational and emotional scaffolding were also observed in the context of an 8-week joint engagement intervention (Gulsrud et al., 2010), suggesting parent scaffolding could play an important part of future interventions on emotion regulation.

Externalizing problems. As expected, child externalizing problems were associated with parent scaffolding, Following co-regulation strategies, and child emotion regulation ability. This suggests that lower levels of parent-reported child externalizing problems are associated with parents who demonstrate higher levels of emotional and motivational scaffolding, as well as those who follow their child's lead and elaborate on their child's emotional states. Similarly, Wilson and colleagues (2013) found that higher levels of parent emotion coaching (a concept similar to parent scaffolding) were associated with lower levels of externalizing problems in children with ASD. The authors found that this association was stronger in children with ASD than in typically developing children, possibly because those with ASD generally had more externalizing problems and required more emotion coaching from their parents. Following co-

regulation strategies, in particular, may be important for predicting child externalizing problems because of their relation to positive parenting (e.g. showing warmth, positivity, and acceptance) (Eisenberg et al., 1998; McCarty, Zimmerman, Diguiseppe, & Christakis, 2005). Through the perspective of positive parenting, parents who display responsiveness and child-centered caring promote healthy emotion regulation, and in turn, their children are less likely to have externalizing problems (McCarty et al., 2005; Wilson et al., 2013).

Our results also support past findings that children with better emotion regulation ability tend to have lower parent reported externalizing problems (e.g., Mazefsky et al., 2014; Rieffe et al., 2011). The current study extends what is known by being the first to demonstrate that children's knowledge of emotion regulation strategies, as coded through child report, are related to parent reports of externalizing problems. Given the high rates of emotional difficulties (Ooi et al., 2011; Totsika et al., 2011), psychopathology (Brereton et al., 2006; Dickerson et al., 2011), and externalizing and internalizing problems (Maskey et al., 2013) in children with ASD, these findings support the need for interventions targeting the underlying deficits in emotion regulation abilities (Gross & Thompson, 2007; Mazefsky et al., 2013; Rieffe et al., 2011; Weiss, 2014). The majority of CBT interventions for children with ASD have focused on anxiety (e.g., Reaven, Blakeley-Smith, Leuthe, Moody, & Hepburn, 2012), but an emotion regulation framework may allow interventions to address both internalizing and externalizing problems in this population (Weiss, 2014).

Although child emotion regulation and parent scaffolding were significant predictors of child externalizing problems in regression analyses, after controlling for age and IQ, child emotion regulation did not emerge as a significant mediator or moderator. In other words, child emotion regulation did not explain the relationship between scaffolding and externalizing

problems. Because the initial relationship between child emotion regulation and scaffolding was not significant, it was unlikely that it would emerge as a mediator. Other studies though have found that child abilities (e.g., emotion regulation, regulatory physiology) moderate the relationship between parental characteristics (e.g., emotional awareness, emotion coaching, warmth) and child outcomes (e.g., academic achievement, health, peer relationships, internalizing and externalizing problems) (Eisenberg et al., 1998; Gottman et al., 1996). Our lack of significant findings may also be due to the relatively small sample size, impacting power in regression analyses. Future studies may seek to use multiple measures of child emotion regulation (e.g., parent report, self-report, galvanic skin response), which may be more sensitive to differences in child emotion regulation abilities, with larger samples.

Internalizing problems. Similar to previous findings (e.g., Mayes et al., 2011), child internalizing problems were related to individual characteristics such as age and IQ. Looking beyond individual factors, internalizing problems were also associated with higher levels of active parent co-regulation strategies. Internalizing problems, such as anxiety, may manifest themselves in avoidance or distraction (Spence, 2001; Thorne, Andrews, & Nordstokke, 2013) during the *Emotion Discussion Task*, so parents may be more likely to respond using Active strategies (e.g., prompting, redirection of attention), rather than Following strategies which require the child to be engaged in the discussion. It is interesting to note that, unlike child externalizing problems, internalizing problems were only associated with parent scaffolding in the anxious condition, and not the angry condition. This may be because the quality of parent emotional support around anger is not relevant to child internalizing problems, and it is parent support around anxiety that is most relevant. Considering the specificity of this relationship, training parents on how to scaffold and support their children during anxious situations could be

an ideal area of focus for interventions for anxiety in children with ASD. For example, Scarpa and Reyes' (2011) CBT program focused on child emotion regulation and taught parents how to help their children cope. The authors found that parents' confidence in supporting their children was related to changes in child emotion regulation post-treatment (Scarpa & Reyes, 2011).

Although CBT for anxiety in children with ASD often includes parent involvement, there is a need for interventions that explain the parent's changing role as the child transitions from childhood to adolescence (Reaven, 2010), and encourage parent scaffolding.

Limitations and Future Research Directions

Generalizability of these findings may be limited in that the sample consisted entirely of parents who were seeking treatment for their child's emotional problems. These parents may exhibit different co-regulation strategies than parents who are not seeking treatment. In addition, all children had an IQ above 80, and it is unclear how the current findings might differ for school-age children with more severe ASD symptomatology or lower intellectual functioning. Regression analyses could have had increased power given a larger sample size, leading to the possibility of Type II error. This study also could have benefited from using multiple measures of child emotion regulation (e.g., parent report, behavioural observation, psychophysical measurement; Weiss, Chan, & Thomson, 2014) instead of relying solely on coding child report of emotion regulation strategies.

Due to the transactional nature of the relationship between child self-regulation and parent co-regulation (Sameroff & Fiese, 2000), as well as this study's reliance on correlational data, it is difficult to determine directionality between parent and child regulation. Future longitudinal research in this area is required, and pre-post intervention data could examine parent co-regulation as a mechanism to explain treatment efficacy in children with ASD. Further

research could also investigate the types of co-regulation strategies used by parents of typically developing school-age children. Without a comparison group, it is difficult to determine whether parents of children with ASD use different co-regulation strategies than do parents of typically developing children.

Conclusion

In summary, the current study had three main findings. First, parents tended to use active and passive co-regulation strategies with their school-age children with ASD, and specifically used prompting and emotion following most often. These methods of parent co-regulation are beneficial because prompting helps parents guide their child's emotional experience, and emotion following avoids emotional arousal while helping children internalize adaptive emotion regulation skills. Second, parent scaffolding's association with internalizing and externalizing problems suggest that interventions for children with ASD targeting emotion regulation should encourage parents to use scaffolding techniques when their child is exhibiting anxiety or anger. Third, child emotion regulation was related to parent-reported rates of child externalizing problems. Emotion regulation may be a helpful framework in understanding the underlying deficits behind internalizing and externalizing problems in children with ASD. Overall, parent-child interactions are an important key in understanding child internalizing and externalizing problems. Parents continue to play a fundamental role in their children's emotional development, beyond toddlerhood and into school-age years. With future research in the topic, parent co-regulation and scaffolding may emerge as useful areas of focus in interventions targeting internalizing and externalizing problems in children with ASD.

References

- Achenbach, T.M., & Rescorla, L.A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Attwood, T. (2004a). James and the maths test. In *Exploring feelings: Cognitive behaviour therapy to manage anxiety*. Arlington, TX: Future Horizons, Inc.
- Attwood, T. (2004b). Dylan is being teased. In *Exploring feelings: Cognitive behaviour therapy to manage anger*. Arlington, TX: Future Horizons, Inc.
- Baker, J. K., Seltzer, M. M., & Greenberg, J. S. (2011). Longitudinal effects of adaptability on behavior problems and maternal depression in families of adolescents with autism. *Journal of Family Psychology*, 25(4), 601-609.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.
- Beaumont, R., Rotolone, C., & Sofronoff, K. (2015). The secret agent society social skills program for children with high-functioning autism spectrum disorders: A comparison of two school variants. *Psychology in the Schools*, 52(4), 390-402.
- Beaumont, R., & Sofronoff, K. (2008). A multi-component social skills intervention for children with Asperger syndrome: The Junior Detective Training Program. *Journal of Child Psychology and Psychiatry*, 49(7), 743-753.

- Berthoz, S., & Hill, E.L. (2005). The validity of using self-reports to assess emotion regulation abilities in adults with autism spectrum disorder. *European Psychiatry, 20*, 291-298.
- Boeldt, D. L., Rhee, S., DiLalla, L. F., Mullineaux, P. Y., Schulz-Heik, R., Corley, R. P., ... Hewitt, J. K. (2012). The association between positive parenting and externalizing behavior. *Infant and Child Development, 21(1)*, 85-106.
- Boonen, H., Maljaars, J., Lambrechts, G., Zink, I., Van Leeuwen, K., & Noens, I. (2014). Behavior problems among school-aged children with autism spectrum disorder: Associations with children's communication difficulties and parenting behaviors. *Research in Autism Spectrum Disorders, 8*, 716-725.
- Bridges, L. J., & Grolnick, W. S. (1995). The development of emotional self-regulation in infancy and early childhood. *Social development*. (pp. 185-211) Sage Publications, Inc, Thousand Oaks, CA.
- Brereton, A. V., Tonge, B. J., & Einfeld, S. L. (2006). Psychopathology in children and adolescents with autism compared to young people with intellectual disability. *Journal of Autism and Developmental Disorders, 36*, 863-870.
- Cole, P. M., Dennis, T. A., Smith-Simon, K. E. and Cohen, L. H. (2009). Preschoolers' emotion regulation strategy understanding: Relations with emotion socialization and child self-regulation. *Social Development, 18(2)*, 324-352.
- Constantino, J. N., & Gruber, C. P. (2012). *Social Responsiveness Scale—Second Edition (SRS-2)*. Torrance, CA: Western Psychological Services.
- Dickerson Mayes, S., Calhoun, S. L., Murray, M. J., Ahuja, M., & Smith, L. A. (2011). Anxiety, depression, and irritability in children with autism relative to other neuropsychiatric disorders and typical development. *Research in Autism Spectrum Disorders, 5*, 474-485.

- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental Socialization of Emotion. *Psychological Inquiry, 9*(4), 241–273.
- Estes, A., Munson, J., Dawson, G., Koehler, E., Zhou, X.-H., & Abbott, R. (2009). Parenting stress and psychological functioning among mothers of preschool children with autism and developmental delay. *Autism, 13*(4), 375-384.
- Farmer, C. (2012). Demystifying moderators and mediators in intellectual and developmental disabilities research: A primer and review of the literature. *Journal of Intellectual Disability Research, 56*, 1148-1160.
- Gadow, K. D., DeVincent, C., & Schneider, J. (2008). Predictors of psychiatric symptoms in children with an autism spectrum disorder. *Journal of Autism and Developmental Disorders, 38*, 1710-1720.
- Gottman, J.M., Katz, L.F., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology, 10*(3), 243-268.
- Greenberg, J., Seltzer, M., Hong, J., Orsmond, G. L. (2006). Bidirectional effects of expressed emotion and behavior problems and symptoms in adolescents and adults with autism. *American Journal on Mental Retardation, 111*, 229-249.
- Grolnick, W. S., Bridges, L. J., Connell, J. P. (1996). Emotion regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child Development, 67*, 928-941.
- Gross, J. J., & Thompson, R. A. (2007). *Emotion regulation: Conceptual foundations*. Guilford Press, New York, NY.

- Gulsrud, A. C., Jahromi, L. B., & Kasari, C. (2010). The co-regulation of emotions between mothers and their children with autism. *Journal of Autism and Developmental Disorders*, 40, 227-237.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: The Guilford Press.
- Hoffman, C., Crnic, K. A., & Baker, J. K. (2006). Maternal depression and parenting: Implications for children's emergent emotion regulation and behavioral functioning. *Parenting: Science and Practice*, 6(4), 271-295.
- Hoffman, M.L. (1983). Affective and cognitive processes in moral internalization: An information processing approach. In E.T. Higgins, D. Ruble, & W. Hartup (Eds.), *Social Cognition and Social Development: A Socio-Cultural Perspective*. New York: Cambridge University Press, 236-274.
- Hooven, C., Gottman, J. M., & Katz, L. F. (1995). Parental meta-emotion structure predicts family and child outcomes. *Cognition and emotion*, 9(2/3), 229-264.
- Jahromi, L. B., Meek, S. E., & Ober-Reynolds, S. (2012). Emotion regulation in the context of frustration in children with high functioning autism and their typical peers. *Journal of Child Psychology and Psychiatry*, 53(12), 1250-1258.
- Konstantareas, M. M., & Stewart, K. (2006). Affect regulation and temperament in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 46(2), 143-154.
- Lewallen, A. C., & Neece, C. L. (2015). Improved social skills in children with developmental delays after parent participation in MBSR: The role of parent-child relational factors. *Journal of Child and Family Studies*, doi:<http://dx.doi.org/10.1007/s10826-015-0116-8>.

- Lindell, M.K., & Whitney, D.J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology, 86*(1), 114-121.
- Lougheed, J. P., Hollenstein, T., Lichtwark-Aschoff, A., & Granic, I. (2014). Maternal regulation of child affect in externalizing and typically-developing children. *Journal of Family Psychology, 29*(1), 10-19.
- Maskey, M., Warnell, F., Parr, J. R., Le Couteur, A., & McConachie, H. (2013). Emotional and behavioural problems in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 43*, 851-859.
- Maslin-Cole, C., & Spieker, S. J. (1990). Attachment as a basis for independent motivation: A view from risk and nonrisk samples. In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 245-272). Chicago, IL: University of Chicago Press.
- Mayes, S. D., Calhoun, S. L., Murray, M. J., & Zahid, J. (2011). Variables associated with anxiety and depression in children with autism. *Journal of Developmental and Physical Disabilities, 23*(4), 325-337.
- Mazefsky, C. A., Borue, X., Day, T. N., & Minshew, N. J. (2014). Emotion regulation patterns in adolescents with high-functioning autism spectrum disorder: Comparison to typically developing adolescents and association with psychiatric symptoms. *Autism Research, 7*(3), 344-354.
- Mazefsky, C. A., Herrington, J., Siegel, M., Scarpa, A., Maddox, B. B., Scahill, L., & White, S. W. (2013). The role of emotion regulation in autism spectrum disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 52*(7), 679-688.

- Mazefsky, C. A., Kao, J., & Oswald, D. P. (2011). Preliminary evidence suggesting caution in the use of psychiatric self-report measures with adolescents with high-functioning autism spectrum disorders. *Research in Autism Spectrum Disorders*, 5(1), 164–174.
- Meyer, J.A., Mundy, P.C., Van Hecke, A.V., & Durocher, J.S. (2006). Social attribution processes and comorbid psychiatric symptoms in children with Asperger syndrome. *Autism*, 10(4), 383-402.
- McCarty, C.A., Zimmerman, F.J., Diguseppe, D.L., & Christakis, D.A. (2005). Parental emotional support and subsequent internalizing and externalizing problems among children. *Developmental and Behavioral Pediatrics*, 26(4), 267-275.
- Ooi, Y. P., Tan, Z. J., Lim, C. X., Goh, T. J., & Sung, M. (2011). Prevalence of behavioural and emotional problems in children with high-functioning autism spectrum disorders. *Australian and New Zealand Journal of Psychiatry*, 45, 370-375.
- Preacher, K., & Hayes, A. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879-891.
- Reaven, J. (2010). The treatment of anxiety symptoms in youth with high-functioning autism spectrum disorder: Developmental considerations for parents. *Brain Research*, 1380, 255-263.
- Reaven, J., Blakeley-Smith, A., Leuthe, E., Moody, E., & Hepburn, S. (2012). Facing your fears in adolescence: Cognitive-behavioral therapy for high-functioning autism spectrum disorders and anxiety. *Autism Research and Treatment*, 2012, 1-13.
- Reynolds, C. R., & Kamphaus, R. W. (2004). *Behavior Assessment System for Children, Second Edition (BASC-2)*. Bloomington, MN: Pearson Assessments.

- Richardson, H.A., Simmering, M.J., & Sturman, M.C. (2009). A tale of three perspectives: Examining post hoc statistical techniques for detection and corrections of common method variance. *Organizational Research Methods*, 12(4), 762-800.
- Rieffe, C., Oosterveld, P., Terwogt, M. M., Mootz, S., Van Leeuwen, E., & Stockmann, L. (2011). Emotion regulation and internalizing symptoms in children with autism spectrum disorders. *Autism*, 15(6), 655-670.
- Rutter, M., Bailey, A., & Lord, C. (2003). *Manual for the Social Communication Questionnaire*. Los Angeles, CA: Western Psychological Services.
- Sameroff, A. J., & Fiese, B. H. (2000). Transactional regulation: The developmental ecology of early intervention. In J. P. Shonkoff & S. J. Meisels (Eds.), *Early intervention: A handbook of theory, practice, and analysis* (2nd ed., pp. 135-159). New York: Cambridge University Press.
- Samson, A. C., Huber, O., & Gross, J. J. (2012). Emotion regulation in asperger's syndrome and high-functioning autism. *Emotion*, 21(4), 659-665.
- Sanders, W., Zeman, J., Poon, J., & Miller, R. (2015). Child regulation of negative emotions and depressive symptoms: The moderating role of parental emotion socialization. *Journal of Child and Family Studies*, 24, 402-415.
- Scarpa, A., & Reyes, N. M. (2011). Improving emotion regulation with CBT in young children with high functioning autism spectrum disorders: A pilot study. *Behavioural and Cognitive Psychotherapy*, 39, 495-500.

Shalom, B.D., Mostofsky, S.H., Hazlett, R.L., Goldberg, M.C., Landa, R.J., Faran, Y., ...

Hoehn-Saric, R. (2006). Normal physiological emotions but differences in expression of conscious feelings in children with high-functioning autism. *Journal of Autism and Developmental Disorders*, 36(3), 395-400.

Silk, J.S., Shaw, D.S., Forbes, E.E., Lane, T.L., & Kovacs, M. (2006). Maternal depression and child internalizing: The moderating role of child emotion regulation. *Journal of Clinical Child and Adolescent Psychology*, 35(1), 116-126.

Sofronoff, K., Attwood, T., & Hinton, S. (2005). A randomized controlled trial of a CBT intervention for anxiety in children with asperger syndrome. *Journal of Child Psychology & Psychiatry*, 46, 1152–1160.

Spence, S. H. (2001). Prevention strategies. *The developmental psychopathology of anxiety*. (pp. 325-351) Oxford University Press, New York, NY.

Sukhodolsky, D. G., Scahill, L., Gadow, K. D., Arnold, L. E., Aman, M. G., McDougle, C. J., ... Vitiello, B. (2008). Parent-rated anxiety symptoms in children with pervasive developmental disorders: Frequency and association with core autism symptoms and cognitive functioning. *Journal of Abnormal Child Psychology*, 36, 117-128.

Suveg, C., Sood, E., Barmish, A., Tiwari, S., Hudson, J. L., & Kendall, P. C. (2008). “I’d rather not talk about it”: Emotion parenting in families of children with an anxiety disorder. *Journal of Family Psychology*, 22(6), 875-884.

Thorne, K.J., Andrews, J.J.W., & Nordstokke, D. (2013) Relations among children’s coping strategies and anxiety: The mediating role of coping efficacy. *The Journal of General Psychology*, 140(3), 204-223.

- Totsika, V., Hastings, R. P., Emerson, E., Lancaster, G. A., & Berridge, D. M. (2011). A population-based investigation of behavioural and emotional problems and maternal mental health: Associations with autism spectrum disorder and intellectual disability. *Journal of Child Psychology and Psychiatry*, 52, 91-99.
- Volker, M. A., Lopata, C., Smerbeck, A. M., Knoll, V. A., Thomeer, M. L., Toomey, J. A., & Rodgers, J. D. (2010). BASC-2 PRS profiles for students with high-functioning autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 40(2), 188-199.
- Wechsler, D. (2011). *Wechsler Abbreviated Scale of Intelligence, Second Edition (WASI-II)*. San Antonio, TX: NCS Pearson.
- Weiss, J. A. (2014). Transdiagnostic case conceptualization of emotional problems in youth with ASD: An emotion regulation approach. *Clinical Psychology: Science and Practice*, 21, 331-350.
- Weiss, J. A., Thomson, K., & Chan, L. (2014). A systematic literature review of emotion regulation measurement in individuals with autism spectrum disorder. *Autism Research*, 7, 629-648.
- Wilson, B. J., Berg, J. L., Zurawski, M. E., & King, K. A. (2013). Autism and externalizing behaviors: Buffering effects of parental emotion coaching. *Research in Autism Spectrum Disorders*, 7, 767-776.
- White, S.W., Ollendick, T., Scahill, L., Oswald, D., & Albano, A.M. (2009). Preliminary efficacy of a cognitive-behavioral treatment program for anxious youth with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 39(12), 1652-1662.
- Wood, J. J., & Gadow, K. D. (2010). Exploring the nature and function of anxiety in youth with autism spectrum disorders. *Clinical Psychology: Science and Practice*, 17, 281-292.

Zhou, T., & Yi, C. (2014). Parenting styles and parents' perspectives on how their own emotions affect the functioning of children with autism spectrum disorders. *Family Process*, 53, 67-79.

Appendix A

Dylan is Being Teased (Attwood, 2004a)

My friend at school is Dylan. We are in Mrs. Smith's class. Dylan is a great friend and we like to do the same things at lunch time. Sometimes we play handball, or go to the library and read about volcanoes, and we both like The Simpsons. There are three boys in our grade who are not our friends. They like to find someone and tease them and get them into trouble. We don't know why they do it. Sometimes they can be really mean and call you names, which are not true, and want to punch you or push you onto the ground. Dylan and I don't do that to anyone.

Dylan has been in trouble with the Principal for getting mad at them and hitting them. They start it but he gets in to more trouble than they do. He was suspended for three days last week when they called him a 'Psycho'. When they said that, he told them to stop, but they didn't, so he hit one of them on the nose. There was a lot of blood everywhere.

On Friday, at lunchtime, they started to tease him again; calling him chicken and saying he is fat and gay. If he gets mad at them again he will be suspended and have to leave the school forever. He is my only friend.

Tell me what you could do and say to help Dylan keep cool and not get mad with them.

Appendix B

James and the Maths Test (Attwood, 2004b)

James' teacher is Mrs. Smith. She is a nice and kind teacher. He really likes the way she manages the class. She makes the classroom quiet with no teasing between the children. She helps James with his difficulty understanding math. She has set a difficult math test for the class on Tuesday and James is worried that he won't do well and the other children will think he is stupid. On the day of the big math test, the school principal comes into the class and says that Mrs. Smith is ill today and that a new teacher will take the class, but they still have the math test. James is very anxious because he has a new teacher that day and the children become very noisy and silly with a replacement teacher. James is also worried they could tease him especially if he doesn't do well in the math test.

Write down what you think James could do and think to feel less anxious.