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PARENT BEHAVIORS IN RELATION TO CHARACTERISTICS OF YOUNG
CHILDREN WITH AUTISM SPECTRUM DISORDERS

BY

AMY C. LAURENT

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR A DEGREE OF

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UNIVERSITY OF RHODE ISLAND

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DOCTOR OF PHILOSOPHY DISSERTATION
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ABSTRACT

Emotional self-regulation (ESR) challenges are well documented in the developmental profiles of children with Autism Spectrum Disorder (ASD); however, less is known about the development of ESR and the role of parents in ESR development for this population. This study explored the associations between diagnostically significant characteristics of children with ASD (i.e., social communication profile and sensory processing abilities) and parent behaviors associated with development of a child's ESR.

Participants were 37 children previously diagnosed with ASD and their parents recruited throughout Southern New England. The children's ages ranged between 30-48 months. The study was a cross sectional design involving observations of parent-child dyads in their home environment during naturalistic routines: free play, social communication assessment, and snack. Observations were video recorded for subsequent coding using combined event/ time sampling procedures. Parent behaviors included physical engaging and helping, language-based engaging and helping, redirection/distraction, vocal comfort, physical comfort, language-based comfort, emotional following, and active ignoring. Children's social communication abilities were assessed using the Communication Symbolic Behavior Scales- Developmental Profile (Wetherby & Prizant, 2002) and their sensory processing abilities were assessed using the Sensory Processing Measure – Preschool Home form (Ecker & Parham, 2010). A demographic questionnaire was also completed by the parent.

Results indicate that parents engaged in all of the behaviors hypothesized to be associated with ESR development during the observations but to varying degrees. Parents most frequently used physical engaging and helping, and language engaging and helping behaviors, while behaviors associated with comfort were infrequent and active ignoring was rare. Children's social communicative abilities were associated with parent engagement such that children with high levels of social communication had parents who used more parent language engaging and helping and less physical engaging and helping, redirection/distraction, and physical comfort. Overall, no parent behaviors were associated with child sensory processing abilities. These findings were fairly consistent across activities studied in the research protocol although some variations were noted.

Future research should explore additional aspects of the interactions by examining the transactions between child emotional state and parent behavior response. Delineation of specific parent behaviors could also serve to further the understanding of the particular qualities of parent behaviors that are most supportive of child ESR development. Understanding the interactive processes between parents and children with ASD has implications for the development of targeted parent-based interventions that increase child ESR capabilities and in turn decrease the secondary burdens and long term difficulties posed by ESR challenges for this population.

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DEDICATION

To my mother and father, for their unwavering support and belief in my ability to accomplish meaningful goals, as well as to make meaningful contributions to the lives of others.

And, especially, to my father who taught me to persevere.

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CHAPTER 1

Introduction

Overview

Emerging research suggests that emotional self-regulation (ESR), poses significant challenges for children diagnosed with Autism Spectrum Disorders (ASD), a neurodevelopmental disorder characterized by impairments in social communication, the presence of repetitive and stereotyped patterns of behavior, and sensory processing deficits (Konstantareas & Stewart, 2006; Nader-Grosbois & Mazzone, 2014; Samson et al., 2014). ESR refers to a developmental capacity which enables an individual's ability to monitor, evaluate, and modify their emotional state and arousal level to maintain engagement and accomplish objectives (Cole, Martin, & Dennis, 2004; Fox, 1994; Gulsrud, Jahromi, & Kasari, 2010; Kopp, 1982). These skills are essential for participating in daily activities, forming relationships, and engaging in positive social interactions (National Research Council and Institute of Medicine, 2000). In typical development, ESR abilities become increasingly complex as children's cognitive, language, and attentional skills develop, and as children experience responsive interactions with parents (Hubley & Trevarthen, 1979; Kochanska, Murray, & Harlan, 2000; Kopp, 1982; National Research Council and Institute of Medicine, 2000; Tronick, 2002). Characteristics consistent with challenges in ESR, such as difficulties managing emotions, inhibiting reactions, delaying gratification, and tolerating transitions, are frequently associated with ASD (American Psychiatric Association,

2013; Baron, Groden, Groden, & Lipsitt, 2006; DeGangi, 2000; National Research Council, 2001)

Parental behavior has been associated with ESR development for typically developing children (Morales, Mundy, Crowson, Neal, & Delgado, 2005; Saarni, 1998; Sanders & Mazzucchelli, 2013). For example, parents who respond to their child's emotional dysregulation by validating their child's emotional experience, labeling their emotional expression, and/or remediating frustrating circumstances have children who utilize more sophisticated ESR (Eisenberg & Sulik, 2012; Spinrad, Eisenberg, & Gaertner, 2007; Tronick, 2002). Parents of typically developing children differentially engage in behaviors associated with supporting child ESR (e.g., helping, redirection, verbal comfort, and physical comfort) during interactions based upon their child's age and related cognitive abilities. For example, as typically developing toddlers age, parents' use of physical behaviors to support engagement has been found to decrease while their use of verbal behaviors increases. Likewise, parents' use of active strategies, such as hand over hand assistance, decreases as they begin to provide more time and opportunity for their children to problem solve challenging situations independently (Grolnick, Kurowski, McMenamy, Rivkin, & Bridges, 1998).

In addition to age, children's behavioral and developmental characteristics influence parental behaviors associated with supporting ESR. For example, parents of children who are described as having difficult temperaments, displaying frequent, intense emotional distress, have mothers who engage in more redirection of attention and provide more reassurance than parents of children who demonstrate less distress (Grolnick et al., 1998). Similar associations have been found among children

diagnosed with ASD. In a study of children 21-36 months of age diagnosed with ASD, the association between externalizing problem behaviors, such as aggression, and parental regulatory strategies was examined. During play, parents of ASD children who demonstrated higher levels of externalizing behaviors, utilized more prompting and redirection, and physical comfort as compared to parents of ASD children who demonstrated low levels of externalizing behaviors (Gulsrud et al., 2010). The associations between behavioral characteristics of children diagnosed with ASD such as social communication and sensory processing abilities and parent behaviors associated with supporting ESR have not been previously studied.

Statement of the Problem

The development of a child's ESR is influenced by the behaviors parents engage in during daily interactions. Children diagnosed with ASD have significant social communicative deficits and sensory processing differences which have the potential to impact parent behaviors. Therefore, exploring the relationship between ASD specific child behavioral characteristics and parents' engagement in behaviors associated with supporting ESR is an important area of inquiry.

Significance of the Study

To date, associations examining social communication and sensory processing abilities, and parent regulatory behaviors have not been explored. Child social communication and sensory processing abilities have been critically linked to child ESR capabilities and are likely to influence behaviors parents engage in during daily interaction (Norona & Baker, 2014; Sameroff & Fiese, 1990; Zimmerman, 2000). Given the importance of the parental role in supporting the development of ESR

(Kopp, 1989; Sameroff & Fiese, 1990; Tronick, 2002), understanding parental behaviors in relation to child characteristics is an important area of inquiry in the study of ASD. Additional knowledge linking child characteristics and parent behaviors that are theoretically supportive of the development of ESR could help to further our understanding of the ESR challenges seen in children diagnosed with ASD and factors influencing the development of these challenges. Likewise, findings illustrating the relationship between child characteristics and parent behaviors could help to inform future family-mediated interventions targeting the development of ESR for young children diagnosed with ASD.

Purpose of the Study

The purpose of the study was to examine the association between behavioral characteristics of young children diagnosed with ASD and their parents' engagement in behaviors which have been previously associated with the development of a child's ESR.

Research question 1.

Are the social communication abilities of young children diagnosed with ASD associated with parent behaviors that are supportive of the development of child ESR?

Research question 2.

Are the sensory processing abilities of young children diagnosed with ASD associated with parent behaviors that are supportive of the development of child ESR?

CHAPTER 2

Review of the Literature

Overview of Emotional Self-Regulation (ESR)

Emotional self-regulation (ESR) refers to a variety of developmental abilities and intentional behaviors which serve to help an individual shift physiological arousal level, modulate emotional state, and modify attentional focus, all in an effort to meet social expectations, maintain engagement, and accomplish objectives (Cole et al., 2004; Eisenberg & Spinrad, 2004; Fox, 1994; Grolnick, Bridges, & Connell, 1996; Kopp, 1982; Thompson, 1994). Emotional regulation is a developmental construct, which implies that a child's skills and capacities are influenced by the child's cognitive and physical development and maturation, as well as scaffolded through modeling and direct teaching by others (Thompson, 1994; Tronick, 2002; Zimmerman, 2000). As a child's ESR abilities increase in breadth and depth so does their ability to navigate challenges independently. (Grolnick, Kurowski, McMenamy, Rivkin, & Bridges, 1998; National Research Council, 2000).

The principle function of ESR is attainment and maintenance of emotional and arousal states that support engagement and learning (Fox, 1994). ESR enables individuals to use regulatory strategies to shift emotion or arousal states to meet the demands of social and physical environments. The match between internal physiological states and environmental demands is often referred to as a well-

regulated state. An individual experiences emotion dysregulation when this adaptive shift of emotion and arousal level does not occur, resulting in an arousal level that is either too high or too low to engage in the social or physical environment (Eisenberg et al., 2003; Rothbart & Bates, 1998).

Effective and efficient age-appropriate ESR abilities have been critically linked to positive social-emotional development in early childhood and to pro-social engagement, social competence, and desirable academic outcomes in later childhood (Eisenberg, Spinrad, & Eggum, 2010; Kopp, 1982; McClelland & Cameron, 2012; Spinrad et al., 2006; Trentacosta & Shaw, 2009; Tronick, 2002). Conversely, deficits in age-appropriate ESR abilities (e.g., difficulties resulting in heightened physiological reactivity, unmodulated emotion, and poor impulse control) are associated with reactive aggression and externalizing behaviors throughout childhood (White, Jarrett, & Ollendick, 2012).

Development of ESR

ESR abilities develop rapidly in early childhood and continue to mature into adulthood (Eisenberg et al., 2010; Eisenberg & Sulik, 2012). It is understood that burgeoning ESR abilities are influenced by development and maturation, as well as interactions with the social and physical environment (Thompson, 1994; Tronick, 2002).

Children are born with a bio-behavioral drive for homeostasis and regulation (Fox, 1994). However, infants have very few strategies available to them to help regulate their arousal level, emotional state, and attention. In general, infants are born with reflexive abilities that serve a regulatory function. These include gaze aversion, a

non-nutritive suck, and sleep. The utility of these strategies is limited in terms of supporting engagement; therefore, infants require frequent assistance with regulation from parents and caregivers (Fox, 1994). In an effort to support infants' regulation, parents typically respond to signals of dysregulation (e.g., crying and vocalizing) by employing respondent mutual regulatory strategies (e.g., physical help, redirection, comfort, etc.) (Tronick, 2002). These strategies provide infants opportunities to experience new regulatory means in supportive interactive relationships. Repeated interactions with parents scaffolding regulatory development paired with increasing developmental abilities (e.g., motor skills, communicative abilities, and social cognitive awareness) support a child's ability to learn, integrate, and utilize new, more sophisticated and socially conventional ESR strategies in his or her behavioral profile which can be employed to soothe, distract, self-comfort, delay gratification, and problem solve (Grolnick et al., 1996; Zimmerman, 2000). This cycle of interactive support, child development, and acquisition of new ESR strategies continues throughout childhood, eventually leading to a child's ability to initiate intentional requests for regulatory assistance and to continue refinement of socially appropriate ESR abilities based on feedback given by the child's social partners.

Children typically exhibit the ability to utilize their expanding ESR abilities for the function of intentional behavioral control starting at 9-12 months of age, to guide interactive responses with internalized behavioral expectations by 24 months, and to meet situational demands with considerable flexibility and expanded effortful control by 36 months (Eisenberg et al., 2010; C. Kopp, 1982; Sanders & Mazzucchelli, 2013).

ESR Among ASD

ASD is a neuro-developmental disorder characterized by impairments in social communication and the presence of restricted repetitive and stereotyped patterns of behavior, interests, and activities (American Psychiatric Association, 2013). In addition to these diagnostically significant behavioral patterns, it is widely accepted that individuals with ASD frequently exhibit additional associated challenges. For example, it is generally acknowledged that children with ASD display characteristics that are consistent with challenges in ESR (Mazefsky et al., 2013). Difficulties regulating sleep-wake cycles, managing emotions, focusing attention, inhibiting reactions, delaying gratification, tolerating transitions, and seeking comfort in conventional ways during times of stress are all challenges frequently associated with the behavioral profile of individuals with ASD (American Psychiatric Association, 2013; Baron et al., 2006; DeGangi, 2000; National Research Council, 2001). Likewise, individuals diagnosed with ASD have also been reported to demonstrate high rates of internalizing and externalizing behavioral disorders which are linked to deficits in ESR (Mazefsky, 2015; Richey et al., 2015; Swain, Scarpa, White, & Laugeson, 2015; Wilson, Berg, Zurawski, & King, 2013). Collectively these ESR related behavioral presentations are a primary reason of referral for treatment in ASD (Mazefsky et al., 2013; Samson, Hardan, Lee, Phillips, & Gross, 2015).

Several recent studies documented the existence of ESR deficits in a sample of children with ASD compared to age-matched typically developing controls and/or to other developmentally disabled populations. For example, Konstantareas and Stewart (2006) found evidence of impaired affect regulation and reduced numbers of effective ESR strategies in the behavioral profile of children with ASD when compared to those

of typically developing controls. Glaser and Shaw (2011) reported evidence of greater ESR challenges in children diagnosed with ASD compared with those diagnosed with 22q13 deletion syndrome. Samyn, Roeyers, & Bijttebier (2011) found reduced effortful control in children diagnosed with ASD when compared to typically developing children during mildly frustrating tasks.

Other studies have focused on discrepancies in the types and frequency of ESR strategies employed by children with ASD when compared to same aged typically developing peers. For example, Jahromi, Bryce & Swanson (2013) reported that children diagnosed with high functioning autism exhibited less frequent self-regulation characterized as greater resignation during lab based frustrating tasks. When ESR strategies were employed by the ASD sample they were characterized as physical and verbal venting, less goal directed, and less socially oriented when compared with typical controls. Additional studies provide further evidence for a maladaptive pattern of ineffective self-regulatory response and suggest that this ESR profile may be linked to high levels of co-morbid psychopathology diagnosed in individuals with ASD (Gerstein et al., 2011), increased negative emotional experiences (Samson et al., 2015), and internalizing and externalizing behavioral disorders (Mazefsky et al., 2013).

Additional studies have examined ESR in ASD as a predictor of engagement and adaptive functioning. One longitudinal study looked at the self-regulation profiles of children with ASD as a predictor of peer and school engagement, finding that differences in ESR were associated with adaptive functioning. Study results suggest that students with ASD who had relatively greater ESR abilities demonstrated more

prosocial peer engagement a year later as compared to those with lower ESR abilities (Jahromi et al., 2013). Similarly, Gray and colleagues (2014) reported that older individuals diagnosed with ASD who demonstrated greater emotional and behavioral difficulties associated with ESR challenges also demonstrated decreased ability to independently engage in activities of daily living and required more extensive support systems and services.

Given the increasing body of literature supporting the existence, prevalence, and implications of ESR challenges in individuals with ASD's behavioral profiles, there is mounting interest in understanding how these challenges develop and the factors influencing their expression.

The Development of ESR in ASD

The study of the development of ESR among individuals diagnosed with ASD is challenging since many of the behaviors associated with ESR are diagnostically related to ASD. In fact some have argued that the development of ASD is inextricably intertwined with altered development of ESR, and that the presence of early self-regulation difficulties in a child's behavioral profile may be an early indicator of a potential diagnosis of ASD (Gomez & Baird, 2005; Loveland, 2005; Mazefsky et al., 2013; Whitman, 2004). Still others have suggested that the degree of ESR impairment displayed by a child with ASD may account for at least a portion of the heterogeneity in long term outcomes and adaptive functioning exhibited by children on the spectrum- with the most dysregulated children demonstrating the poorest outcomes (Jahromi et al., 2013).

To date there has not been a longitudinal study looking at the normative development of regulatory abilities in children with ASD. Research in this area is just beginning to emerge (Mazefsky, 2015). However, several areas of impairment including social communication deficits and sensory processing challenges have been directly associated with ESR differences and emotional dysregulation for children diagnosed on the spectrum (Samson et al., 2014). Challenges in these areas have the potential to influence parent child interactions and the transactional nature of ESR development (Mazefsky et al., 2013; Nader-Grosbois & Mazzone, 2014; Prizant et al., 2006b). Both of these developmental domains will be reviewed in relation to ESR and the current ASD literature.

Social Communication Abilities in ASD

Social communication abilities refer to a wide range of developmental skills. Conceptually, this developmental domain can be divided into two primary capacities: 1) social abilities (e.g., communicative functions) and 2) communicative abilities (e.g., communicative means) (Prizant, Wetherby, Rubin, & Laurent, 2003). Both of these capacities have been critically linked to social competences and a child's ability to acquire more social conventional and effective regulatory strategies through a transactional process of engaging with parents (Bachevalier & Loveland, 2006; Morales et al., 2005; Vaughan Van Hecke et al., 2012). A core capacity related to a child's social abilities is joint attention. Joint attention allows children to see another person as separate from themselves, share attention, share emotions, express intentions, and develop an awareness of another person's attentional focus, knowledge and preferences (Prizant et al., 2003; Stern, 1985). Joint attention correlates with

developmental capacities such as being able to respond consistently to the sound of their mother's voice, follow gaze, referentially look, socially reference, and understand the communicative perspective of another person. Deficits in each of these capacities are considered diagnostically significant for ASD and limit the individual's response to and initiation of reciprocal social interactions germane to the development of ESR (American Psychiatric Association, 2013; Jahromi, Meek, & Ober-Reynolds, 2012).

Typically developing children who engage more frequently in joint attention with parents demonstrate more sophisticated ESR as well as a greater ability to modify emotional reactions and regulatory strategies in response to feedback of others (Bachevalier & Loveland, 2006; Konstantareas & Stewart, 2006; Morales et al., 2005; Raver, 1996). Implications of these finding extend to ASD and suggest that individuals with ASD who demonstrate less joint attention exhibit greater ESR challenges (Gulsrud et al., 2010) and greater emotional dysregulation (Samson et al., 2014) than children with ASD who demonstrate more joint attention.

Communicative development typically refers to the process of acquiring and utilizing sophisticated, conventional communication processes. In infancy this process is concerned with the acquisition of nonverbal communicative means that have shared meaning; while in early childhood it is largely focused on the development of symbolic communication (e.g., vocabulary and syntactic structures). Diagnostically, individuals with ASD exhibit quantitatively and qualitatively impaired receptive and expressive language (e.g., nonverbal and symbolic means)(American Psychiatric Association, 2013). Delays in receptive language impact a child's ability to

understand emotions, respond to language or parental support, and to use language-based ESR strategies to guide behavior (Kopp, 1982; Prizant et al., 2006b; Vygotsky, 1962). In addition, delayed expressive skills are associated with a child's limited ability to request assistance and communicate emotional states using words and non-verbal means (Wetherby, Watt, Morgan, & Shumway, 2007). Collectively, these expressive and reception communication deficits have been shown to be positively associated with higher levels of emotional dysregulation for children with ASD (Samson et al., 2014).

Sensory Processing Abilities Among ASD

Children with ASD demonstrate sensory processing deficits (American Psychiatric Association, 2013). These manifest in many ways including hypo-reactivity (e.g., decreased sensitivity and response to environmental stimuli such as touch and sounds) and hyper-reactivity (e.g., increased sensitivity to sensory stimuli such as sounds and movement). Greater challenges responding adaptively to sensory stimuli and/or displaying unusual interests in sensory aspects of the environment are associated with greater emotional dysregulation in children with ASD (Samson et al., 2014). Sensory processing deficits are also associated with increased risk for the development of anxiety, depression, and maladaptive behaviors all of which have been linked to deficits in ESR (Brindle, Moulding, Bakker, & Nedeljkovic, 2015; Loveland, 2005; Mazefsky et al., 2013).

Additional research highlights temperamental challenges which have been associated with sensory processing deficits for this population (Samson et al., 2014). Children diagnosed with ASD often demonstrate temperaments that are characterized

as difficult, and demonstrate behaviors consistent with ESR challenges such as irritability, poor impulse control, difficulty soothing, and unfocused attention (Clifford, Hudry, Elsabbagh, Charman, & Johnson, 2013; Jahromi et al., 2012; Konstantareas & Stewart, 2006; Loveland, 2005). These temperamental differences frequently translate clinically to large scale emotional reactions and relatively high rates of distress during normal play interactions with mothers (Gulsrud et al., 2010).

Parent Behavior Associated with Facilitating Child ESR Among ASD

Parents play a critical role in the development of ESR for all children. The interdependent relationship between the young child and their social context is considered the foundation of emotional regulation development (Hubley & Trevarthen, 1979; Kopp, 1982; Sameroff & Fiese, 1990; Tronick, 2002). ESR is a transactional process that flourishes within environments that are supportive of social-cognitive and social-emotional learning (Sanders & Mazzucchelli, 2013; Zimmerman, 2000). For example, the quantity and quality of ESR behaviors utilized by typically developing children is shaped by parental emotional expressivity (Eisenberg et al., 2001, 2003) and parental use of supportive behaviors (e.g., redirection of attention, reassurance, physical comfort, etc.)(Grolnick et al., 1998).

Research suggests that parents use a variety of strategies during interactions with their children that are associated with the children's ESR development (Morales, Mundy, Crowson, Neal, & Delgado, 2005; Saarni, 1998; Sanders & Mazzucchelli, 2013). These include, but are not limited to, engaging, helping, redirection of attention, verbal comfort, physical comfort, and emotional following. While evidence suggests that each of these individual parent behaviors plays a role in the development

of ESR, previous studies have grouped them into theoretical categories based on their intended function (i.e., engaging, comforting, or providing opportunity for child to independently employ ESR) and their symbolic qualities (i.e., physical or language based) (Grolnick et al., 1998; Gulsrud et al., 2010).

These theoretical categories conceptually reflect the responsive qualities of parent behavior but also developmental sophistication. For example, parents use of language strategies (e.g., verbal problem solving, reframing of emotions) is regarded as a higher order or more complex when compared to parent use of physical strategies such as hand over hand assistance while manipulating a toy or holding during distress (Zimmerman, 2000). With regard to the responsive quality or the function of the parent strategies, actively engaging behaviors are those that shift attention away from arousing situations, as well as goal directed behaviors such as helping and problem solving; comforting strategies are those that provide soothing and reassurance; while passive strategies focus on providing the child opportunity to self-regulate often referred to as active ignoring (Gulsrud et al., 2010).

Several child characteristics have the potential to impact aspects of regulatory interactions between parents and young children diagnosed with ASD. To date studies have focused on the associations between child developmental age, externalizing problem behaviors, (Gulsrud et al., 2010) and cognitive abilities (Hirschler-guttenberg, Feldman, Ostfeld-etzion, Laor, & Golan, 2015) and the behaviors employed by parents to support child ESR.

One study examining the relationship between a child diagnosed with ASD's cognitive abilities and his/her parent's differential employment of regulatory strategies

found that fathers' use of physical comfort, holding and refocusing of attention during play was inversely associated with IQ during stress conditions (Hirschler-guttenberg, Golan, Ostfeld-etzion, & Feldman, 2015). This finding is interesting to consider in the context of an additional longitudinal study that examined the transactional relationship between parenting and emotion regulation in children with and without cognitive developmental delays (Norona & Baker, 2014). Parents of children diagnosed with developmental delays exhibited less scaffolding of ESR (e.g., less activity demonstration, less praising, less refocusing, less sensitivity toward emotional state, and less emotional following) during interactions with their young children than parents of typically developing children. Finally, Gulsrud and colleagues (2010) reported that parents of cognitively delayed toddlers diagnosed with ASD engaged in high levels of physical prompting, assisting, and comforting during play with their child in contrast to more developmentally sophisticated behaviors (e.g., verbal problem solving, emotional labeling, etc.) frequently employed by parents of typically developing children at similar chronological ages.

These findings suggest that parents of children with ASD differentially employ behaviors associated with supporting ESR in response to their child's characteristics much like parents of typically developing children. For example, parents of typically developing toddlers use regulatory focused behaviors differentially based upon their child's age and cognitive abilities. One study found that parents of 32-month-old toddlers used fewer active engagement strategies (e.g., helping, redirection, and physical comfort) during times of stress than did the parents of younger children (Grolnick et al., 1998). The authors of this study also reported that parents of children

between 18-32 months provided consistent opportunities for their children to self-regulate by engaging in more passive behaviors such as active ignoring (Grolnick et al., 1998) which was not seen with younger children.

In addition to age and cognitive abilities, other factors such as social communication delays and sensory processing differences may also influence parent engagement in behaviors when interacting with their young children diagnosed with ASD. In typical development, as children's age, cognitive and social communicative abilities increase parents use of language strategies for problem solving, maintaining engagement, emotional labeling, and cognitive reframing also increases (Grolnick et al., 1998; Saarni, 1998; Zimmerman, 2000). Parents use of these types of strategies has been related to child executive functioning and adaptive problem solving in longitudinal studies of ESR development (Spinrad et al., 2006).

Parents of children with ASD who demonstrate social communicative delays associated with poor ESR (Samson et al., 2014) engage in reduced scaffolding of ESR (Begeer, Koot, Rieffe, Meerum Terwogt, & Stegge, 2008; Glaser & Shaw, 2011). This reduction in scaffolding has been associated with qualitative differences in social interactions between parents and children. Current research suggests that parents of toddlers with ASD use more helping and physical behaviors and less verbal support strategies such as emotional expression or previewing events during stressful interactions. (Gulsrud et al., 2010). A recent study comparing preschoolers diagnosed with ASD to typically developing preschoolers found that parents of children diagnosed with ASD used fewer complex strategies (e.g., language based strategies) and relied on more simple strategies such as physical comfort and physical

engagement during fear and joy paradigms than parents of typically developing children (Hirschler-guttenberg, Golan, et al., 2015). Likewise, clinic-based studies of the development of play and language have documented that parents of children with ASD's use of physical prompts and directive interactive styles is negatively correlated with their children's social communicative abilities (Kasari, Sigman, Mundy, & Yirmiya, 1988; Konstantareas, Zajdeman, Homatidis, & McCabe, 1988). Despite these related findings, the association between social communicative difficulties for children with ASD and parent behaviors associated with ESR development has not been examined directly.

The association between sensory processing differences exhibited by children with ASD (e.g., sensory processing differences) and parent regulatory strategies also remains unstudied. However, research suggests that parents of typically developing children who have difficult temperaments which are often associated with over-reactivity to sensory stimuli, primarily utilize physical strategies to support their children's emotional regulation (Cole et al., 2013, 2004; Sallquist et al., 2009).

Present Research

The purpose of this study was to examine the associations between social communication and sensory processing abilities of children with ASD and parent behaviors associated with development of a child's ESR in the naturalistic setting of the child's home. The presence of ESR challenges in the developmental profiles of children with ASD has been well established; however, less is known about the role of parents in ESR development for this population, underscoring the need for further study in this area. Additionally, the majority of research on ESR in children with ASD

has been completed in unfamiliar laboratory contexts (Gulsrud et al., 2010; Konstantareas & Stewart, 2006), so the examination of parent behaviors within natural environments is needed. This study was conducted in family homes in an effort to capture parent behaviors during naturalistic routines.

It was anticipated that parents of young children who exhibit greater social communication impairment and sensory processing challenges will engage in behaviors that are physical in nature (e.g., helping activate toys, providing hand over hand assistance, providing postural support, etc.), comfort oriented (e.g., hugging, vocal soothing, reassuring, etc.), and focused on active engagement (e.g., orienting to toy, redirecting attention from distraction, etc.) and use fewer behaviors that are language-based (e.g., verbal problem solving, language-based reassurance, etc.) and are associated with allowing the child time to independently engage in ESR (i.e., active ignoring).

Research Hypotheses

Research question 1. Are the social communication abilities of young children diagnosed with ASD associated with parent behaviors that are supportive of the development the development of child ESR?

Hypothesis 1. Higher levels of child social communication abilities will be associated with lower levels of parent physical engaging and helping, physical comfort, redirection/distraction, vocal comfort, and emotional following.

Hypothesis 2. Higher levels of child social communicative abilities will be associated with higher levels of parent language-based engaging and helping, language-based comfort, and active ignoring.

Research question 2. Are the sensory processing abilities of young children diagnosed with ASD associated with parent behaviors that are supportive of the development of child ESR?

Hypothesis 1. Higher levels of child sensory processing abilities will be associated with lower levels of parent physical engaging and helping, physical comfort, redirection/distraction, vocal comfort, and emotional following.

Hypothesis 2. Higher levels of child sensory processing abilities will be associated with higher levels of parent language-based engaging and helping, language-based comfort, and active ignoring.

CHAPTER 3

METHODOLOGY

Overview

The purpose of the study was to examine the association between behavioral characteristics of young children diagnosed with ASD and their parent's behaviors in a natural setting. The study was a cross-sectional design utilizing survey and observational methods. Observations of parent/child dyads were conducted within the family's home. Home visits consisted of a segmented, standardized research protocol during which children and their parent engaged in free play, a communication assessment, and a snack time. Each home-based observation was video recorded in its entirety. These video recordings were later coded and analyzed for the presence/absence of parent behaviors and also for child social communication data according to study measures. Data were collected by the author of the study along with the assistance of trained research assistants. Data collection took place between December 2014 and May of 2016.

Participants

Participants were 37 primary caregiver-child dyads who were recruited throughout Southern New England. Children aged 30-48 months who had previously been diagnosed with ASD were included in the study with their primary caregiver. Primary caregiver was defined as the family-identified parent who spends the most time caring for and interacting with the child throughout his or her normal daily

routine. One primary caregiver identified as their child's legal guardian, all others identified as mothers or fathers. For the purposes of this study we refer to all primary caregivers as parents.

Children were required to have an ASD diagnosis validated by a positive screen using The Modified Checklist for Autism in Toddlers (M-CHAT; Robbins, Fein, & Barton, 1999), the Autism Diagnostic Interview – Revised (ADI-R; Rutter, LeCouteur, & Lord, 2003), or the Autism Diagnostic Observation Schedule-second edition (ADOS-2; Lord, Rutter, DiLavore, & Risi, 2012) to be included in the study. Children were excluded if they had a history of seizures, blindness, deafness, physical developmental disabilities that significantly impaired mobility, and/or they were medicated for regulation-related challenges. Participants were required to speak English.

Power analysis for bivariate correlation coefficients (power set at .80, $r = .44$, $\alpha = .05$) and regression analyses with three predictors (power set at .80, $\alpha = .05$, $r^2 = .261$) indicated that a sample size of 35 would be adequate. During the recruitment process, 52 families agreed to be contacted by the researchers to discuss the study and 37 enrolled in and completed in the study.

The study was approved by the Institutional Review Board (IRB) at the University of Rhode Island in December 2014 (IRB #HU1415-082).

Measures

Demographics.

Parent participants completed a demographic questionnaire including information on family composition/size, parental age, education, occupation, race, and

child sex. Additional questions included the type(s) and focus of educational and therapeutic interventions in which the child participates. Data from the questionnaire were utilized in a descriptive analysis of the sample and to identify potential covariates. The complete demographic questionnaire is included in Appendix A.

Child social communication abilities.

Children's social communication abilities were assessed using the Communication and Symbolic Behavior Scales – Developmental Profile Behavior Sample (CSBS-DP; Prizant & Wetherby, 2002). The CSBS-DP is a standardized measure designed to assess the social communicative behavior of children between the developmental ages of 6 months and 24 months (Wetherby & Prizant, 2002). However, it has been used as a clinical and research tool for children who demonstrate significant social communicative delays (e.g., children diagnosed with ASD) up to 6 years of age (Green et al., 2010; Jansen, Ceulemans, Grauwels, & Maljaars, 2013; Keen, Couzens, Muspratt, & Rodger, 2010; Maljaars, Noens, Jansen, Scholte, & van Berckelaer-Onnes, 2011; Wetherby et al., 2014).

The CSBS DP evaluates the presence of eight social behaviors (i.e., gaze shifts, shared positive affect, gaze/point following, behavior regulation, social interaction, joint attention, and conventional gestures), as well as the frequency of a child's social behaviors during six play-based activities (i.e., wind-up toys, balloons, bubbles, jar with preferred object enclosed, book sharing, and pretend play). The child's use of speech (e.g., different speech sounds, words, and word combinations) is also assessed during each of these six play-based activities. In addition, during the pretend play activity the child's symbolic abilities were assessed with respect to

language comprehension and the sophistication of play (e.g., types of play schemes, inclusion of self or others in play, and constructive play).

Based upon the scoring protocol, points were given when a child independently exhibits the behavior in accordance with the assessment criteria (e.g., gaze shifts- child shifts gaze between toy and parent during interactions; gestures- child uses a wave to draw parent's attention to toy; words- child uses spoken word to label object during play; understanding- child responds to the question "Where's Mommy?" by pointing at, shifting gaze to, or otherwise indicating mommy's presence; sequences play schemes- child stirs with spoon prior to pretending to feed Big Bird, etc.). In addition, during each of the six play-based activities, a point is given for each social communicative behavior (up to 3) the child initiates. Finally, with respect to the social communicative behaviors that include speech sounds, words, word combinations, and play schemes, inventories of unique communicative behaviors are recorded across the entire assessment and a point is awarded for each unique behavior utilized by the child.

Raw scores for each of the social communicative behaviors were summed and converted to weighted scores that were summed to form four composite scores. These include a Social Composite score (i.e., gaze shifts, shared positive affect, gaze point following, rate of communication, behavior regulation, social interaction, joint attention, conventional gestures, distal gestures,) a Speech Composite score (i.e., syllables with consonants, inventory of consonants, words, inventory of words, word combinations, inventory of word combinations), a Symbolic Composite (i.e., language comprehension, inventory of action schemes, action schemes toward other, sequences

of action schemes, and stacks blocks) and a Total Composite that is the sum of Social Composite, the Speech Composite, and the Symbolic Composite. Higher Total Composite scores are indicative of greater social communicative abilities. The CSBS DP Behavioral Sample Score Sheet is included in Appendix B.

Initially, our intent was to examine social abilities (i.e., Social Composite) and expressive language abilities (i.e., Speech Composite) separately in the data analysis; however, these were found to be highly correlated with one another ($r=.811, p<.01$). Therefore, the Total Composite was used in analyses as a measure of the child's overall social communicative ability.

Video data were coded by trained research assistants. Inter-rater reliability using Kendall's Tau-b was calculated for 20 % of the data. Kendall's Tau-b was used to determine inter-rater reliability as it is a statistical method that can be used with data representing ongoing judgements about behaviors in interactions that are not simply reflective of behavioral performance on discrete trials or during discrete time intervals. Kendall's tau-b for the total score was 1.0. (Appendix C)

Child sensory processing ability.

Child sensory processing abilities were assessed utilizing the The Sensory Processing Measure-Preschool- (SPM-P) Home Form (Ecker & Parham, 2010; Miller Kuhaneck, Ecker, Parham, Henry, & Glennon, 2010). The SPM-P is completed by the parent and is designed to report a child's response to sensory experiences in the context of daily activities (e.g., how often does your child seem bothered by the sound of a vacuum cleaner; how often does your child enjoy watching objects spin or move; how often does your child gag or vomit in response to certain foods or textures). The

form includes seventy-five items covering eight functional areas (i.e., social participation, vision, hearing, touch, body awareness, balance and motion, planning and ideas, and total sensory systems) that parents rate on a four-point frequency scale (1-never to 4-always). The scoring protocol specifies that raw scores from individual functional areas are summed to yield the Total Sensory score which is converted to a *t*-score. The Total Sensory *t*-score is an indicator of overall sensory processing, with higher scores indicating greater impairment/abnormality. This measure is included in Appendix D.

Parent behaviors.

Eight categories of parent behaviors previously identified as representing behaviors important for supporting the ESR of children (Grolnick et al., 1998; Gulsrud et al., 2010) were assessed during the observation. These categories included: 1) physical engaging/helping, 2) language-based engaging/helping, 3) redirection/distraction, 4) emotional following, 5) physical comfort, 6) vocal comfort/intonation, 7) language-based comfort/reassurance, and 8) active ignoring.

Parent behaviors were coded utilizing a combined time and event sampling in 10-second intervals for the presence or absence (1/0) of each behavior. Multiple parental behaviors could be coded within one 10-second episode. Behavioral Observation Research Interactive Software (BORIS) (Friard & Gamba, 2016) was used by trained research assistants to record the data. The frequency of each parental behavior was calculated by adding the total number of intervals during which a behavior occurred. Sums were converted to proportion scores by dividing by the total number of 10-second episodes to adjust for variability in observation lengths. A

complete list of definitions and coding criteria for the parent behaviors is included in Appendix E.

Interrater reliability for each of the eight parent behaviors, as well as an additional “none of the above” category was calculated using percent agreement and Cohen’s Kappa coefficients for 15 % of the study data and yielded an average score at or above 91 % for each of the parent behaviors (range = 91–100) and Kappa coefficients (κ range = 0.807–1.000), with the exception of Active Ignoring (κ =0.498). (Appendix F).

Based on previous research which examined parental behaviors in terms of their function and symbolic quality (Gulsrud et al., 2010), the eight individual parent behaviors were combined to form five composites: 1) active engagement strategies, 2) comfort strategies, 3) passive strategies, 4) physical strategies and 2) language-based strategies. See Figure 1 for composite structure. Test of internal consistency (Cronbach’s α) of each of these composites revealed poor internal consistency ($\alpha < .40$) ; and therefore, individual parent behaviors were retained for analyses.

Procedures

Participants were recruited through medical and educational agencies. Letters introducing the investigators and describing this study (Appendix G) were sent to local early intervention (EI) providers, school districts, community support agencies, and local medical doctors/psychologists, as well as the Rhode Island Consortium for Autism Research and Treatment (RI-CART). Additional recruitment occurred at Autism awareness events where researchers were on site to discuss the project and to provide consent to contact forms. Follow up phone calls were made to all of these

recruiting sources to further describe the study. Sources who agreed to share information with potentially eligible families were provided with informational flyers describing the study and consent to contact forms (Appendix H). Flyers contained the phone number of the researchers so that interested families could directly contact the researchers. Signatures on consent to contact forms were also obtained by referral sources and then returned to the study investigators.

Families were contacted to further describe the study and to determine child/parent eligibility once a consent to contact form was received and to describe parent roles (e.g., play partner, provider of snack, etc.), and to answer any questions about the research. A home visit was scheduled at a mutually convenient time when parents verbally consented to the study phone. The demographic questionnaire and the SPM-P (Ecker & Parham, 2010) were mailed to the family for completion prior to the home visit (Appendix A and D).

At the beginning of each home visit, the researcher reviewed the study protocol with the parent and answered any questions. Upon confirmation of the child's eligibility to participate in the study, written consent for the parent and parental permission for the child (Appendix I) was obtained. Once informed consent was obtained, the demographic questionnaire and the SPM-P Home Form (Ecker & Parham, 2010) were collected (Appendix A and D) and the home-based research protocol commenced. Three families had not completed their questionnaires prior to the home visit and were provided with self-addressed stamped envelopes and instructed to mail the forms back.

Two researchers attended every home visit, the investigator and a trained

research assistant who video recorded the observation using a small monopod mounted camera. The structure of the home visit included a free play period, administration of the CSBS-DP (Wetherby & Prizant, 2002), and a snack time. Video recording began with the start of free play and continued through snack time.

Each home visit began with a parent/child free play session in a location within the house of the parent's choosing. During this time the child was free to move about the room and interact with his/her parent and the researcher. Toys for free play included those of the child as well as novel toys provided by the researchers (e.g., Gazoobo shape sorter, Hoberman sphere, pop up toy). Free play concluded after each novel toy had been introduced and the researcher and parent agreed that the child had had adequate time to explore all of the activities. Following the completion of free play, the child, parent, and researcher moved to a table of the parent's choosing within the child's home for the administration of the CSBS DP. Researchers attempted in all instances to position the parent and child with the parent and child seated next to one another and across from the researcher (Wetherby & Prizant, 2002). However, at times this seating arrangement varied due to space constraints within the house or the child having difficulty maintaining a seated position without physical support from his/her parent. In accordance with the CSBS DP protocol, activities were presented in a predetermined sequence. Initially, minimal direction was given to the child when toys introduced, then parents were instructed to interact naturally with their child.

At the completion of the CSBS DP assessment, the parent was asked to engage the child in a natural snack time routine. Parents were given the instruction to offer

snack to the child as they typically do. If the parent chose to offer snack to the child in a different room or in a space that allowed for the child to move about freely, the camera was repositioned to capture the child and parent in the frame. Throughout the entire observation, if either the child or the parent moved out of the frame, attempts were made to maintain the focus of the camera on the parent. If the child and parent remained out of proximity to one another (e.g., greater than 60 seconds) the camera was moved to capture the child and parent in an effort to ensure adequate data capture.

Data Cleaning/Coding

Parent behavior.

Parent behavior was coded for each activity: free play, assessment and snack. First, data were examined for codability. Time intervals in which the activity or the parent/child interaction was interrupted were deemed uncodable and excluded from the data. For example, time intervals during which another child demanding the parent's attention, the parent answered a phone call, or the parent talked to the researcher to the exclusion of the child, were excluded from further coding and analysis. On average over 80 % of 10 second intervals ($M=81.63\%$, $SD=10.31\%$) were codable across the combined observation for the sample.

Next, data were examined for variability and consistency across each activity. Initial review of the video data for the snack activity indicated a wide range in the length of time from 1.25 minutes to 27.5 minutes, as well as significant variability in the qualities of the snack activity in which dyads were engaged (e.g., parent/child dancing, preparing valentines, placing food on a table, making a meal together). This wide variability in quantity and quality limited our ability to analyze the snack

segments as a cohesive representation of a single activity. Therefore, the snack activity was dropped from further analyses.

The free play and the CSBS DP assessment data, were also examined for variability and consistency. Free play ranged from 8 minutes to 33 minutes in length ($M=16.34$ min, $SD=5.74$ min). Coding began for each observation with the introduction of the first novel toy by the researcher free play and continued for “up to 16” minutes to standardize the protocol, and reduce the wide variability in duration. Mean duration of the coded segments of free play was 13.97 min ($SD=2.46$ min).

The administration of the CSBS DP included three consecutive “play based” tasks during which parents were directly encouraged to actively participate. Parents were asked to read a book to the child, engage in pretend play (e.g., feeding a stuffed animal), and assist their child with building a tower of blocks. The sequence of activities was consistent for all home visits to allow for coding of parent behaviors during the transition to snack time which followed immediately. Coding concluded with the presentation of food to the child. The inclusion of the transition provided an opportunity to observe the behaviors that parents use during transition, a frequent and often challenging event, for children diagnosed on the Autism spectrum. Mean duration of the CSBS assessment segment was 12.99 min ($SD=5.07$ min).

The mean length of time coded for the combined observations for all 37 parent/child dyads was 26.97 min ($SD=5.46$ min). See Appendix J for the mean of each activity.

Data Analysis

Data were entered into Microsoft Excel and uploaded into SPSS 23.0 for

analyses.

All variables were checked for accuracy and reviewed for trends, central tendency, variability and distributions. When assumptions of normality were not met, both square root and Log 10 transformations were attempted. Transformations resulted in fewer interpretable scores, and therefore; non-transformed variables were retained for analyses.

Parent behavior composites were created; internal consistency measures were confirmed and based upon the results parent behavior variables were either retained in their individual form or as composites. Data were examined for mean differences between protocol conditions (free play vs CSBS DP assessment) using *t*-tests; to determine whether parent behavior differed significantly by condition. Data were analyzed separately based on condition, as well as across the entire observation.

The association between demographic variables (e.g., race/ethnicity, socioeconomic status, age, etc.) and the independent (i.e., child social communication and child sensory abilities) and dependent variables (e.g., parent physical engaging and helping, parent redirection/distraction, etc.) were assessed in two ways. The association between categorical variables and the independent and dependent variables were examined using *t*-tests, and the continuous variables were examined using correlational analyses. Demographic variables that were significantly associated with the dependent and independent variables were entered as covariates in the final analyses.

Pearson product-moment correlations examined the association between the independent and dependent variables. Initial research questions and hypotheses were

conceptualized around different domains of parent behaviors (e.g., active, passive, comfort, etc.). However, research questions were reframed to focus on individual parent behaviors because none of the composite scores achieved acceptable reliability. Regression analyses were conducted to test the modified research questions for those parent behaviors that were significantly associated with the independent variables, controlling for covariates.

Research questions analyses.

Research question 1- Are the social communication abilities of young children diagnosed with ASD associated with parent behaviors that are supportive of the development of child ESR?

Research question 2 - Are the sensory processing abilities of young children diagnosed with ASD associated with parent behaviors that are supportive of the development of child ESR?

Each dependent variable was regressed separately on the independent variables: child social communication and child sensory processing. Child age and race/ethnicity (i.e., White/ non-white) were entered as covariates, as were interaction terms (i.e. social communication by race/ethnicity or sensory processing by race/ethnicity) as appropriate.

Analyses were also run separately by condition (i.e., free play and assessment) and for the combined observation. All results are reported for the combined observation. Additional results are reported for individual conditions when they differed from the combined condition results.

CHAPTER 4

RESULTS

Descriptive Analyses

Demographics.

Participants were 37 parent/child dyads. Families in this study were racially, ethnically, and economically diverse (Table 1). The majority of participants were White (67.6%), with the remaining participants identifying as families of color: Hispanic/Latino (16.2%), African American (13.5%), and Chinese (2.7%) ethnicities. Approximately one-third of families (29.7%) self-identified as middle class, 21.6% as lower middle class, and 24.3% as working class, while 4 families (10.8%) identified as upper middle class or upper class.

Parent participants were predominantly (92%) female (8% males). Approximately half (45.9%) had a college education, 29.7% had some college, and 21.6% had a high school diploma or less. Parents ranged between 21 and 43 years of age ($M=33.89$, $SD=5.38$). Children diagnosed with ASD participating in this study ranged in age from 30-48 months ($M=40.86$, $SD=5.75$). See Table 2. Thirty of the child participants were male (81%) and most of the children (81%) spent the majority day at home with their parent (Table 1).

At the time of the study, all child participants were engaged in some form of intervention services. The average duration of intervention programming was 17.42 hours/week, ($SD=10.55$ hours). Participants reported receiving services that included

speech language therapy (92%), occupational therapy (83%), educational services (62%) and Applied Behavioral Analysis therapy (57%). Parents reported that high levels of intervention priorities and goals of services included verbal communication (78%), social interaction (68%), and attention and focus (70%) with less emphasis on coping and soothing (43%) and on augmentative communication (24%). See Appendix K for complete information related to educational programming and intervention services for the child participant.

Child characteristics.

Children's social communication profiles and sensory processing ability scores are reported in Table 3. Children's average social communication total composite was 68.39, $SD=37.82$ (range 0-147) indicating relatively limited levels of verbal and/or non-verbal intentional communication directed towards others. Mean SPM-P Total Sensory t -score was 69.97, $SD=8.143$, (range 40-80) with higher scores reflecting greater sensory processing differences and deficits.

Parent behaviors.

Proportion scores of parent behaviors, for the combined observation and by condition are presented in Table 4. Overall, during the combined observation parents engaged in relatively high amounts of physical ($M= 49.83$, $SD=16.41$) and language-based ($M=52.67$, $SD= 17.28$) engaging and helping behaviors. Parent use of redirection and emotional following was less frequent while comfort behaviors (i.e., physical, vocal, and verbal) and active ignoring were rare. On average, parents were not engaged in any of the previously identified behaviors associated with supporting child ESR more than 20% of the coded time. Similar parent behavior patterns were

observed during the free play and CSBS DP assessment conditions. See Appendix L for a summary of parent behaviors coding.

Differences in parent behavior by condition.

Paired Sample *t*-tests were conducted to determine whether the mean of coded responses of parent behaviors was statistically significant by condition. Results revealed significant differences in several parental behaviors, with higher frequency scores generally noted in free play conditions as compared to the assessment. Parents engaged in more physical engaging and helping ($t=4.29, p=0.000$) and verbal engaging and helping ($t=2.64, p=0.012$), and more emotional following ($t=2.93, p=0.006$) during free play than during the CSBS DP assessment (Table 4). All subsequent analyses were performed by condition as well as for the combined observation.

Association between Demographic Variables, Independent and Dependent Variables

The association between child characteristics, parent behavior, and categorical demographic variables (i.e., child sex, White/children of color, income) were examined using *t*-tests and ANOVA. Results indicated significant differences on parent and child characteristics based on race and ethnicity of the family. As compared to children of color, White children scored higher on the social communication assessment and lower on the sensory processing measure indicating overall fewer deficits (Table 5). Additionally, income was significantly associated with SPM-P scores (ANOVA, $F(5, 31)=3.709, p < .01$). Post-hoc analyses were unable to be performed due to groups with fewer than two cases. See Appendix M for further details related to SPM-P and family income.

In terms of parent behaviors, parents of color used redirection/distraction significantly more often than White parents during the combined observation ($t(35)=-2.547, p<.05$) and the CSBS DP assessment condition ($t(35)=-2.382, p<.05$). In contrast, parents of color used language and helping behavior significantly less often than White parents during free play ($t(35)=2.425, p<.05$). No other differences were observed for parent behaviors based on race/ethnicity, income, or child sex.

The association between child characteristics, parent behavior, and continuous demographic variables (age and hours engaged in intervention) were examined using Pearson product moment correlations. Correlations between continuous demographic variables (age and hours engaged in intervention) and child social communication abilities and sensory processing abilities revealed no significant associations (Table 6). During the combined observation, child age was significantly correlated with the parent physical engaging and helping ($r(35)=-0.403, p=.013$), with younger children receiving more parental physical engaging and helping. Child age was not significantly correlated with any other independent or dependent variables (Table 7).

Similar relationships between continuous demographic variables and parent behaviors were reported for free play and the CSBS DP assessment. A significant correlation between child age and parent physical engaging and helping were reported for the free play condition ($r(35)=-.419, p=.010$), but not for the CSBS DP assessment condition. No other significant correlations were reported for individual conditions (Table 7).

Inter-correlations Among Parent Behaviors

The inter-correlations among parent behaviors are reported in Table 8 for the

combined observation. Two variables that represent parent engaging or helping (i.e., physical engaging and helping and language engaging and helping) were positively associated ($r(35)=0.382, p=.020$). Likewise, three variables assessing parent comfort (i.e., vocal comfort, physical comfort, and language-based comfort) were positively associated with one another. Redirection/distraction was inversely related to parent language engaging and helping ($r(35)=-.352, p=.033$) and positively associated with more emotion following ($r(35) =.398, p=.015$). Finally, active ignoring was positively associated with more language and vocal comfort ($r(35)=.463, p=.004$).

Associations between Child Characteristics and Parent Behaviors

The correlations between child characteristics and parent behaviors are reported in Table 9, for the combined observation and by condition. In general, children who scored higher on social communication had parents who used more language based behaviors ($r(35)=.389, p=.009$) and fewer physical engaging and helping ($r(35)=-.367, p=.013$), fewer redirecting/distracting ($r(35)=-.548, p=.000$) and less physical comforting ($r(35)=-.373, p=.012$). Child sensory processing scores were not associated with parent behaviors at statistically significant levels during the combined observation.

Patterns of associations within each condition showed similar results with only minor differences. During the free play condition, child sensory processing ability was inversely associated with parental engaging (e.g., children with more deficits had parents who engaged in less physical engaging and helping) ($r(35)=-.301, p=.035$) and the association between social communication and physical engagement no longer reached conventional levels of statistical significance ($r(35) = -.259, p = .06$). In

addition, child social communication and parent physical comfort were not statistically associated during the free play condition. Finally, during the CSBS DP assessment, parental language was not statistically significant associated with child communication abilities ($r(35)=.203, p=.115$).

Research Questions

Research question 1. Are the social communication abilities of young children diagnosed with ASD associated with parent behaviors that are supportive of the development of child ESR?

Hypothesis 1. Higher levels of child social communication abilities will be associated with lower levels of parent physical engaging and helping, physical comfort, redirection/distraction, vocal comfort, and emotional following.

Hypothesis 2. Higher levels of child social communicative abilities will be associated with higher levels of parent language-based engaging and helping, language-based comfort, and active ignoring.

The first set of hypotheses were tested using regression analyses to assess the association between child social communication and parent behaviors: language engaging and helping, physical engaging and helping, redirection/distraction and physical comfort behaviors. Additional parent behaviors (i.e., language-based comfort, vocal comfort, emotional following, and active ignoring) were not included due to low frequency of occurrence and lack of bivariate association with the child characteristics. All analyses controlled for child age, race/ethnicity and an interaction variable representing the relationship between child social communication abilities and race/ethnicity. Analyses including the interaction variable are reported only when they are significant.

Results for the combined observation yielded three significant models (Table 10) for physical engaging, language engaging and redirection. Child social

communication scores were significantly associated with parent language engaging and helping frequency after controlling for age and ethnicity ($\beta=.431, p=.016$). Child social communication scores were inversely associated with parental use of redirection/distraction ($\beta=-.619, p=.000$). Despite a significant model, the social communication scores were not associated with parental physical engagement at traditional levels of statistical significance ($\beta=-.314, p=.077$). Age was positively associated with the use of redirection ($\beta=.294, p=.041$). Child age and race/ethnicity were not associated with any of the parental behaviors.

Analyses by condition.

Similar analyses to assess the association between child social communication abilities and parent behaviors were undertaken by condition. These analyses, controlling for child age, race/ethnicity, and interaction terms yielded several differences.

Free play.

Two models that examined child social communication abilities in relationship parent behaviors during free play were statistically significant (Table 11). Child social communication scores were significantly associated with parent language engaging and helping frequency after controlling for age and ethnicity ($\beta=.478, p=.005$). Child social communication scores were significantly inversely associated with redirection/distraction after controlling for age and ethnicity ($\beta=-.462, p=.017$). Child age and race/ethnicity were not significantly associated with parent behavior in either model. The model examining child social communication abilities' associations with parent physical engaging and helping approached overall significance ($F(3, 33)=2.790$,

$p=.056$); however, the model examining physical comfort did not.

CSBS DP assessment.

During the CSBS DP assessment condition, only the model examining child social communication abilities in relationship to redirection/distraction parent behaviors was significant (Table 12). Child social communication scores were significantly inversely associated with redirection/distraction after controlling for age and ethnicity ($\beta=-.557$, $p=.001$). Child age was also a significant predictor in this model ($\beta=.338$, $p=.027$).

Race/ethnicity was not significantly associated with language engaging and helping in this model.

Research question 2. Are the sensory processing abilities of young children diagnosed with ASD associated with parent behaviors that are supportive of the development of child ESR?

Hypothesis 1. Higher levels of child sensory processing abilities will be associated with lower levels of parent physical engaging and helping, physical comfort, redirection/distraction, vocal comfort, and emotional following.

Hypothesis 2. Higher levels of child sensory processing abilities will be associated with higher levels of parent language-based engaging and helping, language-based comfort, and active ignoring.

Similar regression analyses were used to assess the association between child sensory processing scores and high frequency parent behaviors: physical engagement and helping and language-based engagement and helping. Additional parent behaviors (i.e., physical comfort, language-based comfort, vocal comfort, emotional following, redirection/distraction, and active ignoring) were not included in analyses due to low frequency of occurrence and lack of bivariate association with the child characteristics. All analyses controlled for child age, race/ethnicity and an interaction variable representing the relationship between child sensory processing abilities and

race/ethnicity. Results examining these relationships for the combined observation yielded one significant model (Table 13) for parent physical engaging and helping. Child sensory processing abilities were significantly associated with parent physical engaging and helping ($\beta=-1.255$, $p=.040$) after controlling for age and ethnicity, as well as the sensory x race/ethnicity interaction variable. Child age, race/ethnicity, and the interaction variable representing sensory processing abilities and race/ethnicity were not associated with physical engaging and helping in this model. The model for language engaging and helping approached, but failed to meet conventional levels of statistical significance ($F(4,32)=2.656$, $p=.051$) (Table 13).

Analyses by condition.

Similar analyses to assess the association between child sensory processing abilities and parent behaviors were undertaken by condition. These analyses, controlling for child age, race/ethnicity, and interaction terms yielded several differences.

Free play.

Analyses assessing the relationship between child sensory processing scores and physical engaging and helping and language-based engaging and helping yielded two significant models for the free play condition (Table 14). All analyses controlled for child age, race/ethnicity and an interaction variable representing the relationship between child sensory processing abilities and race/ethnicity. Child sensory processing abilities were significantly associated with parent language engaging and helping after controlling for age and race/ethnicity, as well as the sensory x race/ethnicity interaction variable ($\beta=-1.360$, $p=.028$). Race/ethnicity ($\beta=-5.04$, $p=.024$) and the

interaction variable representing sensory processing abilities and race/ethnicity ($\beta=5.337, p=.034$) were associated with language engaging and helping in this model. Child age was not associated with language engaging and helping in this model. Despite a significant model, sensory processing abilities were not associated with parental physical engagement at conventional levels of statistical significance ($\beta=.990, p=.105$) in this condition. Child age was significantly inversely associated with parent physical engaging and helping in this model ($\beta=-.328, p=.049$).

CSBS DP assessment.

During the CSBS DP assessment condition, none of the models examining child sensory processing abilities in relationship to physical and language-based parent behaviors were significant (Table 15).

CHAPTER 5

DISCUSSION

Summary of Findings

The present study examined the association between behavioral characteristics of young children diagnosed with ASD and their parent's engagement in behaviors associated with supporting the development of ESR in children. To date, relationships examining child social communication and sensory processing abilities and parent behaviors have not been explored. Given the importance of the parental role in supporting the development of ESR (Kopp, 1989; Sameroff & Fiese, 1990; Tronick, 2002), understanding parental behaviors in relation to their child's diagnostically significant characteristics is an important area of inquiry in understanding ASD.

The current study yielded three main findings related to the research questions and hypotheses of interest. First, in support of our first set of hypotheses, several parent behaviors were associated with child social communication abilities. Parent's use of physical engaging and helping, redirection, and physical comfort were associated with lower levels of child social communication abilities, while parent use of language engaging and helping was associated with higher levels of child social communication. Second, we found limited support for our hypothesized associations between child sensory processing abilities and parent behaviors associated with supporting ESR. Of the eight parent behaviors assessed only one, physical engaging and helping, was associated with child sensory processing. Third, based upon the

literature we expected parent behaviors to be grouped in theoretical composites according to function and symbolic quality. However, we did not find support for these previously identified theoretical composites of parent behaviors which we had intended to include in our analyses. Therefore, only individual parent behaviors were retained for our analyses. Each of these key findings, as well as, several additional findings will be discussed in the context of the current literature.

Associations between child social communication and parent behaviors

As expected, child social communication was associated with a number of parent behaviors. Specifically, as high levels of child social communication abilities were associated with lower amounts of parental physical engaging and helping, redirection/distraction, and physical comfort decreased. In addition, we found that parent physical engaging and helping was inversely associated with child age in our sample. Collectively, these findings suggest parents of children with lower social communication abilities engage in higher amounts of physical engaging and helping, as well as redirection/distraction. A finding that is in agreement with the normative development literature related to chronologically younger children. Previous studies have reported that parents of young typically developing children (<24 months) frequently utilize physical engaging behaviors and redirection/distraction when interacting with their children (Eisenberg & Spinrad, 2004; Grolnick et al., 1998). Given that the children in our study were older (30-48 months) than those in studies of typically developing children, it is interesting to consider our findings related to parents' use of physical engaging and helping in relation to studies in the ASD literature. Several studies have suggested that parents modify interaction styles based

upon the developmental age of the child as opposed to keeping with chronological age norms seen in studies of typical development. Kasari and colleagues (1988) reported that parents of 4 year olds diagnosed with ASD engage in high levels of physical support and assistance when scaffolding their children's play when compared to parents of typically developing children. The fact that parents used more physical comfort with children with social communication delays also mirrors previous literature that suggests that parents of developmentally younger children adapt their interactive style and utilize more physical engaging behaviors (Eisenberg & Spinrad, 2004; Grolnick et al., 1998).

In addition to these inverse associations between child social communication abilities and parent behaviors, we also found that parents' use of language-based engaging and helping increased as child social communication increased. This finding also aligns with previous research related to the development of ESR in typical populations. Parents of older, more developmentally-advanced, typically developing children frequently utilize language-based strategies to help maintain child engagement (Grolnick et al., 1998; Sameroff & Fiese, 1990). This finding is consistent with additional studies in the ASD literature that have found that parents modify their interactions to the developmental level of their child (Hirschler-guttenberg, Golan, et al., 2015; Kasari et al., 1988; Kasari, Gulsrud, Wong, Kwon, & Locke, 2010). In particular, Kasari and colleagues (1988) reported that parents' use of language when supporting play was associated with more advanced child social communicative abilities. And, Hirschler-guttenberg and colleagues (2015) have reported parents' differential use of parent use of language-based strategies with

autistic preschoolers based upon their cognitive abilities (e.g., higher child IQ associated with more parent language).

Collectively, our findings related to physical engaging and helping and language-based engaging and helping, as well as redirection and distraction suggest sensitive parenting practices, which involve modifying interactive style based on child developmental level. While directions of associations cannot be inferred from our data, these parent behaviors are associated with the sophistication of their child's social communication abilities.

Associations between child sensory processing and parent behaviors

In contrast to our significant findings linking child social communication and parent behaviors, we found minimal support for our second set of hypotheses that child sensory processing would be associated with parent behaviors. Of the eight parent behaviors, only physical engaging and helping was positively related to child sensory processing abilities. Parents of children who had better sensory processing used greater amounts of physical engaging and helping. This finding runs counter to our hypothesized relationship that higher sensory processing abilities would be associated with lower amounts of physical engaging and helping. It also stands in contrast to previous work which relates to sensory sensitivity and parent use of physical strategies in typically developing children (Cole et al., 2013). This finding may in part be due to the nature of the SPM-P. This tool looks broadly at sensory processing differences (e.g., social participation, vision, hearing, body awareness, etc.), whereas previous research in typical development has focused on measures of sensory over-reactivity and related temperamental differences. Alternatively, it might

be a unique finding that parents may be more “hands off” with children who demonstrate increased sensory processing impairments in an effort not to complicate the child’s sensory environment/experience. Future research is needed to further examine and better understand these associations.

General Discussion

It should be noted that a number of parent behaviors were not associated with either child social communication or child sensory processing (e.g., vocal comfort, language-based comfort, emotional following, active ignoring, etc.). In contrast to high frequency behaviors (e.g., physical engaging and helping, language-based engaging and helping, and redirection/distraction), these behaviors were observed only rarely. Therefore, it is possible that the lack of association was due to the low frequency of occurrence.

Several possible explanations exist for the low frequency of behaviors. While all of the behaviors included in the study are common parent behaviors, some of the behaviors may be more likely to be used/observed under specific conditions. For example, parent use of comfort behaviors may be generally more likely observed during times of child distress. While not formally measured, anecdotally, parents appeared to use comfort more often when their children were demonstrating more stress. As a group, the children in this study were observed to be fairly well regulated, and as a result, may have elicited less need to respond with comfort behaviors. And while episodes of distress, intense emotional expression, and arousal changes were observed during the visits, they were not the prevailing child behavioral presentation. Children’s infrequent distress may have been in part due to the nature of the home

visit. Despite the inclusion of a variety of activities in the home observation protocol which were designed to capture a range of parent child interactions, we did not intend to induce stress. It may be that being in their home environment, interacting with their parents, and having access to familiar activities and objects, helped to reduce child stress and, in turn, the need for parental comfort. Therefore, both the nature of the activities and the child's emotional state may have contributed to the low frequency of several parent behaviors.

It should be noted that the children's level of organization and engagement anecdotally reported in our study stands in contrast to the behavioral presentation of young children with ASD described in many lab-based studies where children experienced frequent distress. Given this difference in child presentation, it is possible that our findings more accurately reflect daily interactions between parents and young children diagnosed with ASD and also more accurately represent a wide range of effective ESR child abilities. Further study of the interactions in the home and aspects of the home environment may provide important information related to the ESR capacities of young children with ASD. Additionally, more fully understanding the nature and context of supportive environments reinforces the need to continue to conduct research within families' natural environments.

The literature on emotional regulation has often discussed parent behaviors associated with ESR in relation to their function and/or their symbolic quality. Our coding protocol was originally designed to reflect these theoretically-based categories of behavior. However, we found no empirical support for these constructs. While theoretically meaningful, previous studies which have conceptualized (Grolnick et al.,

1998) or reported on similar composites (Gulsrud et al., 2010) have offered minimal empirical support for the validity of the constructs. Therefore, it is possible that our failure to find internal consistency is not an issue of replication, but rather a reflection of the difference between theoretically driven composites and those that achieve statistical relevance. In addition, it is possible that our small N and the relative low frequency of several of the parent behaviors included in the composites contributed to our lack of anticipated findings of cohesive composites.

Despite the lack of composite structure, the associations among parent behaviors support the validity of our measures. We found relevant and meaningful associations between behaviors associated with functions of behavior. Specifically, engaging and helping variables were associated independent of whether they were physical or verbal. This suggests some cohesion in terms of function which was hypothesized; however, also unique from the original “active” behavior composite which also included redirection/distraction. Likewise, comfort behaviors (e.g., vocal, physical, and language-based) also hung together indicating a functional relationship. Here again, an additional variable included in the proposed “comfort” behavior composite (i.e., emotion following) was not related. Collectively, these results seem to indicate a need for refinement and greater specificity in the originally proposed composites representing functions of parent behavior. Additionally, several other associations between parent behaviors were found that warrant consideration when conceptualizing functional composites of parent behaviors and or considering patterns of parent response. For example, high amounts of parental redirection/distraction were associated with high levels of emotion following and low levels of engaging and

helping. These relationships may reflect established developmental patterns associated with normative development. Parents of developmentally young children redirect and distract based upon the child's emotional experience and expression; however, as the child's developmental skill levels (e.g., ESR, language abilities, cognitive capacities, etc.) increase with age and maturation, parents shift to more language-based behavior (Grolnick et al., 1998). These findings indicate that parents were engaging in behaviors in response to their child's behavior presentation and their developmental abilities. In an effort to better understand parent behaviors in relation to theoretical constructs of function, future research should focus on these associations.

As previously stated, our observation protocol was designed to capture parent behaviors across a variety of activities in naturally occurring settings and was intended to be reflective of typical parent child interactions. During our initial scanning of the data, parent behavior seemed to vary based on activity. Therefore, we decided to examine the data according to different conditions (i.e., free play and assessment) and also as a combined observation. Our analyses revealed several patterns of parent behavior which were consistent across all three conditions. In general parents tended to engage more frequently in physical engaging and helping, language-based engaging and helping, and redirection/distraction than in behaviors associated with comfort (i.e., physical comfort, vocal comfort, language-based comfort or emotional following). Parent use of active ignoring was rare.

Minimal variations in the amount of behaviors emerged by condition. In general, parents used more engaging and helping behaviors during free play than during the CSBS DP assessment; and, they engaged in more redirection and

distraction during the CSBS DP assessment than during free play. These differences in amount of behaviors appear to be related to the unique qualities in the nature of the activities. During free play, parents were able to engage their children in activities of their choosing without expectations and often followed their children's focus of attention. In contrast, during the CSBS DP assessment, predetermined toys were introduced in a structured protocol for the purpose of assessing the child's skills. In this instance parents may have engaged in greater amounts of redirection/distraction in an effort to encourage their children to "do their best." Despite these slight differences in amount of behaviors reported by condition, as previously stated the distribution of behaviors was consistent. Therefore, it appears that parents are consistent in the types of behaviors they use when interacting with their children regardless of the activity they are engaged in.

Overall, parents demonstrated high levels of engagement with their children. Eighty percent of the time parents were engaged in at least one of the parent behaviors included in our protocol. While it is not possible to comment on what was happening during the additional 20% of the time without further inquiry, this overall finding reflects that parents in our study were attentive to and interactive with their children for the overwhelming majority of time during a variety of naturally occurring activities in the home environment.

The parents and children in our study were a unique sample who welcomed us into their homes. The children participating in our study were between 30-48 months of age ($m=40$ months). As a group, they were not observed to be generally stressed during the home visit; however, individually they did exhibit a wide range of

emotional states and arousal levels throughout the visits. Removal of preferred toys and transitions between activities appeared to be the most frequent causes of distress. As a group they were relatively engaged in the home visit activities and took a particular interest in novel toys (i.e., Hoberman sphere) introduced by the researchers. The majority of parents chose to engage their children in play with their familiar toys, as well. Many parents expressed gratitude for the opportunity to participate in research in a home based study and to show researchers what “life is really like.”

Collectively, children demonstrated significant social communication delays for their chronological ages. They represented a wide range of social communication abilities ranging from non-verbal children who initiated interactions infrequently to highly verbal children who engaged fluidly in reciprocal interactions. The children also demonstrated considerable sensory processing challenges according to parent report (e.g., constant seeking of movement, sensitivity to sounds, withdraw from busy environments, etc.). However, here again, individual abilities ranged widely from functioning considered typical for their age group to significant challenges that could impact most aspects of daily life. In the current body of ASD literature, there is no comparable group with regards to age, diagnosis, and child characteristics reported to compare our sample of child participants to. Therefore, we do not know how representative our sample is of the ASD population at this range. However, we feel confident given our review of child characteristic scores that our sample represents the broad spectrum of abilities seen in Autism diagnoses.

Participants in this study were racially and ethnically diverse. In contrast to much of the research of children with ASD at this age, 32.4% of our sample identified

as families of color. These data is consistent with racial and ethnic diversity reported in the national census (US Census Bureau, 2014). Historically, young children of color are under-represented in the ASD literature. This is in part due to the average age of diagnosis for children of color is 5 years of age, in comparison to White children who are diagnosed on average at 2.5 years of age (ADDM, 2012). Several factors are often cited in relation to these diagnostic age differences. They include families of color's lack of connection to services, as well as differing cultural expectations of behavior for young children.

The children of color in our sample demonstrated more significant delays in social communication and sensory processing than the White children in our study. These significant delays may have accounted for their diagnosis earlier than the national average for their race and ethnicity, and for our ability to recruit their participation. Additionally, our ability to recruit a diverse sample may have been related to families of color often being underserved by educational and therapeutic systems. Several parents of color commented on how grateful they were to have someone coming into their home to talk with them and see the realities of daily life. At the conclusion of our home visits, many of these families asked questions related to how to access statewide services and/or how to advocate for school based interventions, which suggests lack of family support mechanisms despite a clear need.

The diversity of our sample allowed us to explore group differences between parent behaviors used by parents of color and those used by White parents. Very few differences emerged. Only two warrant mentioning. Parents of color utilized significantly more redirection and distraction than White parents during the CSBS DP

assessment. They also used less language-based engaging and helping during free play. However, after controlling for child social communication ability these differences were no longer significant. As such, any interpretation of these findings should be undertaken with caution, as the group sizes in this study were small. Further research is needed to explore the associations between parent behaviors and child characteristics for racial and ethnically diverse groups.

Strengths of the Present Study

One of the major strengths of this study was that the data were collected during home visits in the child's natural environment with their parents. Most previous research on ASD has been conducted in clinic-based settings and has focused on times of child stress rather than in natural environments and being inclusive of all child experiences. This study was designed to address these shortcomings in the literature in an effort to gain a broader understanding of behaviors parents in the context of daily activities within the natural environment. In addition, the observational methods employed enabled us to capture and quantify data related to parent behaviors in naturalistic interactions rather than relying on parent report related to their interactive style. Observations across a number of activities allowed for a more detailed analysis and our ability to consider the influence of activity/context on parent/child interactions.

Participants in this study had a confirmed diagnosis of ASD and were between the ages of 30-48 months, an important age for exploring ESR development. Participants in ASD research often represent large age ranges spanning many years which make it difficult to interpret findings. Our relatively narrow age range for child

participants in this study was purposeful to address this shortcoming in the literature. Likewise, the considerable diversity in the sample with respect to race/ethnicity as previously discussed is considered to be a strength as families of color are often not well represented in ASD research despite their representation in the ASD population at large.

Limitations of the Present Study

A limitation of this study is that the findings reported here are cross sectional in nature and do not allow for causal conclusions about child characteristics and parent behaviors, nor do they allow us to make inferences related to change over time or compare to typically developing peers group parent/child interactions. The data provide only a brief snap shot of parents' overall interactive styles. While parents reported their children on a whole behaved as they typically would and that their interactions with them were natural, the data may not be representative. Parents were aware that researchers were interested in how they supported their children. This may have served as a prime for parents. Therefore, social desirability may have influenced their behavior and/or answers on parent report measures.

Additionally, given that this was an observational study the presence of the two researchers in the home, as well as the camera, may have been a factor influencing both parent and child behavior. As previously mentioned, despite variation in emotional expression and arousal levels, collectively child participants were fairly well regulated throughout the observation. This overall presentation may in part have been related to the study being conducted in the comfort and familiarity of their home environment, which is supportive of regulation. In turn, this may have decreased our

ability to assess behaviors engage in when supporting their children during stressful interactions, activities, and environments.

And finally, our coding scheme of parent behavior included categories of behavior that were relatively large and did not account for specific qualities of the behavior. For example, the parent behavior language-based engaging and helping consisted of behaviors ranging from giving the child a direction to commenting on how a toy worked. Therefore, much remains to be investigated with relation to the specific qualities of parent behaviors and their potential impact upon the development of child ESR.

Implications of Study Findings

Our results suggest that parents engage in a variety of behaviors that have been previously associated with supporting child ESR during interactions with their children, and that their engagement in these behaviors is associated with the social communicative abilities of their child. This is considered to be initial evidence related to the relationship of parent behaviors theoretically supportive of ESR and diagnostically significant ASD child characteristics. These initial findings are a critical first step towards greater understanding of the factors impacting ESR development among children with ASD. They may also serve to inform the design of parent based intervention approaches. It is generally acknowledged that ESR challenges emerge early in development for this population and persist, negatively impacting engagement in daily activity and quality of life. Gray and colleagues (2014) highlighted the long term implications of behavioral challenges related to ESR difficulty for adults with ASD citing greater needs for community support and

reduction in employment. Therefore, understanding risk and protective factors related to the development of ESR is essential in the design of effective interventions targeted at minimizing developmental challenges.

The findings of the study have additional implications for consideration related to race/ethnicity for families of young children diagnosed with ASD. We found greater impairments in social communication and sensory processing for young children of color than for White children, lending evidence to the assertion that children of color who demonstrate greater skill in these areas are often diagnosed later and do not have access to early intervention services which are thought to be critical for positive long term outcomes for individuals diagnosed with ASD (ADDM, 2012).

Future Directions

Based on study findings and limitations, future research should seek to clarify a number of questions raised by the current study. The focus of this study was on parent behavior in relation to child characteristics. However, in an effort to further understand the complexities inherent in the transactional nature of ESR development, coding for child emotional state in addition to parent behaviors is considered to be a logical next step of inquiry. This additional data will allow for the exploration of relationships between parent behaviors and particular child emotional states. Previous work has suggested parents of children with ASD use less frequent language based behaviors in times of stress (Gulsrud et al., 2010; Hirschler-guttenberg, Golan, et al., 2015).

In addition, coding for ESR behavior used by children during these same observations will allow for examination of the relationship between parent behaviors

supportive of ESR and child ESR strategies. Ideally, this work would be conducted in a longitudinal manner and in natural environments which would allow for gathering of information related to growth and development of skill over time in natural environments. Likewise, the utilization of qualitative methods to further explore of the current video data set for themes related to parental experience supporting ESR and parental impressions of their child's ESR abilities is considered to be important for providing additional context for the quantitative findings. Collectively, all of these relationships will be important in helping to provide a more comprehensive understanding of parenting practices related to supporting young children with ASD's ESR and the implications of those practices on child ESR abilities. Such knowledge could then be used to inform the development of targeted parent based interventions that may decrease the secondary burdens and long term challenges posed by ESR challenges.

In addition, although this sample is relatively large by ASD research standards, recruitment of a larger sample could be helpful to further understand the associations examined in our study and also potentially illuminate associations with lower frequency behaviors. This may be particularly relevant to the further examination of associations between sensory processing and parent behaviors. Furthermore, future research within culturally diverse populations is warranted to further understand racial/ethnic group differences that emerged in our findings in relation to both child characteristics and parent behavior.

Finally, parent behaviors associated with supporting ESR in the current study are defined broadly. Previous work exploring the relationship between parent

language models and child language acquisition have examined specific qualities of language used in order to establish more specific relationships. Refining the categories of the parent behaviors included in our study for future research projects could help to provide additional, more specific information which may be useful in the design of targeted interventions. Additional consideration should also be given to the theoretical constructs for categorizing parent behaviors in an effort to help refine our understanding of parenting strategies and also potentially to reconsider how we measure them.

TABLES

Table 1

Participant Characteristics as a Percentage of Sample

Characteristic	n	(%)
Parent Gender		
Female	34	(91.9)
Male	3	(8.1)
Child Gender		
Female	7	(18.9)
Male	30	(81.1)
Parent Education		
Some high school	3	(8.1)
Completed high school	5	(13.5)
Some college	11	(29.7)
College	17	(45.9)
Decline to answer	1	(2.7)
Race/Ethnicity		
White	25	(67.6)
Families of Color	12	(32.4)
Latino/ Hispanic	6	(16.2)
African American	5	(13.5)
Chinese	1	(2.7)
Family Income		
Upper class	1	(2.7)
Upper middle class	3	(8.1)
Middle class	11	(29.7)
Lower middle class	8	(21.6)
Working class	9	(24.3)
Decline to answer	5	(13.5)
Child Daily Environment		
Home with parent	30	(81.1)
Daycare	1	(2.7)
Home daycare	1	(2.7)
Preschool	5	(13.5)

Note. N=37

Table 2

Summary of Means, Standard Deviations, and Ranges for Family Member Age

Participant Age (N=37)	M (SD)	Range
Parent Age in Years ^a	33.89 (5.38)	21-43 years
Child Age in Months	40.86 (5.75)	30-48 months

^aN=36, one parent declined to answer

Table 3

Summary of Means, Standard Deviations, and Ranges for Measures of Child Characteristics

Characteristic	M (SD)	Range
Social Communication Abilities	68.39 (37.82)	18-146
Sensory Processing Ability	69.97 (8.143)	45-80

Note. N=37

^aCSBS DP Total Composite

^bSPM P Total Score

Table 4

Proportion of Parent Behaviors during Combined Observation, Free Play, and CSBS-DP

Parent Behavior	<u>Combined Observation</u>		<u>Free Play</u>		<u>CSBS DP</u>		<i>t</i> (36) ^a
	M	SD	M	SD	M	SD	
Physical Engaging and Helping	49.83	16.41	54.96	19.42	42.61	16.68	4.29*
Language-based Engaging and Helping	52.67	17.28	56.23	19.38	48.66	19.59	2.64*
Redirection / Distraction	13.91	9.60	13.20	11.3	16.45	15.15	-1.22
Physical Comfort	1.75	2.44	1.47	3.07	2.21	3.96	-.88
Vocal Comfort	0.19	0.64	0.27	1.14	0.10	0.35	.85
Language-based Comfort	0.72	1.21	0.77	1.62	0.72	1.62	.128
Emotional Following	5.19	3.71	6.41	5.25	3.43	3.67	2.92**
Active Ignoring	0.35	0.96	0.45	1.5	0.28	0.99	.61
None of the Above	21.68	12.84	17.21	11.54	26.53	16.54	-4.66*

Note. N=37

^a *t*-score CSBS DP assessment and free play

p*<.05, *p*<.01

Table 5

t-Test Results Comparing Child Characteristics for White Children and Children of Color

Measure	White (N=25)		Children of Color (N=12)		<i>t</i> -score
	Mean	SD	Mean	SD	
Social Communication Abilities ^a	76.88	38.62	50.71	30.37	2.06*
Sensory Processing Ability ^b	67.72	8.473	74.67	4.979	-2.62*

^aCSBS DP Total Composite

^bSPM P Total Score

**p*<.05

Table 6

Associations between Child Characteristics and Continuous Child Demographics

Demographic	Social Communication Abilities ^a	Sensory Processing Ability ^b
Child age (N=37)	.287	.248
Hours of Intervention (N=30)	-.007	-.117

^aCSBS DP Total Composite^bSPM P Total Score

*p<.05

Table 7

Associations between Continuous Demographics and Parent Behaviors

Parent Behaviors	Combined observation		Free play		CSBS DP	
	Child age	Hours of intervention	Child age	Hours of intervention	Child age	Hours of intervention
Physical Engaging and Helping	-.403*	.129	-.419**	.099	-.221	.112
Language-based Engaging and Helping	-.183	-.111	-.049	-.052	-.277	-.211
Redirection/ Distraction	.138	.310	.002	.121	.199	.271
Physical Comfort	-.057	.174	-.041	-.034	-.038	.315
Vocal Comfort	.017 .919	.153 .419	-.801	.073	.108	.326
Language-based Comfort	-.219	-.125	-.135	-.146	-.159	.253
Emotional Following	.090	-.041	.015	-.022	.180	-.009
Active Ignoring	.001	-.037	.041	-.016	-.049	-.240

*P<.05 level (2-tailed), **p<.01 level (2-tailed)

Table 8

Intercorrelations of Parent Behaviors During Combined Observation

Parent Behavior	1	2	3	4	5	6	7	8
1. Physical Engaging and Helping	1	.382*	.239	.134	.115	.054	.314	-.031
2. Language-based Engaging and Helping		1	-.352*	-.150	-.016	.087	.091	-.194
3. Redirection /Distraction			1	.260	.057	.026	.398*	.320
4. Physical Comfort				1	.373*	.292	.081	.156
5. Vocal Comfort					1	.370*	.189	.638**
6. Language-based Comfort						1	.413*	.463**
7. Emotional Following							1	.172
8. Active Ignoring								1

*p<.05 level (1-tailed), **p<.01 level (1-tailed)

Table 9

Associations between Child Characteristics and Parent Behaviors

	Child Characteristic					
	Combined Observation		Free Play		CSBS DP Assessment	
	Social Communication Abilities ^a	Sensory Processing Ability ^b	Social Communication Abilities ^a	Sensory Processing Ability ^b	Social Communication Abilities ^a	Sensory Processing Ability ^b
Parent Behavior						
Physical Engaging and Helping	-.367*	-.265	-.259	-.301*	-.317*	-.118
Language-based Engaging and Helping	.389**	-.215	.498**	-.233	.203	-.117
Redirection/ Distraction	-.584**	.112	-.476**	.129	-.506**	.042
Physical Comfort	-.373*	.229	-.203	.209	-.326*	.111
Vocal Comfort	-.121	.197	-.127	.214	.040	-.013
Language-based Comfort	-.207	-.132	-.111	.124	-.232	-.087
Emotional Following	-.132	.108	-.206	.059	.145	.159
Active Ignoring	-.258	.113	-.177	.174	-.230	-.082

^aCSBS DP Total Composite^bSPM P Total Score

*p<.05 (1-tailed), **p<.01 level (1-tailed)

Table 10

Combined Observation- Child Characteristics Predicting to Parent Behaviors

Predictors	Parent Behaviors			
	Physical Engaging/ Helping	Language Engaging/ Helping	Redirection /Distraction	Physical Comfort
	β	β	β	β
Child Age	-.298	-.289	.294*	.073
Race / Ethnicity	-.099	-.125	.148	-.073
Social Communication Abilities ^a	-.314	.431*	-.619*	-.418
Model F	3.416*	3.848*	9.402*	1.880

Note. Model (df)= (3,33)

^aCSBS DP Total Composite

*p<.05, **p<.01

Table 11

Free play- Child Characteristics Predicting to Parent Behavior

Predictors	Parent Behaviors			
	Physical Engaging/ Helping	Language Engaging/ Helping	Redirection /Distraction	Physical Comfort
	β	β	β	β
Child Age	-.354	-.157	.114	-.026
Race / Ethnicity	-.083	-.199	.140	.167
Social Communication Abilities ^a	-1.85	.478**	-.462**	-.141
Model F	2.790	5.202*	3.932*	.759

Note. Model (df)= (3,33)

^aCSBS DP Total Composite

*p<.05, **p<.01

Table 12

CSBS DP Assessment- Child Characteristics Predicting to Parent Behavior

Predictors	Parent Behaviors			
	Physical Engaging/ Helping	Language Engaging/ Helping	Redirection /Distraction	Physical Comfort
	β	β	β	β
Child Age	-.126	-.362	.338 *	.133
Race / Ethnicity	-.058	-.013	.140	-.275
Social Communication Abilities ^a	-.300	.302	-.557**	-.455
Model F	1.526	2.150	7.383**	2.287

Note. Model (df)= (3, 33)

^aCSBS DP Total Composite

*p<.05, **p<.01

Table 13

Combined Observation- Child Sensory Processing Predicting to Parent Behavior

Predictors	Parent Behaviors	
	Physical Engaging/ Helping	Language Engaging/ Helping
	β	β
Child Age	-.304	-.047
Race / Ethnicity	-3.779	-5.287
Sensory Processing Ability ^a	-1.255*	-1.426
SensoryXRace	4.403	5.706
Model		
F	3.064*	2.656

Note. Model (df)= (4,32)

^aSPM P Total Score

* p<.05 ** significant at .01

Table 14

Free Play- Child Sensory Processing Predicting to Parent Behavior

Predictors	Parent Behaviors	
	Physical Engaging/ Helping	Language Engaging/ Helping
	β	β
Child Age	-.328	.100
Race / Ethnicity	-2.721	-5.047*
Sensory Processing Ability ^a	-.990	-1.360*
SensoryXRace	3.175	5.337*
Model F	2.842*	2.885*

Note. Model (df)= (4,32)^aSPM P Total Score

*p<.05, ** p< .01

Table 15

CSBS DP Assessment- Child Sensory Processing Predicting to Parent Behavior

Predictors	Parent Behaviors	
	Physical Engaging/ Helping	Language Engaging/ Helping
	β	β
Child Age	-.130	-.198
Race / Ethnicity	-5.035	-3.978
Sensory Processing Ability ^a	-1.478	-1.033
SensoryXRace	5.821	4.369
Model F	1.939	1.620

Note. Model (df)= (4,32)

^aSPM P Total Score

*p<.05 level **p<.01 level

FIGURES

Figure 1.

Theoretical Composites of Parent Behaviors Associated with ESR

APPENDICES

Appendix A

1

Demographic Questionnaire

Child Sex	
Male	
Female	

Date	Child Birth Date	Child Age

Birth Order
Is your child the oldest, youngest, middle, or only child in the home?

Who lives in the home?

Parent Age	
Mother	
Father	

Parent Education Level	Mother	Father
Some high school		
Completed high school		
Some college		
College Degree		

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THINK BIG WE DO™

Highest degree earned		
Decline to answer		

Family Income	
Upper class	
Upper middle class	
Middle class	
Lower middle class	
Working class	
Decline to answer	

Family Race / Ethnicity	Check all that apply
African American, black	
American Indian	
Caucasian , white	
Chinese	
Filipino	
Hispanic or Latino	
Indian	
Japanese	
Korean	
Mexican	
Middle Eastern	
Southeast Asian	
Decline to Answer	

Where does your child spend the majority of their day?

Home with parent	
Home with other relative	
Home with paid caregiver	
Daycare center	
Home daycare	
Other	

Please share a bit of information related to your child's current educational programming and therapy

Number of hours of intervention provided by outside providers?

Services included	Check all that apply
Speech and Language Therapy	
Occupational Therapy	
Physical Therapy	
Educational Services	
Applied Behavioral Analysis Therapy	
Developmental /Floortime Therapy	
Social Work	
Other

Focus of programming	Check all that apply and asterisk priorities
Nonverbal Communication	
Verbal Communication	
Augmentative Communication	
Social Interaction / Relationship Building	
Attention and Focus	
Coping and Soothing Skills	
Cognitive Skills	
Motor Skill Development	

Additional Interventions currently in use	Check all that apply
Dietary	
Supplements	
Medications	
Playgroups	
Horseback riding	
Private Therapies	
Other	

Appendix B

CSBS DP Behavior Sample: Caregiver Perception Rating

Child's name: _____ Date of birth: _____ Date filled out: _____

Filled out by: _____ Relationship to child: _____

Instructions for caregivers: Please compare your child's behavior during the communication and play assessments we have just completed to your observations of your child in similar situations. Circle the response that comes closest to your observations.

	1	2	3
1. Alertness	less than usual/sleepy	typical	very alert/ greater than usual
2. Emotional reaction	more negative than usual	typical	more positive than usual
3. Level of interest and attention	less interest than usual	typical	greater interest/ greater attention
4. Comfort level	more cautious/ more wary than usual	typical	more comfortable/ relaxed than usual
5. Level of activity	less active than usual	typical	more active than usual
6. Overall level of communication	less than usual	typical	greater than usual
7. Play behavior	less organized and less focused	typical	more organized and focused
Comments: _____			

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CSBS DP Behavior Sample: Scoring Worksheet

Child's name: _____ Date completed: _____

Date of birth: _____

Chronological age¹ (in months): _____

¹Calculate chronological age by subtracting Date of birth from Date the Checklist was filled out. If child is 4 or more weeks premature, use corrected age. For detailed instructions, see the CSBS DP Manual, First Normed Edition.

Sampling Opportunity:

1	2	3	4	5	6
Wind-up toy	Balloon	Bubbles	Jar	Books	Play

COMMUNICATION SCALES (Score during Opportunities 1 to 6)

Emotion and Eye Gaze

1. Gaze shifts
2. Shared positive affect
3. Gaze/point following

☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐

Scale 1 + Scale 2 + Scale 3 × 3 =

Weighted Raw Score:

Communication

4. Rate of communicating
5. Behavior regulation
6. Social interaction
7. Joint attention

0 1 2 3+	0 1 2 3+	0 1 2 3+	0 1 2 3+	0 1 2 3+	0 1 2 3+
☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐

Scale 4 ÷ 3 + Scale 5 + Scale 6 + Scale 7 =

Weighted Raw Score:

Gestures

8. Inventory of conventional gestures
check all that child uses:
9. Distal gestures

☐ gives	☐ shows	☐ pushes/pulls away	☐ reaches
☐ points	☐ waves	☐ nods head	☐ shakes head
☐	☐	☐	☐

Scale 8 × 2 + Scale 9 =

Weighted Raw Score:

Sounds

10. Syllables with consonants
11. Inventory of consonants
check all that child uses:

☐	☐	☐	☐	☐	☐
☐ /m/	☐ /n/	☐ /b/p/	☐ /d/t/	☐ /g/k/	
☐ /w/	☐ /l/	☐ /y/	☐ /s/	☐ /sh/	

Scale 10 + Scale 11 × 2 =

Weighted Raw Score:

Words

12. Words
13. Inventory of words
write examples of words used:

☐	☐	☐	☐	☐	☐
1	2	3	4		
5	6	7	8		
9	10	11	12		
13	14	15	16		

14. Word combinations

☐	☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

15. Inventory of word combinations
write examples of words combined:

1	2
3	4
5	6
7	8

Weighted Raw Score:

Scale 12 + Scale 13 ÷ 2 + Scale 14 + Scale 15 =

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SYMBOLIC BEHAVIOR SCALES (Score only during Opportunity 6 Play)

Understanding

16. Language comprehension

object names:

1	2	3	4
---	---	---	---

person names:

1	2	3
---	---	---

body parts:

1	2	3	4
---	---	---	---

(maximum of 3 raw score) (maximum of 2 raw score) (maximum of 3 raw score)

Weighted Raw Score for scale 16:

Object names ____ × 3 + Person names ____ × 3 + Body parts ____ × 3 =

Object Use

17. Inventory of action schemes

check all that child uses:

☐ puts in ¹ ☐ puts on ² ☐ drinks with bottle ³ ☐ drinks with cup ⁴ ☐ hugs ⁵ ☐ kisses ⁶

☐ feeds with utensil ⁷ ☐ feeds with bowl ⁸ ☐ stirs ⁹ ☐ scoops ¹⁰ ☐ pours ¹¹ ☐ other action: ¹²

18. Action schemes toward other

write action numbers & agent's initials:

--	--	--	--

19. Sequences action schemes

write action numbers:

--	--	--	--

20. Stacks tower of blocks

circle highest number:

refuses, mouths, or bangs	tries but fails to stack	stacks	stacks	stacks	stacks
0	1	2	3	4	5

Weighted Raw Score:

Scale 17 + Scale 18 + Scale 19 + Scale 20 =

CSBS DP Behavior Sample: Scoring Summary

		Weighted raw score	Standard score	Percentile rank	Concern
Cluster scores					
Social	Emotion and Eye Gaze				
	Communication				
	Gestures				
Speech	Sounds				
	Words				
Symbolic	Understanding				
	Object Use				
Composite scores					
Social					
Speech					
Symbolic					
TOTAL					

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Appendix C

Inter-Rater Reliability CSBS DP Assessment

Composite	Kendall's tau-b	Asymptotic Standardized Error	Simple Percentage Agreement
Social	0.976	0.03	98
Speech	1.0	0.00	99
Symbolic	1.0	0.00	99
Total Score	1.0	0.00	99

Appendix D

Sensory Processing Measure-Preschool

Cheryl Ecker, M.A., OTR/L,
and L. Diane Parham, Ph.D., OTR/L, FAOTA

Home Form

Summary Sheet

Ages 3-5

Name (or ID#): _____ Age: _____ Gender: ☐ M ☐ F

Date this form completed: _____ Reason for assessment: _____

%ile	T	SOC	VIS	HEA	TOU	BOD	BAL	PLA	TOT	T	%ile
80		28-32	38-44	30-36	36-56	27-36	33-44	29-36	153-232	80	
79		27	37	29		26			151-152	79	
78				28		25		28	149-150	78	
77			35-36	27	35	24	32	27	148	77	
76		26	32-34	26	34	23	28-31	25-26	141-147	76	
75		25	30-31	25			24-27	23-24	140	75	
>99	74		29		33	22		21-22	139	74	>99
99	73	24	28	24			23		137-138	73	99
	72		26-27	22-23	32	21	22	20	119-136	72	
98	71	23	25	21	31	20	21	19	113-118	71	98
	70	22	24	20	30		20		111-112	70	
97	69	21	23	19	29	19		18	106-110	69	97
96	68	20			28	18	19		104-105	68	96
	67	19	22	18	27		17-18	17	98-103	67	
95	66	18	21	17	26	17			95-98	66	95
93	65				25	16		16	93-94	65	93
92	64		20	16	24		16	15	91-92	64	92
90	63	17		15	23				89-90	63	90
88	62		19		22	15	15		88	62	88
86	61							14	85-87	61	86
84	60		18	14	21	14			84-85	60	84
82	59	16							82-83	59	82
79	58		17	13	20		14	13	83-81	58	79
76	57					13			79	57	76
73	56	15	16						77-78	56	73
69	55			12	19		13	12	76	55	69
66	54	14				12			75	54	66
62	53		15		18				74	53	62
58	52	13		11				11	72-73	52	58
54	51								71	51	54
50	50	12	14			11	12		70	50	50
46	49				17				69	49	46
42	48							10	68	48	42
38	47	11	13	10					67	47	38
34	46				16	10			66	46	34
31	45								65	45	31
27	44	10								44	27
24	43		12		15				64	43	24
21	42						11		63	42	21
18	41									41	18
16	40	8-9	11	9	14	9		9	58-62	40	16

Raw Score ► _____

T-Score ► _____

Interpretive Range

Typical (40T-59T) ☐

Some Problems (60T-69T) ☐

Definite Dysfunction (70T-80T) ☐

◀ Raw Score

◀ T-Score

DIF Calculation

Home Form TOT T-score _____

School Form TOT T-score _____

Environment Difference (DIF) = _____

DIF Interpretation

☐ DIF ≥ 15 DEFINITE difference: More problems in Home than in School

☐ 14 ≥ DIF ≥ 10 PROBABLE difference: More problems in Home than in School

☐ 9 ≥ DIF ≥ -9 NO difference in amount of problems between School and Home

☐ -10 ≥ DIF ≥ -14 PROBABLE difference: More problems in School than in Home

☐ -15 ≥ DIF DEFINITE difference: More problems in School than in Home

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EXAMINER: REMOVE THIS SHEET BEFORE COMPLETING FORM.

Sensory Processing Measure-Preschool

Cheryl Ecker, M.A., OTR/L,
and L. Diane Parham, Ph.D., OTR/L, FAOTA

Home Form

Summary Sheet

Age 2

Name (or ID#): _____

Age: _____

Gender: ☐ M ☐ F

Date this form completed: _____

Reason for assessment: _____

%ile	T	SOC	VIS	HEA	TOU	BOO	BAL	PLA	TOT	T	%ile
80	29-32	31-44	27-36	47-56	32-36	28-44	28-36	161-232	80		
79	28	30		45-46	30-31	26-27	26-27	151-160	79		
78			25-26					141-150	78		
77	27	29		43-44	28-29	24-25	24-25	136-140	77		
76			23-24					131-135	76		
75	26	28		41-42	27		23	125-130	75		
>99	74		21-22	39-40	26		21-22		74	>99	
99	73	25		37-38			20		73	99	
72		27	20	35-36	25		19		72		
98	71	24	26	32-34	24	22		118-122	71	98	
70		25		30-31	23	20-21		113-117	70		
97	69		24	19	28-29	21-22	19		69	97	
96	68	23				19-20		110-112	68	96	
67		22		18			18	106-109	67		
95	66	21	23		27	18		107	66	95	
93	65	20		17	26	17		105-106	65	93	
92	64		22		25		17	104	64	92	
90	63			16	24			102-103	63	90	
88	62		21		23	16	16	98-101	62	88	
86	61	19	20	15				92-97	61	86	
84	60		19		22	15	15	90-91	60	84	
82	59	18		14				88-89	59	82	
79	58				21	14		87	58	79	
76	57	17	18	13			14	85-86	57	76	
73	56							84	56	73	
69	55			12	20			82-83	55	69	
66	54	16	17			13		80-81	54	66	
62	53				19		13	79	53	62	
58	52					12	12	77-78	52	58	
54	51	15	16		18			76	51	54	
50	50			11				74-75	50	50	
46	49	14	15					73	49	46	
42	48				17	11	12	72	48	42	
38	47	13	14					71	47	38	
34	46			10				70	46	34	
31	45	12			16			68-69	45	31	
27	44	11	13				10	67	44	27	
24	43					10		66	43	24	
21	42							65	42	21	
18	41	10	12		15			64	41	18	
16	40	8-9	11	9	14	9	11	9	40	16	

Raw Score ▶	_____	_____	_____	_____	_____	_____	_____	_____	_____	◀ Raw Score
T-Score ▶	_____	_____	_____	_____	_____	_____	_____	_____	_____	◀ T-Score
Interpretive Range										
Typical (40T-59T)	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Some Problems (60T-69T)	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Definite Dysfunction (70T-80T)	☐	☐	☐	☐	☐	☐	☐	☐	☐	

DIF Calculation

Home Form TOT T-score _____

School Form TOT T-score _____

Environment Difference (DIF) = _____

DIF Interpretation

☐ DIF ≥ 15

☐ 14 ≥ DIF ≥ 10

☐ 9 ≥ DIF ≥ -9

☐ -10 ≥ DIF ≥ -14

☐ -15 ≥ DIF

DEFINITE difference: More problems in *Home* than in *School*

PROBABLE difference: More problems in *Home* than in *School*

NO difference in amount of problems between *School* and *Home*

PROBABLE difference: More problems in *School* than in *Home*

DEFINITE difference: More problems in *School* than in *Home*

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Sensory Processing Measure-Preschool

HOME

Cheryl Ecker, M.A., OTR/L,
and L. Diane Parham, Ph.D., OTR/L, FAOTA

AutoScore™ Form

Directions

Please answer the questions on this form based on your *child's typical behavior during the past month*. Use the following rating scale:

- Never:** The behavior *never* or *almost never* happens
Occasionally: The behavior happens *some of the time*
Frequently: The behavior happens *much of the time*
Always: The behavior *always* or *almost always* happens

Circle the *one* answer that best describes how often the behavior happens. Try your best to answer all of the questions.

Several questions ask whether your child shows "distress" in certain situations. Showing distress may include verbal expressions (whining, crying, yelling) or nonverbal expressions (withdrawing, gesturing, pushing something away, running away, wincing, striking out).

You may use the space provided on the left to add any comments on your child's behavior or functioning.

Parent/Guardian Information

Your Name/ID#: _____

Your Relationship to Child: _____ Today's Date: _____

Child Information

Child's Name/ID#: _____

Child's Gender: ☐ M ☐ F Child's Age: _____ Years _____ Months

Race/Ethnicity:

- ☐ American Indian/Alaska Native ☐ Asian ☐ Black/African American
☐ Hispanic/Latino ☐ Native Hawaiian/Pacific Islander ☐ White ☐ Other

Comments on child's behavior/functioning: _____

PLEASE PRESS HARD WHEN CIRCLING YOUR RESPONSES.

Never Occasionally Frequently Always

SOCIAL PARTICIPATION This child...

- N.....O.....F.....A..... 1. Plays with friends cooperatively.
N.....O.....F.....A..... 2. Shares things when asked.
N.....O.....F.....A..... 3. Joins in play with others without disrupting the ongoing activity.
N.....O.....F.....A..... 4. Takes part in appropriate mealtime interactions.
N.....O.....F.....A..... 5. Participates appropriately in family outings, such as dining out or going to a park or museum.
N.....O.....F.....A..... 6. Participates appropriately in family gatherings, such as holidays, weddings, and birthdays.
N.....O.....F.....A..... 7. Participates appropriately in activities with friends, such as parties, using playground equipment, and riding tricycles.
N.....O.....F.....A..... 8. Cooperates during family errands, such as grocery shopping or picking up siblings from school.

VISION This child...

- N.....O.....F.....A..... 9. Seems bothered by light, especially bright light (blinks, squints, cries, closes eyes, etc.).
N.....O.....F.....A..... 10. Has trouble finding an object when it is part of a group of other things.
N.....O.....F.....A..... 11. Has difficulty recognizing how objects are similar or different based on their colors, shapes, or sizes.
N.....O.....F.....A..... 12. Enjoys watching objects spin or move more than most children his or her age.
N.....O.....F.....A..... 13. Walks into objects or people as if they were not there.
N.....O.....F.....A..... 14. Likes to flip light switches on and off repeatedly.
N.....O.....F.....A..... 15. Enjoys looking at moving objects out of the corner of his or her eye.
N.....O.....F.....A..... 16. Has trouble paying attention if there are a lot of things to look at.
N.....O.....F.....A..... 17. Becomes bothered by busy visual environments, such as a cluttered room or a store with a lot of items.
N.....O.....F.....A..... 18. Becomes easily distracted by looking at things while walking.
N.....O.....F.....A..... 19. Has trouble completing simple tasks when there are many things to look at.

HEARING This child...

- N.....O.....F.....A..... 20. Seems bothered by ordinary household sounds, such as the vacuum cleaner, hair dryer, or toilet flushing.
N.....O.....F.....A..... 21. Responds negatively to loud noises by running away, crying, or holding hands over ears.
N.....O.....F.....A..... 22. Appears not to hear certain sounds.
N.....O.....F.....A..... 23. Seems disturbed by or intensely interested in sounds not usually noticed by other people.
N.....O.....F.....A..... 24. Seems easily distracted by background noises, such as a lawn mower outside, an air conditioner, a refrigerator, or fluorescent lights.
N.....O.....F.....A..... 25. Likes to cause certain sounds to happen over and over again, such as by repeatedly flushing the toilet.
N.....O.....F.....A..... 26. Shows distress at shrill or brassy sounds, such as whistles, party noisemakers, flutes, and trumpets.
N.....O.....F.....A..... 27. Becomes distressed by busy sounds, such as a party or a crowded room.
N.....O.....F.....A..... 28. Startles easily when hearing a loud or unexpected sound.

continue on back page...

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PLEASE PRESS HARD WHEN CIRCLING YOUR RESPONSES.

Never	Occasionally	Frequently	Always	
N.....	O.....	F.....	A.....	TOUCH This child... 29. Pulls away from being touched lightly.
N.....	O.....	F.....	A.....	30. Prefers to touch rather than to be touched.
N.....	O.....	F.....	A.....	31. Becomes distressed by having his or her fingernails cut.
N.....	O.....	F.....	A.....	32. Seems bothered when someone touches his or her face.
N.....	O.....	F.....	A.....	33. Avoids touching or playing with finger paint, paste, sand, clay, mud, glue, or other messy things.
N.....	O.....	F.....	A.....	34. Has an unusually high tolerance for pain.
N.....	O.....	F.....	A.....	35. Dislikes teeth brushing, more than most children his or her age.
N.....	O.....	F.....	A.....	36. Seems to enjoy sensations that should be painful, such as crashing onto the floor or hitting his or her own body.
N.....	O.....	F.....	A.....	37. Dislikes having his or her hair combed, brushed, or styled.
N.....	O.....	F.....	A.....	38. Dislikes having his or her hair cut.
N.....	O.....	F.....	A.....	39. Avoids eating foods of certain textures.
N.....	O.....	F.....	A.....	40. Gags or vomits in response to foods of certain textures.
N.....	O.....	F.....	A.....	41. Dislikes having his or her face washed or wiped.
N.....	O.....	F.....	A.....	42. Drools more than most children his or her age.
N.....	O.....	F.....	A.....	TASTE AND SMELL This child... 43. Likes to taste nonfood items, such as glue or paints.
N.....	O.....	F.....	A.....	44. Seems to ignore or not notice strong odors to which other children react.
N.....	O.....	F.....	A.....	45. Prefers certain food tastes to the point of refusing to eat any other foods offered.
N.....	O.....	F.....	A.....	46. Refuses to use toothpaste on the toothbrush.
N.....	O.....	F.....	A.....	BODY AWARENESS This child... 47. Grasps objects (such as a pencil or spoon) so tightly that it is difficult to use the object.
N.....	O.....	F.....	A.....	48. Seems driven to seek activities such as pushing, pulling, dragging, lifting, and jumping.
N.....	O.....	F.....	A.....	49. Seems unsure of how far to raise or lower the body during movement such as sitting down or stepping over an object.
N.....	O.....	F.....	A.....	50. Grasps objects (such as a pencil or spoon) so loosely that it is difficult to use the object.
N.....	O.....	F.....	A.....	51. Seems to exert too much pressure for the task, such as walking heavily, slamming doors, or pressing too hard when using pencils or crayons.
N.....	O.....	F.....	A.....	52. Jumps a lot.
N.....	O.....	F.....	A.....	53. Tends to pet animals with too much force.
N.....	O.....	F.....	A.....	54. Bumps or pushes other children.
N.....	O.....	F.....	A.....	55. Chews on toys, clothes, or other objects more than other children.
N.....	O.....	F.....	A.....	BALANCE AND MOTION This child... 56. Seems excessively fearful of movement, such as going up and down stairs or riding swings, teeter-totters, slides, or other playground equipment.
N.....	O.....	F.....	A.....	57. Avoids balance activities, such as walking on curbs or on uneven ground.
N.....	O.....	F.....	A.....	58. Falls out of a chair when shifting his or her own body.
N.....	O.....	F.....	A.....	59. Fails to catch himself or herself when falling.
N.....	O.....	F.....	A.....	60. Seems not to get dizzy when others usually do.
N.....	O.....	F.....	A.....	61. Spins and whirls his or her body more than other children.
N.....	O.....	F.....	A.....	62. Shows distress when his or her head is tilted away from the upright, vertical position.
N.....	O.....	F.....	A.....	63. Shows poor coordination and appears to be clumsy.
N.....	O.....	F.....	A.....	64. Leans on other people or furniture when sitting or when trying to stand up.
N.....	O.....	F.....	A.....	65. Rocks his or her body when awake and sitting up.
N.....	O.....	F.....	A.....	66. Seems afraid to descend stairs or hills.
N.....	O.....	F.....	A.....	PLANNING AND IDEAS This child... 67. Has trouble figuring out how to carry multiple objects at the same time.
N.....	O.....	F.....	A.....	68. Seems confused about how to put away materials and belongings in their correct places.
N.....	O.....	F.....	A.....	69. Becomes confused about the proper sequence of actions when doing familiar, everyday routines, such as getting dressed or going to bed.
N.....	O.....	F.....	A.....	70. Fails to complete tasks with multiple steps.
N.....	O.....	F.....	A.....	71. Has difficulty imitating demonstrated actions, such as movement games or songs with motions.
N.....	O.....	F.....	A.....	72. Has difficulty copying another child or an adult when building with blocks.
N.....	O.....	F.....	A.....	73. Has trouble coming up with new ideas during play activities.
N.....	O.....	F.....	A.....	74. Tends to play the same activities over and over, rather than shift to new activities when given the chance.
N.....	O.....	F.....	A.....	75. Has trouble climbing in and out of the car seat.

Appendix E

1

Appendix E

Partial Interval Time Sampling of Parent Behaviors Associated with Regulation

Adapted by Laurent (1/15/16...4/25/2016) from:

Partial Interval Time Sampling of Adaptive Strategies for the Useful Speech Project

Yoder, Fey, Thompson, McDuffie, Lieberman (5/27/09)

Revised by Flippin & Watson (1/19/10)

Commented on by Yoder (2/19/10)

Revised by Firestone & Watson (2/22/10)

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None of the Above	11
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Overview

Purpose of the coding system

This manual is designed to guide observers through a process that will yield variable scores thought to reflect the amount and types of behaviors utilized by parents of young children diagnosed with ASD to support regulation in naturalistic interactions. These variable scores will be pro-rated by the number of intervals that are codable. By “pro-rate” we mean dividing the number of coded regulatory strategies by the number of intervals that are “codable.” Pro-rating is often necessary and is particularly important in naturalistic/ home-based observations because (a) the child and parent are allowed to move, thus potentially rendering the camera angle non-optimal and (b) the degree to which events are controllable is less in parent child sessions than in examiner-child sessions. Some of these controlled events are off screen or obscured camera angle periods are likely to occur more often in home-based observations.

Theory posits that parents utilize regulatory strategies differently to support their child’s engagement depending upon their child’s chronological age, sex, and language abilities. Additional research suggests that factors, such as child’s developmental age and diagnosed developmental disability may also impact upon strategies utilized. While all parental strategies can be regarded as helpful at times, language based strategies and strategies that encourage problem solving are thought to provide young children with opportunities to learn and acquire new strategies critical for self-regulation.

To reliably code types of parent behaviors associated with supporting regulation, experience tells us that key terms need to be defined. We need to define the terms because they have accompanying separate symbols (e.g., “codes”) that are recorded in the BORIS data file. All “codes” are defined in this manual for reference. We define the codes because they are used frequently and in a specific way in this manual. This degree of specificity may seem “picky” at times, but is necessary for variable values to be very similar across different observers for the same session (i.e. reliable).

Overview of the coding process

Research Assistants will do the following:

- 1) For each participant- up to 16 minutes of the free play condition will be coded. The portion selected for each dyad will start with the introduction of the Hoberman sphere by the researcher and will conclude after 16 minutes or with the transition to the CSBS-DP (whichever occurs first). Free play time frames for observation will be predetermined prior to coding by the RA. Additionally, a portion of the CSBS-DP will be coded. This segment will include book sharing, toy play, blocks, and the transition to snack. These time frames will also be predetermined prior to coding.
- 2) Files to be coded are located on the coding computer in a file named – Footage for Coding.
- 3) Use BORIS software to code the media file in a 10 second interval behavior sampling method
 - a. Because different types of behaviors are to be considered for coding each

interval, the decisions are grouped into 5 different “sets” of codes. These are:

- (a) Activity: free play, CSBS-DP, snack, transition
 - (b) Codable: uncodable vs. codable
 - (c) Parent behavior: parent physical engaging and helping, parent language based engaging and helping, parent redirection/distraction, parent emotional following, parent physical comforting, parent vocal comforting/intonation, parent language-based comforting/ reassurance, and parent active ignoring and none-of-the above
- b. Multiple “passes” through the media file are required. A pass means that the research assistant looks at each interval (perhaps several times) and makes a decision on how to code each interval until all intervals are coded for each set of codes.
- i. It is strongly suggested that a pass be used to define the activity that the parent/child dyad is engaged in. The next pass should be used to determine the codability of an interval (i.e., codable vs. uncodable). This pass may occur in concert or separate from the pass used to code parent behavior and the pass that codes extreme emotional state. An additional pass is required to code the child lead. The rationale for this is that the mindset for deciding each of these categories is considered to be quite different.
- 4) **Save the project after each coding session.** Failure to do so will result in loss of all of your coding session data.
- 5) Indicate in the coding progress chart that the coding has been completed.

Rationale for Level of Distinctions, Inclusion of Categories, Need for the Definitions, and Identification of Terms to be Defined

Activity is defined as the portion of the home visit protocol that the parent/child dyad is engaged in. 4 activity codes are possible: free play, CSBS-DP, snack, and transition.

As mentioned earlier, a certain number of 10-second intervals will be “uncodable” primarily because the parent is off the screen. Because there can be some confusion and challenge coding this category reliably, we define what is considered an uncodable interval to aid in coding uncodable reliably, we will define the term “off screen.” Any interval that is not uncodable is, by definition, codable. That is, all intervals are either “uncodable” or “codable.” There is no “null” option for the codability decision.

In this coding scheme, the types of parent behavior we code are ways that parents support their child’s regulation. There are 3 general categories of behaviors that we consider. We want to recognize when a parent utilizes an “active” strategy which involves active engagement on the parent’s part. Strategies such as “helping/engaging” and “redirection/distraction” are included in this category. These behaviors are different than a parent “sitting back and/ or passively holding an object” a somewhat common occurrence. “Helping and engaging” behaviors are those thought to help maintain a child’s focus of attention and extend engagement. While, “redirection” strategies aim to help focus the child’s attention.

Additionally, we code parents' "comfort" behaviors that are linked to a child's emotional expression (i.e., elaboration of child emotional expression – "emotional following" or "comforting" – in response to a child signal of distress).

Finally, we are concerned about parent behaviors that are focused on allowing the child to work through a situation independently or cope with emotional experiences. This behavior is coded as "active ignoring" and considered "passive."

Absence of all of the previously identified behaviors should be coded as "none of the above."

Using BORIS to code data

Please refer to BORIS manual supplement dated 4/21/2016 for specific coding instructions.

Coding Definitions

Activity

1. Activity will be coded as continuous variable that is mutually exclusive. That is only one activity can be coded at a time; and, each time point on the video is associated with an activity.

Activity	Definition	Coding Instruction
Free play (P)	Unstructured play with novel toys provided as part of protocol, as well as toys introduced by the parent or child	<ul style="list-style-type: none"> Free play begins at the onset of the recording and ends when the parent initiates shifting the child's attention from toys to the table for the CSBS-DP or to the wind up toy if the child does not physically move to the table
CSBS-DP (C)	Engagement in structured communicative temptations / play	<ul style="list-style-type: none"> CSBS-DP begins with the introduction of the wind up toy and ends when the blocks (or last materials introduced) are put away
Snack (S)	Natural caregiving routine where food is offered to child	<ul style="list-style-type: none"> Snack begins when parent offers child something to eat and ends when the video recording ends
Transition (T)	Periods of time in between the above activities	<ul style="list-style-type: none"> Code transition when the parent initiates shifting attention from free play toys to table or wind up toy for CSBS-DP until the child is engaged with the wind up toy Code transition when the blocks (or last materials) of the CSBS-DP are put away until the parent offers the child something to eat

Uncodable vs. Codable

1. One of the following codes (u or c) is coded in all intervals in the predetermined time epochs for coding on the 2nd pass. That is the codability dimension is an exhaustive one. All intervals MUST either be recorded in the observation record as codable or uncodable.
2. Ask whether the interval is uncodable first. If it is not, then it is by default codable.

Definitions needed to code the codability column:

Uncodable (U):

A. The following are examples of situations that may occur during the session. If these situations arise, the interval will be marked as “uncodable.” Regardless of the duration of the distraction during the interval (1 second versus entire 10 second interval) the interval will always be marked “uncodable.” The interval will always be “uncodable” when:

- (1) The interval is not part of the pre-determined activity length for this research project
- (2) Part of the 10 second interval / activity is interrupted
 - e.g., bathroom break
 - e.g., phone call
 - e.g., sibling secures and commands parent’s attention (back and forth exchange)
- (3) The caregiver/child interaction is disrupted during the interval
 - e.g., second parent or caregiver takes over as primary interactant
 - e.g., researcher and parent interact to exclusion of child

B. There may be instances when due to point of view of the camera and arrangement of the referents and/or parent and child, the coder cannot determine whether parent behavior has occurred. Because we do not want unclear instances to count in the parent behaviors, we mark these intervals as uncodable.

Uncodable (U)		Codable (C)
<u>Distraction</u>	<u>Poor camera view</u>	Any Interval not determined uncodable
1) Parent focus is interrupted during the interval <ul style="list-style-type: none"> • bathroom break • phone call • sibling secures parent attention • second parent takes over interaction • researcher and parent interact to exclusion of child (back and forth exchange) 	1) Parent is off screen for part or all of interval	
2) Interval is not part of pre-determined activity length		

- (1) The parent is off screen for part of the interval or the video is so unfocused that it is difficult to tell what the parent is doing. To maintain reliability, an interval in which the parent is off-screen for part of the interval should be marked as uncodable, even if the parent is on-screen and provides engages in a behavior during another part of the interval.

Codable (C):

Any interval that is not “uncodable.”

Parent Behaviors

1. ALL codable intervals “C” are coded for parent behavior.
2. No parent behavior category may be left blank – For each of the behaviors coders will determine the presence or absence of the behavior. If the parent does not engage in any of the predetermined 8 parent behaviors- the final option in this behavioral group “none of the above” should be selected.
3. When determining if a parent’s behavior is in response to a child’s behavior (e.g., emotional following) it may be helpful to watch an interval multiple times.
4. Parent behavior codes are NOT mutually exclusive. Therefore, it is possible to code multiple parent behaviors in a single interval (e.g., physical comfort and verbal comfort).

Definitions needed to code parent behaviors

(Adapted from Grolnick, et al 1998; Gulsrund, et al 2010)

Strategy	Definition	Coding instruction
Physical Engaging / Helping Present-A Absent-B	Parent physically engaging in ongoing activity, prompting, or helping.	<p>Include parent:</p> <ul style="list-style-type: none"> • engaging in activity and taking active role (imitates or extends child’s play with object/referent) • engaging physically in social routines • showing child them things related to activity (e.g., holding up items and calling attention) • touching the child to direct his/her attention (e.g., tapping child’s shoulder, stroking child’s cheek to get him/her to turn head) • physically helping/aiding with activity (e.g., manipulating toy for child, holding puzzle still as child placed piece, etc) <p>Do not include:</p> <ul style="list-style-type: none"> • if family member is passively holding a toy or object, but not engaged in the activity or with the child

<p>Language-based Engaging / Helping</p> <p>Present-E Absent-F</p>	<p>Parent engaging in conversation related to ongoing activity, child's participation, or emotional state.</p>	<p>Include parent:</p> <ul style="list-style-type: none"> commenting on the activity (e.g., "Look at the bunny." while pointing to picture in the book. "Lots of bubbles" while playing with bubble toy, etc) verbally directing child's attention to aspect of ongoing activity (e.g., calling child's name, saying "Look here," "Did you see?") sharing parent emotional state verbally (e.g. "I'm sad that the balloon popped." "Mommy is having so much fun." giving cues (e.g., "Try this." "I see a blue piece that might help." etc) helping problem solve by talking through the activity (e.g., "Where does that go? I see a blue space. Do you see a blue piece? Does it match? Let's put it in." etc) direction of attention to a different part of an ongoing activity (e.g., child looking at cup and mom directing attention to big bird) Routinized forms, stories, and songs (if they are extension of play – singing Old McDonald to extend engagement in farm play) <p>Do not include:</p> <ul style="list-style-type: none"> Verbatim Reading – adult utterances that are being read verbatim from a book Comments or questions that do not pertain to the activity that the child is currently engaged in (e.g., "You had a yummy breakfast this morning.") Routinized forms, stories, and songs that are used as redirection / distractions (to shift attention away from current activity) – code as redirection/distraction Generic affirmative and
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		negative response words that are used in the absence of a specific reference to a child lead (e.g., all right, no, okay)- if these are stated in response to child emotion- code as emotional following
Redirection / Distraction Present-G Absent-H	Parent directing child's attention away from arousing or dysregulating activity	<p>Include parent:</p> <ul style="list-style-type: none"> directing child's attention to a different activity or object, (e.g., showing child preferred toy when becoming upset during book sharing, pointing out other objects in room, etc) Routinized forms, stories, and songs that are used as redirection / distractions (to shift attention away from current activity) offering child a break from the activity or play (e.g., announcing the premature end of an activity, helping the child remove himself/herself from an activity, etc) <p>**use this code when a child is focused on something other than the ongoing activity or if family is directing attention to a new activity</p>
Emotional Following Present-I Absent-J	Parental reflection and elaboration on child's emotional experience.	<p>Include parent:</p> <ul style="list-style-type: none"> mirroring child's emotions back to him/her with face and words (e.g., smiling and laughing when child expresses joy with an accomplishment or looking concerned and saying "you look sad" when the child is clearly upset, etc) Commenting on a child's emotional state- (i.e., saying "Wow, good job!" if the child was showing they were proud of their accomplishment or happy) acknowledging child's focus of attention and emotional state verbally or physically (e.g., "You love to play with balloons." "Oh no, balloon pop. Jimmy sad."

		<p>etc).</p> <ul style="list-style-type: none"> Showing child how to use actions to calm, focus or engage – (e.g., how to use a fidget toy, bounce leg, get a drink, jump, clap hands) Using language to demonstrate who child can express themselves (e.g., “I can do this.” “I’m feeling...” “I want to keep playing.” “I’m all done.” etc) Make sure when coding emotional following that the parent is really “following” (e.g., mirroring) the child’s emotional state. <p>Do not include:</p> <ul style="list-style-type: none"> if the child gets out a new toy, and the parent acts excited, but the child doesn’t really look excited
Physical Comfort Present-K Absent-L	Parent initiates physical actions in an effort to provide comfort to child based on some signal from the child indicating dysregulation (arousal or emotion shift)	<p>Include parent responding to child stress by:</p> <ul style="list-style-type: none"> comforting child by physical means (e.g., picking up him/her up, hugging child, rubbing child’s back, holding his/her hand, etc) in response to a sign from the child (may be subtle) code behaviors as comfort if child responds as if it was comfort even if initial signal from child was not clear DO NOT code simple affection
Vocal Comfort / intonation Present- M Absent- N	Parent initiates vocalizations in an effort to provide comfort to child based on some signal from the child indicating dysregulation (arousal or emotion shift)	<p>Include parent responding to child stress by:</p> <ul style="list-style-type: none"> comforting child by using vocal means (e.g., humming, Sshhning, singing through an activity, etc) using an exaggerated speaking style to gain his/her attention using a quieter subdued tone for calming effect

<p>Language-based Comfort / Reassurance</p> <p>Present-Q Absent-R</p>	<p>Parent initiates talking to child in an effort to provide reassurance and comfort based on some signal from the child indicating dysregulation (arousal or emotion shift)</p>	<p>Include parent responding to child stress by:</p> <ul style="list-style-type: none"> comforting child by talking through the situation (e.g., "It's OK that the balloon popped. We can get another one. Open the bag." or talking through specific steps of distressing activity such as washing hands, etc) verbally telling child that he/she is OK, verbally telling child that parent will help (e.g., "Mommy help open." "Daddy fix.", etc) Verbally expressing love (e.g., "Daddy loves you." "You're mommy's favorite little boy." etc) Verbally using terms of affection (e.g., child's nick names) Parent providing information that helps a child in a situation (e.g., information to help cope) <p>Do not include:</p> <ul style="list-style-type: none"> If parent simply repeats what child says (code this as emotional following)
<p>Active Ignoring</p> <p>Present-W Absent-X</p>	<p>Allowing the child to actively problem solve a situation</p>	<p>Include parent</p> <ul style="list-style-type: none"> Actively ignoring child by: continuing to play with toy despite the child's focus of attention shifting purposefully turning away from child when the child is becoming distressed or frustrated looking away when the child begins to engage in "inappropriate behaviors"
<p>None of the Above</p> <p>Present- Y Absent- Z</p>	<p>Absence of previously listed strategies</p>	<ul style="list-style-type: none"> Parent disengaged Parent not responsive to child

Appendix F

Inter-Rater Reliability for Parent Behaviors

Parent Behavior	Kappa	95% CI		Simple Percentage Agreement
		Lower Bound	Upper Bound	
All	0.9775	0.9732	0.9818	97.9
Physical engaging and helping	0.8812	0.8419	0.9205	93.5
Language-based Engaging and Helping	0.8981	0.8574	0.9388	95.8
Redirection / Distraction	0.8781	0.8071	0.9491	97.5
Physical Comfort	0.8316	0.6019	1.0000	99.6
Vocal Comfort	1.0000			99.6
Language-based Comfort	0.9403	0.8235	1.0000	99.5
Emotion Following	0.9482	0.8765	1.0000	99.8
Active Ignoring	0.4982	0.1912	0.8052	99.6
None of the Above	0.8413	0.7783	0.9044	95.9

Appendix G

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DEPARTMENT OF PSYCHOLOGY
Chafee Hall, 142 Flegg Road, Kingston, RI 02881 USA p: 401.674.2193 f: 401.674.2157 uri.edu/artsci/psy

September 10, 2014

Todd Levine, MD
Brown Center for the Study of Children at Risk
50 Holden Street
Providence RI 02908

Dear Dr. Levine:

My name is Amy Laurent; and, I am a doctoral candidate in Behavioral Science in the Psychology department at the University of Rhode Island. I am conducting my dissertation research with a focus on exploring the relationship between characteristics of young children diagnosed with ASD and the strategies that their parents employ to help support their children's emotional regulation. In an effort to capture typical interactions between children with ASD and their family members and to increase child comfort, this study will be conducted in the child's home. Data for the study will be collected via parent questionnaires and video recordings of interactions between parents and their children during playtime, administration of a communicative assessment, and snack. Time commitment to participate in this study is roughly 1½ hours (i.e., ½ hour to complete questionnaires sent to the home and 1 hour for the home visit.)

Through this study we hope to learn more about the relationship between characteristics of children with ASD and strategies that parents use to support their children's regulation. Understanding this relationship is a crucial first step in exploring parental influence in the development of self-regulatory skills for children with ASD and in the eventual development of an intervention model to help parents learn new and different ways to support their child with ASD's emotional regulation.

This research is being conducted under the supervision of Dr. Kathleen Gorman, who is the Principal Investigator for the study.

I am writing to ask for your assistance in recruiting potential participants for my research project. If you agree, I would be asking for you to share information related to my study with parents of young children diagnosed with ASD who meet my inclusion criteria. I would provide you with flyers describing the study. These flyers will be structured as consent to contact forms; and, in the event that a parent signed the form in your presence, I would be asking for you to return the flyer to me. These flyers will also contain contact information for the researchers so that families who would prefer to contact the researchers directly may do so.

If you would like to discuss this further, I would be happy to speak with you. Please feel free to email me (amylaurent@me.com) or to call (401.219.0201). If you agree to assist me in recruiting potential participants, please fill out the information below. By signing below you are agreeing to distribute flyers

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to families who meet inclusion criteria for the study and to return any flyers if and when families fill out the consent to contact portion in your presence.

Name: _____

Date: _____

Email: _____

Thank you for your consideration of this request.

All my best-

Amy Laurent, EdM,OTR/L
Doctoral Candidate, Psychology
University of Rhode Island

UNIVERSITY OF RHODE ISLAND

Opportunity to participate in exciting research
for young children diagnosed with Autism Spectrum Disorders and their parents.

Does your child have a diagnosis of Autism Spectrum Disorder?
Is he or she between the ages of 30-48 months?

We are currently conducting a new research study to better understand how parents support their children who are diagnosed with ASD during play and natural family routines.

We need your help!

Participation in this study involves a researcher visiting you and your child in your home. The brief 45-minute home visit consists of playtime, administration of a quick social communicative assessment, and a snack of your choosing. These fun, parent/child activities will be video recorded for later analysis.

You are being asked for permission to be contacted about possible participation in this research study. If you agree to be contacted, a researcher will call you to give you more information about the study and participation requirements. By giving your consent to be contacted, you are under no obligation to participate in this study.

I agree to be contacted by a researcher regarding this study.

Signature: _____

Date: _____

Printed Name: _____

Child's Name: _____

Phone Number: _____

Child's Age: _____

Best times to call: _____

To learn more about this research study please contact:

Amy Laurent
401-219-0201
email: amylaurent@me.com

This research is being conducted under the supervision of:

Dr. Kathleen Gorman
University of Rhode Island
Department of Psychology
401-874-9089

Parent participants in this study will be invited to attend a workshop focused on supporting emotional regulation for children with ASD.

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Appendix I

THE
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DEPARTMENT OF PSYCHOLOGY

Chafee Hall, 142 Flagg Road, Kingston, RI 02881 USA p: 401.874.2193 f: 401.874.2157 uri.edu/artsci/psy

THINK BIG WE DO™

CONSENT FORM FOR RESEARCH

Dear Parent/Guardian,

You and your child have been invited to take part in a research project described below. The researcher will explain the project to you in detail. You should feel free to ask questions. If you have more questions later, Dr. Kathleen Gorman (401) 874-9089 or Amy Laurent at (401) 219-0201, the people mainly responsible for this study will discuss them with you.

Exclusionary criteria:

Participants in this study are children diagnosed with Autism Spectrum Disorder (ASD) aged 30-48 months and their parent or guardian. Children are not eligible to participate in this study if they have a history of seizures, blindness, deafness, physical developmental disabilities that significantly impair mobility, and/or they are medicated for difficulties attending or heightened activity level. No participants will be excluded on the basis of race, gender, or ethnicity; however, due to the nature of the assessment tools participants must be proficient in English.

Description of the project:

This study is designed to explore the relationship between characteristics of young children diagnosed with ASD and the strategies that their parents use to help them pay attention and manage their emotions. In an effort to capture typical interactions between children with ASD and their family members and to increase child comfort, this study will be conducted in the child's home. Data for the study will be collected via parent questionnaires and video recordings of your child playing with toys, engaging in a number of interactions with you and the researcher, and eating a snack. Time commitment to participate in this study is roughly 1½ hours (i.e., ½ hour to complete questionnaires sent to the home (parent) and 1 hour for the home visit (parent and child)

What will be done:

If you decide to take part in this study here is what will happen. A researcher will contact you to explain the study and to set up a time to visit you and your child in your home. Following this call, she will send you two questionnaires for you to complete prior to the home visit. During the home visit, a researcher and a research assistant will come to your home. You and your child will be asked to engage in a brief playtime with the researcher. The researcher will provide some toys for this playtime, but your child is also welcome to play with his/her own toys. Once your child has had a chance to warm up, the researcher

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DIVISION OF RESEARCH
AND ECONOMIC
DEVELOPMENT

IRB NUMBER: 1
IRB APPROVAL DATE: 10/28/2015
IRB EXPIRATION DATE: 10/27/2016

HU1415-092

will administer the Communication and Symbolic Behavior Scales, Developmental Profile (CSBS DP). For this 20-minute assessment, you and your child will be seated at a table across from the researcher. The researcher will give a variety of small toys and books to your child. You and your child will have opportunities to interact as you typically do when playing together. Following the CSBS DP, the researcher will ask you to provide your child with a snack. You will be encouraged to provide whatever types of foods your child typically eats when given a snack, and to interact with your child as you typically do. For example, if you often give your child small portions of food several times during a typical snack to encourage them to ask for more, we would like you to do that during this visit. The research assistant will video record the play, CSBS DP, and snack portions of this visit. These video recordings will be analyzed at a later date and time. At the end of the visit, the researcher will ask you if you have any questions and make sure that you have her contact information so that you can reach her in the future if questions or concerns arise.

Risks or discomfort:

There are no anticipated risks or discomforts with this study.

Benefits of this study:

Although, there may be no direct benefit to you or your child for taking part in this study, the researchers hope to learn more about the relationship between characteristics of children with ASD and strategies that parents use to support their children's regulation. Understanding this relationship is a first crucial step in exploring parental influence in the development of self-regulatory skills for children with ASD and in the eventual development of an intervention to help parents support their child with ASD's emotional regulation, active engagement, and attention.

Confidentiality:

Your part and your child's part in this study are confidential. None of the information in this study will identify you or your child by name. All records and video recordings will be deidentified and assigned a record number. Records and video recordings will be kept in a locked office. Only individuals working on the research project will have access to the records and video recordings.

In case there is any injury to the subject:

If this study causes you or your child any injury, you should write or call Dr. Kathleen Gorman at the University of Rhode Island at (401) 874-9089. You may also call the office of the Vice President for Research and Economic Development, 70 Lower College Road, Suite 2, University of Rhode Island, Kingston, Rhode Island, telephone : (401) 874- 4328.

Decision to quit at any time:

The decision to take part in this study is up to you. You and your child do not have participate. If you decide to take part in the study, you may quit at any time. Whatever you decide will in no way penalize you or your child. If you wish to quit, simply inform Dr. Kathleen Gorman (401-874-9089) or Amy Laurent (401-219-0201) of your decision.

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Rights and Complaints:

If you are not satisfied with the way this study is performed, you may discuss your complaints with Dr. Kathleen Gorman at (401)874-9089, anonymously, if you choose. In addition, if you have questions about your rights as a research participant, you may contact the office of the Vice President for Research and Economic Development, 70 Lower College Road, Suite 2, University of Rhode Island, Kingston, Rhode Island, telephone: (401) 874-4328.

Video recording:

You understand that video recording of your interactions with your child is an essential part of this study protocol. Your signature below indicates your agreement for you and your child to be videotaped as part of this study.

Signature of Participant/Parent

All records and video recordings for this study will be de-identified and assigned a record number. Records and video recordings will be kept in a locked office. We are asking to keep the records and video recordings in a secure data repository for future research projects. Your signature below indicates your agreement to allow the researcher to keep the recordings for future research focusing on young children diagnosed with ASD and their parents.

Signature of Participant/Parent

You have read the Consent Form. Your questions have been answered. Your signature on this form means that you understand the information and you agree to participate in this study. Your signature on this form also means that you understand the information and agree to allow your child to participate in this study.

Signature of Participant/Parent

Signature of Researcher

Printed Participant/Parent Name

Researcher Name

Child's Name

Date

Date

Please sign both consent forms, keeping one for yourself.

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Appendix J

Duration of Behavior Sample Coded - Reported in Minutes

Condition	M (SD)	Range
Free Play	13.97 (2.46)	7.66-16.00
CSBS-DP	12.99 (5.07)	6.5-27.00
Total	26.97 (5.46)	18.66-37.83

Appendix K

Educational Programming Services

Table K1

Duration of Weekly Educational Programming/Intervention

	M(SD)	Range
Educational / Intervention Programming Hours	17.42 hr (10.55)	1 -41 hrs

Note. N=37

Table K2
Services included in Weekly Educational Programming/Intervention

Type of Service	n	(%)
Speech and Language Therapy *	34	(91.9)
Occupational Therapy*	31	(83.8)
Physical Therapy**	3	(8.1)
Educational Services**	23	(62.2)
Applied Behavioral Analysis	21	(56.8)
Developmental Therapy	4	(10.8)
Social Work***	6	(16.2)
Focus of Weekly Educational Programming		
Nonverbal communication	17	(45.9)
Verbal Communication	29	(78.4)
Augmentative Communication	9	(24.3)
Social Interaction	25	(67.6)
Attention and Focus	26	(70.3)
Coping and Soothing	16	(43.2)
Cognitive Skills	21	(56.8)
Motor Skills	18	(48.6)
Additional Interventions		
Dietary	9	(24.3)
Supplements	4	(10.8)
Medications	5	(13.5)
Playgroups	12	(32.4)
Horseback riding	3	(8.1)
Private Therapies	7	(18.9)

Note. N=35

*N=36, **N=37, ***N=34

Appendix L

Relative Frequency of Parent Behaviors Associated with Supporting ESR

Table L1

Proportion of Parent Behaviors Coded during Free Play

Parent Behavior	M (SD)	Range	Skewness (SE=0.388)	Kurtosis (SE=0.759)
Physical Engaging and Helping	54.96 (19.42)	7.41 – 92.85	-0.224	-0.275
Language-based Engaging and Helping	56.23 (19.38)	22.67 – 87.23	-0.171	-1.284
Redirection / Distraction	13.20 (11.3)	0.00 – 58.33	2.014	5.827
Physical Comfort	1.47 (3.07)	0.00 – 13.95	2.606	7.262
Vocal Comfort	0.27 (1.14)	0.00 – 6.67	5.227	29.010
Language-based Comfort	0.77 (1.62)	0.00 – 6.67	2.384	5.334
Emotional Following	6.41 (5.25)	0.00 -21.53	0.712	0.235
Active Ignoring	0.45 (1.5)	0.00 -8.33	4.330	20.245
None of the Above	17.21 (11.54)	1.19 – 51.85	0.958	0.884

Note. N=37

Table L2
Proportion of Parent Behaviors Coded During CSBS Assessment

Parent Behavior	M (SD)	Range	Skewness (SE=0.388)	Kurtosis (SE=0.759)
Physical Engaging and Helping	42.61 (16.68)	5.36 – 81.58	0.297	0.034
Language-based Engaging and Helping	48.66 (19.59)	8.93 – 93.93	0.29	-0.418
Redirection / Distraction	16.45 (15.15)	0.00 – 57.14	0.985	0.192
Physical Comfort	2.21 (3.96)	0.00 – 14.28	1.900	2.718
Vocal Comfort	0.10 (0.35)	0.00 – 1.51	3.378	10.342
Language-based Comfort	0.72 (1.62)	0.00- 7.32	2.707	7.587
Emotional Following	3.43 (3.67)	0.00- 17.28	1.669	4.115
Active Ignoring	0.28 (0.99)	0.00 – 4.88	3.720	13.878
None of the Above	26.53 (16.54)	0.00- 83.93	1.289	3.014

Note. N=37

Table L3
Proportion of Parent Behaviors Coded for Combined Observations

Parent Behavior	M (SD)	Range	Skewness (SE=0.388)	Kurtosis (SE=0.759)
Physical Engaging and Helping	49.83 (16.41)	6.36 -82.14	0.002	0.290
Language-based Engaging and Helping	52.67 (17.28)	18.18 –81.08	-0.181	-1.406
Redirection / Distraction	13.91 (9.60)	0.00- 38.51	0.973	0.634
Physical Comfort	1.75 (2.44)	0.00 – 8.63	1.467	1.281
Vocal Comfort	0.19 (0.64)	0.00 – 3.60	4.582	23.023
Language-based Comfort	0.72 (1.21)	0.00 – 5.66	2.491	7.311
Emotional Following	5.19 (3.71)	0.00 – 13.57	0.522	-0.503
Active Ignoring	0.35 (0.96)	0.00 – 4.50	3.337	11.404
None of the Above	21.68 (12.84)	2.38- 68.18	1.386	3.722

Note. N=37

Appendix M

Summary of Means, Standard Deviations, and Range for Child Sensory Total Score by Self-Reported Income Level

Income Level	N	Mean (SD)	Range
Upper Class	1	58 (-)	-
Upper Middle Class	3	61.67 (10.693)	50-71
Middle Class	11	70.91 (5.186)	64-80
Lower Middle Class	8	73.38 (4.984)	66-80
Working Class	9	74.11 (4.595)	68-80
Decline to Answer	5	62.40 (12.779)	45-80

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