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Emotion Regulation in Children with Autism Spectrum Disorders:  
Individual Differences and Influence of Parental Emotion Scaffolding

A dissertation submitted in partial satisfaction of the requirements for the degree

Doctor of Philosophy in Psychology

by

Lauren Dawn Berkovits

2016



## ABSTRACT OF THE DISSERTATION

Emotion Regulation in Children with Autism Spectrum Disorders:  
Individual Differences and Influence of Parental Emotion Scaffolding

by

Lauren Dawn Berkovits

Doctor of Philosophy in Psychology

University of California, Los Angeles, 2016

Professor Bruce L. Baker, Co-Chair

Professor Janet B. Blacher, Co-Chair

Previous research has documented tantrums and behavior problems, as well as deficits in emotion perception and labeling, among children with autism spectrum disorder (ASD), but there has been little research seeking to understand and connect underlying emotion processes to the frequent behavior problems within this population. Additionally, few studies have explored the ways in which parents help teach children with ASD about emotions, though these processes are frequently studied among typically-developing children.

This study assessed emotion regulation deficits among young children with ASD ( $N = 108$ ; ages 4-7) and explored child and family characteristics that longitudinally predict children's emotion regulation development. Children's emotion regulation was assessed at two time-points,

approximately 9-10 months apart, along with a detailed measure of parental emotion scaffolding at the first time-point. Part I focused on the development of the coding system to capture parental scaffolding of children's emotion understanding during a dyadic reading task. Part II explored children's emotion regulation abilities, and Part III assessed the ability of parent emotion scaffolding to predict change in children's emotional, social, and behavioral functioning.

Results indicated that the emotion scaffolding coding system could be reliability coded and that maternal emotion comments predicted child emotion talk above and beyond child IQ. Children exhibited largely stable levels of emotional, behavioral, and social functioning, with these three areas closely related across development. Higher levels of parental emotion scaffolding predicted improvements across time in emotion dysregulation and behavior problems by both parent- and teacher-report, but this link may be limited to children with higher initial levels of social skills. While parental emotion scaffolding did not directly relate to child social skills, there was evidence of an indirect effect of parental emotion scaffolding whereby children who exhibited reduced emotion dysregulation in turn showed improvements in social skills. Questions about emotions, in particular, were found to contribute to reductions in emotion dysregulation. These findings support the importance of focusing on emotion regulation as an underlying deficit for children with ASD, and highlight ways in which parent-child interactions can support children's functioning across emotional, social, and behavioral domains. Intervention implications are discussed.

The dissertation of Lauren Dawn Berkovits is approved.

Connie L. Kasari

Scott Pratt Johnson

Janet B. Blacher, Committee Co-Chair

Bruce L. Baker, Committee Co-Chair

University of California, Los Angeles

2016

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Lauren Dawn Berkovits

EDUCATION

*University of California, Los Angeles*  
C. Phil. in Psychology, March 2014  
M.A. in Psychology, December 2011

*Dartmouth College*  
A.B. in Psychology, June 2008

SELECTED HONORS AND AWARDS

Dissertation Year Fellowship, *UCLA*  
Norma and Seymour Feshbach Doctoral Dissertation Award, *UCLA*  
Edwin W. Pauley Fellowship, *UCLA*  
National Science Foundation (NSF) Graduate Research Fellowship, Honorable Mention  
Graduate Summer Research Mentorship Fellowship, *UCLA*

PUBLICATIONS

- Berkovits, L.D.**, Eisenhower, A.S., & Blacher, J. (2016). Brief Report: Stability of emotion regulation in young children with autism spectrum disorders. Manuscript under editorial review.
- Neece, C.L. Christensen, L.L., **Berkovits, L.**, & Mayo, D. (2015). Psychopathology: ADHD, Autism Spectrum Disorders, and Other Conditions Present in Early Childhood. In Matson, J.L. & Matson, M.L. (Eds.) *Comorbid Conditions in Individuals with Intellectual Disabilities* (pp 55-84). New York, NY: Springer Publishers. doi: 10.1007/978-3-319-15437-4\_3.
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Diehl, J.J. & **Berkovits, L.** (2010). Is prosody a diagnostic and cognitive bellwether of autism spectrum disorders? In A. Harrison (Ed.) *Speech Disorders: Causes, Treatments, and Social Effects* (pp. 159-176). New York: Nova Science Publishers, Inc.

#### SELECTED PRESENTATIONS

**Berkovits, L.D.**, Moody, C., Baker, B.L., & Blacher, J. (May 2015). *What 'being on the spectrum' means to me: How adolescents with autism spectrum disorder understand and explain their diagnoses*. Paper presented at the 14<sup>th</sup> Annual International Meeting for Autism Research, Salt Lake City, UT.

**Berkovits, L.D.**, Caplan, B., Eisenhower, A. & Blacher, J. (May 2014). *Parental scaffolding of emotion understanding in children with autism spectrum disorders: Relations to emotion regulation abilities*. Poster presented at the 13<sup>th</sup> Annual International Meeting for Autism Research, Atlanta, GA.

**Berkovits, L.D.**, Caplan, B., Blacher, J., & Eisenhower, A. (August 2013). *Emotion dysregulation in children with autism spectrum disorder: Correlates and predictors*. Symposium title: "The early school experiences of young children with ASD: Contributions of teacher, parent, and child factors to school adaptation." Paper presented at the 2013 APA Annual Convention, Honolulu, Hawaii.

**Berkovits, L.D.**, Green, S.A., & Baker, B.L. (April 2013). *Predictors of anxiety symptom development in children with or without intellectual disability*. Symposium title: "Psychiatric disorders in the context of developmental risk: Children with and without intellectual disability." Paper presented at the 2013 Society for Research in Child Development Biennial Meeting, Seattle, Washington.

**Berkovits, L.** & Baker, B.L. (July 2012). *Emotion regulation and social competence: Bidirectional pathways in the context of family relationships*. Symposium title: "Supportive parenting and parent support." Paper presented at the 14th World Congress of the International Association for the Scientific Study of Disabilities, Halifax, Nova Scotia.

**Berkovits, L.**, Zeedyk, S., Cohen, S. & Blacher, J. (May 2012). *Focus on the positive: Adolescents with ASD and their impact on the family*. Poster presented at the 11<sup>th</sup> Annual International Meeting for Autism Research, Toronto, Canada.

**Berkovits, L.** & Baker, B.L. (August 2011). *Emotion-socialization parenting and social competence of children with intellectual disabilities*. Symposium title: "Parenting youth with ID across early and middle childhood." Paper presented at the 2011 APA Annual Convention, Washington, D.C.

**Berkovits, L.**, Tipton, L.A., Laugeson, E.A., & Blacher, J. (May 2011). *Understanding the relationships between emotion regulation and social skills in adolescence*. Poster presented at the 10<sup>th</sup> Annual International Meeting for Autism Research, San Diego, CA.

## Introduction

### *Emotion Regulation and Dysregulation – Definition and Development*

There is much literature on children with autism spectrum disorders (ASD) addressing social and behavioral difficulties (e.g., Georgiades et al., 2011; Hill et al., 2014), but a specific focus on emotional regulation, particularly during the early school years, is lacking with few exceptions (Jahromi, Bryce, & Swanson, 2013; Jahromi, Meek, & Ober-Reynolds, 2012; Mazefsky et al., 2013; Mazefsky, Borue, Day, & Minshew, 2014). Generally, the term “emotion regulation” refers to the range of cognitive, physiological, and behavioral abilities that allow an individual to monitor and modulate the occurrence, valence, intensity, and expression of one’s emotions and arousal (Cole, Michel, & Teti, 1994; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Thompson, 1994). Successfully regulating one’s emotions theoretically requires a child to be able to: (a) recognize his or her own emotional states at age-appropriate levels, (b) access strategies to self-soothe or relax when experiencing a negative emotion or strong levels of excitement or arousal, and (c) maintain progress in current activities in the face of potentially interfering emotions (Gratz & Roemer, 2004; Southam-Gerow & Kendall, 2002). Thus, emotion regulation underlies multiple key areas of development for children, as it is central to children’s abilities to interact successfully with their surrounding social and physical environment.

In contrast, children with emotion dysregulation have difficulties with some or all of these abilities, such as demonstrating difficulty recognizing one’s own emotions, displaying a lack of understanding of emotions, exhibiting disruptive behaviors in the face of negative emotions (e.g., engaging in tantrums or physical aggression when frustrated or angry), or experiencing emotions in a way that interferes with their goal-directed behaviors (e.g., strong excitement, anger, or sadness impeding with one’s ability to focus on a given task, engage in

leisure activities, or interact with others). There is some debate in the field over how to best understand the constructs of emotion regulation and dysregulation. Many view these two constructs on a continuum, such that emotion dysregulation represents a failure of the individual to effectively engage in emotion regulation processes (e.g., Cole, Michel & Teti, 2004); others discuss emotional reactivity (i.e., how strongly one experiences emotions) and emotion regulation as orthogonal constructs, with emotion dysregulation resulting from insufficient emotion regulation strategies in the face of high reactivity (e.g., Eisenberg et al., 1993). As this study relies on behavioral observations of emotional experiences and did not directly measure physiological emotional reactivity (for example, by assessing heart rate or vagal tone; Cole et al., 2004), these two terms will be used in line with the continuum definition throughout the study.<sup>1</sup>

Emotion regulation is considered to be one aspect of the broader construct of self-regulation, or the ability to control one's actions and responses to stimuli in order to effectively pursue a goal. Two other aspects of self-regulation that are frequently discussed are cognitive regulation, such as executive functioning and goal-directed reasoning, and behavioral regulation, such as the monitoring of physical movement and inhibiting or delaying impulses or gratification (Jahromi & Stifter, 2008; Williford, Vick Whittaker, Vitiello, & Downer, 2013). Though these three facets of self-regulation are related, evidence suggests that they may hold independent predictive power for children's development. For example, in one study, only cognitive self-regulation predicted theory of mind development, while emotional and behavioral regulation were unrelated to theory of mind (Jahromi & Stifter, 2008).

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<sup>1</sup> The terms used in this study will reflect the language used in the development of the measures, with "emotion regulation" generally referring to states of well-regulated emotions and the skills/abilities that support these states, and "emotion dysregulation" generally referring to a lack of these abilities resulting in the difficulties described above.

Among typically-developing children, the preschool and early childhood period is commonly considered the period of largest growth in self-regulation abilities (Jahromi & Stifter, 2008; Williford et al., 2013), and these emotion regulation abilities have strong implications for children's social functioning. Beginning in infancy, emotion regulation is seen in subtle ways during social interactions, such as when 5-month-old babies briefly avert their eye gaze in order to regulate their internal experiences and remain calm when stimuli become too intense (Stifter & Moyer, 1991). Later in development, emotion regulation continues to be closely tied to social interactions. Preschool-aged children with higher levels of emotional intensity and dysregulation in the classroom are rated to have fewer social skills, are less accepted by peers, and engage in more peer conflict (Eisenberg et al., 1993; Miller, Kiely Gouley, Seifer, Dickstein, & Shields, 2004); emotion regulation continues to predict social functioning as children enter middle childhood (ages 8 to 9; Rydell, Thorell, & Bohlin, 2007). For children with developmental disabilities, in particular, emotion regulation predicts children's social difficulties above and beyond cognitive ability (Wilson, Fernandes-Richards, Aarskog, Osborn, & Capetillo, 2007).

Similarly, emotion regulation is closely related to children's academic functioning. Emotion regulation abilities observed during the toddler years (ages 14 to 36 months), as well as growth in emotion regulation abilities across these ages, is seen to relate positively to cognitive school readiness as measured by early literacy and math achievement tests at age 5 (Brophy-Herb, Zajicek-Farber, Bocknek, McKelvey, & Stansbury, 2013). Additionally, emotion regulation has been found to predict academic success and productivity among 5-year-old children, explaining additional variance over and above children's cognitive functioning, children's behavior problems, and the student-teacher relationship (Graziano, Reavis, Keane, & Calkins, 2007). Children's emotional and behavioral self-regulation as observed in the early

preschool years also partially explains why children with cognitive impairments (i.e., presence of an intellectual disability) experience poorer student-teacher relationships several years later (Eisenhower, Baker, & Blacher, 2007).

During early stages of development, typically developing children learn to regulate their emotions through parent-child interactions and parental co-regulation of their emotional experiences. Joint attention abilities (e.g., following eye gaze at age 6 months; collaborative joint attention during play at age 24 months) appear to be closely related to this process of learning about emotion regulation through parent-child interactions (Morales, Mundy, Crowson, Neal, & Delgado, 2005). During toddler and early childhood years, children begin to use more overt self-regulatory skills to manage negative emotions, with the complexity increasing throughout development and particularly during the preschool-aged period (Jahromi & Stifter, 2008; Williford et al., 2013). However, the use of these skills during toddler and preschool years is often dependent upon support from caregivers in learning and accessing strategies when needed (Cole, Martin, & Dennis, 2004). For example, an early strategy of self-distraction was more frequently utilized by toddlers (age 2 years) in the presence of an interactive caregiver, even when the caregiver was not actively engaging the child in emotional coping (Grolnick, Bridges, & Connell, 1996). Thus, examining parent-child interactions is a rich area for furthering our understanding of emotion regulation development.

#### *Emotion Regulation in Autism Spectrum Disorders*

Among children with autism spectrum disorders (ASD), some aspects of emotion regulation are well understood but there is an overall dearth of information about emotion regulation capacities. For instance, facial perception and emotion labeling tasks have been well studied among individuals with ASD and most research has indicated difficulties with speed and



accuracy in recognizing emotional facial expressions for this population (e.g., Bal et al., 2009; Celani, Battacchi, & Arcidiacono, 1999). However, “emotion regulation” as a term is not often used in the autism spectrum literature, with the behavioral symptoms (e.g., tantrums, “meltdowns,” aggression, or self-injury) that likely represent emotion regulation difficulties highlighted instead (e.g., Mazefsky et al., 2013). While this is a subtle distinction, it has large implications for our understanding of children’s development and for our ability to evaluate intervention programs and their efficacy, as emotion regulation may serve as a more proximal target for ultimately improving children’s social and behavioral functioning.

The few studies that have attempted to understand emotion dysregulation in children with ASD have consistently found more difficulties with emotion regulation compared to typically developing children. For example, Garon and colleagues (2008) found that ‘ASD sibs’ (high-risk siblings who were diagnosed with ASD at an age three assessment) exhibited a reduced ability to manage negative emotions as well as lower levels of goal-oriented extraversion and self-control at age 2. Even in later childhood years (e.g., 12 years of age), parents tended to report that their children with ASD experienced negative emotions (i.e., sadness, fear, anger, shame, and guilt) more frequently and positive emotions (i.e., joy) less frequently than reported by parents of typically-developing children (Capps, Kasari, Yirmiya, & Sigman, 1993).

Two studies observed children’s emotion regulation in the laboratory, coding children’s behaviors in the face of frustration (e.g., abrupt removal of a desired toy). Konstantareas and Stewart (2006) found that children with ASD (ages 3 to 10) were rated to have significantly lower average ratings of emotion regulation strategies, demonstrating more hiding of the toy, fewer attempts to ask the examiner directly to play longer with the toy, and fewer instances of complying with the examiner’s request for the toy. Jahromi and colleagues (2012) also found

that children with ASD (ages 3 to 7) exhibited less advanced emotion regulation when frustrated compared to typically-developing peers, and that use of emotion regulation strategies among children with ASD did not consistently predict improvements in negativity or resignation, as it did in their typically-developing peers.

Difficulties with emotion regulation, including higher use of maladaptive and involuntary emotion regulation strategies, seem to continue into adolescence and relate to higher levels of internalizing and externalizing symptoms (Mazefsky et al., 2014). Teachers also rated school-age children with ASD (ages 6 to 10) as significantly more emotionally labile, with a much higher percentage of students with ASD falling in the borderline-clinical and clinical ranges of standardized measures of dysregulation (Ashburner, Ziviani, & Rodger, 2010). Together, these studies all suggest that children with ASD have difficulties with the underlying processes of emotional and behavioral self-regulation beginning at an early age, and go on to experience higher levels of negative emotionality and develop fewer adaptive emotion regulation strategies throughout later childhood.

The potential social correlates of emotion regulation, well-established among children without ASD, have received little study among children with ASD; yet, given the social and communicative difficulties that represent hallmarks of ASD, there is a need to examine whether these associations are present among children with ASD as well. One known study (Jahromi et al., 2013) has linked emotion regulation among children with ASD to social outcomes, finding that better emotion regulation predicted prosocial peer engagement, thus buffering their social deficits. However, more studies are needed to further explore emotion regulation abilities among young children with ASD, in order to increase our understanding of the underlying dysregulation they experience and to determine how this might influence their broader development.

Given the importance of parent-child interactions and joint attention for the development of early self-regulatory capacities, deficits in joint attention abilities may help to explain the hampered emotion regulation development among young children with ASD. Researchers have begun to find promising results in utilizing parent-directed intervention to enhance children's emotion regulation development. One study of toddlers (21 to 36 months of age) with ASD found that, throughout the course of an 8-week intervention targeting children's joint attention abilities, parents improved in co-regulation strategy use and children improved in their regulation of negative emotions (Gulsrud, Jahromi, & Kasari, 2010). In addition, school-based interventions have been developed with a core focus on emotion regulation deficits among children with ASD (e.g., SCERTS). The SCERTS model describes as a primary goal for children to develop the ability to regulate their emotions in order to cope with stressors and to maintain an emotional state conducive to learning and interacting with others (Prizant, Wetherby, Rubin, Laurent & Rydell, 2006). Thus, the intervention field has begun to recognize the importance of helping children with ASD manage their emotions, in addition to focusing on the social and communicative deficits inherent to the diagnosis. However, much of the emotional experience of children with ASD remains unknown, including nuances of emotion regulation deficits displayed within this population, factors that contribute to deficits in emotion regulation abilities, and the variety of ways parents, teachers, and other caregivers can support children's development of emotion regulation strategies.

#### *Reading Tasks to Capture Parental Emotion Scaffolding*

Many studies with typically developing children have explored how parents utilize reading tasks and tasks involving play narratives to teach social and emotional concepts to their children. In several different research studies, parental use of emotion-related speech (e.g.,

commenting on or labeling affective states, explaining emotional experiences, asking children questions about emotions) was found to predict preschool-aged children's use of emotion words. Denham and Auerbach (1995) found that mothers' use of emotional language during a storybook reading task related to children's use of emotional language among 2½ to 4½ year olds. Cervantes and Callanan (1998) conducted free-play and shared storytelling activities with 2- to 4-year-old children and their mothers, finding that both labels and explanations about emotions provided by mothers predicted 2-year-old children's emotion-related speech but that only explanations (a more advanced scaffolding approach) predicted 4-year-old children's speech. Thus, parents have used a variety of teaching techniques with their children, but, based on the children's developmental level, these techniques appear to be differentially helpful for children's ability to use emotional language.

Throughout early development, parental use of emotional talk also relates to children's social development. Brownell and colleagues (2013) coded the ways in which parents read books with emotional content to toddlers and young children (1½ - 3 years of age) to determine if parental emotion-based speech related to children's prosocial behaviors. Children whose parents elicited more emotion-related talk from their children (e.g., by asking the child to provide emotion labels or describe why a character was experiencing an emotion) were more likely to share objects with the examiner when asked and to provide help to the examiner during experimental procedures. Parental questioning about emotions provided unique explanation of variance above and beyond children's age, but parental use of labels or explanations did not independently relate to children's sharing or helping behaviors. Similarly, Denham and Auerbach (1995) found that the frequency of questions posed by their mothers about emotions during a storybook reading task related to young children's (ages 2½ to 4½) emotion

understanding and prosocial behavior in the classroom, though other aspects of mothers' emotion-related talk (e.g., comments or explanations) did not hold predictive power.

Furthermore, children's own emotion-related comments during the storybook task predicted their prosocial classroom behaviors (e.g., children who did not use sadness terms during the parent-child task tended to ignore peer distress in their classrooms).

Together, these studies highlighted the ways in which children learn to communicate about emotions during one-on-one activities with their parents – ways that have meaningful influences on their everyday social interactions and their own use of emotion language. However, discrepancies are seen regarding which types of parental scaffolding (e.g., providing labels, questions, or explanations) are most meaningful, leading to the possibility of other aspects of parental emotion scaffolding (e.g., the quality or level of the scaffolding provided) having greater predictive power for child outcomes. Additionally, the directionality of these effects remains unclear, given the cross-sectional nature of these studies. Furthermore, while studies often accounted for child age, detailed analyses regarding the utility of these strategies for children at different baseline levels of functioning have not been completed.

Only one known study has explored similar scaffolding processes among children with ASD. Slaughter and colleagues (2007) asked mothers to read wordless storybooks with their preschool and school-aged (ages 3 to 9 years) children with ASD. A range of parental utterances surrounding mental states were coded, including references to cognitive states (such as “thinking” and “pretending”), false belief references (such as noting what a given character may or may not be aware of, despite additional knowledge held by other characters), and comments about characters attention or sensory/perceptual experiences, in addition to references to emotional or affective states. Parents' use of clarifications or explanations of characters' emotions most

strongly related to performance on theory of mind tasks for children with ASD, while explanations about cognitions predicted the performance of typically-developing children on these tasks. Thus, discussions about affective states via parental explanations in the context of a joint storybook activity related children's level of socio-emotional understanding, an area of documented deficit among children with ASD. However, this study did not focus on the related area of emotion regulation and provided only a cross-sectional examination of the link between parenting and child functioning.

*Dissertation Study: Research Questions and Hypotheses*

This study aimed to promote understanding of emotion regulation among young children (ages 4 to 7) with ASD, focusing on drawing a more coherent picture of emotion regulation deficits within this population and exploring child and family characteristics that longitudinally predict children's emotion regulation development. Children's emotion regulation was assessed at two time-points, approximately 9-10 months apart, with a detailed measure of parental emotion scaffolding assessed during a dyadic interaction task at the first emotion regulation measurement.

Part I: For Part I of the study, the primary aims were to develop and finalize a parental emotion scaffolding coding system and to determine if this coding system was appropriate for all children in the ASD sample or only a subset (e.g., only children with higher cognitive abilities). The primary research questions included: (1) Can parent emotion scaffolding be reliably measured through coding of parent-child interactions during a joint reading task? (2) How does parental emotion scaffolding relate to children's abilities to discuss emotions within a reading task? (3) To what extent do child characteristics (e.g., level of language, cognitive abilities) constrain or guide parental emotion scaffolding? (3a) Is this construct relevant for children

across a wide range of functioning levels, or is it relevant only to higher functioning children?

Hypotheses related to these questions are listed below:

- 1.1 *Parents of children with ASD will utilize a range of emotion scaffolding techniques (e.g., varying levels of scaffolding, labels of emotions, questions, explanations) to promote children's development of emotion understanding and emotion regulation.*
- 1.2 *This construct of emotion scaffolding techniques can be coded reliability from the parent-child reading task.*
- 1.3 *Certain pre-existing child factors, such as higher IQ, increased child age, and lower autism severity, will relate to increased use of parental emotion scaffolding strategies.*
- 1.4 *Parental use of emotion scaffolding strategies will positively relate to children's emotion-related comments during the parent-child interaction task, above and beyond child IQ.*

Part II: In Part II of the study, the primary aim was to explore the emotion regulation profile of children with ASD. The primary research questions included: (1) What level of emotion regulation and dysregulation are exhibited by children with ASD? (2) Which child characteristics (e.g., cognitive ability, language ability, social skills, and behavioral problems) relate to and predict children's emotion regulation/dysregulation? (3) What influence does emotion regulation/dysregulation have on children's development in other areas (e.g., social skills, behavioral problems)? Hypotheses related to these questions are listed below:

- 2.1 *Children's emotion regulation abilities will relate positively to child social skills and negatively to internalizing and externalizing behavior problems.*

- 2.2 *Children's emotion regulation abilities will be independent of cognitive impairments and core symptoms of ASD (e.g., language impairment), as suggested by preliminary analyses as well as previous research with typically-developing children (Jahromi & Stifter, 2008).*
- 2.3 *Child emotion regulation abilities will predict changes in social skills and behavior problems, such that more difficulties with emotion regulation will predict less improvement across time.*

Part III: In Part III of the study, connections between parental emotion scaffolding and child emotion regulation abilities were examined. Research questions included: (1) To what extent does parental emotion scaffolding predict change in ED symptoms? (2) To what extent does parental emotion scaffolding predict change in children's social skills and behavioral difficulties? (3) How does type of parental emotion scaffolding (i.e., emotion labels, explanations, and questions) relate to change in ED symptoms? Hypotheses related to these questions are listed below:

- 3.1 *Parental use of emotion scaffolding strategies will predict improvement in children's ED across time.*
- 3.2 *Parental use of emotion scaffolding strategies will predict improvement in children's social skills across time.*
- 3.3 *Parental use of emotion scaffolding strategies will predict improvement in children's behavior problems across time.*
- 3.4 *The effect of the type of emotion scaffolding (i.e., labels, questions, and explanations) will be examined in an exploratory manner given discrepancies regarding the relative benefits of each in the existing literature.*



## Methods

### *Smooth Sailing Study*

The Smooth Sailing Study was a cross-site, longitudinal study funded by the Institute of Education Sciences (IES; “Successful Transition in the Early School Years for Children with Autism”, R324A110086, J. Blacher, PI). Subjects were recruited and assessed in Southern California and Massachusetts. The study’s larger goal was to assess how children with ASD adjust to school during the early school years, with a focus on finding those characteristics that help predict a successful school transition.

### *Participants*

Children were recruited for the Smooth Sailing Study through community agencies (e.g., autism service providers, support groups, summer camps), preschools and elementary schools, websites, and local autism-specific events (e.g., fundraising walks, social events for families with children on the autism spectrum). If interested, participating families were also provided with fliers to share with other families from their children’s schools or social groups to aid in recruitment.

Inclusion criteria were: (a) diagnosis of an autism spectrum disorder from an outside psycho-educational evaluation and/or diagnosis of autistic-like behaviors from a school district; (b) child meeting the autism spectrum cutoff on the Autism Diagnostic Observation Schedule (ADOS) [as well as the Autism Diagnostic Interview-Revised (ADI-R), if prior diagnoses only included autistic-like behaviors from school districts]; (c)  $IQ \geq 55$  on the Wechsler Preschool and Primary Scales of Intelligence, 3<sup>rd</sup> Edition (WPPSI-III); and (d) age 4 to 7 year at the time of the Eligibility Visit. A phone screening was conducted with interested families to ensure the child was appropriate for the study based on the age criteria, the child’s diagnostic history, and current

verbal and cognitive abilities; eligibility was verified during an initial eligibility visit at the research center.

Table 1 contains child and parent demographic information on the 108 eligible participants used in this study, as well as information on child current functioning. Scores from the cognitive and diagnostic measures administered for eligibility were entered into subsequent analyses.

### *Procedures*

After eligibility was determined, children participated in a series of three visits to assess multiple aspects of child behavior, child literacy development, student-teacher relationships, and parent-child interactions. Time 1 visits were completed in the fall shortly after the eligibility visits, Time 2 visits were completed in the spring of the same academic year (approximately 4-6 months after the Time 1 visit), and Time 3 visits were completed the following winter (approximately 9-10 months after the Time 2 visit). Participants ( $N = 108$ ) who completed the Time 2 and Time 3 visits were included in the current study. Primary caregivers participated with their children to complete questionnaires, interviews, and dyadic tasks. As the majority of these caregivers are mothers ( $N = 98$ ; 90.7%), the terms “mother” or “maternal” have been used when referring to the caregivers.

For each visit, families came to the research center to complete parent interviews, child assessments, and parent-child interaction tasks. Assessments were completed at University of Riverside’s SEARCH Center, University of California Los Angeles’ Fernald Child Study Center, The Help Group’s Young Learners Preschool Sherman Oaks Campus, and the University of Massachusetts Boston’s McCormack Hall. In addition, children’s current teachers provided their

perspectives of the children's behavior and development at the time of each visit via questionnaires.

After the Eligibility and Time 1 Visits, parents were provided with a report of the child's performance during the standardized assessment measures. Parents were offered a tape of their child after the Time 2 visit. After the Time 3 visit, parents were provided with a report of the child's performance at the Time 3 visit and an explanation of the child's progress on the measures that are administered across all three visits. Families received \$50 compensation for completion of each of the three visits following the Eligibility Visit, and teachers received \$25-\$50 for completion of teacher packets (i.e., \$125 for all three).

### *Measures*

Emotion Scaffolding Coding System (Berkovits & Caplan, 2013). This coding system was developed to capture the manner in which parents scaffold their children's emotion understanding and the ways in which children respond to this scaffolding within the interaction. Similar to Slaughter et al. (2007), parents and children were observed reading a wordless storybook. Of note, wordless storybooks have been found to result in mothers elaborating more while telling the story to their children, especially on characters' mental states (Ziv, Smadja, & Aram, 2013). Therefore, this particular task provides abundant material for examining the ways in which parents choose to narrate the story to their children including the aspects that they choose to focus on during the task (e.g., action plot vs. emotional experiences).

For the encoding of parental behaviors, this system measured the frequency of parents' emotion-centered comments during the 8-minute picture-book reading task videotaped during the Time 2 assessment. Each emotion-related comment made by the parent was rated on a four-point scale (Low, Moderate, High and Advanced) encoding the level of scaffolding provided. In order

to make each category applicable to both verbally fluent and minimally verbal children within the ASD population, each level included ways in which parents could scaffold emotional understanding for a range of child functioning levels (e.g., higher levels of scaffolding could be reached by asking questions of the children, or by the parent providing more assistance or detail in their explanations to the children). For the purposes of data analysis, the High and Advanced levels were combined due to low frequency of comments in each category. In Table 2, examples of emotion-related comments coded in each of the four levels are provided (see Appendix B for the full coding manual). Data collected from this coding system included the frequency of comments within each level of scaffolding, as well as a summary score calculated based on the frequencies to provide step-wise profiles describing increasingly complex scaffolding used. For example, a middle rating on this 5-point summary score could be reached by a parent using frequent (i.e., 8-13 instances) moderate level approaches or one instance of a high level approach. The algorithm to create the summary score was developed such that the distribution of summary scores fit a normal curve once coding was complete.

In addition to capturing the comments as rated in these four categories, each maternal comment was also coded as either a *label*, *question*, or *explanation*, to mirror previous coding systems of shared book-reading tasks. This allowed for a detailed analysis of the ways in which parents work to scaffold their children's emotional understanding and provide a means of assessing which types of techniques are ultimately most effective for children with differing presentations.

To capture children's responses to this parental scaffolding, responses to each parental emotion-centered comment were categorized as either: (0) no response when the child does not acknowledge the parent's emotion-centered comment either verbally or nonverbally, (1) a

response consisting of a simple (verbal or nonverbal) answer to a direct parent question or repetition of the emotion stated by the parent, (2) a response that elaborates beyond the parent's question or comment (e.g., asking a follow-up question, explaining the causes behind the emotion), or (3) an unprompted comment or question about emotions when the parent had not been talking about emotions immediately prior to the child's initiation. Similar to the codes capturing the parents' behaviors, children's emotion-centered responses and comments were coded as frequencies of each type of comment. As in the parent coding, a summary score was added to profile children's level of emotion-centered discussion.

Three global codes were also incorporated into this coding manual. First, given the potential of differences in mother's verbal expressivity (e.g., intonation, enthusiasm) that might influence the effects of parental emotion scaffolding, parental expressivity was rated on a four-point scale to capture this quality. Second, given the cognitive delays and inattentive symptoms of some of the children in our sample, dyadic engagement during the interaction was coded on a four-point scale to represent the extent to which parents and children are both attentive and engaged in the picture book task and related dialogue. Dyads with the lowest engagement code were removed from further analyses, given the children's limited focus on the task at hand and parents' inability to utilize narrative strategies. Third, parent dialogue that focused on educating the children about social norms/behaviors and perspective taking was coded on a four-point scale to measure the extent to which parents stimulated their children's social understanding.

All coding was completed by pairs of coders, consisting of undergraduate students, graduate students, and research staff. Coding pairs were trained by the master coder until they reached the reliability criterion of an average of 80% agreement on each type of coding decision (parent level codes, parent type codes, child comment codes, each of the three global codes) on

ten consecutive tapes. This criterion ensured that coding teams and the master coder were accurately capturing the same emotion-related comments and could come to a consensus for the majority of ratings of parent and child comments. Once reliability was established and the teams began to code independently, maintenance of reliability was ensured through calculation of consensus between the teams and the master coder for 20% of tapes. Ongoing reliability criteria were set for a minimum of at least 70% exact agreement for all codes.

Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1995). Children's emotion regulation capacity was measured with maternal ratings on the Emotion Regulation Checklist (ERC) at Time 2 and Time 3 visits. The ERC is a 24-item parent-report measure that yields two subscale scores: Emotion Regulation and Lability/Negativity. The Emotion Regulation subscale (ERC-ER) assesses children's overall mood, their ability to label and express emotions, and their ability to display appropriate emotions in positive and negative social situations. The Lability/Negativity subscale (ERC-LN) assesses children's lack of flexibility, rapid changes and variation in mood states, dysregulation of negative affect, and a tendency to behave in an overly exuberant manner. The internal consistency for both the ERC-LN ( $\alpha=.96$ ) and the ERC-ER ( $\alpha=.83$ ) is high as reported by Shields and Cicchetti (1997) within their sample of children ages 6 to 12. Within the study sample, internal consistencies were high for the ERC-LN ( $\alpha=.83$ ) and ERC-ER ( $\alpha=.81$ ) at Time 2 and for the ERC-LN ( $\alpha=.86$ ) and ERC-ER ( $\alpha=.74$ ) at Time 3.

Child Behavior Checklist 1½-5 and 6-18; Teacher Report Form 1½-5 and 6-18 (CBCL; TRF; Achenbach & Rescorla, 2000; 2001). The CBCL/TRF is one of the most widely used report measures of children's socio-emotional and behavioral functioning, and was gathered here at each time-point. Both the 1½-5 and 6-18 versions contain items that are rated on 3-point scales (0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true) and have high

reliability and validity. The CBCL and TRF 1½–5 versions contain 100 items, while the CBCL and TRF 6–18 versions contain 113 items.

Mothers and teachers reported on child behavior problems using the CBCL and TRF respectively. The Total Problems scale was used as an overall measure of child behavior problems in analyses exploring the relationship between emotion regulation problems and child behavior. Since the two different versions of the CBCL were utilized based on children’s ages, analyses were completed with T-scores as they are independent of the number of items and allow comparisons across the two versions. This scale has high levels of internal consistency (CBCL 1½-5 and 6-18:  $\alpha=.97$ ; TRF 1½-5 and 6-18:  $\alpha=.97$ ) (Achenbach & Rescorla, 2000; 2001). Cross-informant reliability for parents vs. teachers is only moderate in the normative sample (CBCL/TRF 1½-5:  $r=.50$ ; CBCL/TRF 6-18:  $r=.35$ ), highlighting the importance of using each informant to obtain a complete picture of children’s behavior.<sup>2</sup>

In order to explore behavior problems in more detail, children’s behaviors were also measured in terms of internalizing and externalizing behavior problems. Across the 1½-5 and 6-18 versions of the CBCL and TRF, the subscales in the internalizing composite are largely consistent (the 1½-5 version has an additional subscale of Emotionally Reactive, but several items represent constructs from the other three subscales and it is highly correlated with the three subscales that are consistent across the two versions). Therefore, the traditional Internalizing Behaviors t-score was used across both versions for this study. However, the subscales in the Externalizing Behaviors t-score are more inconsistent; the externalizing composite consists of Attention Problems and Aggressive Behavior in the 1½-5 version, but Aggressive Behavior and Rule-Breaking Behavior in the 6-18 version. Given a low prevalence of clinically-significant

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<sup>2</sup> Cross-informant reliability is even lower in this sample for both the CBCL/TRF 1½-5 (Time 2:  $r=.18$ , *n.s.*; Time 3:  $r=.43$ ,  $p = .097$ ) and the CBCL/TRF 6-18 (Time 2:  $r=.11$ , *n.s.*; Time 3:  $r=.17$ , *n.s.*).

rule-breaking behaviors in this young sample with only 10-16% of children scoring in the borderline-clinical or clinical ranges of difficulties on the Rule-Breaking Behavior subscale, an composite score was created for both versions by averaging the Attention Problems and Aggressive Behavior t-scores to represent externalizing behaviors in this sample.

*Emotion Dysregulation Index:* The Emotion Dysregulation index (CBCL-EDI) is a newly published approach to assessing emotion dysregulation among children using items from the CBCL (Samson et al., 2014). This index score was formed via an expert rating process and has been used with children with ASD (see Samson et al., 2014 for more information). This 18-item index was initially used with children ages 6 to 16, using the CBCL 6-18 version, and has high reported internal consistency ( $\alpha=.90$ ). Two items addressing self-harm and suicidality were endorsed at a very low frequency within this younger sample and were removed from the index for the purposes of this study, leaving 16 of the original CBCL-EDI items to create this index score. Among children who were administered the CBCL 6-18 version in this study, this revised CBCL-EDI had similar internal consistency ( $\alpha=.85$ ) to the normative sample. Additionally, a comparable CBCL-EDI scale was formed using the CBCL 1½-5 version, with 14 identical items and two substitute items representing analogous constructs (“defiant” substituted for “argues a lot;” “hits others” for “threatens people”). This scale also had high internal consistency within our sample ( $\alpha=.81$ ). A parallel scale using teacher-report of children’s emotion dysregulation was also created using the TRF 1½-5 and 6-18 forms (TRF-EDI), with identical items as the CBCL versions. Details of the CBCL-EDI and TRF-EDI are provided in Appendix C. These index scores were not used in analyses in conjunction with the CBCL or TRF Total, Internalizing, or Externalizing Scores due to overlapping items.



Social Skills Improvement System (SSIS; Gresham & Elliott, 2008). The SSIS is a parent-report questionnaire measure that provides a broad assessment of social skills, problem behaviors, and academic competence, administered here at the Time 2 and Time 3 assessments. Parents and teachers rated the frequency of specific social skills defined in behavioral terms on a 4-point scale including *never*, *seldom*, *often*, and *almost always*, and scores are converted to standard scores with mean of 100 (SD of 15). The previous (Social Skills Rating System) and current (Social Skills Improvement System) versions of this measure have been widely used to assess social functioning in children with autism (Frankel, Myatt, & Feinberg, 2007) and intellectual disabilities (Neece & Baker, 2008).

This study used the Total Social Skills score, obtained from both parents and teachers, as a measure of children's social skill development. This measure has high internal consistency (Parent Version:  $\alpha=.96$ ; Teacher Version:  $\alpha=.97$ ), strong construct validity and good convergent validity (Gresham & Elliott, 2008; Gresham, Elliott, Cook, Vance, & Kettler, 2010). However, parent and teacher scores on the Total Social Skills score exhibits only moderate inter-rater reliability ( $r=.30$ ; Gresham et al, 2010).

Comprehensive Assessment of Spoken Language (CASL-2; Carrow-Woolfolk, 1999). The CASL-2 is a standardized assessment of spoken language abilities in individuals aged 3-21 years. The CASL-2 assesses 4 aspects of spoken language: lexical/semantic, syntactic, supralinguistic, and pragmatic language. This measure has strong reliabilities of .90-.96 for each of the 4 indices (Carrow-Woolfolk, 1999), and has been used with children with a variety of developmental and language disabilities (e.g., Reichow, Salamack, Paul, Volkmar, & Klin, 2008). In this study, two subtests of the CASL-2 were administered to all children at Time 1,

including Syntax (measuring grammatical and syntactical skills) and Pragmatic Judgment (measuring children's use of language in social situations).

#### Data Analytic Procedures

This study used data from the Time 2 and Time 3 visits. At the Time 2 visit, the parent-child reading task was completed and additional measures were added to assess children's emotion regulation abilities. Data from the Time 3 visit allowed for a measure of change in children's emotion regulation abilities across time. For questions assessing other areas of child development that may predict or relate to emotion regulation abilities, some of the data collected from the eligibility and Time 1 visits were used as measures of related child characteristics (e.g., autism symptoms, language and cognitive functioning) and as potential correlates for analyses.

*Part I Analyses:* Descriptive analyses of all aspects of the emotion scaffolding coding system were run. Correlations and hierarchical linear regressions were then conducted in order to determine the extent to which parental emotion scaffolding related to child emotion-related comments, above and beyond children's cognitive functioning.

*Part II Analyses:* In order to better understand children's emotion regulation, a series of analyses were conducted using parent- and teacher-report of children's emotion regulation and dysregulation. Correlational analyses explored the relationships between parent and teacher data, and paired-sample t-tests were used to assess stability of children's emotion regulation. Correlational analyses also explored relationships between children's emotion regulation and other measures of children's functioning.

Follow-up analyses were conducted via hierarchical linear regressions to assess if related areas of child functioning might mutually predict developmental change from Time 2 to Time 3. Demographic variables (i.e., child age, child gender, maternal education, family income) that

correlated with a given outcome variable at  $p < .10$  were entered as covariates in all analyses utilizing that outcome measure. If multiple covariates were relevant for a given outcome measure, all covariates were entered into the regression and retained if their coefficients were significant at  $p < .10$ . However, if one or more covariates did not enter into the model at  $p < .10$ , the covariate with the greatest  $p$  value was removed and the model was re-run to assess for significance with the remaining covariates.

Two series of hierarchical regressions were run: one predicting child emotion regulation (outcomes as CBCL-EDI, TRF-EDI, ERC-ER, and ERC-LN at Time 3), and one predicting child social skills and behavior problems (parent- and teacher-report on SSIS at Time 3 and internalizing and externalizing behavior problems on the CBCL/TRF at Time 3). In order to explore interactions, all predictor variables were centered to the mean of the sample. Variables were entered into the hierarchical regression in the following blocks for both series of regressions: (1) Demographic covariates, if relevant; (2) Child's score on the parallel measure at Time 2, to control for prior levels and thus predict change to the same measure at Time 3; and (3) Child IQ. For regressions predicting child emotion regulation, child social skills on the SSIS and autism symptoms on the SRS were entered in Block 4, and two- and three-way interactions between social skills, autism symptoms, and IQ were explored in Block 5. For regressions predicting child social skills and behavior problems, child emotion regulation measures were entered individually in Block 4, and two-way interactions between IQ and emotion regulation were explored in Block 5. Non-significant interactions were dropped from the final models.

*Part III Analyses:* The key question for Part III was to understand how parental emotion scaffolding related to change in measures of child functioning (i.e., emotional, social and behavioral functioning). Preliminary hierarchical regressions were completed to assess the extent

to which parental emotion scaffolding explained variability in child functioning at Time 2 (the same time-point as the measurement of parental emotion scaffolding) and at Time 3 (9-10 months later). Data analyses and results of these preliminary regressions are described in Appendix D.

The main Part III analyses consisted of a series of hierarchical linear regressions to determine if parent emotion scaffolding predicted *change* in child functioning from Time 2 to Time 3. Variables were entered into the hierarchical regression in the following blocks for regressions predicting change in child emotion dysregulation and child behavior problems: (1) Demographic covariates, if relevant; (2) Child's score on the parallel measure at Time 2, to control for prior levels and thus predict change to the same measure at Time 3; (3) Child IQ and child social skills; (4) Parent emotion scaffolding; (5) Two- and three-way interactions between parental emotion scaffolding, child IQ and child social skills. Variables were entered into the hierarchical regression in the following blocks for regressions predicting child social skills: (1) Demographic covariates, if relevant; (2) Child's score on the parallel measure at Time 2, to control for prior levels and thus predict change to the same measure at Time 3; (3) Child IQ; (4) Parent emotion scaffolding; (5) Parental stimulation of social understanding global code; (6) Two- and three-way interactions between parental emotion scaffolding, parental stimulation of social understanding, and child IQ. Non-significant interactions were dropped from the final models.

For outcome variables with no direct relationship to parental emotion scaffolding, mediation analyses were conducted to determine the possibility of indirect effects of parental emotion scaffolding on child outcomes. These analyses were conducted with the PROCESS macro in SPSS using the basic mediation model (Template 4) with biased corrected confidence

intervals (95% CI, Hayes, 2012, 2013). This method uses bootstrapping, a robust analysis using nonparametric resampling procedures that has high statistical power and low probability of making Type I errors. Confidence intervals were examined to determine the significance of the mediator's indirect effects on the outcome variables, with the indirect effect considered to be statistically significant when confidence intervals do not include zero.

In addition to examining the effects of parental emotion scaffolding by level of scaffolding, the effect of different *types* of parental emotion comments on child emotion dysregulation were explored in hierarchical regressions. Each type (i.e., labels, explanations and questions) was examined individually to determine the unique influence each type might have on child outcomes. To measure the proportion of each type of comment utilized, ratio scores were created for each type by dividing the total number of comments of that type (e.g., total number of labels) by the total number of emotion comments coded (see Bailey, Denham, & Curby, 2013). Variables were entered into the hierarchical regression in the same manner as the regressions predicting child emotion dysregulation described above, with the ratio scores entered in place of the parental emotion scaffolding summary score in Block 4.

## Results – Part I

### *Emotion Scaffolding Coding*

Coding was completed on 103 dyads from parent-child reading task interactions at the Time 2 visit.<sup>3</sup> Parents displayed a range of levels and techniques of emotion scaffolding during the dyadic reading task, and children displayed a range of emotion-related comments. Reliability of coding was adequately established between the pairs of coders and the master coder (see Table 3).

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<sup>3</sup> Five videotapes from completed visits were missing and could not be coded.

Parent emotion-related comments were largely unrelated to child functioning as assessed during the eligibility and Time 1 visits with few exceptions (see Table 4). Child emotion-related comments were moderately correlated to child IQ and language ability, but largely uncorrelated with autism symptoms (see Table 4). Additionally, age was uncorrelated with children's ability to make prompted or elaborated responses, but children were significantly more likely to initiate emotion-related topics with increasing age within the sample. Given the most consistent relationship between the emotion scaffolding coding and child IQ, IQ was controlled for in further analyses to account for children's current level of functioning.<sup>4</sup>

Parent emotion scaffolding was related to child emotion-related comments within the dyadic reading task, above and beyond the influence of children's cognitive ability (see Table 5). While the parental emotion scaffolding summary score and total number of comments were both related to child comments, above and beyond the effect of IQ, stronger and more consistent prediction was found for the emotion scaffolding summary score. Thus, this variable was used in further analyses regarding the effect of parental emotion scaffolding on children's abilities.

The global codes also indicated a range of parent and child behaviors during the task. In terms of dyadic engagement during the task, the majority of the children and parents were fully engaged in the task throughout nearly the entire 8-minute dyadic reading period (68.9%). Smaller proportions of dyads exhibited engagement throughout most of the 8-minute period (21.4%) or approximately half of the 8-minute period (8.7%). Only one dyad was rated to have minimal engagement in the task and was removed from further analyses resulting in a final sample of  $N = 102$  for Time 2 participants. After removing this dyad, dyadic engagement was unrelated to parent variables, including mother's education, parental emotion scaffolding

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<sup>4</sup> Given high correlations between IQ and language ability (IQ and CASL Syntax:  $r = .73$ ; IQ and CASL Pragmatics:  $r = .77$ ), only IQ was controlled for rather than both IQ and language ability.

summary or total scores, or parental expressiveness. Dyadic engagement was also unrelated to child social skill, age, or autism severity, but was moderately correlated with child language and IQ (see Table 4).

Parental simulation of social understanding was moderately correlated with parental emotion scaffolding (summary score  $r = .24, p < .05$ ; total number of comments  $r = .42, p < .001$ ) but unrelated to mother's education. Parents of children with higher pragmatic language levels used more stimulation of social understanding, but this global code was not significantly related to other measures of child functioning (see Table 4).

Parental expressiveness during the reading task was unrelated to most measures of child functioning except child autism severity based on parent ratings on the SRS (see Table 4). It was also unrelated to mother's education, but was moderately related to other measures of parental emotion scaffolding (summary score  $r = .24, p < .05$ ; total number of comments  $r = .23, p < .05$ ).

## Results – Part II

### *Child Emotion Regulation and Dysregulation*

Given several measures across parent and teacher raters on child emotion regulation and dysregulation, initial analyses explored how these measures related to one another. Significant relationships existed between the scales measuring emotion regulation (see Table 6). These moderate to high correlations across the three parent-report ratings lend validity to the larger context of emotion regulation/dysregulation. Lower correlations across parent and teacher report show a similar pattern to other behavioral report measures of low to moderate inter-rater reliability between parents and teachers.

Each of the emotion regulation/dysregulation measures showed high stability across Time 2 to Time 3 as assessed via correlations and paired t-tests (see Table 7a). This indicates that

parents and teachers both see children as largely stable in their emotion regulation and dysregulation across this year in development, though as expected, the teacher correlation is lower given changes in teachers and classroom context for most children across the two school years. This relatively high stability in measures may serve as a barrier to predicting change in children's levels of emotion regulation and dysregulation.

Emotion regulation and dysregulation as seen by parents appears to be a construct independent of core measures of child functioning (e.g., cognitive development, language functioning; see Table 8). None of the parent-report measures showed significant correlations with children's IQ, language level, or ASD symptom severity on the ADOS-2. However, teacher-rated emotion regulation/dysregulation was moderately correlated with these measures of child functioning, suggesting that classroom-based emotion regulation capacities may be linked with cognitive and language abilities and ASD-related impairments. Furthermore, children's emotion regulation/dysregulation related to measures of children's social and behavioral functioning as assessed by the same raters in the same contexts, but not across raters and contexts (see Table 8). Given this disconnect between parent and teacher ratings, further analyses used measures by the same rater when comparing across social, behavioral, and emotional functioning.

#### *Prediction of Change in Emotion Regulation/Dysregulation*

Despite high measures of stability in child emotion regulation and dysregulation as rated by parents and teachers, a series of regressions was conducted to determine if any child factors predicted change in these measures from Time 2 to Time 3. Only child autism symptoms on the SRS predicted change in parent-rated emotion dysregulation (ED) on the CBCL-EDI, such that children with higher initial ratings of autism symptoms exhibited increased ED on the CBCL-



EDI at Time 3 (see Table 9). These child factors (IQ, social skills, and autism symptoms) did not predict change in child emotion regulation/dysregulation on the ERC-ER, ERC-LN or TRF-EDI (tables not included). Thus, in Part III, analyses of parenting factors that might further predict change in child ED are explored.

#### *Prediction of Social and Behavioral Functioning by Emotion Regulation/Dysregulation*

Social skills and behavior problems also had highly stable sample means from Time 2 to Time 3, with moderate to high correlations across time (see Table 7b). However, a similar series of hierarchical linear regressions was conducted to determine if children's initial levels of emotion regulation/dysregulation predicted small amounts of change in social or behavioral functioning. When assessing change in behavioral functioning, the CBCL-EDI and TRF-EDI were not used as predictors given overlap of items between the EDI and other CBCL subscales.

Child emotion regulation on the ERC-ER was a significant predictor of change in child social skills, such that children with higher emotion regulation scores at Time 2 exhibited increases in social skills scores at Time 3 (see Table 10). Child emotion regulation on the ERC-ER also predicted change in children's externalizing behaviors on the CBCL. Children with higher levels of emotion regulation exhibited lowered externalizing behaviors at Time 3 (see Table 11). Additionally, child emotion dysregulation on the ERC-LN was a significant predictor of change in child internalizing behavior problems on the CBCL. Children with lower levels of ED exhibited lowered internalizing behaviors on the CBCL at Time 3 (see Table 12).

### Results – Part III

#### *Parental emotion scaffolding as a predictor of child emotion dysregulation*

To examine the relationship between parental emotion scaffolding and child emotion dysregulation (ED), the TRF-EDI was used as the measure of teacher-reported child ED in this

series of regressions. To minimize analyses and strengthen the construct of ED as assessed by parents, a composite score was used as the measure of parent-reported child ED created by averaging the z-scores across the CBCL-EDI and ERC-LN.<sup>5</sup>

In predicting *change in parent-reported emotion dysregulation* from Time 2 to Time 3 (see Table 13), previous levels of ED at Time 2 accounted for much of the variance at Time 3. However, an interaction between parental emotion scaffolding and child social skills was also a significant predictor of change in ED. For children with higher social skills, more parental emotion scaffolding predicted lowered ED at Time 3, but for children with lower social skills, more parental emotion scaffolding predicted increased dysregulation scores at Time 3 (see Figure 1).<sup>6</sup> Thus, parental emotion scaffolding appears to be helpful for children with higher social skills, who may be more ready and able to learn about emotional experiences, a nuanced social skill, in detail. However, it may not be helpful (or may even be detrimental) for children with lower social skills who do not yet have the background knowledge of social skills to support this new information.

In predicting *change in teacher-reported emotion dysregulation* (see Table 14), lower IQ predicted lowered ED at Time 3. Additionally, above and beyond the influence of IQ and social skills, more parental emotion scaffolding at Time 2 predicted lowered child ED at Time 3. Thus, unlike the results with the parent data, teachers view children who experienced higher levels of

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<sup>5</sup> The ERC-LN and CBCL-EDI are closely related at Time 2 ( $r = .79$ ) and Time 3 ( $r = .68$ ) as reported in Table 7.

<sup>6</sup> Simple effects assessed by running the regression with groups of children with low, moderate, and high social skills (divided into three equal groups) did not reach significance, likely due to limited power with these smaller samples. However, emotion scaffolding was a marginally significant predictor of change in emotion dysregulation within both the low ( $p = .068$ ) and high ( $p = .066$ ) social skills group.

parental emotion scaffolding as improving in ED from Time 2 to Time 3, regardless of the children's level of social skills.

*Parental emotion scaffolding as a predictor of child behavior problems*

In this series of regressions, the CBCL and TRF Internalizing T-scores were used as measures of internalizing behavior by parent- and teacher-report respectively. The Externalizing Behaviors composite scores (created by averaging the t-scores from the Attention Problems and Aggressive Behavior subscales) from the CBCL and TRF were used as measures of externalizing behaviors by parent-and teacher-report respectively.

In predicting *change in parent-reported externalizing problems* (see Table 15), previous levels of externalizing problems at Time 2 accounted for much of the variance in externalizing problems at Time 3. In addition, an interaction between parental emotion scaffolding and child social skills was a significant predictor of Time 3 externalizing behaviors (see Figure 2). For children with higher social skills, more parental emotion scaffolding predicted lowered externalizing behavior scores at Time 3. However, for children with lower social skills, more parental emotion scaffolding predicted increased externalizing behavior scores at Time 3.<sup>7</sup> For *parent-reported internalizing problems* (see Table 15), the pattern is nearly identical to that seen for externalizing problems. Though previous levels of internalizing problems at Time 2 accounted for much of the variance in internalizing problems at Time 3, an interaction between parental emotion scaffolding and child social skills was also a significant predictor of Time 3 internalizing behaviors with the same interpretation as described above (see Figure 3). Thus, similar to the results with parent-reported ED, parental emotion scaffolding appears to be helpful

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<sup>7</sup> Simple effects assessed by running the regression with groups of children with low, moderate, and high social skills (divided into three equal groups) did not reach significance, likely due to limited power with these smaller samples.

for both internalizing and externalizing behaviors of children with higher social skills, who may be more ready and able to learn about detailed emotional experiences, but may not be helpful (or may even be detrimental) for children with lower social skills.

In predicting *change in teacher-reported externalizing problems* (see Table 16) none of the predictors entered significantly into the model. Parental emotion scaffolding was a marginally significant predictor of Time 3 externalizing behaviors, such that higher levels of parental emotion scaffolding predicted lowered Time 3 externalizing behavior problems at a trend level. For *teacher-reported internalizing problems* (see Table 16), both child and parenting factors predicted change in internalizing problems from Time 2 to Time 3. Children with lower IQ and children who experienced more parental emotion scaffolding had lowered levels of internalizing symptoms at Time 3. Thus, based on teacher-report, parental emotion scaffolding significantly predicted children's improvement in internalizing behavior across 9-10 months of development, but was only a marginally significant predictor of change in externalizing behaviors.

#### *Parental emotion scaffolding as a predictor of child social skills*

In predicting *change in parent- and teacher-reported social skills* from Time 2 to Time 3 (see Table 17), only the prior time-point's measurement predicted child social skills at Time 3. The key parenting variables did not predict change in child social skills, indicating that there was no direct relationship between parental emotion scaffolding and children's social skills. However, in contrast to traditional mediation analyses (Baron & Kenny, 1986), statistical analyses now recognize that mediation does not require a significant direct effect of the predictor on the outcome and can instead represent an indirect effect between the predictor and the outcome (e.g., Hayes, 2009). Thus, parental emotion scaffolding could still exert an effect on children's

development of social skills through indirect pathways. Given significant predictive value for parental emotion scaffolding on child ED, as well as significant relationships between child ED and child social skills, child ED was explored to determine its significance as an indirect pathway between parental emotion scaffolding and child social skills.

Analyses were completed separately for parent-reported and teacher-reported data. In order to account for change in ED and social skills, ratings on these measures at Time 2 were included as covariates of the model. Child IQ was included as an additional covariate in both models, as well as other relevant demographic covariates. Beta values for each pathway are provided in the figures in unstandardized form, the preferred metric in causal modeling.

For *parent-reported social skills*, the sample was split at the mean into low and high social skills as assessed by parent-report at Time 2.<sup>8</sup> For children with *low* social skills (see Figure 4), there was no evidence of an indirect pathway between parent emotion scaffolding and child social skills through child ED. Though ED predicted lowered child social skills at Time 3, parent emotion scaffolding did not relate to child ED at Time 3 for this low social skills group. In contrast, for children with *high* social skills (see Figure 5), there was evidence of an indirect effect of parent emotion scaffolding on child social skills through the pathway of ED. Children whose parents displayed higher levels of emotion scaffolding showed lowered ED, which in turn predicted increased ratings of social skills.

For *teacher-reported social skills*, given that child social skills did not moderate the effect of parent emotion scaffolding on child ED, the sample was examined as a whole. Analysis of these pathways also indicated evidence for an indirect effect of parent emotion scaffolding on

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<sup>8</sup> The sample needed to be split to account for Time 2 social skills as a moderator of parenting-emotion dysregulation link (see Table 15), as it could not be included as both a moderator of the pathway from parent emotion scaffolding to child emotion dysregulation, and as a covariate of the model to account for prior social skills in predicting to Time 3 social skills. The sample was split into 2, rather than 3, groups to maximize sample size for each analysis given the increased complexity of these mediation analyses.

child social skills, through the pathway of child ED (see Figure 6). Children whose parents displayed higher levels of emotion scaffolding exhibited lowered ED, which in turn predicted increased ratings of social skills.

*Parental expressiveness as a moderator of effects of parental emotion scaffolding*

Parental expressiveness as a moderator of the effect of parental emotion scaffolding was explored by adding two steps to each of the change regressions discussed above. In the first additional step, the centered term for the parental expressiveness global code was entered, and in the second additional step, the interaction term between parental expressiveness and the summary score for parental emotion scaffolding was entered. Neither of these terms was significant in any of the regressions, suggesting that parental expressiveness does not moderate the influence of parental emotion scaffolding on change in child outcomes.

*Effect of type of parental emotion scaffolding comments on child emotion dysregulation*

In predicting *change in child emotion dysregulation* from Time 2 to Time 3, children whose parents asked more questions about emotion during the dyadic interaction showed significantly lowered levels of ED *as rated by parents* at Time 3 (see Table 18). Parent emotion labels and explanations did not significantly predict *change in parent-rated ED* from Time 2 to Time 3, and none of the ratios (questions, labels, or explanations) predicted *change in teacher-rated ED* from Time 2 to Time 3.

## Discussion

Researchers have recently begun to shift their focus to emotion regulation development among children with autism spectrum disorder (ASD), but few studies have explored how emotion regulation deficits relate to other areas of functioning for children with ASD and how parent behaviors exhibited during interactions with their child might support development in this

domain. This study aimed to address these gaps in the field through the development of a measure of parental emotion scaffolding and a longitudinal examination of its influence on child characteristics.

Results indicated that the emotion scaffolding coding system could be reliability coded with the majority of children in the study, and that maternal emotion comments predicted child emotion talk above and beyond child IQ. Children exhibited largely stable levels of emotional, behavioral, and social functioning, with these three areas closely related across development. Higher levels of parental emotion scaffolding predicted improvements, by both parent- and teacher-report, in children's emotion dysregulation and behavior problems. Higher parental emotion scaffolding also indirectly predicted improvement in children's social skills, whereby children who exhibited reduced emotion dysregulation in turn showed improvements in social skills. However, results differed slightly between parents and teachers, suggesting that parental emotion scaffolding may be helpful only for children with higher initial levels of social skills. Examination of the types of comments suggested that questions about emotions, in particular, contributed to reductions in emotion dysregulation.

### *Part I*

The Emotion Scaffolding Coding System was developed to represent parent and child comments about emotions during a dyadic book-reading task. This coding scheme provides a novel and thorough way of observing and measuring the ways in which parents provide emotion scaffolding to their children during dyadic interactions, focusing both on the types of comments used and the level of scaffolding provided. Results suggest that this task and coding scheme was appropriate for the majority of young children with ASD in this study. However, it is important to note that this sample already consisted of a moderately high-functioning group of children;

88% had their IQ assessed at or above 70. Further research is needed to explore the appropriateness of this type of task for children with lower cognitive or language abilities.

The extent to which parents spoke about emotion in the shared reading context did relate to the child's use of emotion-laden speech, suggesting that informal interweaving of emotional content into parent-child discussions does influence children's ability to speak about emotions. Further research should explore this important relationship over a longer period of time in order to determine if more parental emotion scaffolding would predict increases in positive child emotion speech, as well as examine the connections between children's ability to speak about emotions and their broader emotion regulation skills. In addition, future studies should assess the accuracy of child emotion labels and explanations, to determine whether parent emotion speech serves as a teaching mechanism for helping their children with ASD to develop more accurate emotion identification, at least in the texts that they read.

## *Part II*

Ratings of children's emotion regulation were highly stable, which indicates that one can measure children's emotion regulation and dysregulation through observational ratings reliability across time. Ratings of children's emotion regulation also correlated strongly with their overall social and behavioral functioning. These strong relationships suggest that emotion dysregulation may be at the core of some of the behavior problems and social difficulties that young children with ASD exhibit during the early school years. However, it is important to note that emotion regulation difficulties may also influence respondents' (e.g., parents, teachers) ratings on profiles or questionnaires relating to problem behaviors, inflating the correlation between these two constructs. Additionally, ratings of child emotion regulation across parents and teachers showed weaker relationships, and links between emotion regulation and child social/behavioral



functioning only held when using reports within the same rater (parents or teachers). This suggests that the children may be presenting differently across the home and school contexts, or that parents and teachers hold different points of comparison when assessing children's behavior.

To date, most behavioral interventions for children with ASD have focused on controlling environmental contingencies. Given the close connections between emotional dysregulation and behavior problems, we may be able to address these difficulties more effectively by working from the ground up, teaching young children with ASD to recognize their own emotional states and helping them learn strategies to manage interfering emotions. Several intervention approaches have begun to target children's emotion dysregulation directly with promising results. Scarpa and Reyes (2011) utilized cognitive-behavioral therapy to address emotion regulation in young children with ASD, with results showing fewer tantrum episodes, shorter tantrums, and improvements in ratings on the ERC as a result of treatment. Additionally, the SCERTS model, a school-based intervention, describes as a primary goal for children to develop the ability to regulate their emotions in order to cope with stressors and to maintain an emotional state conducive to learning and interacting with others (Prizant, Wetherby, Rubin, Laurent & Rydell, 2006).

Emotion regulation has been shown to relate to social functioning, both in this study and in the previous literature (e.g., Blandon, Calkins & Keane, 2010; Eisenberg et al., 1993, Rydell, Thorell, & Bohlin, 2007). Several models and studies have described how emotions influence social behaviors in positive or negative ways, depending on the appropriateness of the regulation and expression of emotions (Crick & Dodge, 1994; Goodman & Southam-Gerow, 2010). Thus, children with poor emotion regulation skills may ultimately tend to act in ways that reduce their chances of success in social interactions. For children with ASD, this negative cycle may be

particularly salient, as emotion dysregulation exacerbates their social difficulties, resulting in high rates of social rejection or social neglect (Cappadocia, Weiss, & Pepler, 2012; Chamberlain, Kasari, & Rotheram-Fuller, 2007). Gulsrud and colleagues (2010) illustrated how targeted social interventions for young children with ASD can lead to improvements in emotion regulation, but further research is needed to examine if the opposite relationship may exist, in which interventions targeting emotion regulation can lead to increased social skills.

Ratings of emotion regulation showed mixed findings in relationship to children's cognitive and language abilities. While parent-ratings of emotion regulation were largely uncorrelated with child IQ, language abilities, and clinician-based ratings of ASD symptomatology, teacher-ratings showed moderate relationships between emotion dysregulation and these measures of child functioning. In typically-developing populations, some aspects of self-regulation are related to IQ (Calero, García-Martín, Jiménez, Kazén, & Araque, 2007), but these tend to be aspects of self-regulation that are generally considered more aligned with attention and executive functioning domains. Meanwhile, regulation of one's emotions and IQ seem to be unrelated constructs in typically developing populations (e.g., Graziano, et al, 2007). It is possible that child emotion dysregulation in the school context may be driven in part by academic frustrations, thus creating a link between child cognitive abilities and emotion regulation for this ASD sample. Alternatively, it is possible that teachers, particularly of children in mainstream environments, may view some of the symptoms of ASD in these children as representative of overall emotion dysregulation, thus conflating the relationship between these constructs. As this study consisted of a somewhat restricted range of IQ among ASD populations, further research with children with ASD with the full range of cognitive functioning is needed to clarify this point.

Analyses showed limited ability to predict change in child emotion regulation by child factors alone (social skills, IQ, and autism symptoms). Of the four measures of child emotion regulation/dysregulation, higher autism symptoms predicted worsening emotion dysregulation across time on the CBCL-EDI only, while IQ and social skills offered no predictive value for change in child emotion regulation. Meanwhile, child emotion regulation showed some ability to predict change in child social and behavioral functioning, but results were not consistent across measures. In particular, while higher ratings on the ERC-ER predicted improvement in social skills and externalizing behaviors, lower ratings on the ERC-LN predicted improvement in internalizing behavior across time. Due to this inconsistency, replication studies are needed to verify this link. Additionally, while one of the strengths of this study is the use of multiple measures of emotion dysregulation and ratings across both parents and teachers, further research would benefit from incorporating a direct observational measure of child emotion regulation as well.

### *Part III*

The third part of this study examined the ability of parental emotion scaffolding to predict changes in child functioning across emotion regulation, social skills, and behavioral measures. Results indicated that the quality of parental emotion scaffolding predicted change in child emotion dysregulation and child behavior problems, but with somewhat different results for parent and teacher ratings. Based on *teacher* ratings, more advanced parental scaffolding predicted improvements in emotion dysregulation and behavioral problems for all children, while based on *parent* ratings, more advanced parental scaffolding was only found to be helpful for children with higher level of social skills. One possible explanation for this discrepancy is that children with low social skills might lack the more basic social knowledge needed to incorporate

more complex information about emotions into their social understanding. Alternatively, parental ratings of children social skills may be capturing the extent to which the children are able to attend meaningfully to dyadic interactions with their parents, and may thus be a proxy for how well the parental scaffolding can be absorbed and utilized by the children in other settings. Yet a third possible explanation is that parents who are noticing that their children lack basic social skills, but still provide advanced levels of scaffolding about emotions (what one might consider an advanced or nuanced area of social understanding), might have difficulty modulating their parenting to their child's current abilities and lack awareness of the next steps the child needs to progress in social-emotional areas. If this is the case, the effects of parenting on child emotion regulation development may not truly differ based on child social skills, but instead may depend on appropriate alignment between parent observations and parenting behavior. This suggests that interventions that focus on how parents can best match their parenting strategies to children's current functioning might be useful.

Further research should help filter through these possible reasons for differential findings based on parent-rated social skills and explore what types of parenting behaviors predict improvement in regulation for children with low social skills. In particular, it remains unclear if lower levels of emotion scaffolding, such as frequent emotion labels, might be helpful for children with less advanced social skills.<sup>9</sup> Alternatively, it is possible that trying to help children with low social skills understand emotions in others might exacerbate their current emotional and behavioral difficulties by overwhelming or confusing them. Lastly, it is important to note that while parental emotion scaffolding was a *significant* predictor of improvement in emotion regulation and behavioral functioning, it still only explained a small portion of the variance in

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<sup>9</sup> Analyses with the total number of low-level comments suggests that this is not the case however, as more low-level comments was a marginally significant predictor of *increased* emotion dysregulation in children with low social skills (split sample at the mean):  $\beta = .169, p = .091$ .

child outcomes (i.e., 2-6%, across analyses). Thus, while this aspect of parenting may be a piece of the puzzle in understanding how to help children with ASD in their key areas of difficulties, there are many other factors that explain the development of children with ASD and other areas of focus are also needed to intervene effectively and meaningfully with this population.

Additional results found that parent emotion scaffolding did not predict change in social skills directly. Instead, parent emotion scaffolding influenced social skills through an indirect pathway, whereby children who improved in emotion dysregulation as a result of parental scaffolding (all children per teacher ratings; only children with high initial social skills per parent ratings) showed cascading improvement in social skills as a result. It is interesting to note that the global code of stimulation of social understanding also had no direct influence on child social skills. However, this code was less comprehensive than the emotion scaffolding coding; further research could explore whether social or perspective-taking comments analyzed in a more detailed manner might influence child social skills more directly.

In examining the types of parental comments, the proportion of questions was most strongly related to child emotion dysregulation, such that more questions predicted improvement in emotion dysregulation. The predictive value of maternal questions about emotions was also seen in several other studies (e.g., Brownell et al., 2013; Denham & Auerbach, 1995). Meanwhile, emotion labels and explanations did not relate to child emotion regulation, in contrast with the existing literature. For example, Denham and Auerbach (1995) found that simple use of emotion words (labels) also predicted child emotion understanding and helping behaviors. Furthermore, Slaughter and colleagues (2007) found that emotion explanations predicted later theory of mind performance among children with ASD. Given these discrepancies, further study is required to better understand the specific effects of labels, explanations and

questions on child emotion regulation development among children with ASD, and determine the circumstances in which labels and explanations might be helpful for scaffolding children's emotion understanding.

While there are limitations to any study, several pertaining to this one will be highlighted here. First, while measures that addressed or contained items relevant to emotional regulation/dysregulation were administered as part of this study, the parent-child shared reading paradigm was not designed expressly for this purpose. Thus, the context may not have provided enough "presses" to elicit the relevant parent and child behaviors. Second, it is crucial to acknowledge that the observational coding during the dyadic reading task was a proxy for how parents typically talk with their children about emotions. Thus, future research should compare assessments of emotion scaffolding during naturalistic observations (e.g., daily speech recordings) to emotion scaffolding during this dyadic reading task, as well as during other structured tasks (e.g., joint play, parental supervision of peer play), to determine which contexts result in assessments that are most representative of everyday parent-child interactions. Finally, the relative homogeneity of the child participants may have restricted the variance on some measures.

### *Conclusions and Implications*

In sum, these studies have shown that, although young children (ages 4 to 7) with ASD are rated to have largely stable levels of emotion regulation and dysregulation across 9-10 months, parental emotion scaffolding can predict changes in children's emotion regulation across this time as rated by both parents and teachers. Furthermore, parental emotion scaffolding can predict changes in children's behavioral functioning and, indirectly, in children's social functioning. These findings utilizing teacher-reported data are particularly noteworthy, given that

teachers are presumably unaware of the parental emotion scaffolding provided to their students (at least as measured during the observed dyadic interaction), yet are still noticing improvements in the children's emotion regulation.

Ultimately, these results have important intervention implications regarding ways to promote social-emotional and behavioral development among children with ASD. If we can teach parents to use optimal emotion scaffolding strategies, with a focus on aligning these techniques with the children's current level of social functioning, parents could further assist their children in making improvements in emotion regulation, social, and behavioral functioning. The coding system developed here could be used to monitor parental emotion scaffolding strategies throughout an intervention program, and could provide parents with examples of more advanced emotion scaffolding strategies to use when appropriate for their children's development. While adjusting conversation patterns with children with ASD would address only a small part of the needs of this population, incorporating parental emotion scaffolding (and, perhaps, classroom-based emotion scaffolding administered by teachers) into already established, comprehensive treatment programs could help address this particular area of difficulty for children with ASD with cascading effects on their functioning in other related areas (social and behavioral functioning). Furthermore, if emotion scaffolding leads to improvements in children's regulatory skills, incorporating parental emotion scaffolding into intervention programs might ultimately reduce societal costs by improving the efficacy and perhaps reducing the duration needed of more intensive interventions.

## Tables

Table 1. Participant demographics

| Sample (N = 108)   | % of sample or Mean (SD) |
|--|--------------------------|
| <u>Child Demographic Variables</u>   |                          |
| Age at EV Visit (years)  | 5.1 (1.1)                |
| Age at Time 2 Visit (years)  | 5.7 (1.1)                |
| Gender (% Male)  | 82.4%                    |
| Race/Ethnicity   |                          |
| Caucasian/White  | 58.3%                    |
| Latino/Hispanic  | 9.3%                     |
| African-American/Black   | 4.6%                     |
| Asian/Asian-American   | 4.6%                     |
| Other (including bi-racial/mixed)  | 23.1%                    |
| <u>Current Child Functioning</u>   |                          |
| Estimated FSIQ (WISC)  | 90.3 (17.1)              |
| IQ Below 70  | 12.0%                    |
| Level of Autism Symptoms (SRS Total T-score)   | 77.7 (11.4)              |
| ADOS Module administered   |                          |
| Module 1   | 13.0%                    |
| Module 2   | 33.3%                    |
| Module 3   | 53.7%                    |
| ASD Symptom Severity (ADOS-2 Comparison Score)   | 7.4 (1.8)                |
| Spoken Language Level (mean of CASL Syntax Construction and Pragmatic Language subtests) | 83.2 (17.4)              |
| Syntax Construction  |                          |
| Syntax Construction  | 81.7 (17.8)              |
| Pragmatic Language   |                          |
| Pragmatic Language   | 84.8 (19.1)              |



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| <u>Parent/Family Demographic Variables</u> |            |
|--|------------|
| Annual Family Income (% > \$50,000)        | 75.5%      |
| Maternal Age (years)                       | 38.4 (5.5) |
| Maternal Race/Ethnicity                    |            |
| Caucasian/White                            | 66.7%      |
| Latino/Hispanic                            | 15.7%      |
| African-American/Black                     | 4.6%       |
| Asian/Asian-American                       | 7.4%       |
| Other (including bi-racial/mixed)          | 5.6%       |
| Maternal Education                         |            |
| (4-year college degree or higher)          | 72.2%      |
| Maternal Marital Status (% Married)        | 85.2%      |

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Table 2. Parental emotion scaffolding coding system examples

| <u>Level of Scaffolding</u>  | <u>Examples</u>   |
|--|---|
| <p><b>Low:</b> <i>labeling emotional states, labeling behaviors that reflect emotional states, emotional explicatives</i></p>  | <p>“The boy is happy.”</p> <p>“The mom and the dad are angry.”</p> <p>“The frog is laughing.”</p> <p>“Yuck!”</p> <p>“The boy likes his new frog.”</p>   |
| <p><b>Moderate:</b> <i>explaining emotional states by connecting the plot or behaviors to emotional states, asking the child to identify emotional states, labeling mixed emotions</i></p> | <p>“The boy is scared because he lost his frog.”</p> <p>“How do you think the boy is feeling?”</p> <p>“Is the frog happy or scared?”</p> <p>“He’s feeling sad, and a little angry too.”</p>     |
| <p><b>High:</b> <i>highlighting or asking the child to identify clues to emotional states</i></p>  | <p>“What makes you think he’s sad?”</p> <p>“I think he’s actually angry – look, his eyebrows are going down.”</p> <p>“Look at how his eyes are a bit wide – how do you think he’s feeling?”</p> |
| <p><b>Advanced:</b> <i>connecting emotional states in the book to the child’s own experiences</i></p>  | <p>“Remember last week, when you were sad like the frog is?”</p> <p>“If you had a frog in your dinner, would you be scared too?”</p>  |

Table 3. Descriptive statistics of emotion scaffolding coding

| Parent Emotion Scaffolding Comments |       |            |                   |
|-------------------------------------|-------|------------|-------------------|
|                                     | Range | Mean (SD)  | % Exact Agreement |
| Level Codes                         |       |            | 85%               |
| Low Level                           | 0-20  | 6.8 (4.7)  |                   |
| Moderate Level                      | 0-23  | 8.5 (4.5)  |                   |
| High/Advanced Level                 | 0-7   | 0.7 (1.1)  |                   |
| Type Codes                          |       |            | 86%               |
| Labels                              | 0-19  | 7.8 (4.8)  |                   |
| Questions                           | 0-22  | 5.3 (4.6)  |                   |
| Explanations                        | 0-13  | 4.6 (3.0)  |                   |
| Total Comments                      | 2-38  | 16.0 (7.5) |                   |
| Summary Score                       | 0-4   | 2.1 (0.9)  |                   |
| Child Emotion-Related Comments      |       |            |                   |
| Comment Codes                       |       |            | 87%               |
| Prompted Response                   | 0-21  | 4.8 (4.7)  |                   |
| Elaborated Response                 | 0-10  | 1.3 (1.7)  |                   |
| Initiation                          | 0-11  | 1.0 (2.0)  |                   |
| Total Comments                      | 0-29  | 7.1 (5.9)  |                   |
| Summary Score                       | 0-4   | 2.2 (1.2)  |                   |
| Global Codes                        |       |            |                   |
| Parent Expressiveness               | 0-3   | 2.0 (0.8)  | 83%               |
| Dyadic Engagement                   | 0-3   | 2.6 (0.7)  | 89%               |
| Social Understanding                | 0-3   | 1.9 (0.8)  | 80%               |

Table 4. Correlations between emotion scaffolding coding and child functioning

|                           |                | Age     | IQ      | CASL<br>Syntax | CASL<br>Pragmatics | ADOS-2<br>Severity<br>Score | SRS<br>Total<br>T-Score | Parent SSIS<br>Social Skills<br>T-score |
|---------------------------|----------------|---------|---------|----------------|--------------------|-----------------------------|-------------------------|---|
| Parent Emotion Comments   | Low            | -.01    | .13     | -.05           | .05                | -.24 *                      | .05                     | -.07                                    |
|                           | Moderate       | -.02    | .12     | .10            | .07                | -.03                        | .04                     | -.09                                    |
|                           | High/Adv.      | .06     | .22 *   | .17 +          | .15                | .15                         | -.17 +                  | .10                                     |
|                           | Labels         | .03     | .11     | -.04           | .05                | -.23 *                      | .07                     | -.10                                    |
|                           | Explanations   | .00     | .00     | .00            | .04                | -.09                        | .11                     | -.11                                    |
|                           | Questions      | -.03    | .18 +   | .14            | .10                | .06                         | -.06                    | -.02                                    |
|                           | Total Comments | -.01    | .18 +   | .06            | .09                | -.14                        | .03                     | -.07                                    |
| Summary Score             | -.01           | .23 *   | .17 +   | .20 *          | .08                | -.17                        | .00                     |   |
| Child Emotion<br>Comments | Prompted       | -.05    | .24 *   | .18 +          | .13                | .05                         | -.03                    | .06                                     |
|                           | Elaborated     | .16     | .34 *** | .18 +          | .21 *              | .00                         | -.20 *                  | .03                                     |
|                           | Initiation     | .36 *** | .29 **  | .22 *          | .23 *              | -.03                        | -.05                    | -.09                                    |
|                           | Total Comments | .13     | .39 *** | .27 **         | .24 *              | .03                         | -.09                    | .02                                     |
|                           | Summary Score  | .22 *   | .44 *** | .27 **         | .35 ***            | .08                         | -.11                    | .03                                     |
| Global Codes              | Dyadic         | -.04    | .36 *** | .23 *          | .33 **             | -.20 +                      | .05                     | .03                                     |
|                           | Engagement     |         |         |                |                    |                             |                         |   |
|                           | Social         | -.19 +  | .09     | .12            | .20 *              | -.05                        | .17 +                   | -.04                                    |
|                           | Understanding  |         |         |                |                    |                             |                         |   |
|                           | Parental       | -.09    | -.02    | .03            | -.02               | -.08                        | .20 *                   | -.04                                    |
|                           | Expressiveness |         |         |                |                    |                             |                         |   |

+ p < .10; \* p < .05; \*\* p < .01; \*\*\* p < .001

Table 5. Relationship between parent emotion scaffolding and child emotion comments

| Variable            | Outcome:<br>Child Total Comments |       |              | Outcome:<br>Child Summary Score |       |              |
|---------------------|----------------------------------|-------|--------------|---------------------------------|-------|--------------|
|                     | $\beta$                          | $R^2$ | $\Delta R^2$ | $\beta$                         | $R^2$ | $\Delta R^2$ |
| Block 1             |                                  | .15   |              |                                 | .19   |              |
| IQ                  | .39 ***                          |       |              | .44 ***                         |       |              |
| Block 2             |                                  | .51   | .36 ***      |                                 | .33   | .14 ***      |
| IQ                  | .25 **                           |       |              | .35 ***                         |       |              |
| Emotion Scaffolding | .62 ***                          |       |              | .38 ***                         |       |              |
| Summary Score       |                                  |       |              |                                 |       |              |
| Block 1             |                                  | .15   |              |                                 | .19   |              |
| IQ                  | .39 ***                          |       |              | .44 ***                         |       |              |
| Block 2             |                                  | .38   | .25 ***      |                                 | .21   | .02          |
| IQ                  | .29 ***                          |       |              | .41 ***                         |       |              |
| Emotion Scaffolding | .50 ***                          |       |              | .15                             |       |              |
| Total Comments      |                                  |       |              |                                 |       |              |

\*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 6. Correlations between measures of emotion regulation at Time 2 and Time 3

|                                     | Emotion<br>Regulation<br>(ERC-ER) | Lability/<br>Negativity<br>(ERC-LN) | Emotion<br>Dysregulation<br>(CBCL-EDI) | Emotion<br>Dysregulation<br>(TRF-EDI) |
|-------------------------------------|-----------------------------------|-------------------------------------|--|---------------------------------------|
| Emotion Regulation<br>(ERC-ER)      |                                   | -.37 ***                            | -.46 ***                               | -.04                                  |
| Lability/Negativity<br>(ERC-LN)     | -.49 ***                          |                                     | .79 ***                                | .19 +                                 |
| Emotion Dysregulation<br>(CBCL-EDI) | -.42 ***                          | .68 ***                             |  | .23 *                                 |
| Emotion Dysregulation<br>(TRF-EDI)  | -.12                              | .26 *                               | .21 <sup>+</sup>                       |                                       |

ERC-ER: Emotion Regulation Subscale of the Emotion Regulation Checklist

ERC-LN: Lability Negative Subscale of the Emotion Regulation Checklist

CBCL-EDI: Emotion Dysregulation Index of the Child Behavior Checklist

TRF-EDI: Emotion Dysregulation Index of the Teacher Report Form

Time 2: un-shaded (upper-right) correlations; Time 3: shaded (bottom-left) correlations

+ p < .10; \* p < .05; \*\*\* p < .001

Table 7. Stability of child functioning across time

|                                     | Time 2       | Time 3       | Paired t-tests          | Correlations         |
|-------------------------------------|--------------|--------------|-------------------------|----------------------|
|                                     | <i>M(SD)</i> | <i>M(SD)</i> | <i>(Time 2 to 3)</i>    | <i>(Time 2 to 3)</i> |
| a) Emotion Regulation Measures      |              |              |                         |                      |
| Emotion Regulation<br>(ERC-ER)      | 23.8 (4.1)   | 24.3 (3.8)   | <i>N.S.</i> , $p > .05$ | .78 ***              |
| Lability/Negativity<br>(ERC-LN)     | 33.3 (6.3)   | 33.1 (6.8)   | <i>N.S.</i> , $p > .05$ | .71 ***              |
| Emotion Dysregulation<br>(CBCL-EDI) | .54 (.36)    | .53 (.37)    | <i>N.S.</i> , $p > .05$ | .61 ***              |
| Emotion Dysregulation<br>(TRF-EDI)  | .32 (.33)    | .29 (.31)    | <i>N.S.</i> , $p > .05$ | .37 **               |
| b) Social and Behavioral Measures   |              |              |                         |                      |
| Parent-Rated Social Skills          | 80.1 (17.3)  | 79.9 (17.1)  | <i>N.S.</i> , $p > .05$ | .67 ***              |
| Teacher-Rated Social Skills         | 86.0 (15.3)  | 87.1 (14.9)  | <i>N.S.</i> , $p > .05$ | .48 ***              |
| CBCL Total Problems                 | 61.6 (9.3)   | 62.0 (10.6)  | <i>N.S.</i> , $p > .05$ | .74 ***              |
| Externalizing Composite             | 61.4 (8.3)   | 62.9 (10.0)  | $t(104)=-2.45, p=.016$  | .78 ***              |
| Internalizing                       | 59.8 (9.5)   | 59.4 (11.7)  | <i>N.S.</i> , $p > .05$ | .63 ***              |
| TRF Total Problems                  | 57.0 (10.2)  | 57.8 (8.9)   | <i>N.S.</i> , $p > .05$ | .41 ***              |
| Externalizing Composite             | 58.0 (7.4)   | 58.3 (7.3)   | <i>N.S.</i> , $p > .05$ | .35 **               |
| Internalizing                       | 55.2 (10.1)  | 54.8 (9.4)   | <i>N.S.</i> , $p > .05$ | .37 **               |

\*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 8. Relationships between emotion regulation at Time 2 and child functioning

|  | ADOS-2   |                |                    |                   |                  |                |                 |               |              |
|--|----------|----------------|--------------------|-------------------|------------------|----------------|-----------------|---------------|--------------|
|  | IQ       | CASL<br>Syntax | CASL<br>Pragmatics | Severity<br>Score | SRS<br>Total     | Parent<br>SSIS | Teacher<br>SSIS | CBCL<br>Total | TRF<br>Total |
| Emotion<br>Regulation<br>(ERC-ER)      | .05      | .09            | .06                | -.11              | -.48 ***         | .73 ***        | .23 *           | -.48 ***      | -.13         |
| Lability/Negativity<br>(ERC-LN)        | .01      | -.07           | -.04               | .15               | .54 ***          | -.45 ***       | -.01            | .75 ***       | .17          |
| Emotion<br>Dysregulation<br>(CBCL-EDI) | .01      | .08            | .08                | -.19 <sup>+</sup> | .50 ***          | -.44 ***       | -.01            | --            | --           |
| Emotion<br>Dysregulation<br>(TRF-EDI)  | -.45 *** | -.27 *         | -.35 **            | .27 *             | .19 <sup>+</sup> | -.14           | -.49 ***        | --            | --           |

Note: dashes represent correlations that were not run, due to overlap of items between measures

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$



Table 9. Prediction of change in emotion dysregulation by child factors

| Variable           | Outcome: Time 3 CBCL-EDI |       |              |
|--------------------|--------------------------|-------|--------------|
|                    | $\beta$                  | $R^2$ | $\Delta R^2$ |
| Block 1            |                          | --    |              |
| Block 2            |                          | .378  |              |
| Time 2 CBCL-EDI    | .614 ***                 |       |              |
| Block 3            |                          | .378  | .001         |
| Time 2 CBCL-EDI    | .615 ***                 |       |              |
| IQ                 | -.027                    |       |              |
| Block 4            |                          | .401  | .048 *       |
| Time 2 CBCL-EDI    | .471 ***                 |       |              |
| IQ                 | .035                     |       |              |
| Parent SSIS Time 2 | -.076                    |       |              |
| SRS Total          | .217 *                   |       |              |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

\*  $p < .05$ ; \*\*\*  $p < .001$

Table 10. Prediction of change in child social skills by child factors

| Variable           | Outcome: Time 3 Parent-Rated Social Skills |       |                   |
|--------------------|--|-------|-------------------|
|                    | $\beta$                                    | $R^2$ | $\Delta R^2$      |
| Block 1            |  | --    |                   |
| Block 2            |  | .441  |                   |
| Parent SSIS Time 2 | .664 ***                                   |       |                   |
| Block 3            |  | .460  | .019 <sup>+</sup> |
| Parent SSIS Time 2 | .639 ***                                   |       |                   |
| IQ                 | .140 <sup>+</sup>                          |       |                   |
| Block 4            |  | .506  | .046 **           |
| Parent SSIS Time 2 | .404 ***                                   |       |                   |
| IQ                 | .178 *                                     |       |                   |
| ERC-ER Time 2      | .315 **                                    |       |                   |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

<sup>+</sup> p < .10; \* p < .05; \*\* p < .01; \*\*\* p < .001

Table 11. Prediction of change in child externalizing behavior problems by child factors

| Variable  | Outcome: Time 3 CBCL Externalizing Behavior Composite |       |              |
|---|---|-------|--------------|
|   | $\beta$   | $R^2$ | $\Delta R^2$ |
| Block 1   |   | .061  |              |
| Child Age                                       | .247 *  |       |              |
| Block 2   |   | .609  | .548 ***     |
| Child Age                                       | -.010   |       |              |
| CBCL Externalizing Behavior<br>Composite Time 2 | .784 ***  |       |              |
| Block 3   |   | .614  | .005         |
| Child Age                                       | -.009   |       |              |
| CBCL Externalizing Behavior<br>Composite Time 2 | .776 ***  |       |              |
| IQ  | -.068   |       |              |
| Block 4   |   | .631  | .017 *       |
| Child Age                                       | -.007   |       |              |
| CBCL Externalizing Behavior<br>Composite Time 2 | .714 ***  |       |              |
| IQ  | -.070   |       |              |
| ERC-ER Time 2                                   | -.145 *   |       |              |

\*  $p < .05$ ; \*\*\*  $p < .001$

Table 12. Prediction of change in child internalizing behavior problems by child factors

| Variable                     | Outcome: Time 3 CBCL Internalizing Behaviors |       |              |
|------------------------------|--|-------|--------------|
|                              | $\beta$                                      | $R^2$ | $\Delta R^2$ |
| Block 1                      |  | --    |              |
| Block 2                      |  | .400  |              |
| CBCL Internalizing Behaviors | .632 ***                                     |       |              |
| Time 2                       |  |       |              |
| Block 3                      |  | .403  | .003         |
| CBCL Internalizing Behaviors | .627 ***                                     |       |              |
| Time 2                       |  |       |              |
| IQ                           | .052   |       |              |
| Block 4                      |  | .433  | .030 *       |
| CBCL Internalizing Behaviors | .529 ***                                     |       |              |
| Time 2                       |  |       |              |
| IQ                           | .051   |       |              |
| ERC-LN Time 2                | .199 *                                       |       |              |

\*  $p < .05$ ; \*\*\*  $p < .001$

Table 13. Prediction of change in parent-reported emotion dysregulation by parental emotion scaffolding

| Variable   | Outcome: Time 3 Parent Emotion Dysregulation Composite |       |              |
|--|--|-------|--------------|
|  | $\beta$  | $R^2$ | $\Delta R^2$ |
| Block 1  |  | N/A   |              |
| Block 2  |  | .489  |              |
| Time 2 Parent Emotion<br>Dysregulation Composite | .700 ***   |       |              |
| Block 3  |  | .498  | .009         |
| Time 2 Parent Emotion<br>Dysregulation Composite | .673 ***   |       |              |
| IQ   | -.052  |       |              |
| Parent SSIS Time 2                               | -.070  |       |              |
| Block 4  |  | .505  | .006         |
| Time 2 Parent Emotion<br>Dysregulation Composite | .655 ***   |       |              |
| IQ   | -.030  |       |              |
| Parent SSIS Time 2                               | -.085  |       |              |
| Emotion Scaffolding                              | -.083  |       |              |
| Block 5  |  | .530  | .026 *       |
| Time 2 Parent Emotion<br>Dysregulation Composite | .665 ***   |       |              |
| IQ   | -.047  |       |              |
| Parent SSIS Time 2                               | -.077  |       |              |
| Emotion Scaffolding                              | -.047  |       |              |
| Emotion Scaffolding x Parent<br>SSIS Time 2      | -.164 *  |       |              |

<sup>+</sup> p < .10; \* p < .05; \*\*\* p < .001

Table 14. Prediction of change in teacher-reported emotion dysregulation by parental emotion scaffolding

| Variable            | Outcome: Time 3 TRF-EDI |       |              |
|---------------------|-------------------------|-------|--------------|
|                     | $\beta$                 | $R^2$ | $\Delta R^2$ |
| Block 1             |                         | --    |              |
| Block 2             |                         | .091  |              |
| Time 2 TRF-EDI      | .302 *                  |       |              |
| Block 3             |                         | .149  | .058         |
| Time 2 TRF-EDI      | .260 <sup>+</sup>       |       |              |
| IQ                  | .220                    |       |              |
| Teacher SSIS Time 2 | -.275 <sup>+</sup>      |       |              |
| Block 4             |                         | .209  | .059 *       |
| Time 2 TRF-EDI      | .251 <sup>+</sup>       |       |              |
| IQ                  | .314 *                  |       |              |
| Teacher SSIS Time 2 | -.303 <sup>+</sup>      |       |              |
| Emotion Scaffolding | -.258 *                 |       |              |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

<sup>+</sup>  $p < .10$ ; \*  $p < .05$

Table 15. Prediction of change in parent-reported externalizing and internalizing behavior problems by parental emotion scaffolding

| Variable            | Time 3 CBCL Externalizing<br>Problems Composite Score |       |              | Time 3 CBCL Internalizing<br>Problems T-Score |       |              |
|---------------------|---|-------|--------------|---|-------|--------------|
|                     | $\beta$   | $R^2$ | $\Delta R^2$ | $\beta$                                       | $R^2$ | $\Delta R^2$ |
| Block 1             |   | .104  |              | --  | --    |              |
| Child Age           | .269 **   |       |              | --  |       |              |
| Mother's Education  | -.177 <sup>+</sup>                                    |       |              | --  |       |              |
| Block 2             |   | .590  | .486 ***     |   | .390  |              |
| Child Age           | .030  |       |              | --  |       |              |
| Mother's Education  | -.026   |       |              | --  |       |              |
| CBCL Rating Time 2  | .752 ***  |       |              | .625 ***                                      |       |              |
| Block 3             |   | .606  | .016         |   | .412  | .022         |
| Child Age           | -.007   |       |              | --  |       |              |
| Mother's Education  | -.032   |       |              | --  |       |              |
| CBCL Rating Time 2  | .689 ***  |       |              | .576 ***                                      |       |              |
| IQ                  | -.009   |       |              | .077  |       |              |
| Parent SSIS Time 2  | -.147 <sup>+</sup>                                    |       |              | -.157 <sup>+</sup>                            |       |              |
| Block 4             |   | .608  | .002         |   | .416  | .004         |
| Child Age           | -.007   |       |              | --  |       |              |
| Mother's Education  | -.032   |       |              | --  |       |              |
| CBCL Rating Time 2  | .693 ***  |       |              | .574 ***                                      |       |              |
| IQ                  | -.022   |       |              | .092  |       |              |
| Parent SSIS Time 2  | -.141 <sup>+</sup>                                    |       |              | -.163 <sup>+</sup>                            |       |              |
| Emotion Scaffolding | .050  |       |              | -.063   |       |              |
| Block 5             |   | .653  | .045 **      |   | .448  | .032 *       |
| Child Age           | -.019   |       |              | --  |       |              |

|   |                    |                    |
|---|--------------------|--------------------|
| Mother's Education                          | -.017              | --                 |
| CBCL Rating Time 2                          | .678 ***           | .559 ***           |
| IQ  | -.014              | .077               |
| Parent SSIS Time 2                          | -.153 <sup>+</sup> | -.169 <sup>+</sup> |
| Emotion Scaffolding                         | .086               | -.032              |
| Emotion Scaffolding x IQ                    | .139 <sup>+</sup>  | --                 |
| Emotion Scaffolding x<br>Parent SSIS Time 2 | -.198 **           | -.183 *            |

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Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed. The

CBCL Rating Time 2 variable entered is externalizing problems at Time 2 for the first column and internalizing problems at Time 2 for the second column.

<sup>+</sup> p < .10; \* p < .05; \*\* p < .01; \*\*\* p < .001



Table 16. Prediction of change in teacher-reported internalizing and externalizing behavior problems by parental emotion scaffolding

| Variable            | Time 3 TRF Externalizing Problems Composite Score |       |                   | Time 3 TRF Internalizing Problems T-Score |       |                   |
|---------------------|---|-------|-------------------|---|-------|-------------------|
|                     | $\beta$   | $R^2$ | $\Delta R^2$      | $\beta$                                   | $R^2$ | $\Delta R^2$      |
| Block 1             |   | --    |                   |   | --    |                   |
| Block 2             |   | .099  |                   |   | .106  |                   |
| TRF Score Time 2    | .315 *  |       |                   | .326 *                                    |       |                   |
| Block 2             |   | .136  | .037              |   | .186  | .080 <sup>+</sup> |
| TRF Score Time 2    | .268 <sup>+</sup>                                 |       |                   | .377 *                                    |       |                   |
| IQ                  | .174  |       |                   | .339 *                                    |       |                   |
| Teacher SSIS Time 2 | -.227   |       |                   | -.153                                     |       |                   |
| Block 3             |   | .180  | .045 <sup>+</sup> |   | .188  | .057 *            |
| TRF Score Time3 2   | .279 <sup>+</sup>                                 |       |                   | .401 **                                   |       |                   |
| IQ                  | .267  |       |                   | .445 **                                   |       |                   |
| Teacher SSIS Time 2 | -.242   |       |                   | -.166                                     |       |                   |
| Emotion Scaffolding | -.226 <sup>+</sup>                                |       |                   | -.256 *                                   |       |                   |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

<sup>+</sup> p < .10; \* p < .05; \*\* p < .01; \*\*\* p < .001

Table 17. Prediction of change in child social skills by parental emotion scaffolding

| Variable                            | Outcome: Time 3 Parent SSIS  |       |              | Outcome: Time 3 Teacher SSIS |       |              |
|-------------------------------------|------------------------------|-------|--------------|------------------------------|-------|--------------|
|                                     | Social Skills Standard Score |       |              | Social Skills Standard Score |       |              |
|                                     | $\beta$                      | $R^2$ | $\Delta R^2$ | $\beta$                      | $R^2$ | $\Delta R^2$ |
| Block 1                             |                              | .036  |              | --                           |       |              |
| Child Age                           | -.190 <sup>+</sup>           |       |              |                              |       |              |
| Block 2                             |                              | .411  | .375 ***     | .198                         |       |              |
| Child Age                           | .071                         |       |              | --                           |       |              |
| Social Skills Time 2                | .666 ***                     |       |              | .445 ***                     |       |              |
| Block 3                             |                              | .418  | .007         | .218                         | .020  |              |
| Child Age                           | .070                         |       |              | --                           |       |              |
| Social Skills Time 2                | .645 ***                     |       |              | .348 *                       |       |              |
| IQ                                  | .084                         |       |              | .172                         |       |              |
| Block 4                             |                              | .432  | .014         | .246                         | .028  |              |
| Child Age                           | .075                         |       |              | --                           |       |              |
| Social Skills Time 2                | .655 ***                     |       |              | .355 *                       |       |              |
| IQ                                  | .054                         |       |              | .097                         |       |              |
| Emotion Scaffolding                 | .121                         |       |              | .181                         |       |              |
| Block 5                             |                              | .434  | .002         | .256                         | .010  |              |
| Child Age                           | .086                         |       |              | --                           |       |              |
| Social Skills Time 2                | .663 ***                     |       |              | .352 *                       |       |              |
| IQ                                  | .046                         |       |              | .080                         |       |              |
| Emotion Scaffolding                 | .112                         |       |              | .170                         |       |              |
| Stimulation of Social Understanding | .051                         |       |              | .103                         |       |              |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed. Social Skills Time 2 is Parent SSIS Social Skills score in first column and Teacher SSIS Social Skills score in second column

<sup>+</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 18. Prediction of change in child emotion dysregulation by parent emotion questions

| Variable                     | Outcome: Time 3 Parent Emotion<br>Dysregulation Composite |       |              | Outcome: Time 3 TRF EDI |       |              |
|------------------------------|---|-------|--------------|-------------------------|-------|--------------|
|                              | $\beta$   | $R^2$ | $\Delta R^2$ | $\beta$                 | $R^2$ | $\Delta R^2$ |
| Block 1                      |   | --    |              |                         | --    |              |
| Block 2                      |   | .490  |              |                         | .090  |              |
| Emotion Dysregulation Time 2 | .700 ***  |       |              | .300 *                  |       |              |
| Block 3                      |   | .499  | .009         |                         | .146  | .056         |
| Emotion Dysregulation Time 2 | .674 ***  |       |              | .264 <sup>+</sup>       |       |              |
| IQ                           | -.054   |       |              | .229                    |       |              |
| Social Skills Time 2         | -.069   |       |              | -.268 <sup>+</sup>      |       |              |
| Block 4                      |   | .529  | .030 *       |                         | .154  | .008         |
| Emotion Dysregulation Time 2 | .634 ***  |       |              | .270 <sup>+</sup>       |       |              |
| IQ                           | -.005   |       |              | .263                    |       |              |
| Social Skills Time 2         | -.083   |       |              | -.274 <sup>+</sup>      |       |              |
| Emotion Questions Ratio      | -.183 *   |       |              | -.093                   |       |              |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

Emotion Dysregulation Time 2 is the parent emotion dysregulation composite at Time 2 in the first column and the TRF EDI at Time 2 in the second column.

Social Skills Time 2 is the Parent SSIS Social Skills score in the first column and the Teacher SSIS Social Skills score in the second column

<sup>+</sup> p < .10; \* p < .05; \*\* p < .01; \*\*\* p < .001

## Figures

Figure 1. Interaction between parent emotion scaffolding and child social skills in predicting change in parent-reported emotion dysregulation

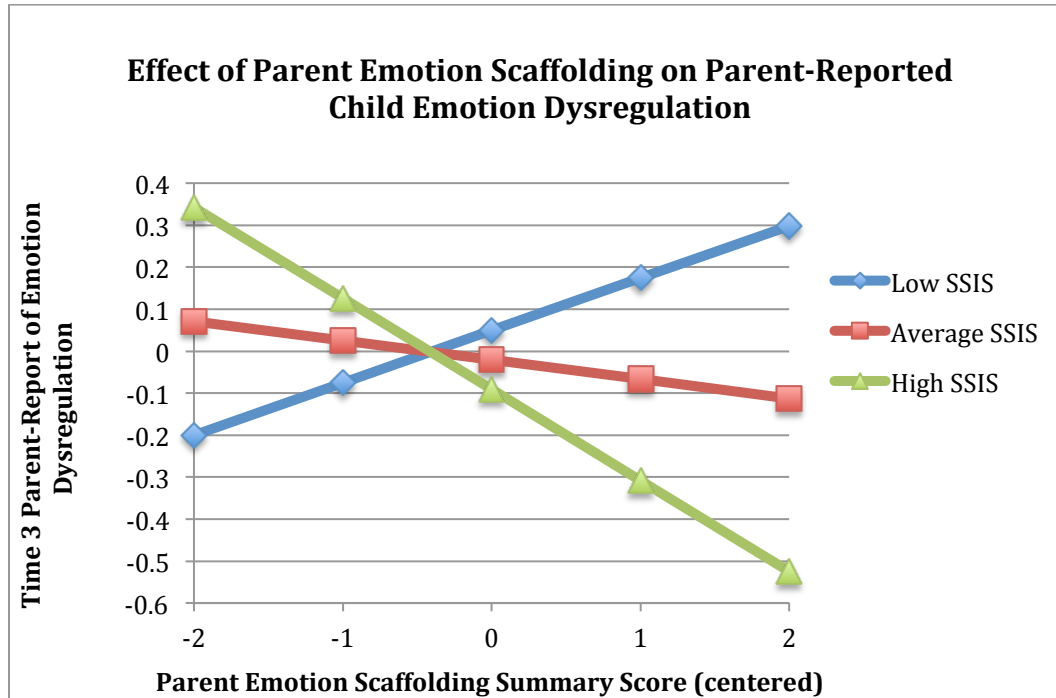


Figure 2. Interaction between parent emotion scaffolding and child social skills in predicting change in parent-reported externalizing behavior problems

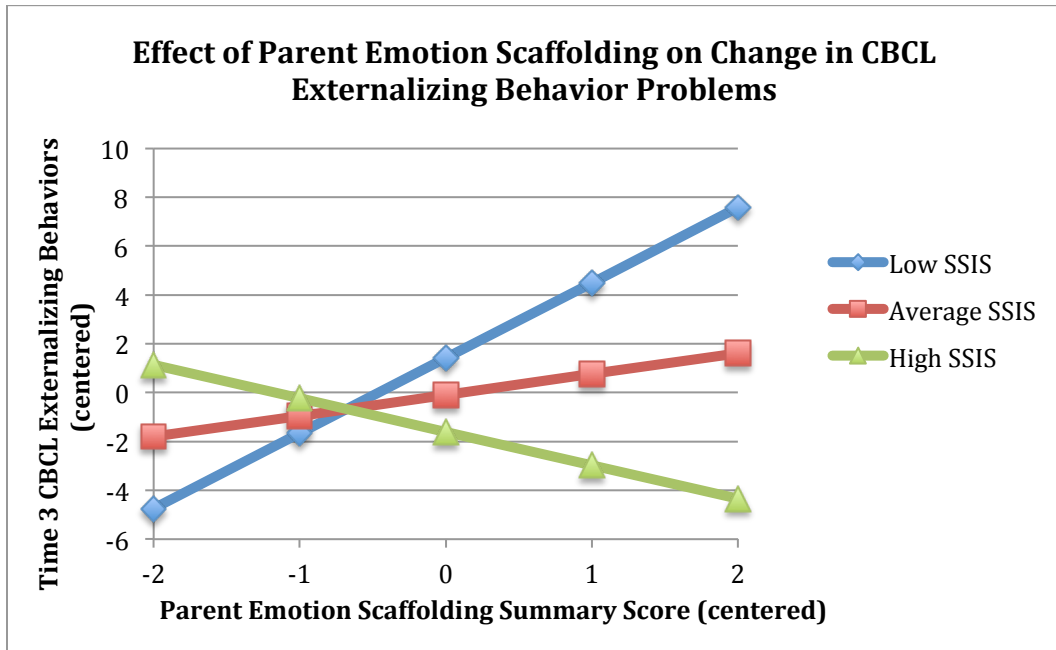


Figure 3. Interaction between parent emotion scaffolding and child social skills in predicting change in parent-reported internalizing behavior problems

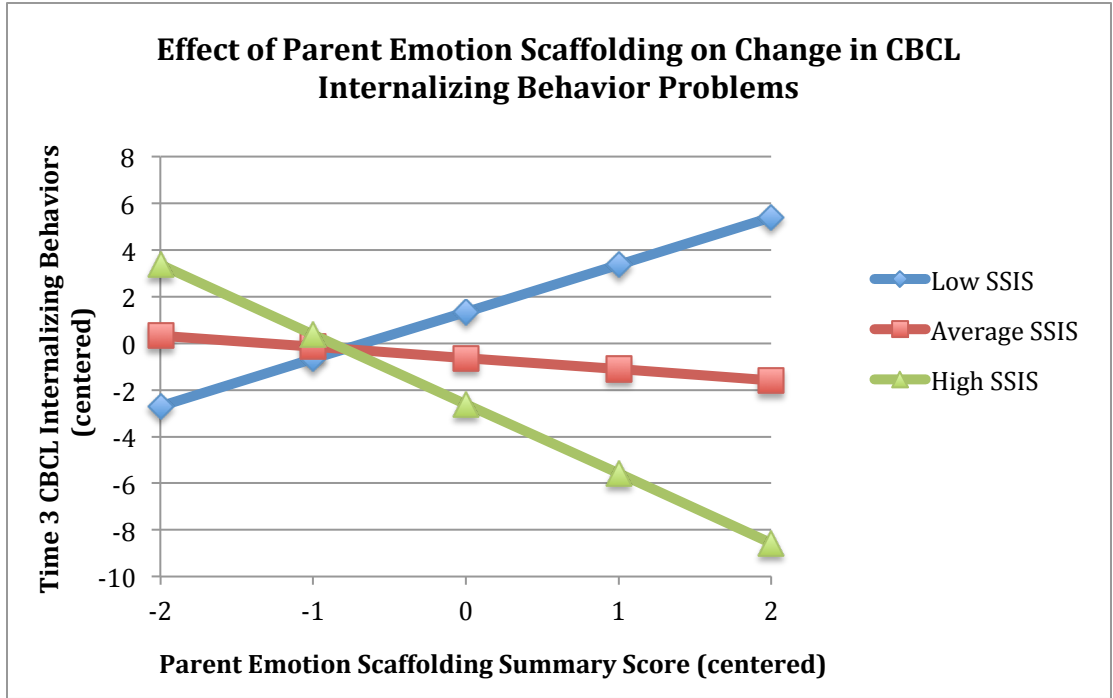
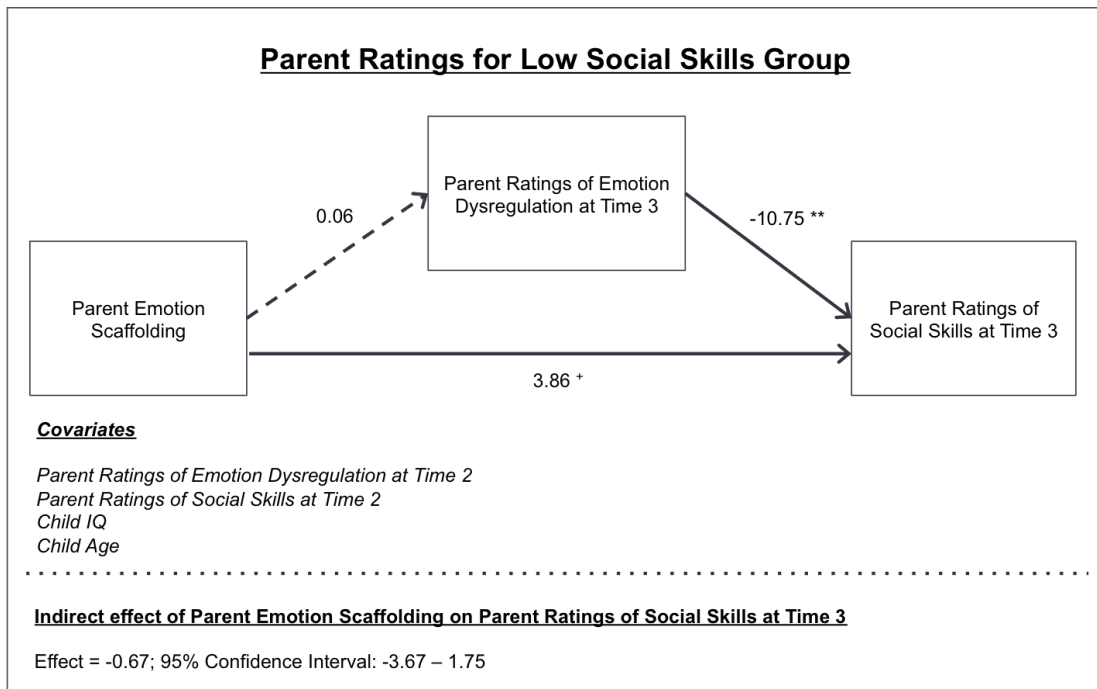


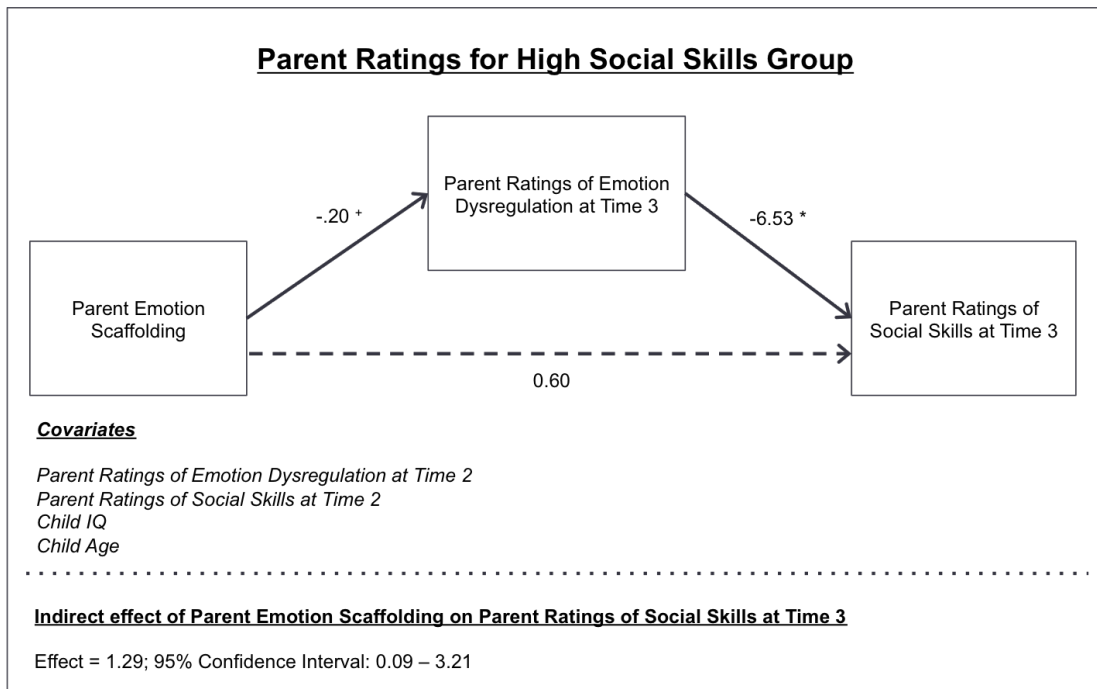
Figure 4. Analysis of indirect pathway of parental emotion scaffolding on parent-rated social skills for low social skills group



Note: Pathways that are not significant at a minimum of  $p < .10$  are indicated via a dashed line

<sup>+</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Figure 5. Analysis of indirect pathway of parental emotion scaffolding on parent-rated social skills for high social skills group

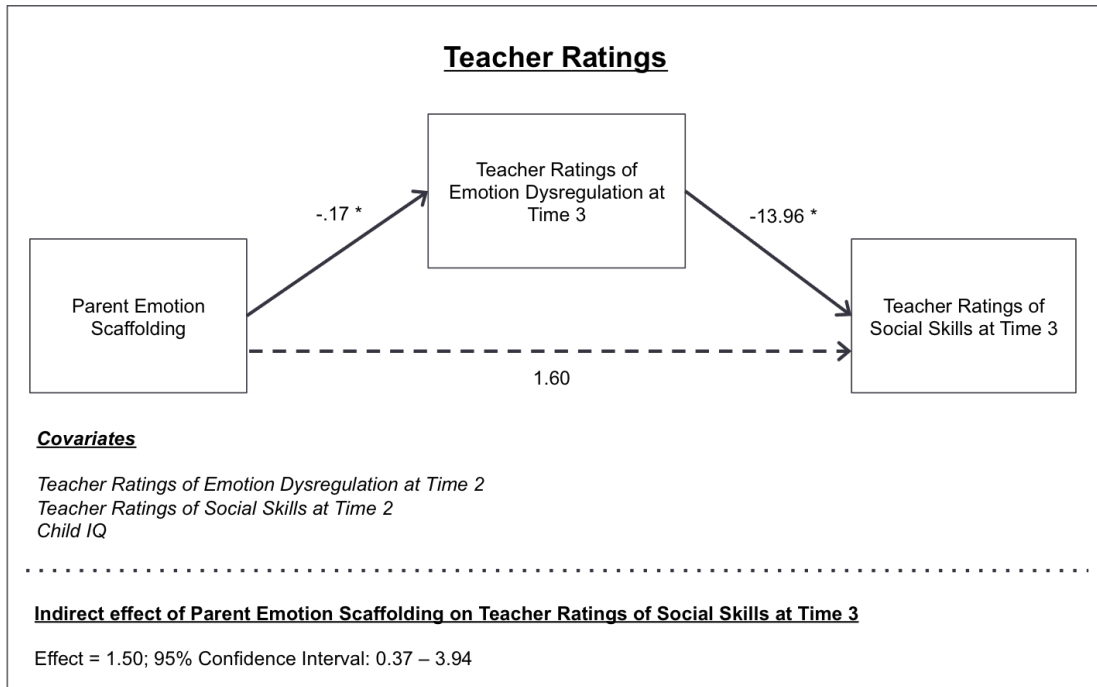


Note: Pathways that are not significant at a minimum of  $p < .10$  are indicated via a dashed line

<sup>+</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$



Figure 6. Analysis of indirect pathway of parental emotion scaffolding on teacher-rated social skills



Note: Pathways that are not significant at a minimum of  $p < .10$  are indicated via a dashed line

<sup>+</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

## Appendix A

### Measures Collected in the Smooth Sailing Study

|   | Eligibility Visit           | Time 1 Visit         | Time 2 Visit           | Time 3 Visit           |
|---|-----------------------------|----------------------|------------------------|------------------------|
|   | Wave 1:<br>Summer/Fall 2011 | Wave 1:<br>Fall 2011 | Wave 1:<br>Spring 2012 | Wave 1:<br>Winter 2013 |
|   | Wave 2:<br>Summer/Fall 2012 | Wave 2:<br>Fall 2012 | Wave 2:<br>Spring 2013 | Wave 2:<br>Winter 2014 |
|   | Wave 3:<br>Summer/Fall 2013 | Wave 3:<br>Fall 2013 | Wave 3:<br>Spring 2014 | Wave 3:<br>Winter 2015 |
| <b>Participant Characterization</b>     |                             |                      |                        |                        |
| Cognitive Ability (WPPSI)               | <u>X</u>                    |                      |                        |                        |
| Autism Diagnosis Verification (ADOS)    | <u>X</u>                    |                      |                        |                        |
| <b>Parent Interview/Questionnaires</b>  |                             |                      |                        |                        |
| Demographics and Family Background      | <u>X</u>                    | <u>X</u>             | <b>(Update)</b>        | <b>(Update)</b>        |
| Interview                               |                             | X                    | X                      | X                      |
| Language/Communication (CCC)            | X                           |                      |                        | X                      |
| Autism Symptoms (SRS)                   |                             | <u>X</u>             |                        |                        |
| Behavior Problems (CBCL)                |                             | X                    | <u>X</u>               | <u>X</u>               |
| Social Skills (SSIS)                    |                             | X                    | <u>X</u>               | <u>X</u>               |
| Emotion Regulation (ERC)                |                             |                      | <u>X</u>               | <u>X</u>               |
| Parent-Teacher Involvement Scale (PTIS) |                             | X                    | X                      | X                      |
| <b>Teacher Questionnaires</b>           |                             |                      |                        |                        |
| Behavior Problems (TRF)                 |                             | X                    | <u>X</u>               | <u>X</u>               |
| Social Skills (SSIS)                    |                             | X                    | <u>X</u>               | <u>X</u>               |
| Academic Engagement Scale (AES)         |                             | X                    | X                      | X                      |
| Student-Teacher Relationship (STRS)     |                             | X                    | X                      | X                      |
| Parent-Teacher Involvement Scale (PTIS) |                             | X                    | X                      | X                      |

|                                   | Eligibility Visit           | Time 1 Visit         | Time 2 Visit           | Time 3 Visit           |
|-----------------------------------|-----------------------------|----------------------|------------------------|------------------------|
|                                   | Wave 1:<br>Summer/Fall 2011 | Wave 1:<br>Fall 2011 | Wave 1:<br>Spring 2012 | Wave 1:<br>Winter 2013 |
|                                   | Wave 2:<br>Summer/Fall 2012 | Wave 2:<br>Fall 2012 | Wave 2:<br>Spring 2013 | Wave 2:<br>Winter 2014 |
|                                   | Wave 3:<br>Summer/Fall 2013 | Wave 3:<br>Fall 2013 | Wave 3:<br>Spring 2014 | Wave 3:<br>Winter 2015 |
| Classroom Climate Survey          |                             | X                    |                        | X                      |
| Teacher Strategies Questionnaire  |                             | X                    |                        | X                      |
| Teacher's Beliefs                 |                             | X                    |                        | X                      |
| Literacy Abilities (WJ-A)         |                             |                      |                        |                        |
| Letter-Word Naming                |                             | X                    | X                      | X                      |
| Reading Fluency                   |                             | X                    | X                      | X                      |
| Reading Comprehension             |                             |                      | X                      | X                      |
| Nonsense Word Reading             |                             | X                    | X                      | X                      |
| Picture Vocabulary                |                             | X                    | X                      | X                      |
| Emerging Literacy Skills (DIBELS) |                             |                      |                        |                        |
| DIBELS Subtests (based on grade)  |                             | X                    | X                      | X                      |
| Spoken Language Abilities (CASL)  |                             |                      |                        |                        |
| Basic Concepts                    |                             | X                    |                        | X                      |
| Syntax                            |                             | <u>X</u>             |                        | X                      |
| Pragmatic Language                |                             | <u>X</u>             |                        | X                      |
| Parent-Child Interaction Tasks    |                             |                      |                        |                        |
| Free Play Task                    |                             | X                    |                        |                        |
| Picture-Book Reading Task         |                             |                      | <u>X</u>               | <u>X*</u>              |
| Kindle Reading Task               |                             |                      |                        | X                      |

\* The Picture Book Reading Task will be administered to a subset of subjects at Time 3, to allow for analyses of stability and change in the construct of parental emotion scaffolding over time, as well as more clearly assess effects of this strategy on child behavior.

Notes:  Bolded & underlined measures will be used in the dissertation study

Wave 3 participants were not included in the dissertation study, as data from Wave 3 Time 3 were not available for analyses.

## Appendix B

### **Emotion Scaffolding Coding System**

Smooth Sailing Project- Time 2 Visit

Parent-Child Shared Literacy Task

Duration: 8 minutes

The purpose of this coding system is to capture the ways in which parents talk with children about emotions during a storybook reading task. The underlying assumption is that the strategies that parents use during this task to teach their children about emotions will also be carried out during other daily activities they complete with their children. As social and emotional functioning is impaired among children with autism spectrum disorders (ASD), gaining a better understanding of how parents try to promote their children's development in these areas could have major implications for developing more effective parent- and school-based treatment programs. In particular, we are interested in how the parent helps the child to recognize and understand others' emotions, through discussing or modeling the emotions of the characters in the books.

With this in mind, the main focus of this coding system is to capture both parent and child verbalizations about emotions or emotional experiences during the shared literacy task. Each emotion-related verbalization made by the parent will be coded on a four-point scale for the quality of the scaffolding provided for the child's emotional understanding (ranging from low to advanced levels of scaffolding). Parent verbalizations might include statements such as labeling emotional states or emotional behaviors, explaining emotional experiences to the child, asking the child to label or explain emotions of the characters, or helping the child to understand emotions by connecting something in the book to the child's life experiences.

In order to provide information about the effectiveness of the parent's attempts to scaffold the children's understanding (i.e., whether the parents' questions result in a meaningful response from the child or more use of emotion-related terms), as well as provide an observational measure of the child's current level of emotional understanding, children's emotion-related verbalizations or responses to the parents' scaffolding will also be coded.

Each verbalization made by the child will be coded on a three-point scale for the quality and spontaneity of the child's statements (ranging from a simple response to the parent's question to an independent initiation of an emotional topic).

At the end of the coding, data from this system will consist of a frequency count of each level of emotion-related statement or response from both the parent and the child. Global codes will be calculated by computer algorithms to form profiles of parental emotion scaffolding based on various combinations of these frequency counts.

In addition to these frequency counts for emotion-related comments, coders will provide several global codes. One code will rate the parent's overall level of emotional expressivity during the task. This global code will help differentiate parents who may speak in a flat and relatively unexpressive tone of voice from parents who use a lot of emotional variation when speaking with their child. This will allow for exploratory analyses regarding the importance of emotional expressivity in conjunction with emotion-centered discourse or explicit teaching provided by parents. A second code will rate level of dyadic engagement, in order to determine the portion of the task in which the parent and child are mutually engaged in reading or related conversations. Lastly, parents will be coded on the level of social scaffolding or stimulation provided during the interaction, as both emotion scaffolding and social scaffolding may influence children's social development.

Lastly, as emotion-related discussions may systematically differ whether the observer is in the room with the dyad or in a separate room, the coders will note whether or not a live observer was present during the interaction.

#### Decision Rules for Coding:

Segmenting consecutive comments: One emotion-related comment is defined as a comment made by the parent referencing an emotion or emotion-related behavior. If two statements about emotions are made in a row, they should be separated by a child response, a page-turn (i.e., a different picture being discussed), 2-3 seconds of silence (i.e., a notable pause), or 2-3 seconds of unrelated talk to count as two separated emotion-related comments. (For example, repetition by labeling the same emotion for several characters will often count as one comment by these

rules). Comments referencing different emotions experienced by two or more characters should also be segmented into separate comments, even if they are consecutive (i.e., not separated by silence, unrelated talk, or a child comment; e.g., “Look the boy is happy. But his mom, dad, and sister are all mad at him.”). Otherwise, count consecutive comments as one emotion-related comment. When coding consecutive statements as one emotion-related comment, rate the overall comment to reflect the highest level of emotion scaffolding used (e.g., if a parent uses a low-level and moderate-level approach consecutively, count the overall comment as moderate).

- E.g., “He’s feeling angry. And I think he may be feeling a bit sad since he’s left out.” – would count as one comment if said consecutively without 3 seconds in between, and bump up to the moderate level since the parent ends up talking about mixed emotions.

The following types of comments will not be coded or counted in the frequency of emotion-related comments:

- Comments about the plot or other descriptives not related to emotions (e.g., “What color is the frog?” or “What are they going to do next?” or “What is he going to order?”)
- Interjections in response to the plot (e.g., “Oh no!” “Oh my goodness,” or gasps), if not connected to an emotional experience in the book or designed to just move the plot along / solely accompany a page turn. However, these interjections may be included in the global rating of parent expressiveness.
- Comments solely about mental states (e.g., wanting, wishing, hoping, thinking: “Did he want the frog to come to dinner with him?”). Liking and loving also do not count if referencing an object preference.
- Comments that are not connected to a clear emotional state (e.g., that’s silly, that’s crazy, she’s weird, that’s funny). Comments such as “having fun” or “having a good time” would typically not count if it is not tied into an emotional experience, though it could count toward the social understanding global code.

## PARENT EMOTION-CENTERED SCAFFOLDING CATEGORY CODING

**Labels:** Labels refer to a category of comments that provides a word for an emotion or draws the child's attention to the emotion or emotion-related behavior without further explanation or clarification. Labels help provide vocabulary for the child, but do not provide any information as to what the emotion really is or how it interacts with other aspects of the story. Examples include:

- Noting a character's feelings without further explanation or clarification
  - E.g., "The boy looks kind of sad now."
- Noting a character's emotion-related behavior without further explanation or clarification
  - E.g., "And look, she screamed!"
- Exclamations that reflect a clear underlying emotion
  - E.g., "Yay!"
- Labeling an emotion, with "huh" or "do they" at the end of the statement if it is clear the parent does not expect a response.
  - E.g., "The boy is happy, huh," or "They look mad, don't they."
- Nonverbally expressing affect mirrored in the book (coded as a label-moderate)
  - E.g., "[surprised face]"

**Explanations:** Explanations typically include labels of emotions or emotion-related behaviors (or reference to the emotion in some way) with an explanation in some way. The parent may define the emotion to the child, help connect the emotions to the plot or character's behaviors, discuss details about emotional states, etc. Examples include:

- Describing the causes or reasons behind the emotions or emotion-related behavior
  - E.g., "He's so sad because he can't find his frog."
  - E.g., "The waiter was angry because he didn't want a frog in his restaurant."
- Describing consequences of emotions
  - E.g., "The dad was so mad that he yelled at the boy and sent him to his room."
  - E.g., "The frog felt bad that everybody was angry at him."

**Questions:** Questions include ways in which the parents attempt to elicit information from the child about emotions or emotion-related behaviors. Examples include:

- Asking the child to identify the emotions of characters
  - E.g., "Do you think he's sad or happy?"
  - E.g., "How do you think he's feeling?"
  - E.g., "And this boy is feeling...?"
- Asking the child to identify the causes/consequences of emotions
  - E.g., "Why do you think he's feeling sad now?"
  - E.g., "Why do you think the lady screamed?"
  - E.g., "How did the boy feel after he got yelled at?"



*Note: If multiple categories are used consecutively, code each one separately regardless of how they are segmented for quality coding (e.g., if parent provides a question and then a label, code as both label and question categories, even though the two may be combined under the quality ratings).*

*If the same category is used consecutively within one comment as segmented for quality coding, do not count categories separately (e.g., two labels in a row, captured as a low level code, will count as one label).*

## PARENT EMOTION-CENTERED SCAFFOLDING QUALITY CODING

- **Low level approaches:** Examples of low level emotion-centered approaches include:
  - *Labeling emotional states* (e.g., “He’s happy/sad/angry/afraid/confused”)
  - *Labeling behaviors that reflect emotional states* (e.g., “he’s crying/laughing/having a fit”). Note: “yelling” or “screaming” may be coded here if the context indicates that the parent is yelling or screaming at another person in a manner referencing anger or other emotions. If the context indicates solely dialogue (e.g., “she’s yelling that there’s a frog”), do not count as an emotion-related comment. Note: “Laughing at” counts under social stimulation as teasing/bullying, but not as an emotion-related behavior. “Angry at” remains as a low level if there is no additional explanation.
  - *Explicatives reflecting emotional states* (e.g., “yuck,” or “yay”), or *emotional reactions to the book’s plot that reflect a clear emotional state* (e.g., comments such as “oh my goodness” if it is clearly describing a character feeling shocked)
  - *Comments referencing “like” or “love”* can be included here but should refer to a person or character as the object of the emotion rather than an object preference (e.g., “The boy likes the frog,” counts as an emotion comment, but “The boy likes peanut butter,” does not)
  - *Comments about parent’s own emotions* (e.g., “I’m getting frustrated that you’re not sitting down,” or “I really like this frog.”)
  - *Explaining or asking questions about emotion-related behaviors* without labeling the emotion itself, by connecting behaviors to the plot (e.g., “He cried. He missed his frog.”)
  - *Confirmations of the child’s emotion-related response* by providing positive feedback (e.g., “Yes”) or repeating the child’s statements (even if the repetition would otherwise be a moderate response). Confirmation of a child’s simple yes/no response would not be sufficient to be coded.
  - *Efforts to draw attention to characters for the purpose of discussing emotions without explicitly drawing attention to the faces* (e.g., and now look at this character... [pause to have child label])

- **Moderate level approaches:** Examples of moderate level approaches include:
  - Explaining emotional states (e.g., further describing what an emotional word means by connecting behaviors/plot to emotional states, such as “The little frog is mad because the big frog is so mean to him” or “He’s smiling so he’s happy now”)
  - Asking child to identify emotional states or behaviors with reference to emotional experiences (e.g., “How do you think he’s feeling?” “Do you think he’s happy?” “How does the boy look? [geared to emotions]” “Show me who’s sad.” “He’s angry... what do you think he’ll do?”)
  - Nonverbally expressing affect mirroring the book (e.g., clearly acting out a character’s emotional expression).
  - Comments that explain the possibility of mixed emotions (e.g., “He’s feeling sad and angry”; “She’s happy but also a bit confused”).
  - If parents talk about the child’s own emotional experiences during the task, this provides a level of connecting emotional states to the child’s current experiences and should be coded here (e.g., “You look like you’re feeling really sad right now”).
  - Efforts to draw child’s attention to the facial expressions (globally, not with details of expressions) (e.g., “He’s feeling sad. Look at his face.”)
  
- **High level approaches:** Examples of high level approaches of scaffolding the child’s understanding of emotions include:
  - Asking child to identify clues that indicate emotional states (e.g., “What makes you think that he’s sad?” or “How can you tell that he’s happy?”)
  - Making significant efforts to help child understand an emotional state by drawing the child’s attention to details to help him/her accurately recognize emotions (e.g., “Look again, his eyebrows are going down which tells us that he’s angry”).
  - Asking the child to explain emotional states (e.g., “Why do you think he’s crying?” or “Why did the lady fall out of her chair?”)

- **Advanced level approaches:** Advanced level approaches must help connect the child's understanding of the emotional experiences in the book to *the child's own experiences*. Examples include:
  - Talking about the *child's own past experiences* (e.g., "Remember last week when you were upset just like the little boy in story?")
  - Helping the *child put himself in the character's shoes* by thinking about his/her own emotional response to the story's characters or actions (e.g., "How do you think you would feel in that situation?" or "If you saw a bear, would you be scared?").

## PARENT EXPRESSIVENESS GLOBAL SCALE

- **0** = Parent reads book with flat affect. The parent never or rarely uses animation in her voice.
  
- **1** = Parent uses some animation in her voice but is still notably flat throughout much of the interaction. May include some moments of enthusiasm to keep child interested, variation in pitch, or a few interjections (e.g., “Oh no!” or “Oh my goodness!”) in response to the plot, but these instances of animation are sparsely used throughout the interaction. Parent may only use one or two modes of animation while reading (e.g., only tone of voice, but no facial expressions, or vice versa).
  
- **2** = Parent uses an average level of animation in her voice, without any prolonged times of being flat or unexpressive. Parent appropriately varies pitch throughout the reading and exhibits enthusiasm and interjections at appropriate times to convey times of increased activity in the book. Parent uses several modes of animation (e.g., tone of voice, facial expressions, interjections). Animated moments may be interspersed with rare moments of flat affect or expressiveness (e.g., may warm up as the story begins). A “2” parent could also be somewhat expressive throughout the interaction (i.e., the parent is consistently expressive through both tone of voice and another mode of animation, but parent does not seem to be overtly expressive).
  
- **3** = Parent is notably and overtly animated and expressive (above-average) throughout the reading. Parent consistently uses high variation in pitch, facial expressions, physical movements, and tone of voice to indicate excitement or other emotions in the book. Parent frequently engages with the child through taking on character voices, directing facial expressions, etc. Parent uses a lot of animation and responsiveness when reading, including gasps or interjections. Parent’s animation may increase significantly during times of increased activity in the book.

## PARENT STIMULATION OF SOCIAL UNDERSTANDING GLOBAL SCALE

This scale measures the degree to which the parent tries to foster the child's understanding of typical social relationships and/or ability to take the perspective of others. A stimulating parent typically takes advantage of interactions as opportunities to teach the child social norms, help the child think about social interactions, or learn ways to view the ways others may be thinking. The focus is on the amount and intensity of activities that may ultimately enhance children's social development directly. Behaviors that characterize social stimulation within a picture book reading task include:

- Social Relationships:
  - Family member roles: e.g., "This is the little boy. And this is the mom, dad, and sister."
  - Social/occupational roles: e.g., "The man is all dressed up in the suit and taking their order. He must be the waiter," or "The frog keeps being mean. He's a bully."
  - Friendships: e.g., "Look, the frog is his new friend."
- Discussion of social norms and behaviors:
  - Comment on appropriateness of behaviors: nice/mean (e.g., "Is it nice to bite the little frog?"), silly, strict, messy
  - Restaurant rules: e.g., dress up in a restaurant, quiet voices, no animals
  - Describing social interactions: e.g., playing ("They're going to have an adventure. He's the pirate and he's pretending..."), greeting/saying goodbye
  - Consequences for inappropriate behavior: time out/go to room for misbehavior, describing why they're getting kicked out of the restaurant
- Perspective taking/mental states:
  - Cognitions: e.g., thinking/hoping/wanting/wondering (e.g., "What is the boy thinking?" "What is the boy going to say?" (weaker, b/c can be plot-focused), "He's wondering why his saxophone isn't working.")
  - Preference: liking/loving objects (e.g., "The frog likes music," "The lady likes salad.")
  - Awareness: knowing/not knowing (e.g., "Does the boy know the frog's in his pocket?")
- Connections to child's real life:
  - Any of the above statements with a clear connection to the child's past experiences or own cognitions/preferences/etc.

Behavior-management strategies are not included as learning opportunities, unless the parent is discussing the child's appropriate behavior in a broader context (e.g., it's respectful to listen to the story; it's not okay to hit other people).

### Stimulation of Social Understanding Ratings

- **0** = Non-stimulating -- The parent makes no attempt to teach the child about social relationships. She/he may make up a plot to go along with the story, but does not include language that is clearly meant as an opportunity for the child to learn social skills or social cognition.
- **1** = Minimally stimulating -- The parent's purposeful attempts to engage the child in ways that would develop their social understanding are limited overall (e.g., may only include a few instances of stimulation, or instances that are not well-targeted to the child's current abilities).
- **2** = Moderately stimulating -- The parent makes some clear efforts to provide stimulation of social understanding, but this is limited in frequency, variety, or appropriateness to the child's current level of functioning (e.g., only during some portions of the interaction). The parent may engage in numerous instances of teaching the child about social interactions, but these instances are likely to be repeated rather than varied and original (e.g., a parent may frequently use words such as "nice" and "mean," but displays minimal use of other strategies to enhance children's social understanding). Similarly, a parent could be moderately stimulating by using several different strategies, but applying these sparsely throughout the interaction.
- **3** = Highly stimulating -- The parent makes significant efforts to stimulate the child's social understanding. The parent uses frequent and varied approaches to teach these concepts to the child, such as describing social relationships, connecting the book to the child's own experiences, or describing/inquiring about the perspective of characters in the book. Stimulation of the child's social development appears to be one of the parent's main goals in the interaction.

## DYADIC ENGAGEMENT GLOBAL SCALE

- **0** = Parent and child are rarely engaged together in the book-reading task or related conversation. Nearly all of the time within the 8-minute task (i.e., approximately 6 minutes or longer) is spent either engaging in behavioral management strategies to get the child to sit next to the parent/attend to the book, or the parent gives up and allows the child to roam around the room or talk about an unrelated topic (note: topics that are branched off of the book would not count here). The parent may choose to read for some or all of the time, but the child is clearly not paying attention as evidenced by child's location in relationship to the parent or child's behavior during the task.
  
- **1** = Parent and child display some engagement together in the book-reading task, but large portions of time (e.g., up to several 1-2 minute segments) are spent disengaged as described above. Parent and child should be able to read some pages together during the task, but these pages are either interspersed with significant disengagement or the child only attends for part of the task (e.g., the first 4 minutes).
  
- **2** = Parent and child are largely engaged together in the book-reading task overall, but small portions of time throughout the task are spent disengaged (e.g., for behavioral management, redirection of a special interest). This code should be used for a dyad in which the child appears to be an inattentive child overall, but the parent is able to successfully use behavioral management strategies to keep the child engaged throughout most of the task. Alternatively, this code may be given to a child who is generally attentive, but may become distracted for small portions of the activity. In this case, the child (or parent) is able to re-engage the child in the task.
  
- **3** = Parent and child are engaged together in the task for nearly the entire 8-minute segment. Any disengagement should be very brief (e.g., the child asking if he/she could be done), and the child is able to quickly re-engage with the task. The child is attentive to the book, and the conversation between the parent and child is related to the task throughout the segment.



## CHILD EMOTION-BASED COMMENTS CODING

- **Prompted Response:** Child responds to a direct prompt or question from parent, such as the parent asking how a character is feeling, giving the child a choice of emotions to choose from, or telling the child to label or demonstrate an emotion. This code may also be used if the child indicates affirmation of a label provided by the parent or simply repeats an emotion label from the parent.
  - E.g., Mom: “Is he happy or sad?” Child: “Happy.”
  - E.g., Mom: “How does he feel?” Child: “Happy.”
  - E.g., Mom: “Do you think he’s sad?” Child: “Yes.”
  - E.g., Mom: “Show me happy.” Child: [demonstrates smile]
  - E.g., Mom: “He’s happy.” Child: “Yeah.” [if not solely a rote/repetitive response]
  - E.g., Mom: “She’s scared.” Child: “Scared...” [if not purely echolalic]
- **Elaboration:** Parent is talking about emotions or may ask the child a question about emotions immediately before the child comments about an emotion, but child’s response provides more than a direct answer to parent’s prompt or question. The child may label an emotion without being directly asked (e.g., the child describes the emotion of a character that the parent points to in the process of the storytelling, or talks about a different character’s emotions than the one a parent mentions), may explain the causes behind an emotion, or ask a question about an emotion the mom labels, etc. Note: an elaboration can be coded on a separate coding line, if the elaboration is an additional comment in response to a previous parent emotion-related comment (e.g., child first answers with prompt “Happy,” then when the mom confirms child elaborates by asking, “Why is he happy?”).
  - E.g., Mom: “Look, he’s happy.” Child: “No, he looks sad.”
  - E.g., Mom: “I wonder what he’s thinking.” Child: “He’s feeling sad because he misses the boy.”
  - E.g., Mom: “Look, this boy’s sad.” Child: “And the mom is happy.”
  - E.g., Mom: “Look, he’s happy.” Child: “Why is he happy?”
- **Initiation:** Child comments or asks about an emotion when the parent has not been talking about emotions or prompting the child to respond about emotions in any way (e.g., labeling emotions, asking questions, pointing to faces, etc.). Child may also make this comment when the parent hasn’t been talking at all in the last several moments of the narrative.
  - E.g., Mom: “They’re all going to dinner.” Child: “And the boy is happy!”
  - E.g., Mom: [not talking recently]. Child: “Is the mom mad?”

## SUMMARY CODES

### **Parent emotion scaffolding 7-point rating scale**

- 0 = Never or rarely discusses emotions during course of interactions. May have up to 7 instances of low level approaches to emotion discourse and/or up to one instance of a moderate level approach to emotion discourse. No high/advanced approaches.
- 1 = Extensive (8+) use of low-level emotion-based approaches and/or some (2-7) moderate-level approaches. No high/advanced approaches.
- 2 = Frequent (8-12) use of moderate-level approaches and/or one instances of high/advanced approaches to emotion discourse.
- 3 = Extensive (13+) use of moderate-level approaches and/or two instances of high/advanced approaches.
- 4 = Frequent (3+) use of high/advanced approaches.

### **Child emotion understanding 5-point rating scale**

- 0 = Child never responds to the parents attempts at emotion scaffolding or initiates any emotion-centered verbalizations. Child may or may not appear to attend to many of the parent's attempts.
- 1 = Child exhibits 1-2 *prompted responses* to a parent's emotion-based comment, but does not exhibit any emotion-based elaborations or initiations.
- 2 = Child exhibits 3 or more prompted responses or 1-2 elaborations (with or without prompted responses), but not does initiate any emotion-based comments.
- 3 = Child displays 3 or more elaborations (with or without prompted responses), or 1-2 initiations of emotion-based comments.
- 4 = Child exhibits extensive emotional understanding, including 3 or more initiations of emotion-based comments.

## Appendix C

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CBCL Emotion Dysregulation Index (EDI) items from Samson et al. (2014) – based on CBCL 6-18

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- #3 – argues a lot
- #11 – clings to adults or too dependent
- #14 – cries a lot
- #18 – deliberately harms self or attempts suicide
- #20 – destroys his/her own things
- #21 – destroys things belonging to his/her family or others
- #37 – gets in many fights
- #45 – nervous, highstrung, or tense
- #50 – too fearful or anxious
- #57 – physically attacks people
- #68 – screams a lot
- #86 – stubborn, sullen, or irritable
- #87 – sudden changes in mood or feelings
- #91 – talks about killing self
- #95 – temper tantrums or hot temper
- #97 – threatens people
- #103 – unhappy, sad, or depressed
- #112 – worries

| <u>Revised CBCL-EDI (6-18 version)</u>  | <u>Revised CBCL-EDI (1½-5 version)</u>   |
|---|--|
| <ul style="list-style-type: none"> <li>#3 – argues a lot</li> <li>#11 – clings to adults or too dependent</li> <li>#14 – cries a lot</li> <li>#20 – destroys his/her own things</li> <li>#21 – destroys things belonging to his/her family or others</li> <li>#37 – gets in many fights</li> <li>#45 – nervous, highstrung, or tense</li> <li>#50 – too fearful or anxious</li> <li>#57 – physically attacks people</li> <li>#68 – screams a lot</li> <li>#86 – stubborn, sullen, or irritable</li> <li>#87 – sudden changes in mood or feelings</li> <li>#95 – temper tantrums or hot temper</li> <li>#97 – threatens people</li> <li>#103 – unhappy, sad, or depressed</li> <li>#112 – worries</li> </ul> | <ul style="list-style-type: none"> <li>#15 – defiant (parallel to “argues a lot”)</li> <li>#10 – clings to adults or too dependent</li> <li>#13 – cries a lot</li> <li>#17 – destroys his/her own things</li> <li>#18 – destroys things belonging to his/her family or other children</li> <li>#35 – gets in many fights</li> <li>#47 – nervous, highstrung, or tense</li> <li>#87 – too fearful or anxious</li> <li>#53 – physically attacks people</li> <li>#66 – screams a lot</li> <li>#81 – stubborn, sullen, or irritable</li> <li>#82 – sudden changes in mood or feelings</li> <li>#85 – temper tantrums or hot temper</li> <li>#40 – hits others (parallel to “threatens people”)</li> <li>#90 – unhappy, sad, or depressed</li> <li>#99 - worries</li> </ul> |

Internal Consistency

| CBCL-EDI 6-18           | TRF-EDI 6-18            | CBCL-EDI 1½-5           | TRF-EDI 1½-5            |
|-------------------------|-------------------------|-------------------------|-------------------------|
| Time 1: $\alpha = .851$ | Time 1: $\alpha = .851$ | Time 1: $\alpha = .828$ | Time 1: $\alpha = .851$ |
| Time 2: $\alpha = .869$ | Time 2: $\alpha = .869$ | Time 2: $\alpha = .821$ | Time 2: $\alpha = .869$ |
| Time 3: $\alpha = .873$ | Time 3: $\alpha = .873$ | Time 3: $\alpha = .860$ | Time 3: $\alpha = .873$ |

Test-Retest Reliability

- 
- CBCL-EDI Time 1 to 2:  $r = .770, p < .001$  (n=102)
  - CBCL-EDI Time 2 to 3:  $r = .614, p < .001$  (n=102)
  - TRF-EDI Time 1 to 2:  $r = .839, p < .001$  (n=71)
  - TRF-EDI Time 2 to 3:  $r = .365, p = .002$  (n=69)
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## Appendix D

### Part III Preliminary Analyses – Predicting Child Functioning at Time 2 and Time 3, *Without Predicting Change*

In examining the influence of parental emotion scaffolding on child behavior, initial hierarchical regressions were completed to assess the extent to which parental emotion scaffolding explained variability in child functioning at Time 2 (the same time-point as the measurement of parental emotion scaffolding) and at Time 3 (9-10 months later). In order to explore interactions, all predictor variables were centered to the mean of the sample. Variables were entered into the hierarchical regression in the following blocks for regressions predicting child emotion dysregulation and child behavior problems: (1) Demographic covariates, if relevant; (2) Child IQ and child social skills; (3) Parent emotion scaffolding; (4) Two- and three-way interactions between parental emotion scaffolding, child IQ and child social skills. Variables were entered into the hierarchical regression in the following blocks for regressions predicting child social skills: (1) Demographic covariates, if relevant; (2) Child IQ; (3) Parent emotion scaffolding; (4) Parental stimulation of social understanding global code; (5) Two- and three-way interactions between parental emotion scaffolding, parental stimulation of social understanding, and child IQ. Non-significant interactions were dropped from the final models.

#### *Parental emotion scaffolding in relation to child emotion dysregulation*

For *parent-reported emotion dysregulation* (see Appendix D, Table 1), children's ED at *Time 2* related to children's IQ and social skills, in that lower IQ and higher social skills related to lower ED. In addition, there was a marginally significant relationship with parental emotion scaffolding ( $p = .056$ ), in that parents of children with lower ED engaged in higher levels of

parental emotion scaffolding. In predicting children's ED at *Time 3*, higher Time 2 social skills related to lower ED. In addition, above and beyond the influence of IQ and social skills, higher parental emotion scaffolding at Time 2 predicted lower child ED at Time 3.

For *teacher-reported emotion dysregulation* (see Appendix D, Table 2), children's ED at Time 2 related to child social skills, but not parental emotion scaffolding. In predicting children's ED at *Time 3*, lower IQ and higher child social skills at Time 2 predicted lower ED 9-10 months later. In addition, above and beyond the influence of IQ and social skills, higher parental emotion scaffolding at Time 2 predicted lower child ED at Time 3.

#### *Parental emotion scaffolding in relation to child behavior problems*

For *parent-reported externalizing behaviors* (see Appendix D, Table 3a), only child social skills related to externalizing symptoms at *Time 2*, in that children with higher social skills were rated as having fewer externalizing behaviors. In predicting externalizing behaviors at *Time 3*, an interaction between parental emotion scaffolding and child social skills was a significant predictor of child externalizing behaviors (see Appendix D, Figure 1). For children with high social skills, more parental emotion scaffolding related to lower externalizing behaviors at Time 3. However, for children with low social skills, more parental emotion scaffolding related to higher externalizing behaviors at Time 3.<sup>10</sup> For *parent-reported internalizing behaviors* (see Appendix D, Table 3b), only higher family income and higher social skills related to lower internalizing symptoms at *Time 2*. In predicting internalizing behaviors at *Time 3*, an interaction between parental emotion scaffolding and child social skills was also a significant predictor of internalizing symptoms, with effects in the same direction as for externalizing symptoms described above (see Appendix D, Figure 2).

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<sup>10</sup> Simple effects assessed by running the regression with groups of children with low, moderate, and high social skills (divided into three equal groups) did not reach significance, likely due to limited power with these smaller samples.

*For teacher-reported externalizing problems* (see Appendix D, Table 4a), children's externalizing symptoms at both *Time 2* and *Time 3* was related only to children's social skills, in that children with higher social skills were rated to have fewer externalizing behaviors. For *teacher-reported internalizing behaviors* (see Appendix D, Table 4b), children's internalizing symptoms at *Time 2* was related only to social skills, in that children with higher social skills were rated to have fewer internalizing behaviors. Internalizing problems at *Time 3* were predicted by both IQ and social skills, such that children with lower IQ and higher social skills were rated to have fewer internalizing behaviors. Additionally, parental emotion scaffolding was a marginally significant predictor of *Time 3* internalizing symptoms, such that higher levels of parental emotion scaffolding predicted lower internalizing behaviors.

#### *Parental emotion scaffolding in relation to child social skills*

For *parent-reported social skills* (see Appendix D, Table 5), parents reported higher social skills for younger children and girls at *Time 2*. Higher IQ also related to higher social skills at *Time 2*, but the key parenting variable were unrelated to child social skills. At *Time 3*, there were no significant predictors of parent-reported social skills. For *teacher-reported social skills* (see Appendix D, Table 6), children with higher IQ were rated as having higher social skills at *Time 2* and *Time 3*. No other variable examined related to children's social skill levels, including the key parenting variables.

#### *Type of parental emotion scaffolding comments in relation to child emotion dysregulation*

Neither the ratio of parent emotion labels nor the ratio of parent emotion explanations significantly predicted child ED at *Time 2* or *Time 3* as rated by parents or teachers after accounting for child IQ and child social skills. In contrast, the ratio of parent emotion questions did significantly predict child ED as rated by parents, but not teachers. For *parent-reported ED*

(see Appendix D, Table 7a), the ratio of parent emotion questions was marginally related to child ED at *Time 2* and significantly related to child ED at *Time 3*, such that parents who asked a higher proportion of emotion-related questions had children with lower levels of ED, after accounting for child IQ and child social skills.



Appendix D, Table 1. Relationship between parental emotion scaffolding and parent-reported emotion dysregulation at Time 2 and Time 3

| Variable            | Outcome: Time 2 Parent Emotion Dysregulation Composite |       |                   | Outcome: Time 3 Parent Emotion Dysregulation Composite |       |              |
|---------------------|--|-------|-------------------|--|-------|--------------|
|                     | $\beta$  | $R^2$ | $\Delta R^2$      | $\beta$  | $R^2$ | $\Delta R^2$ |
| Block 1             |  | --    |                   |  | --    |              |
| Block 2             |  | .206  |                   |  | .139  |              |
| IQ                  | .176 <sup>+</sup>                                      |       |                   | .066   |       |              |
| Parent SSIS Time 2  | -.468 ***  |       |                   | -.385 ***  |       |              |
| Block 3             |  | .237  | .031 <sup>+</sup> |  | .178  | .039 *       |
| IQ                  | .219 *   |       |                   | .113   |       |              |
| Parent SSIS Time 2  | -.482 ***  |       |                   | -.401 ***  |       |              |
| Emotion Scaffolding | -.182 <sup>+</sup>                                     |       |                   | -.202 *  |       |              |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

<sup>+</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*\*  $p < .001$

Appendix D, Table 2. Relationship between parental emotion scaffolding and teacher-reported emotion dysregulation at Time 2 and Time 3

| Variable            | Outcome: Time 2 TRF-EDI |       |              | Outcome: Time 3 TRF-EDI |       |              |
|---------------------|-------------------------|-------|--------------|-------------------------|-------|--------------|
|                     | $\beta$                 | $R^2$ | $\Delta R^2$ | $\beta$                 | $R^2$ | $\Delta R^2$ |
| Block 1             |                         | --    |              |                         | --    |              |
| Block 2             |                         | .235  |              |                         | .098  |              |
| IQ                  | -.174                   |       |              | .173                    |       |              |
| Teacher SSIS Time 2 | -.361 **                |       |              | -.367 *                 |       |              |
| Block 3             |                         | .235  | .000         |                         | .159  | .061*        |
| IQ                  | -.176                   |       |              | .270 <sup>+</sup>       |       |              |
| Teacher SSIS Time 2 | -.361 **                |       |              | -.392**                 |       |              |
| Emotion Scaffolding | .006                    |       |              | -.262*                  |       |              |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

<sup>+</sup> p < .10; \* p < .05; \*\* p < .01; \*\*\* p < .001

Appendix D, Table 3. Relationship between parental emotion scaffolding and parent-reported behavior problems at Time 2 and Time 3

| a) Externalizing Behavior Problems |           |       |              |           |       |              |
|------------------------------------|-----------|-------|--------------|-----------|-------|--------------|
|                                    | Time 2    |       |              | Time 3    |       |              |
|                                    | $\beta$   | $R^2$ | $\Delta R^2$ | $\beta$   | $R^2$ | $\Delta R^2$ |
| Block 1                            |           | .145  |              |           | .323  |              |
| Child Age                          | .302 **   |       |              | .269 **   |       |              |
| Family Income                      | -.214 *   |       |              | --        |       |              |
| Mother's Education                 | --        |       |              | -.177 +   |       |              |
| Block 2                            |           | .302  | .157 ***     |           | .522  | .169 ***     |
| Child Age                          | .129      |       |              | .098      |       |              |
| Family Income                      | -.152     |       |              | --        |       |              |
| Mother's Education                 |           |       |              | -.157 +   |       |              |
| IQ                                 | -.009     |       |              | -.013     |       |              |
| Parent SSIS Time 2                 | -.436 *** |       |              | -.442 *** |       |              |
| Block 3                            |           | .305  | .003         |           | .523  | .000         |
| Child Age                          | .126      |       |              | .098      |       |              |
| Family Income                      | -.147     |       |              | --        |       |              |
| Mother's Education                 | --        |       |              | -.157 +   |       |              |
| IQ                                 | .006      |       |              | -.016     |       |              |
| Parent SSIS Time 2                 | -.442 *** |       |              | -.441 *** |       |              |
| Emotion Scaffolding                | -.059     |       |              | .012      |       |              |
| Block 4                            |           | --    | --           |           | .579  | .062 *       |
| Child Age                          | --        |       |              | .079      |       |              |
| Family Income                      | --        |       |              | --        |       |              |
| Mother's Education                 | --        |       |              | -.144     |       |              |
| IQ                                 | --        |       |              | .005      |       |              |



Appendix D, Table 4. Relationship between parental emotion scaffolding and teacher-reported behavior problems at Time 2 and Time 3

| a) Externalizing Behavior Problems |           |       |              |                    |       |                   |
|------------------------------------|-----------|-------|--------------|--------------------|-------|-------------------|
|                                    | Time 2    |       |              | Time 3             |       |                   |
|                                    | $\beta$   | $R^2$ | $\Delta R^2$ | $\beta$            | $R^2$ | $\Delta R^2$      |
| Block 1                            |           | --    |              |                    | --    |                   |
| Block 2                            |           | .336  |              |                    | .092  |                   |
| IQ                                 | -.192     |       |              | .107               |       |                   |
| Teacher SSIS Time 2                | -.444 *** |       |              | -.347 *            |       |                   |
| Block 3                            |           | .339  | .002         |                    | .133  | .041              |
| IQ                                 | -.175     |       |              | .193               |       |                   |
| Teacher SSIS Time 2                | -.447 *** |       |              | -.367 *            |       |                   |
| Emotion Scaffolding                | -.050     |       |              | -.216              |       |                   |
| b) Internalizing Behavior Problems |           |       |              |                    |       |                   |
|                                    | Time 2    |       |              | Time 3             |       |                   |
|                                    | $\beta$   | $R^2$ | $\Delta R^2$ | $\beta$            | $R^2$ | $\Delta R^2$      |
| Block 1                            |           | --    |              |                    | --    |                   |
| Block 2                            |           | .215  |              |                    | .084  |                   |
| IQ                                 | -.100     |       |              | .284 <sup>+</sup>  |       |                   |
| Teacher SSIS Time 2                | -.397 **  |       |              | -.317 *            |       |                   |
| Block 3                            |           | .220  | .004         |                    | .128  | .044 <sup>+</sup> |
| IQ                                 | -.124     |       |              | .373 *             |       |                   |
| Teacher SSIS Time 2                | -.393 **  |       |              | -.338 *            |       |                   |
| Emotion Scaffolding                | .070      |       |              | -.225 <sup>+</sup> |       |                   |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

<sup>+</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Appendix D, Table 5. Relationship between parental emotion scaffolding and parent-reported social skills at Time 2 and Time 3

| Variable                            | Outcome: Time 2 Parent SSIS Social Skills Standard Score |       |              | Outcome: Time 3 Parent SSIS Social Skills Standard Score |       |              |
|-------------------------------------|--|-------|--------------|--|-------|--------------|
|                                     | $\beta$  | $R^2$ | $\Delta R^2$ | $\beta$  | $R^2$ | $\Delta R^2$ |
|                                     | Block 1  |       | .246         |  |       | .032         |
| Child Age                           | -.361 ***  |       |              | -.179 <sup>+</sup>                                       |       |              |
| Child Gender                        | -.304 **   |       |              | --   |       |              |
| Block 2                             |  | .286  | .040 *       |  | .077  | .045 *       |
| Child Age                           | -.344 ***  |       |              | -.173 <sup>+</sup>                                       |       |              |
| Child Gender                        | -.290 **   |       |              | --   |       |              |
| IQ                                  | .201 *   |       |              | .212 *   |       |              |
| Block 3                             |  | .289  | .003         |  | .090  | .013         |
| Child Age                           | -.345 ***  |       |              | -.173 <sup>+</sup>                                       |       |              |
| Child Gender                        | -.288 **   |       |              | --   |       |              |
| IQ                                  | .215 *   |       |              | .186 <sup>+</sup>  |       |              |
| Emotion Scaffolding                 | -.057  |       |              | .118   |       |              |
| Block 4                             |  | .303  | .013         |  | .090  | .000         |
| Child Age                           | -.364 ***  |       |              | -.174 <sup>+</sup>                                       |       |              |
| Child Gender                        | -.284 **   |       |              | --   |       |              |
| IQ                                  | .231 *   |       |              | .187 <sup>+</sup>  |       |              |
| Emotion Scaffolding                 | -.036  |       |              | .120   |       |              |
| Stimulation of Social Understanding | -.121  |       |              | -.011  |       |              |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

<sup>+</sup> p < .10; \* p < .05; \*\* p < .01; \*\*\* p < .001

Appendix D, Table 6. Relationship between parental emotion scaffolding and teacher-reported social skills at Time 2 and Time 3

| Variable                            | Outcome: Time 2 Teacher SSIS |       |              | Outcome: Time 3 Teacher SSIS |       |              |
|-------------------------------------|------------------------------|-------|--------------|------------------------------|-------|--------------|
|                                     | Social Skills Standard Score |       |              | Social Skills Standard Score |       |              |
|                                     | $\beta$                      | $R^2$ | $\Delta R^2$ | $\beta$                      | $R^2$ | $\Delta R^2$ |
| Block 1                             |                              | --    |              |                              | --    |              |
| Block 2                             |                              | .357  |              |                              | .119  |              |
| IQ                                  | .597 ***                     |       |              | .346 **                      |       |              |
| Block 3                             |                              | .359  | .002         |                              | .124  | .005         |
| IQ                                  | .610 ***                     |       |              | .324 **                      |       |              |
| Emotion Scaffolding                 | -.044                        |       |              | .071                         |       |              |
| Block 4                             |                              | .361  | .002         |                              | .140  | .016         |
| IQ                                  | .600 ***                     |       |              | .317 **                      |       |              |
| Emotion Scaffolding                 | -.050                        |       |              | .051                         |       |              |
| Stimulation of Social Understanding | .050                         |       |              | .127                         |       |              |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

<sup>+</sup>  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Appendix D, Table 7. Relationship between emotion questions and child emotion dysregulation at Time 2 and Time 3

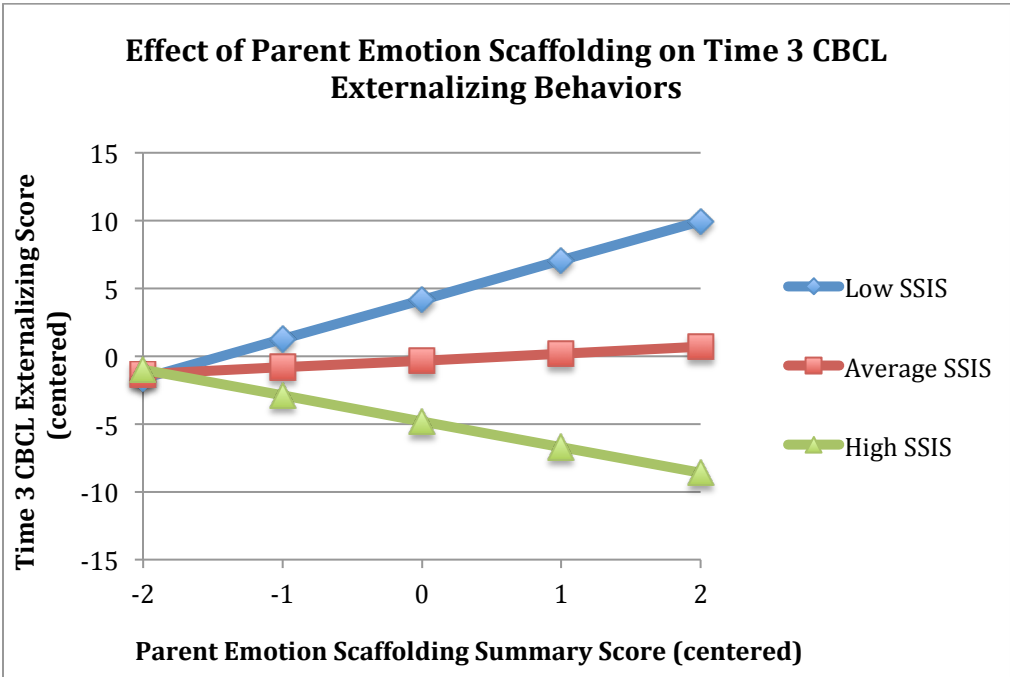
| a) Parent-reported emotion dysregulation  |                      |       |                   |                      |       |                    |
|---|----------------------|-------|-------------------|----------------------|-------|--------------------|
| Variable                                  | Time 2               |       |                   | Time 3               |       |                    |
|   | $\beta$              | $R^2$ | $\Delta R^2$      | $\beta$              | $R^2$ | $\Delta R^2$       |
| Block 1                                   |                      | --    |                   |                      | --    |                    |
| Block 2                                   |                      | .197  |                   |                      | .135  |                    |
| IQ  | .159 <sup>+</sup>    |       |                   | .053                 |       |                    |
| Parent SSIS Time 2                        | -.457 <sup>***</sup> |       |                   | -.377 <sup>***</sup> |       |                    |
| Block 3                                   |                      | .230  | .032 <sup>+</sup> |                      | .220  | .085 <sup>**</sup> |
| IQ  | .203 <sup>*</sup>    |       |                   | .123                 |       |                    |
| Parent SSIS Time 2                        | -.453 <sup>***</sup> |       |                   | -.370 <sup>***</sup> |       |                    |
| Emotion Questions Ratio                   | -.185 <sup>+</sup>   |       |                   | -.300 <sup>**</sup>  |       |                    |
| b) Teacher-reported emotion dysregulation |                      |       |                   |                      |       |                    |
| Variable                                  | Time 2               |       |                   | Time 3               |       |                    |
|   | $\beta$              | $R^2$ | $\Delta R^2$      | $\beta$              | $R^2$ | $\Delta R^2$       |
| Block 1                                   |                      | --    |                   |                      | --    |                    |
| Block 2                                   |                      | .235  |                   |                      | .093  |                    |
| IQ  | -.173                |       |                   | .182                 |       |                    |
| Teacher SSIS Time 2                       | -.360 <sup>**</sup>  |       |                   | -.363 <sup>*</sup>   |       |                    |
| Block 3                                   |                      | .245  | .010              |                      | .105  | .012               |
| IQ  | -.171                |       |                   | .222                 |       |                    |
| Teacher SSIS Time 2                       | -.341 <sup>*</sup>   |       |                   | -.371 <sup>*</sup>   |       |                    |
| Emotion Questions Ratio                   | .101                 |       |                   | -.116                |       |                    |

Note: dashes represent that a particular variable/block was not relevant for the outcome measure listed.

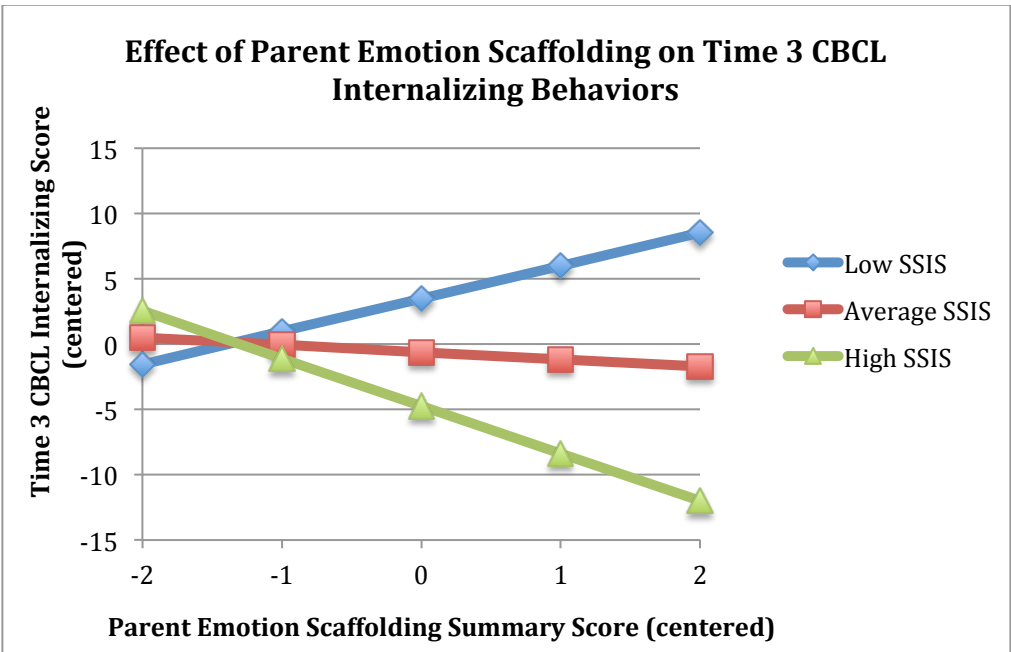
<sup>+</sup>  $p < .10$ ; <sup>\*</sup>  $p < .05$ ; <sup>\*\*</sup>  $p < .01$ ; <sup>\*\*\*</sup>  $p < .001$



Appendix D, Figure 1. Interaction between parent emotion scaffolding and child social skills in predicting Time 3 parent-reported externalizing behavior problems



Appendix D, Figure 2. Interaction between parent emotion scaffolding and child social skills in predicting Time 3 parent-reported internalizing behavior problems



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