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Early Parenting, Represented Family Relationships, and Externalizing Behavior Problems in Children Born Preterm

Julie Poehlmann[a,*], **Cynthia Burnson**[a], and **Lindsay A. Weymouth**[a]

[a]Human Development and Family Studies, University of Wisconsin-Madison, Madison, USA

Abstract

Through assessment of 173 preterm infants and their mothers at hospital discharge and at 9, 16, 24, 36, and 72 months, the study examined early parenting, attachment security, effortful control, and children's representations of family relationships in relation to subsequent externalizing behavior problems. Less intrusive early parenting predicted more secure attachment, better effortful control skills, and fewer early behavior problems, although it did not directly relate to the structural or content characteristics of children's represented family relationships. Children with higher effortful control scores at 24 months had more coherent family representations at 36 months. Moreover, children who exhibited less avoidance in their family representations at 36 months had fewer mother-reported externalizing behavior problems at 72 months. The study suggests that early parenting quality and avoidance in children's represented relationships are important for the development of externalizing behavior problems in children born preterm.

Keywords

attachment; effortful control; family; preterm; relationships

Introduction

Positive parenting and parent-child relationships are closely associated with resilience in children experiencing significant risk (Ainsworth, Bell, & Stayton, 1971; Masten & Coatsworth, 1998). Further research focusing on the internalization of positive parent-child and family relationships in high risk children can reveal potential protective processes and contribute to theory and research seeking to understand child well-being in the context of risk (Bretherton & Munholland, 1999). The present study examined representations of family relationships in young children born preterm (< 37 weeks gestation) in relation to early parenting, attachment security, toddler effortful control, and externalizing behavior problems. Prematurity is a significant public health concern in the U.S., with more than one in ten infants born preterm each year (March of Dimes, 2007). Despite advances in neonatal care, rates of disability and other morbidities have not decreased (Institute of Medicine, 2006). Although there is much within-group variability, children born preterm are, on

*Correspondence regarding this article can be addressed to: Julie Poehlmann, Ph.D., Professor, Human Development & Family Studies, Waisman Center, University of Wisconsin, 1500 Highland Ave, Madison, WI 53705; poehlmann@waisman.wisc.edu; 608-263-4839.

average, more likely to develop behavior problems and impaired self-regulation compared with healthy full-term children (e.g., Bhutta, Cleves, Casey, Cradock, & Anand, 2002; Clark, Woodward, Horwood, & Moor, 2008). However, it is unclear how attachment processes and early self-regulation relate to subsequent behavioral outcomes in children born preterm.

Parenting Interactions and Attachment Relationships in Children Born Preterm

In addition to increased risk for developmental delays and behavior problems, preterm children experience less optimal dyadic interactions, such as intrusive parenting, compared to full-term infants (Feldman, 2007). Preterm infants, especially those who experience more neonatal medical risks, are less alert and responsive, less able to provide clear signals, and more easily stressed than low risk full-term infants (e.g., Buka, Lipsitt, & Tsuang, 1992; Greene, Fox & Lewis, 1983; Malatesta, Grigoryev, Lamb, Albin, & Culver, 1986), although the quality of their social interactions tends to improve over the first two years of life (Poehlmann, Schwichtenberg, Bolt, Hane, Burnson, & Winters, 2011). Moreover, research has found that quality of parent-infant interaction is a robust predictor of subsequent cognitive and social development in children born preterm, including attachment relationships assessed using the Strange Situation Procedure and the Attachment Q-sort (e.g., Candelaria, Teti, & Black, 2011; Shah, Clements, & Poehlmann, 2011; Smith, Landry, & Swank, 2006). Moreover, recent studies have found that early interaction quality and maternal grief or trauma symptoms are associated with attachment security or maternal representations of the child when infants are born preterm (e.g., Forcada-Guex, Borghini, Pierrehumbert, Ansermet, & Muller-Nix, 2011; Shah et al., 2011). However, studies have not examined attachment or representations of family relationships as predictors of preterm children's subsequent behavioral outcomes.

Internalized Representations of Relationships

Bowlby (1973, 1982, 1988) postulated that mental representations, or internal working models, of self and others emerge during the infant years on the basis of internalized early experiences, including interactions with parents. Children develop representations of less optimal relationships when parents are not available or responsive or when disruptions in care occur (Bowlby, 1973; Toth, Maughan, Manly, Spagnola, & Cicchetti, 2002). Representations of early family relationships are thought to provide one basis for the development of social and emotional competence or psychopathology in children as they grow older (Bowlby, 1988).

As children reach preschool age, their mental representations of family members and self may be assessed indirectly through language and play themes, such as following presentation of story stems using dolls and props (e.g., Bretherton, Biringen, Ridgeway, Maslin, & Sherman, 1989; Bretherton, Ridgeway, & Cassidy, 1990). Techniques such as the MacArthur Story Stem Battery (MSSB; Bretherton, Oppenheim, Buchsbaum, Emde, & the MacArthur Narrative Group, 1990) and the Attachment Story Completion Task (ASCT; Bretherton, Ridgeway, et al., 1990) ask children to verbalize and act out solutions following presentation of attachment-relevant story stems and then apply categorical or thematic coding schemes. Some scholars have applied thematic codes to both the structure and

content of children's responses, including nurturing, violence, and coherence or avoidance (e.g, Grych, Wachsmuth-Schlaefer, & Klockow, 2002; Hodges, Steele, Hillman, Henderson, & Kaniuk, 2003; Toth et al., 2002).

Internalized Relationship Representations and Effortful Control

In addition to reflecting family relationships, children's internalized representations may reflect child characteristics, such as their emerging self-regulation skills. Self-regulation can be defined as the ability to exert internalized control over one's attention, behaviors, and emotions (Kopp, 1982). A component of self-regulation, effortful control (EC), is a temperament-based construct referring to a child's emerging ability to regulate attention and behaviors, specifically defined as suppression of a dominant or prepotent response in order to exhibit a subdominant but more contextually-appropriate response (Rothbart & Bates, 2006). Although evidence suggests that attachment is important for the development of self-regulation in general and EC in particular (e.g., Fearon & Belsky, 2004; Kochanska, Philibert, & Barry, 2009; Muris & Dietvorst, 2006), research has not examined the association between EC and attachment relationships or internalized relationship representations in children born preterm. Nevertheless, one might expect preterm children who exhibit strong EC skills to respond to attachment-relevant tasks with more focused and emotionally regulated responses compared to children with weak EC skills, in part because the constructs share parenting precursors (e.g., Fearon & Belsky, 2004). In addition, Clyman (2003) has theorized that young children's narrative content and structure reflects both internal representations and emotion regulation strategies. Thus, represented family relationships in the ASCT that are coherent and well-organized may reflect both internal working models as well as a regulatory component, possibly related to EC skills.

Researchers have found that EC is linked to other internalized processes that are important for children's social development, including conscience, morality, and theory of mind (Kochanska, 1997; Kochanska, Murray, & Harlan, 2000; Carlson, Moses, & Claxton, 2004). Kochanska and colleagues have found that individual differences in EC to be related to the development of conscience, which involves internalization of societal (parental) rules and expectations (e.g., Kochanska, Padavich, & Koenig, 1996; Kochanska, Murray, & Coy, 1997; Kochanska, Coy & Murray, 2001; Kochanska & Knaack, 2003). Rothbart and Rueda (2005) suggested that EC is linked to empathy and moral development because it provides the attentional flexibility needed to attend to others' distress but not be overwhelmed by one's own distress, therefore freeing the individual to act in an empathic and moral manner. The present study extended this research by examining preterm children's 24-month EC as a predictor of their 36-month internalized family relationships.

Representations of Family Relationships and Children's Behavior Problems

In studies of children who were not born preterm, prosocial and affiliative themes coded from children's story stem enactments have been associated with fewer externalizing behavior problems at home and school and lower teacher-rated hostility (Oppenheim, Nir, Warren, & Emde, 1997; Warren, Oppenheim, & Emde, 1996; Zahn-Waxler, Friedman, Cole, Mizuta, & Hiruma, 1996). In addition, Greig and Howe (2001) found that children classified as insecure on the basis of their ASCT responses performed more poorly on an

emotional understanding task than children classified as secure from ASCT responses. For children from divorced families, child-mother proximity-seeking in story completions predicted fewer behavior problems in the preschool setting (Page & Bretherton, 2001). In research with children raised by their grandparents as the result of maternal imprisonment and other significant parental problems, more positive ASCT responses were associated with fewer concurrent externalizing behavior problems, but not internalizing behavior problems, controlling for numerous risk factors (Poehlmann, Park, Bouffiou, Abrahams, Shlafer, & Hahn, 2008). Few studies have found associations between ASCT responses and internalizing behavior problems. In the present study, we examined associations between preterm children's representations of family relationships and mother-reported externalizing behavior problems.

Child Gender, IQ, and Socioeconomic Status as Controls

Previous studies have found relations between children's story stem responses and their gender and verbal or cognitive skills (e.g., Easterbrooks & Abeles, 2000; Grych et al., 2002; Verschueren & Marcoen, 1999; Poehlmann, 2005), with girls and children with higher verbal or cognitive skills responding more positively than boys and children with lower verbal or cognitive abilities. In addition, children's cognitive skills appear to play a large role in emerging EC, with children who score higher on cognitive assessments also performing better on EC tasks (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Jennings et al., 2008; Kochanska & Knaack, 2003). Across multiple studies, girls tend to outperform boys on EC tasks (Eiden, Colder, Edwards, & Leonard, 2009; Kochanska, Barry, Jimenez, Hollatz, & Woodard, 2009; Kochanska & Knaack, 2003; Kochanska et al., 2000; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005). Although neonatal medical risks are important predictors of preterm infant developmental outcomes, family socioeconomic variables such as parental education become increasingly important for children's cognitive and behavioral functioning as they grow older (e.g., Bhutta et al., 2002). Thus, child gender, cognitive abilities, and neonatal medical risks as well as maternal education were included as controls in the present study.

Research Questions and Hypotheses

Our hypothesized path model is presented in Figure 1. We hypothesized that secure attachment, better effortful control skills, and less early intrusive parenting interactions during the toddler period would predict representations of family relationships with more optimal structure (e.g., more coherence, less avoidance) and content (e.g., more nurturance, less violence) at 36 months. We also hypothesized that more positive structural and content characteristics of children's representations of family relationships would be associated with fewer externalizing behavior problems at 72 months. 'Insert Figure 1 about here'

Methods

Participants

Infants and their mothers were recruited from three neonatal intensive care units (NICUs) in southeastern Wisconsin. A research nurse at each hospital invited families to participate in the study if they met the following criteria: (a) infants were born at or less than 35 weeks

gestation or weighed less than 2500 grams at birth, (b) infants had no known congenital malformations or prenatal drug exposures (including significant neurological complications like PVL or grade IV IVH, (c) mothers were at least 17 years of age, (c) mothers could read English, and (d) mothers self-identified as the child's primary caregiver. The 173 children who were born preterm (<36 weeks gestation), had no significant neurological complications by NICU discharge, and had no pervasive developmental disabilities (i.e. Cerebral Palsy or Autism) were included in this sample. Sample characteristics are detailed in Table 1.

The current study included data from the NICU Discharge (Time 1), 9 month (Time 3), 16 month (Time 4), 24 month (Time 5) 36 month (Time 6) and 6 year (Time 7) assessments. One hundred seventy-three mother-child dyads participated at hospital discharge, 143 at 9 months, 147 at 24 months, 138 at 36 months, and 109 at 6 years. Sixty percent of the original families participated at the 6-year assessment. Families lost to attrition did not differ from families who remained in the study on birthweight, gestational age, neonatal health variables, child gender, paternal age, family income, number of children in the family, and maternal race. However, families were more likely to be lost to attrition when the mother was younger and single and had completed fewer years of education, and when the father had completed fewer years of education. In addition, infants lost to attrition were less likely to be Caucasian.

Procedure

A research nurse at each NICU informed eligible families about the study. Interested families signed an IRB-approved consent form and were contact by study personnel to schedule a visit prior to NICU discharge. During this visit, a research collected demographic data from the mother and infant health risk information from the infant's medical chart. When the child was 9 months postterm, infants and their mothers were visited at home and participated in 10–15 minutes of videotaped free play. When the child was 16 months postterm, children and their mothers visited the lab and participated in the Strange Situation Procedure as well as other assessments. At 24 and 36 months postterm, children and mothers again visited the lab. At 24 months, mothers completed the Child Behavior Checklist and children participated in assessments of effortful control and cognitive skills; at 36 months, children participated in the Attachment Story Completion Task (ASCT). When the child was 6 years postterm, the mother completed the Child Behavior Checklist (CBCL) and returned it via mail. Families were paid $40 for the 9-month visit, $60 for the 16-month visit, $80 for the 24-month visit, $85 for the 36-month visit, and $15 for the 6-year data collection.

Measures

Maternal Parenting Interactions During Play at 9 months—Infant-mother play interactions at 9 months postterm were coded using the Parent Child Early Relational Assessment (PCERA; Clark, 1985). Standard data collection recommendations for the PCERA include recording a 15-minute play episode and coding 5 minutes of the video clip. Following the recommendation of Dr. Roseanne Clark, who developed the PCERA, the first 5 minutes in which each dyad was actively engaged in play were coded.

The PCERA was designed to assess the frequency, duration, and intensity of affect and behaviors of parents and infants that occur during 5 minutes of face-to-face interactions. Each variable is coded on a scale ranging from 1 (negative quality) to 5 (positive quality). Parent variables coded included tone of voice, affect and mood, attitude toward child, affective and behavioral involvement, and style. Of the three established parent subscales that have been used in previous research (e.g., Durik, Hyde, & Clark, 2000), only the Low Intrusiveness, Insensitivity, and Inconsistency parenting scale was used in the current study because it is closely associated with attachment processes. Items in this subscale are detailed in Clark (1985). Some of the items stress negative parenting, such as “intrusiveness”, which ranges from a 1 (“Very intrusive; domineering”) to a 5 (“Not at all intrusive; includes respecting child’s autonomy”). Other items assess positive parenting, such as “Parent reads child’s cues and responds sensitively and appropriately”, which ranges from a 1 (“Insensitive to child; oblivious, indifferent or unresponsive to child’s cues; consistently misreads or misinterprets child’s cues”) to a 5 (“Very empathic, characteristically reads child’s cues and responds sensitively and appropriately”). Thus, the subscale addresses intrusiveness in both negative and positive ways. Cronbach’s alpha was .84. Ten percent of the sample was independently coded by 4 trained research assistants, and kappas ranged from .60 to 1.0 (M = .83). The Low Intrusiveness subscale ranged from 1 to 5 (M = 3.70, SD = 0.6), with higher scores indicating less intrusiveness.

Previous studies have found that the PCERA has an acceptable range of internal consistency, factor validity (Clark, 1999), and discriminate validity between high risk and well-functioning mothers (Clark, Paulson, & Conlin, 1993). The PCERA has been used previously with preterm infants (e.g., Brown, 2007; Pridham, Lin, & Brown, 2001).

Infant-Mother Attachment Security at 16 months—Security of attachment between preterm infants and their mothers was assessed at 16 months postterm using Ainsworth’s Strange Situation Procedure (SSP; Ainsworth et al., 1978). The SSP is the gold-standard instrument used in assessing the quality of attachment in infants aged 12 to 18 months. The videotaped procedure includes a series of separations and reunions between the mother and child, involving mild but cumulative stress for the infant. The goal of the procedure is to provide an environment that would arouse in the infant both the motivation to explore (when not distressed), and the urge to seek proximity to the caregiver (when distressed). Classification is based on a 4-category system (Secure, Insecure-Avoidant, Insecure-Resistant, Disorganized) and is based on the child’s behavior upon reunification with the mother (Ainsworth et al., 1978). A trained attachment researcher blind to study variables coded the tapes. Ten tapes (6%) were also coded by a second trained attachment researcher (κ = .80). For use in path analysis, we assigned infants a continuous score of not-B (representing more insecure behavior) to B (representing more secure behavior) based on their Strange Situation behaviors (Richters, Waters, & Vaughn, 1988; Van Ijzendoorn & Kroonenberg, 1990). Children ranged from −10.25 to 5.77 with a mean of −.59 (SD = 3.43). Scores above 1 indicate more secure attachment behavior while scores below 0 indicate more insecure attachment behavior.

Toddler Effortful Control at 24 months—At 24-months, we used a behavioral battery described in Kochanska et al. (2000) to assess effortful control (EC). Five components of EC were examined: ability to delay (Snack Delay, Gift Bag), suppressing-initiating activity to signal (Towers), effortful attention (Shapes), slowing motor activity (Walk-a-line Slowly), and lowering voice (Whisper). The tasks were administered by a trained graduate student while the child's mother sat behind a screen to complete paperwork, with the exception of Gift Bag, in which the mother and experimenter left the room. If a child became upset at the mother's departure, she was asked to comfort the child and sit behind a screen during the task (this occurred in 26% of the cases). All tasks were administered in the same order for all children (except in cases in which the child refused the task, then the experimenter attempted to administer it again later in the visit).

The Snack Delay task included four trials, with each successive trial requiring the child to wait for longer periods of times (range of 10 to 30 seconds). The child was asked to wait with his hands on the table until the experimenter rang a bell before retrieving a candy from underneath a clear plastic cup. Delay to touch the cup (in seconds) was coded for each trial and averaged across all four trials. The delay task was independently coded by two trained students, who attained 100% reliability with each other within 1 second of the child's response. During the Gift Bag task, the child was presented with a brightly colored gift bag filled with tissue paper and a small prize and asked not to touch the bag for 2 minutes. The task was rated using mutually exclusive categorical codes ranging from 1 (child pulls gift from bag) to 5 (child does not touch bag). The Gift Bag task was independently coded by two trained students who attained 100% reliability (= 1.0).

For the Shapes task, we assessed the child's responses to imbedded animal cards following a brief training. The training consisted of presenting the child with two sets of three cards each (one set of large animals and one set of the same animals in smaller sizes) to ensure that the child understood the animal names and the words "big" and "little." For the testing sets, the child was then shown two sets (of three cards each) with a small picture of an animal imbedded within a larger picture of a different animal. Children's answers were scored from 0 (refusal or pointing to incorrect animal) to 3 (correctly pointing to small animal). For the Shapes task, Cronbach's alpha was .83, and coders achieved average kappas of .95.

The Whisper task included raising the child's activity level (i.e., chasing game), and then asking the child to whisper across two trials. The task was coded as 0 (no response), 1 (responds but does not whisper), or 2 (whispers), with a kappa of 1.0. The task was immediately followed by Walk-a-line-slowly, where the child was asked to walk on a line taped to the floor as slowly as possible for two trials. The seconds that it took the child to walk the line was recorded. Two coders were 100% accurate with each other within 1 second of children's walk times.

Finally, the Towers task included providing instruction regarding expectations for turn taking, then asking the child to build a block tower with the experimenter across two trials. Twelve blocks were presented per trial. The task was coded as a function of the average number of turns the child allowed the experimenter, with higher scores indicating more turn taking (kappa = 1.0). On average, experimenters took two turns per trial (range of 0 to 5

turns per trial). Because studies with children born full-term have combined these tasks into an effortful control composite (EC composite; Kochanska et al., 2000, 2001), we also used this approach. At 24 months, the EC composite was created by averaging standardized scores from Gift Delay, Snack Delay and each of the two trials of Walk-a-line, Whisper, Animal Shapes, and Towers. The 24-month EC composite had a Cronbach's α of .60 (10 items), with higher scores indicating more effortful control skills. Internal consistency for the EC composite for Kochanska et al.'s (2000) full-term study was .42 for 22-month-olds and .77 for 33-month-olds. EC composites ranged from −1.07 to 1.41, with a mean of −.02 (SD = 0.47).

Representations of Family Relationships at 36 months—At 36 months postterm, children completed the Attachment Story Completion Task (ASCT; Bretherton, Ridgeway, et al., 1990). The ASCT, used to assess children's representations of family relationships, was designed to elicit responses reflecting the relationship between the child and parental figures in four increasingly stressful story stems: (a) parental figure as authority (Spilled Juice), in which a child spills his or her juice at dinner, (b) parental figure as comforter (Hurt Knee), in which a child falls off a rock and hurts his or her knee; (c) parental figure as protector (Monster), in which a child calls for the parental figure, thinking he or she has seen a monster; and (d) separation of the child from the parental figure as he or she leaves for a trip and the subsequent reuniting of the child with the parental figure the next day (Separation/Reunion). In the present study, both mother and father figure props were included in each story stem, in addition to a child and sibling figure. The gender of the child and sibling were matched to the target child and the race of the doll props used was matched to the child's race. Story stems were presented to children by a trained researcher at a small table. Stems were simultaneously narrated and acted out with the dolls and props. Researchers were trained to clarify unclear child narratives and give up to two prompts to resolve the conflict associated with the story stem. Children's responses to ASCT were videotaped and later transcribed and coded.

Four key codes (avoidance, coherence, nurturing behavior, and violence), drawn from previous research (e.g., Grych et al., 2002; Poehlmann, 2005), were selected to capture structural and content characteristics of children's narratives. The two structural codes were avoidance (e.g. child denies conflict of story, does not respond to story stem after repeated prompts although the child is attending to the task) and coherence (e.g. child resolves conflict in story with few contradictions). The two content codes were nurturing behavior of mother doll to child doll (e.g. caregiver figure comforts, praises, helps, or physical comforts child) and general violence (e.g. the story stem includes fighting, violence acts, death, or destruction). These variables were coded in a binary fashion for each of the 4 story stems from review of videotapes and transcripts. Two trained coders, blind to other study variables, independently coded each variable across 29 (25%; *n*=118) randomly selected tapes. Kappas for individual codes ranged from .64 to 1.0, with an average of .84. Scores for each code were summed across the 4 story stems so that children's scores ranged from 0 (*present in none of the stems*) to 4 (*present in all of the stems*). Cronbach's alphas ranged from .51 to .71, with a mean of .62. Higher scores indicated presence of the code in more

stems (e.g., higher avoidance scores indicated more avoidance; higher coherence scores indicated more coherence).

The ASCT was designed for preschool age children and it has been used with high risk children (Bretherton & Page, 2004; Poehlmann, 2005); similar story stem procedures have been used with typically developing (Oppenheim, Emde, & Warren, 1997) and maltreated children (Macfie, Cicchetti, & Toth, 2001; Toth, Cicchetti, Macfie, Maughan, & Vanmeenen, 2000). The validity of story stem techniques such as the ASCT and MSSB has been established with young children from middle and low socioeconomic backgrounds, including correspondence with earlier Strange Situation codes, concurrent separation-reunion behavior, and maternal Adult Attachment Interview classifications (Bretherton et al., 1990; Gloger-Tippelt et al., 2002). Studies have found themes of interparental conflict, avoidance, and lack of coherence in children who experienced family violence (Grych et al., 2002) and negative representations of parents and self in maltreated preschoolers (Macfie, Toth, Rogosch, Robinson, Emde, & Cicchetti, 1999; Toth, Cicchetti, Macfie, & Emde, 1997; Toth, et al., 2000). Toth et al. (2002) also found that an attachment-based parent-child psychotherapy program caused a decrease in children's negative representations of their mothers over time.

Children's Behavior Problems at 24 months and 6 years—The Externalizing scale of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) was used to assess maternal reports of children's behaviors at 24 months and 6 years of age. The CBCL is a widely-used standardized behavior rating scale that is completed by an adult with whom the child lives. The preschool forms list 99 problem behaviors. Mothers rated each problem behavior on a three point scale, not true (0), somewhat or sometimes true (1), or very true or often true (2), regarding the child's behaviors during the past two months. The CBCL has high internal consistency (αs=.78 to .97) and has been used with preterm children (e.g., Gray, Indurkhya, & McCormick, 2004; Yu, Buka, McCormick, Fitzmaurice, & Indurkhya, 2006). Raw scores were used in analyses. The Externalizing scales at 24 months (M=14.58, SD=8.12, Cronbach's α=.91) and at 6 years (M=6.45, SD=5.79, Cronbach's α=.87) were used.

Control Variables

Children's cognitive skills: Child cognitive skills at 24 months (corrected for gestational age) were estimated using the Abbreviated Battery scale (ABIQ) from the Stanford-Binet Intelligence Scales, 5th edition, administered by a trained graduate student supervised by a licensed psychologist (Roid, 2003). This is a commonly-used, standardized assessment for children aged 2 years to adulthood, with a standardization sample mean of 100 and standard deviation of 15 (α = .90) (Roid, 2003). ABIQ scores correlate highly with full-battery IQ scores (Roid, 2003). Corrected ABIQ scores ranged from 52 to 121 (M = 80.15, SD = 18.25). (Of the 173 children in this sample, 43 children had ABIQs < 70. The SEM results were the same if we retained or dropped these cases; we chose to retain them).

Neonatal health risks: A neonatal health risk index was created from NICU medical records, summing the presence of 10 health risks occurring during the NICU stay: apnea,

respiratory distress, chronic lung disease, gastroesophageal reflux, multiple birth, supplementary oxygen at NICU discharge, apnea monitor at NICU discharge, 5-minute APGAR < 6, ventilation during NICU, and NICU stay > 30 days. Higher scores reflected poorer neonatal health (α = .72). Scores ranged from 0 to 9 (*M* = 3.12, *SD* = 2.24). Table 1 provides additional information.

Family socioeconomic assets: Families completed a demographic questionnaire at the infant's birth. A family socioeconomic assets index was created from standardizing mother's age, mother's education, and family income and then summing the scores (Poehlmann, Schwichtenberg, Bolt, & Dilworth-Bart, 2009). Higher scores reflected greater socioeconomic assets (α = .69). Scores ranged from .1.77 to 1.97, with a mean of −0.02 (*SD* = 0.83).

Child gender: Children's gender was included in the model as it been reported to have an effect on effortful control (Li-Grining, 2007) and externalizing behavior (Karreman, van Tuijl, van Aken, & Dekovic, 2009; Miner & Clarke-Stewart, 2008). Of the 173 children who participated in the study, 92 were male (53.2%).

Results

To test our hypotheses, path analyses were conducted using Mplus 7 (Muthén & Muthén, 2011). Path analysis is a special case of structural equation modeling which models only include relations among observed, directly measured variables, as opposed to latent variables (MacCallum & Austin, 2000). Path analysis allows for the evaluation of many associations among variables simultaneously, providing a distinct benefit over other techniques such as multiple regression (Tomarken & Waller, 2005). The models were specified, identified, and tested for assumption violations prior to path estimation and interpretation. In addition, a full information maximum likelihood (FIML) procedure was used to address missing data. FIML in Mplus generates an observed information matrix by assessing individual missing data patterns and using them to calculate the means and covariances for each missing data pattern (Kaplan, 2009). In structural equation modeling, FIML is a preferred method of missing data estimation over other methods such as listwise deletion in part because it yields unbiased estimates of population parameters (Tomarken & Waller, 2005). To improve the estimation of missing data, several auxiliary variables hypothesized to relate to attrition or the main outcome variable, externalizing behavior problems at 6 years, were included. Auxiliary variables are variables included solely to improve the missing data estimation and are excluded from the specification of the path analysis (Collins, Schafer, & Kam, 2001). These variables were maternal depressive symptoms assessed at hospital discharge using the Center for Epidemiological Studies Depression Scale, paternal education, and externalizing behavior problems at 16 months.

Four path models were tested, one per ASCT code (avoidance, coherence, violence, and maternal nurturance). Except for the ASCT code, the four models tested were identical. Figure 1 depicts the hypothesized associations among substantive variables, omitting the covariates gender, prematurity, cognitive skills, and family socioeconomic assets for visual clarity. For each model, the fit was assessed and then the path coefficients were interpreted.

Four fit indices were examined, including X^2, root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root mean residual (SRMR). To be considered an acceptable fit to the data, the X^2 null hypothesis indicates a well-fitting model and should not be rejected, the RMSEA and SRMR should be less than .08, and the CFI should be greater than or equal to .95 (Schreiber, Nora, Stage, Barlow, & King, 2006). Fit indices were acceptable for all models and are reported in Table 2.

Predictors of ASCT scores and 6 year externalizing behavior problems

In all models, higher PCERA scores indicating less intrusive parenting at 9 months predicted more secure attachment at 16 months ($\beta = .21–.22$, $p < .05$), higher EC at 24 months ($\beta = .19$, $p < .05$), and fewer externalizing behavior problems at 24 months ($\beta = -.23$, $p < .01$). Contrary to expectations, the PCERA did not predict ASCT codes. Higher EC at 24 months was associated with higher coherence on the ASCT at 36 months ($\beta = .32$, $p < .01$; See Figure 2a). However, EC was not associated with avoidance, violence, or maternal nurturance. In addition, contrary to expectations, attachment security at 16 months did not predict ASCT scores.

Children with higher avoidance scores on the ASCT exhibited significantly more maternal-reported externalizing problems at 6 years ($\beta = .28$, $p < .001$; See Figure 2b). In addition, children with lower maternal nurturance on the ASCT had more externalizing problems at 6 years at a trend level ($\beta = -.16$, $p = .06$). Coherence and violence did not predict externalizing behavior problems at 6 years.

Covariates—Family socioeconomic assets were a robust predictor of developmental outcomes in all models. Children with more family assets were more likely to have higher cognitive skills ($\beta = .38$, $p < .001$), higher EC ($\beta = .23$, $p < .01$), and fewer externalizing problems at 24 months ($\beta = -.25$, $p < .01$). In addition, children with more family assets experience significantly less hostile, angry parenting at 9 months ($\beta = .29$, $p < .001$).

As expected, externalizing behavior problems at 24 months were highly predictive of externalizing behavior problems at 6 years in all models ($\beta = .49–.53$, $p < .001$), suggesting moderate stability in externalizing behavior problems. EC at 24 months was strongly associated with concurrent cognitive skills in all models ($\beta = .53$, $p < .001$).

Consistent with theory and previous research, gender differences emerged with respect to the ASCT. Boys were more likely to display higher avoidance and violence on the ASCT ($\beta = -.25$, $p < .01$; $\beta = -.37$, $p < .01$). Girls were more likely to display more maternal nurturance ($\beta = .21$, $p < .05$). However, contrary to expectations, no gender differences were found in externalizing problems or EC. In addition, children with higher birthweight and gestational age had moderately higher EC, at a trend level ($\beta = .15$, $p < .06$).

Discussion

The study suggests that early parenting quality and avoidance in children's represented relationships predicted preterm children's externalizing behavior problems. Our results paint a picture of preterm children who are in the process of becoming more or less regulated and

resilient in multiple developmental domains within the first six years of life, depending on child- and family-level characteristics and processes.

Representations of Family Relationships, Behavior Problems, and Self-Regulation

Consistent with previous studies focusing on low and high risk samples, aspects of children's represented family relationships longitudinally predicted their externalizing behavior problems. In our sample of children born preterm, children who had more avoidance in their narrative representations at 36 months exhibited more mother-reported externalizing behavior problems at 72 months. Although we did not observe significant relations between children's coherence or violence in the story stems and their behavior problems, there was a trend-level association between more nurturance and fewer externalizing problems. Attachment theory suggests that representations of others and the self guide future interpersonal interactions (e.g., Bretherton & Munholland, 1999) and provide a basis for the development of psychopathology or interpersonal competence (Bowlby, 1988). Because externalizing behavior problems can interfere with interpersonal relationships with adults and peers, it is important to recognized that attachment processes may lead to such problems in preterm children as well as other risk groups.

Theory (e.g., Bowlby, 1988; Fearon & Belsky, 2004) and prior research with low risk samples (e.g., Kochanska et al., 2009) also suggest that the development of parent-child relationships, emerging self-regulation, and internalization processes are intimately linked. Partially consistent with this literature, the present study found that preterm children who exhibited strong effortful control skills at 24 months postterm also had more coherent responses to the ASCT at 36 months postterm compared to children with weak effortful control skills. Clyman (2003) theorized that young children's narrative responses to story stem assessments reflect both internal representations of relationships as well as self-regulation strategies. Effortful control skills may provide attentional flexibility so that children can focus on others' distress in a supportive way without being overwhelmed (Rothbart & Rueda, 2005) and thus resolve attachment-related story stems in a coherent manner. These findings point to emerging effortful control as a potential protective factor for preterm children's social emotional development.

Parenting Interactions

Intrusive parenting is particularly important to examine within preterm populations. Feldman (2007) suggests parents of premature infants tend to increase intrusive behaviors in attempts to support infants' inconsistent signals and promote cognitive growth. Intrusive parenting may weaken children's autonomy and increase arousal, both of which undermine self-regulation (Taylor, Eisenberg, Spinrad, & Widaman, 2013). Less intrusive parenting behavior that fosters secure attachment relationships may also result in better child self-regulation, and attention in particular, which is an integral component of effortful control (Fearon and Belsky (2004). The present study found that less intrusive maternal behavior, assessed during play at 9 months, predicted more secure attachment at 16 months and better effortful control at 24 months. Feldman & Eidelman (2006) also found that maternal intrusiveness predicts impoverished cognitive outcomes at 24 months. Other studies with fullterm infants have also reported this association (Graziano, Keane, & Calkins, 2010;

McFadden & Tamis-Lemonda, 2013; Taylor, et al., 2013). These findings support the literature emphasizing the importance of variations in early parenting and emerging self-regulatory capacities for preterm children's subsequent cognitive and emotional development (e.g., Poehlmann, Schwichtenberg, Shlafer, Hahn, Bianchi, & Warner, 2011), including their understanding of and feelings about family relationships.

Although many deficits in preterm infants are hypothesized to reflect impaired self-regulatory capacities (Davis & Burns, 2001), research focusing on the potential protective effects of self-regulation, internalization, and effortful control in preterm infants has only recently emerged (e.g., Poehlmann, Schwichtenberg, Shah, Shlafer, Hahn, & Maleck, 2010). By examining the interface between parenting, children's biologically-based risks and capacities, and emerging self-regulation, scholars can explore how nature and nurture interact over time on preterm children's outcomes. Although attachment theory and theories of temperament have sometimes been viewed as opposing explanations for variations in children's emerging emotional development and personality, such theories can be used together to further our understanding of resilience processes in high risk children. It is especially important to examine the interface between biologically-based processes related to medical risk, physiological vulnerabilities, and infant temperament in relation to parenting interactions and the family context in children born preterm, as preterm children are more likely to experience medical complications and family stress associated with prematurity (Institute of Medicine, 2006). Such integrated, and often interdisciplinary, research may lead to better approaches to supporting children and families over time following the birth of a preterm infant.

Early Attachment Security and Subsequent Represented Family Relationships

Contrary to our expectations, infant-mother attachment security assessed in the SSP at 16 months postterm did not predict children's representations of family relationships at 36 months in this sample of children born preterm. The lack of association may have resulted because the ASCT, as administered in the present study as well as in some previous studies (e.g., Grych et al., 2002), focused on representations of broader or more generalized family relationships rather than specifically on the child's dyadic relationships with mothers or fathers. Because we only assessed infant-mother attachment at 16 months postterm and not infant-father attachment, it is difficult to know if the ASCT reflected the quality of either parent-child relationship or more general family dynamics, including variables such as marital discord. A second possible reason for the non-association between the SSP and ASCT may be related to the relatively high risk nature of the sample relative to the task demands. Administration of the ASCT requires children not only to attend to the dolls and props, which are usually engaging, but also to the verbal instructions and visual enactments that comprise the story stems. Such a task makes high demands on a child's attentional and regulatory capacities as reflected, in part, in their emerging effortful control skills (as discussed above) as well as their language skills and general cognitive functioning (discussed below), in addition to accessing the organization of specific or generalized thoughts and feelings about the family. A third possibility for the lack of association between the SSP and ASCT is that the ASCT has not been used in previous published studies focusing on children born preterm; consequently, its validity with this population is

not well-established, although it has been used with other groups of young at risk children who show a higher than average rate of cognitive delays and behavior problems (Poehlmann, 2005; Toth et al., 2002). Yet one argument against such a conclusion is that ASCT avoidance predicted externalizing problems, similar to studies with other risk groups. In any case, additional research with the ASCT and similar assessments focusing on attachment or family relationships at the representational level should be conducted with children born preterm as well as with other children at risk for developing psychopathology.

Child Gender and Cognitive Skills

Child characteristics such as gender and cognitive skills appear to be important on multiple levels for young children born preterm. Girls and children with more optimal general cognitive functioning perform better on effortful control tasks (e.g., Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Kochanska & Knaack, 2003) and assessments focusing on internalized representations of relationships (e.g., Bretherton et al., 1990; Grych et al., 2002; Verschueren & Marcoen, 1999; Poehlmann, 2005). The findings of the present study confirmed the importance of gender and cognitive skills for represented relationships in children born preterm and suggest that boys born preterm may experience particular risk for problems related to self-regulation and internalization processes as they grow older. Interventions designed to improve such skills in children born preterm may be especially needed for boys.

Limitations

The limitations of our study should be noted. Although attrition was relatively low across the first 3 years of the study, attrition was higher between the 3 and 6 year timepoints. Moreover, families who remained in the study were more socioeconomically advantaged than ones who dropped out of the study or could not be located. Thus, appropriate caution should be used in generalizing our findings to more socioeconomically stressed families. In addition, because we focused on children born preterm, our results are not generalizable to full-term children. It also should be noted that our assessment of children's behavior problems relied on maternal report and future research should also make use of teacher-reported behavior problems as well. Our use of laboratory-based EC assessments, standardized assessment of children's cognitive development, and observer ratings of mother-child interactions, attachment security, and internalized family relationships were strengths of the study. Although fathers are important for children's development, we did not assess infant-father attachment or father-child parenting interactions over time. Inclusion of fathers and assessment of marital relationships will be important in future research focusing on the family context in children born preterm.

Conclusion

In sum, our prospective longitudinal study found that aspects of represented relationships showed predictive associations with externalizing behavior problems in children born preterm. Because children born preterm are at high risk for developing behavior problems (Bhutta et al., 2002), it is important to identify factors leading to such difficulties in order to facilitate early identification and treatment for this vulnerable population, especially within the family context.

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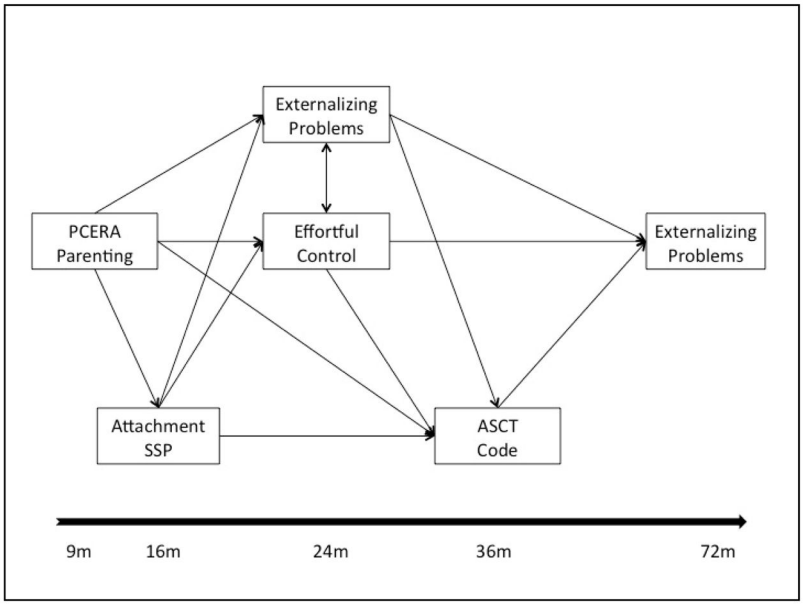

Figure 1.

Hypothesized path model.

Note. Covariates (not depicted) were gender, prematurity, cognitive skills and family sociodemographic assets.

Figure 2a

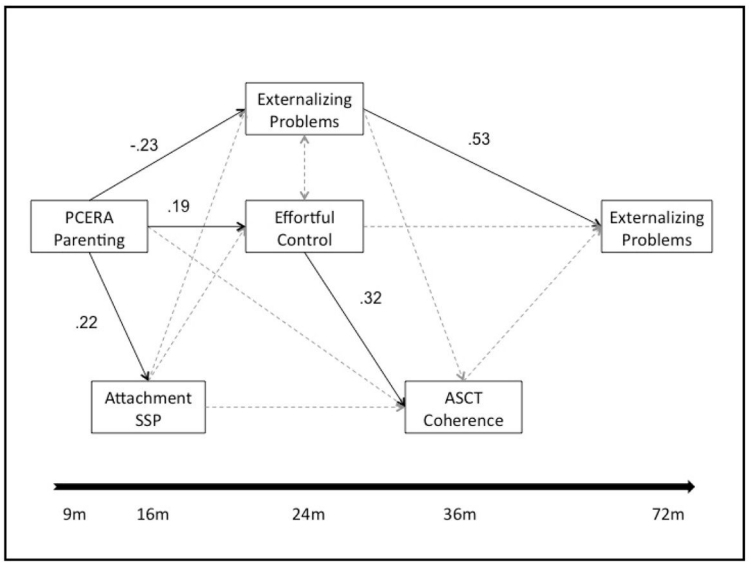

Figure 2b

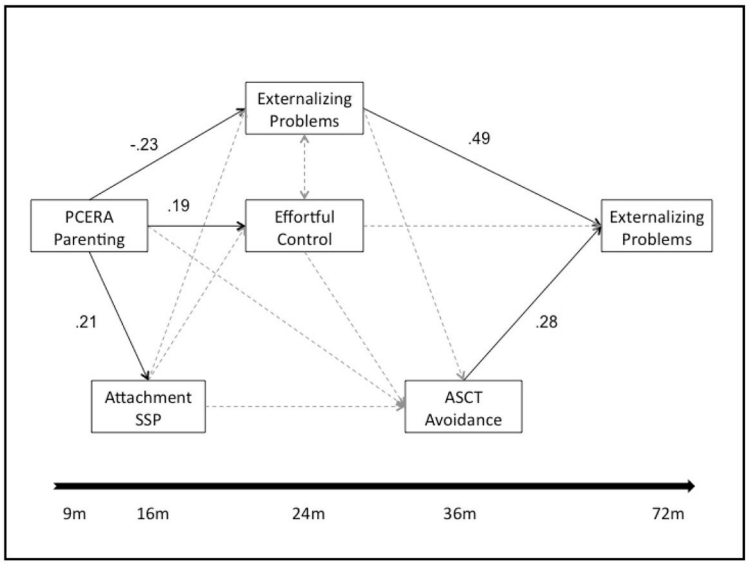

Figure 2.

Figure 2a: Significant Path Estimates for Model using ASCT-Coherence

Figure 2b: Significant Path Estimates for Modes using ASCT-Avoidance

Table 1

Child and Family Characteristics (*N*= 173)

Variables	Range or Frequency (%)	*M*	*SD*
Maternal Age (at child's birth)	17–42	29.54	6.26
Maternal Education (years)	8–21	14.25	2.69
Family Yearly Income	$0–500,000	$59,076	$52,837
Maternal Marital Status			
Married	119 (68.8%)		
Not married	54 (31.2%)		
Gender of Child			
Male	92 (53.2%)		
Female	81 (46.8%)		
Child Race			
African American	24 (13.9%)		
Caucasian	114 (65.9%)		
Latino	3 (1.7%)		
Multiracial	28 (16.3%)		
Infant Gestational Age (weeks)	23.7 – 36.0	31.34	3.03
Infant Birthweight (grams)	490–3328	1712.46	577.24
Days Hospitalized in NICU	2 – 136	33.27	27.92
1-minute APGAR scores	1 – 9	5.90	1.97
5-minute APGAR scores	2 – 10	7.92	1.32
Multiple Birth	33 (19.1%)		
Ventilation During NICU Stay	92 (53.2%)		
Apnea During NICU Stay	119 (68.8%)		
Bradycardia During NICU Stay	107 (61.8%)		
Respiratory Distress Syndrome	91 (52.6%)		
Gastroesophageal Reflux	16 (9.2%)		
Supplementary O_2 at NICU	17 (9.8%)		
Discharge			

Note. NICU = Neonatal Intensive Care Unit.

Table 2

Path Analysis Estimates

	Avoidance	Coherence	Violence	Maternal Nurturance
6 Year Externalizing Probs on	**β**	**β**	**β**	**β**
ASCT	.28***	.00	.09	−.16^{t}
24m EC	−.04	−.10	−.09	−.10
24m Ext Probs	.49***	.53***	.53***	.53***
ASCT on				
Gender	−.25**	.16	−.37***	.21*
Family SES	−.25**	.07	−.01	.14
Prematurity	−.09	.10	.07	−.04
ABIQ	−.05	.06	.09	.11
PCERA	−.05	−.03	.01	−.11
Attachment Security	.11	−.14	.02	−.05
24m EC	−.15	.32**	−.03	−.06
24m Ext Probs	.05	−.10	−.02	.03
ABIQ on				
Gender	.12	.12	.12	.12
Family SES	.38***	.38***	.38 ***	.38 ***
Prematurity	.09	.09	.08	.08
PCERA	.10	.10	.10	.10
Attachment Security	−.03	−.04	−.03	−.03
24m EC on				
Gender	.11	.11	.11	.11
Family SES	.23**	.23**	.23**	.23**
Prematurity	.15^{t}	.15^{t}	.15^{t}	.15^{t}
PCERA	.19*	.19*	.19*	.19*
Attachment Security	−.11	−.11	−.11	−.11
24m Ext Probs on				
Gender	−.02	−.02	−.02	−.02
Family SES	−.25**	−.25**	−.25**	−.25**
Prematurity	.09	.09	.09	.09
PCERA	−.23**	−.23**	−.23**	−.23**
Attachment Security	.00	.00	.00	.00
Attachment Security on				
Family SES	−.08	−.08	−.08	−.08
Prematurity	.11	.11	.11	.11
PCERA	.21*	.22*	.22*	.22*

	Avoidance	Coherence	Violence	Maternal Nurturance
6 Year Externalizing Probs on	**β**	**β**	**β**	**β**
PCERA on				
Gender	.03	.03	.03	.03
Family SES	.29***	.29***	.29***	.29***
Prematurity	−.03	−.03	−.03	−.03
24m EC with 24m Ext Probs	.05	.05	.05	.05
24m EC with ABIQ	.53***	.54***	.54***	.54***
24m Ext Probs with ABIQ	−.08	−.08	−.08	−.08
X^2 (*df*) *p*	5.28*(7)p* = .63	10.94*(7)p* = .14	9.27*(7)p* = .24	8.98*(7)p* =.25
RMSEA (CI)	.00 (.00–.08)	.06 (.00–.12)	.04 (.00–.11)	.04 (.00–.11)
CFI	1.00	.98	.99	.99
SRMR	.02	.03	.03	.03

Note.

* *p* < .05,

** *p* < .01,

*** *p* < .001,

t *p* < .06.

ASCT = Attachment Story Completion Task, PCERA = Parent-Child Early Relational Assessment, ABIQ = Abbreviated IQ, EC = Effortful Control, Ext Probs = Externalizing behavior problems