MULTILEVEL LATENT CLASS ANALYSIS FOR THE IDENTIFICATION OF PRESCHOOL-AGED CHILDREN'S INTERNAL REPRESENTATION TYPOLOGIES AND EARLY PARENTING PREDICTORS IN A LOW-INCOME SAMPLE

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ABSTRACT

MULTILEVEL LATENT CLASS ANALYSIS FOR THE IDENTIFICATION OF PRESCHOOL-AGED CHILDREN'S INTERNAL REPRESENTATION TYPOLOGIES AND EARLY PARENTING PREDICTORS IN A LOW-INCOME SAMPLE

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Children's internal representations of attachment relationships comprise the underlying cognitive structure that reflects regularities in patterns of early relationships with attachment figures. Internal representations of these patterns of early relationships heavily influence how children interpret and respond to the world around them, making the study of internal representations in early childhood critical. Further, because children from economically-vulnerable homes are at higher risk for less optimal developmental outcomes, identifying attachment-related patterns of children's internal representations as they relate to early parenting is highly salient to promoting early parenting strengths and positive developmental trajectories. The purposes of this study were to: (1) identify different typologies of children's internal representations of attachment relationships via story stem narrative responses (MacArthur Story Stem Battery: Bretherton, Oppenheim, Buchsbaum, Emde, & the MacArthur Narrative Group, 1990) at 5 years of age; (2) examine early parenting predictors of children's internal representation typologies; and (3) examine the effects of typologies of children's internal representations on their later externalizing behavior problems and academic outcomes. Data were drawn from the National Early Head Start Research and Evaluation Project (EHSREP), which sampled 3,001 low-income families with children up to 12 months of age at time of enrollment through kindergarten entry, when children were transitioning from preschool to

kindergarten, and when children were in the 5th grade. Primary methods of analysis included Multilevel Latent Class Analysis. Results confirmed four hypothesized typologies of children's internal representations: *Secure*, *Resistant*, *Anxious*, and *Dysregulated*. Early parenting predictors were studied by examining typologies of parenting behaviors (parent supportiveness, parent intrusiveness, and dyadic mutuality/ connectedness), maternal psychosocial stressors (maternal depressive symptoms, maternal stress, and family conflict) and the home environment (physical environment and social-emotional environment). Parenting typologies included *Competent, Controlled*, and *Distressed*, and were significant predictors of children's internal representation typologies. Further, child internal representation typologies in early childhood predicted externalizing behavior problems and academic outcomes (math and reading performances) when children were 10 years of age.

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CHAPTER 1
INTRODUCTION

Previous literature highlights the importance of systematic knowledge about children's internal representations as they reflect attachment security and are related to children's developmental outcomes in early childhood (Waters & Rodrigues, 2004; Waters, Rodrigues, & Ridgeway, 1998; Waters & Waters, 2006). The current study extends the extant literature on young children's internal representations of early parenting and family experiences by: (1) exploring differing typologies of representations; (2) identifying early parenting predictors of these typologies; and, (3) examining internal representations in early childhood as predictors of later social-emotional and academic outcomes in middle childhood. In addition to extending current empirical understandings about children's internal representations, the current study also addresses key implications for practice. Specifically, identifying variations in children's internal representations better positions practitioners to promote parenting associated with children's more optimal early cognitive and social-emotional development.

In this chapter, a broad overview of the study is presented. The overview includes perspectives on: (a) the study as framed within the current empirical literature; (b) the relevance of the novel statistical techniques employed in the current study to advancing research on children's internal representations of attachment relationships; and (c) the analytical model tested in the current study including rationale for the selected study variables. Following this chapter in Chapter 2 is a critical literature review. Methods are detailed in Chapter 3 and include study design, description of the sample and measures, and the steps required for the analytical models. Study results are articulated in Chapter 4, and the study discussion is found in Chapter 5.

Overview of the Literature

A central tenet of attachment theory is that beliefs and expectations regarding relationships throughout the life span are derived from early experiences and primarily from interactions with significant caregivers, specifically parents (with the bulk of the research focused on mothers) (Bowlby, 1969/1982, 1973, 1980). Children's internal representations of attachment relationships are conceptualized as a type of abstract, structured schema of experiences specific to early experiences in the social world including primary relationships (e.g., Bretherton & Munholland, 2008; Neisser, 1967). Preschoolers' abilities to regulate emotion during affectively-charged situations are thought to be influenced by their internal representations (and the underlying cognitive schema that have themselves been shaped by previous experiences) (Rholes & Simpson, 2004). Early internal representations are thought to be relatively stable, with novel situations or experiences becoming assimilated into preexisting representations. Therefore, children who experienced warm and sensitive parenting develop the capacity to express positive feelings, thoughts and behaviors within subsequent relationships and elicit positive responses in return- a cycle of behavior consistent with attachment theory (Ainsworth, 1982).

Methodological Limitations in the Study of Children's Internal Representations

Because of the limited access to children's internal worlds researchers have struggled to gain information on children's internal representations. Traditionally, parents and teachers have been key informants of the status of preschoolers' internal representations. Such sources have lacked access to understand children's internalized thoughts and feelings. Another studied, yet problematic, source of information for

internal representations includes self-reports from the preschooler. Self-report measures and clinical interviews with children younger than 8 years old generally have not been successful, lacking measurement reliability and validity (Perrin & Last, 1992; Silverman, 1991). Because of the difficulties reporting time-specific events and tendency to under-report problems, young children struggle directly reporting problematic symptoms (Glasberg & Aboud, 1982; Harter & Pike, 1984; Schwab-Stone et al., 1994). Play techniques have long been used in clinical settings for understanding and treating young children, yet have a limited research basis. Several studies have recently used systematic children's play narratives to characterize children's internal representations (Bretherton et al., 1990; Cassidy, 1988; Oppenheim et al., 1997; Solomon et al., 1995; Toth et al., 1997; Warren, Oppenheim, & Emde, 1996). Such narratives may enable access for examining children's internal representations because children can portray experiences with others, expectations, and conflicts through play (Warren, Oppenheim, & Emde, 1996). Studying internal representations in children living in poverty (which brings greater stressors to parenting and early child experiences) is particularly key to understanding how early experiences contribute to paths of resilience and flourishing development or to paths of less optimal developmental outcomes.

Overview of the Current Study Purposes and Model

The purposes of the current study are to: (a) identify different typologies of children's internal representations of attachment relationships as articulated in the narratives at age 5 years; (b) test relations between early parenting and children's typologies on internal representations; and (c) examine children's internal representation typologies as predictors of their later externalizing behavior problems and academic

outcomes at age 10 years. The proposed internal representation typologies are based on *a priori* attachment classifications identified in infants and adults (see Ainsworth et al., 1978; Main et al. 1985; Main et al., 2003), and also contributions from Davies' and colleagues emotional security patterns identified in school-aged children (see Davies & Forman, 2002). The current study classified internal representation typologies as the following: secure, resistant, anxious, and dysregulated. These hypothesized typologies are described and discussed in Chapter 2. The statistical method for extracting typologies was Latent Class Analysis in which to identify subtypes of related individuals using a set of children's internal representation indicator variables. Traditional Latent Class Analysis assumes that observations are independent and neglects the possibility of multilevel data structures (e.g., children nested within families). Therefore, the current study proposes an innovative methodological approach, Multilevel Latent Class Analysis, to determine the likelihood of internal representation class membership across parenting within the family context, such as parenting behavior, maternal psychosocial stressors, and home environment. Latent classes of internal representation among $n = 575$ low-income preschoolers are considered. The Multilevel Latent Class Analysis used a nonparametric approach with parenting predictors (Level 2- parent/family) of children's internal representation typologies (Level 1- child). Several child characteristic covariates at the child level (i.e., child age, child gender, child race, and child temperament) were included as predictors for the latent classes of internal representation in the latent class analysis model. In addition, at the parent/family level, family characteristic covariates (i.e., maternal cumulative demographic risk and Early Head Start program status) were included relative to early parenting. These covariate variables were selected for the

current study based on previous evidence that supports relations with the study measures and are discussed next.

Rationale for inclusion of child and family characteristics. Previous research found child gender group differences in how parenting behaviors effect children's internal representations of attachment relationships (Pierrehumbert et al., 2009; Zimmer-Gembeck et al., 2013). Particularly, girls demonstrate more internalized behaviors in response to parenting behaviors compared to boys (Zimmer-Gembeck et al., 2013; Goodman et al., 2011). Second, internalizing behavior problems in children were found to differ across ethnoracial groups (Georgiades, Boyle, & Fife, 2013). Thus, ethnoracial groups were included to control for variability in children's emotional development, including internal representations. Third, child temperament relates to children's representations of attachment security (Laible, 2004), and associated with how a child reacts in stressful situations (Kochanska & Coy, 2002). In addition, children characterized by difficult temperament (i.e., high negative emotionality) are more susceptible to impacts of poorer parenting behaviors (Belsky, 2005; Belsky, Hsieh, & Crnic, 1998). Belsky et al. (1998) found that negative parenting was a stronger predictor of later internalizing behaviors, particularly inhibited and withdrawn, in children assessed as higher on negative temperament. Finally, Early Head Start program status was included at the family level to reflect the low-income, Early Head Start eligible nature of the selected sample. Early Head Start is a publicly funded program designed to promote early child development in low-income families (National Research Council and Institute of Medicine, 2000). Research found positive Early Head Start program effects on early parenting and child outcomes (Love et al., 2005). By using a person-centered approach

rather than a variable-centered approach, this study emphasized within-group variations in representations with early parenting predictors. Variable-centered statistical methods limit the inclusion of variables when defining different categories of individuals. Person-centered models analyze a clustering of several variables designed to identify qualitatively different categories of individuals. The following section includes a description of the parenting indicators in which the parenting typologies were comprised, and used to predict children's internal representation typologies.

Rationale for parenting predictors. Family level parenting predictor variables[1] on children's internal representation typologies included parenting behaviors during mother-child interaction, maternal psychosocial stressors, and home environment at 14 month. Specifically, family level early parenting indicators consisted of parenting behaviors (parent supportiveness, parent intrusiveness, and dyadic mutuality/ connectedness), maternal psychosocial stressors (maternal depressive symptoms, maternal stress, and family conflict) and the quality of the home environment (physical environment and social-emotional environment). In order to better capture the complex nature of parenting which reflects parenting behaviors, maternal psychosocial functioning, and the nature of the home environment (Dix & Meunier, 2009; Horowitz & Kerker, 2001; O'Brien, Asay, & McCluskey-Fawcett, 1999), multilevel latent class analysis accounted for the nested structure of the data to allow internal representation latent class intercepts to vary across family units (measured by early parenting) assessing if and how family units (measured by early parenting) influence the internal

[1] Parenting construct variables include eight indicators that are each referenced throughout this study in one of the three parenting categories: (1) parenting behaviors, (2) maternal psychosocial stressors, and (3) home environment. The eight parenting indicators are entered individually in the multilevel latent class analysis model; however, for simplicity they are discussed within these three parenting dimensions.

representation latent classes. Thus, instead of entering each parenting indicator (behavioral, psychosocial and home environment) separately, the use of multilevel latent class analysis allowed for the identification of naturally occurring parenting typologies reflecting differing degrees of parenting behaviors, maternal psychosocial functioning and home environment. Because children internalize early parenting which is imbedded in maternal psychosocial functioning and the quality of the home environment, this approach allowed for a more robust examination of early parenting from an ecological framework.

Using multilevel latent class analysis, the random intercepts allow the probability of membership in a particular internal representation latent class to vary across family units (measured by early parenting typologies). For example, the probability that a child will belong to the dysregulated representation class is likely to vary significantly across families as indicated by parenting types. That is, in some families there is a large probability that a child will belong to the dysregulated representation class and in other families there is a small probability that a child will belong to the dysregulated representation class. Please see Chapter 2 for detailed discussions of the theoretical framework for the current study research models.

CHAPTER 2
LITERATURE REVIEW

The following chapter reviews research literature emphasizing the understanding of children's internal representations and the use of statistical methods to capture study internal representations of relationships. Following the theoretical framework relative to internal representations, literature concerning the impacts of early parenting on children's internal representations of attachment relationships is reviewed. Developmental risks in preschoolers are briefly discussed. Next, a broad overview of storytelling methods for studying children's internal representations and the importance of identifying different patterns of children's internal representations using a person-centered approach as a means for classifying unique patterns in storytelling are addressed. The examination of individual development of children's internal representations is discussed within a person-centered framework, specifically from a holistic-interactionistic perspective (Block, 1971; Magnusson, 1985; Magnusson & Allen, 1983). The chapter concludes with statement of the purposes of the present study, research questions and hypotheses.

Introduction of Internal Representations

Internal representations reflect the conscious and unconscious experiences of one's reality (Calder, Lawrence, & Young, 2001). In response to an affectively-charged scenario, conscious behaviors reflect a child's awareness of how he/she is responding in a given situation, whereas the unconscious are behaviors motivated by an unknown source. For example, when a child is in a fearful situation he/she may recall little or no conscious thinking about the situation, and may respond via automatic, unconscious responses reflecting fear or anger. How models of children's internal representations of relationships develop is a question of theoretical interest and practical importance.

Attachment theory provides a useful framework from which to examine the influence of early, close relationships on the development of children's internal representations. Researchers have emphasized early experiences with primary caregivers as a primary focus of children internal representations of attachment relationships. The relationship between parenting and attachment in infancy is well established (De Wolff & van IJzendoorn, 1997). However, less is known about the quality of parenting, particularly during toddlerhood that is associated with the development of internal representations of attachment relationships in preschool-aged children. The link between toddlerhood and preschool is important for understanding long term effects on child development and to highlight early intervention for the long term. The attachment literature demonstrates that preschoolers' attachment styles relate to positive and negative developmental outcomes, emphasizing the importance of better understanding these internal representations of relationships. Securely attached preschool-aged children show better adaptation following critical transitional periods into early adolescence (Seven, 2010) and higher social-emotional and problems-solving skills (Raikes & Thompson, 2008). Alternatively, preschool-aged children with insecure attachments demonstrate greater externalizing behavior problems (DeVito & Hopkins, 2001; Greenberg, Speltz, DeKlyen, & Jones, 2001), internalizing behaviors and emotional problems (Shamir-Essakow, Ungerer, & Rapee, 2005). To better understand the conceptual framework of the current study, the next section provides a discussion of attachment theory and an extension of attachment theory, the emotional security hypothesis, followed by an in-depth discussion of internal representations of attachment relationships.

Theoretical Framework of Attachment

Attachment theory developed from the collaborative work of John Bowlby and Mary Ainsworth (Ainsworth & Bowlby, 1991). Bowlby formulated the basic tenants of attachment theory from an array of concepts across several disciplines, including child development and psychoanalysis. At the time this novel concept of explaining children's behaviors through their early relationships, revolutionized how researchers thought about child development. However, the methodological support of Bowlby's theory was lacking prior to the innovative work conducted by Ainsworth that expanded on this theory.

Bowlby (1969) believed humans are biologically predisposed to form interpersonal relationships in their social environments. Children seek close relationships primarily from attachment figures that provide emotional and physical support to fulfill developmental needs. The term attachment refers to the quality of the parent-child relationship to form a secure base from which the child may explore the environment (Ainsworth, Bell, & Stayton, 1971; Bowlby, 1969). The ability to use the caregiver as a secure base reflects children's internal working models and the behavioral expressions of a structured set of expectations about the self, the world, and of relationships (Bowlby, 1969/1982, 1973, 1980). This innate function of reasoning allows children to also maintain comfort from the caregiver in times of perceived threat or distress (Ainsworth, Bell, & Stayton, 1971). Children's psychological processes are mentally represented and motivate behavior.

Ainsworth and colleagues (Ainsworth, Bell, & Stayton, 1971; Ainsworth, Blehar, Waters, & Wall, 1978) further elaborated on attachment theory through the understanding

of individual differences in the variations of sensitive and responsive caregiver attachment behavior determined from the quality of the caregiver-child relationship. Caregiver sensitivity and responsiveness to child cues for proximity were associated with a *secure* quality of caregiver-child attachment relationships. Alternatively, an unresponsive or rejecting caregiver to the child's cues and bids for proximity refers to an *insecure* quality of the caregiver-child attachment relationships. Davies and Cummings (1994) extended on the theoretical framework of attachment by introducing the Emotional Security Hypothesis. Children's emotional security is a product of past experiences in the context of distress and primary influences on later representations. Highlighting the importance of attachment relationships on the organization of cognition, affect, and behavior in later relationships (e.g., Bowlby, 1969/1982, 1973, 1980; Bretherton, 1991; Erickson, Sroufe & Egeland, 1985; Fraley & Brumbaugh, 2004; Greenberg, 1999), the following section discusses internal representations as the underlying mechanisms of attachment relationships.

Internal Representation of Attachment Defined

The underlying cognitive structure that reflects regularities in patterns of behavioral responses relative to the unique history of primary relationships is defined as internal representations of attachment relationships (Ainsworth et al., 1978). Internal representations encompass several attachment-related constructs, including internal working models (e.g., Bowlby, 1969/1982, 1973, 1980; Bretherton, 1991; Main, Kaplan, & Cassidy, 1985), relational schemas (e.g., Baldwin, 1992), secure base schemas (e.g., Mikulincer, Hirschberger, Nachmias, & Gillath, 2001), and secure base scripts (e.g., Waters, Rodrigues, & Ridgeway, 1998). Bowlby suggests individuals form internal

representations of attachment relationships to provide assistance in navigating within the social world. Because of the complexity of the information processed in the social world the brain constructs internal representations. Children's internal representations are constructed from expectations and appraisals of the self and others based on the continual interaction. Through the inclusion of both affective and cognitive components, these models guide behavior. Researchers have referred to the brain as a meaning-making organ (e.g., Heider, 1958; Lewin, 1933). Internal cognitive structures (internal representations) direct attention toward, represent, and organize relevant features of the social world (Bowlby, 1969). As individuals develop the capacity for symbolic representations the initial internal representations are abstract, generalized and scarce. Internal representations in infancy are basic, fundamental expectations regarding the emotional availability of the caregiver based on their daily interactions (Farrar & Goodman, 1990). As information is acquired, children's understanding of emotions depends on their internal representations (scripts). Following the formation of internal representations, individuals use the constructed models to guide subsequent information processing from the social environment with regard to the regulation of emotional responses and the understanding of others thoughts, feelings, perceptions, and intentions during interactions (Bretherton & Munholland, 2008).

Because of the implications of attachment theory beyond infancy, researchers have further determined the importance of understanding the content, organization and function of internal representation of attachment relationships (Baldwin, 1992; Bretherton, 1991; Bretherton & Munholland, 1999; Main et al., 1985; Mikulincer et al., 2001; Waters, Rodrigues, & Ridgeway, 1998). Script theory states that internal

representations or mental scripts allow children to understand and make sense of life experiences by connecting experiences to their internal representation of attachment relationships. Mental scripts organize children's emotional construction of reality conveyed by internal representations of relationships. Therefore, internal representations organize the path of family history, life experiences, and the developing sense of self identity (Wolf, 2003). Children engage in meaning making experiences about early attachment relationships and those relationship templates (representations) then guide the meaning making processes as they encounter subsequent social and affective experiences (Bamberg & Damrad-Frye, 1991; Wolf, 2003). Internal representations influence how we perceive and respond to (including how we regulate our responses) affectively-charged situations. Children who are securely attached express and regulate emotions, and coherently communicate feelings and needs. Please see the next section for descriptions of two major components of mental states comprising internal representations: 1) declarative knowledge about the self, other, and relationship within different interactions, and organization of affect and behavior patterns involved in interactions; and 2) implicit procedural knowledge about relational scripts acquired from interactive communication in infancy and guidelines for social information processing (e.g., propositional statements, such as 'if-then').

Declarative and Procedural Knowledge

Internal representations consist of declarative as well as procedural knowledge about interactions (Zimmermann, 1999), both of which influence the cognitive and affective (appraisal) processes of patterns involved in the interactions and behavioral responses to the interactions. Neurological impairments in the hippocampus of the brain

occur when procedural knowledge (implicit right brain) and declarative knowledge (explicit left brain) are dissociated, common when memories in early childhood are repressed (Clyman, 2003; Lenzi et al., 2013). While procedural knowledge is developed from birth throughout early childhood, declarative knowledge develops later and does not mature until approximately the fifth year of life (Zimmermann, 1999). The development of declarative knowledge at age 5 years highlights an important stage in children's growth trajectory for the formation of explicit memory (Lenzi et al., 2013).

Declarative knowledge refers to conscious memories of facts and events that are learned, stored in memory, and later recalled. This form of explicit memory consists of semantic memory and episodic memory. Semantic memory stores information about the social world (abstract or generalized information extracted from repeated experiences of a similar kind), whereas episodic memory stores information about specific events experienced in the social world (memory of specific past events). In addition, internal representations also consist of implicit procedural knowledge that functions outside of the conscious mental state, thus, elicited automatically by prevalent information in the social world. Main and colleagues (1985) suggest that the procedural aspects of internal representations provide rules for the direction and organization of attention and memory as it relates to social interaction in relationships. The access to specific forms of declarative knowledge of the self, other, and the relationship, is controlled through these procedural rules.

Thus, internal representations function as a network of cognitive structures that encompasses complementary declarative knowledge of self, others, and relationships, as well as procedural knowledge providing rules for behaviors and information processing

in relevant contexts (relational contexts) (Baldwin, 1992). The interpretation of social behavior relies on declarative knowledge about the self and other in interaction, whereas the organization of incoming social information, in the generation of interpersonal expectations, and in the planning of appropriate behavioral responses, is dependent on procedural knowledge about the attended information. Please see the next section for a discussion of how internal representations in preschool-aged children function within a network of representations.

Preschool-Aged Children's Internal Representation Network

A network is a global system that consists of internal representations of relationships in preschool-aged children. The internal representations network in preschoolers' is used to predict how the child responds to other people's behaviors in conjunction with more transient intentional states contingent from a given situation (Fonagy & Target, 1997). Expectations are based on previous behavioral responses that a child has learned (Bowlby, 1968). Insecure children learn that the social world is unpredictable, insensitive, and the self does not deserve better treatment. Therefore, expectations of disappointment, fear, and hurt are reflected in new relationships later through aggressive and angry behaviors (Weinfield et al., 1999). According to the prototype hypothesis, early internal representations form a cognitive prototype, or template, that remains as a conceptual understanding of self, others, and relationships throughout later development and present within later relationships (Fraley, 2002; Fraley & Brumbaugh, 2004; Owens et al., 1995; Waters & Waters, 2006). However, as children develop from infancy to preschool-aged and as their social worlds expand, their internal representation networks are modified. Novel internal representations which have

developed over time are assimilated with the pre-existing mental states within the network (Schneider-Rosen, 1990). The organization of how internal representations function within the network is important for understanding the complexity of children's representational models throughout the life span (Fraley, 2002; Overall et al., 2003). Implications of the functions of internal representations are discussed next.

Functional Implications of Proposed Internal Representation Typologies

The current study proposed four internal representation typologies based on empirical literature. The proposed four typologies and how they are conceptualized in the literature are discussed. Children's internal representation typologies were labeled a priori in the current study as 1) secure representations, 2) resistant representations, 3) anxious representations, and 4) dysregulated representations (see Table 1). The proposed typologies in the current study are analogous of attachment classifications supported in previous attachment research with reference to emotional security patterns (see Ainsworth et al., 1978; Davies & Forman, 2002; Main et al. 1985; Main et al., 2003).

Proposed typologies. The primary focus of the proposed internal representation typologies was to classify preschool-aged children's internal representations based on *a priori* attachment classifications theorized to be expressed in infancy (Ainsworth et al., 1978) and adulthood (Mains et al., 2003), and emotional security patterns in school-aged children (Davies & Cummings, 1994; Davies & Forman, 2002). According to attachment theory, the internal representation network should be activated when children are motivated to seek out an attachment figure, such as in times of fear and distress (Bowlby, 1969). In addition, internal representations with a secure base nature should be activated in novel situations for the purpose of exploration (Waters & Cummings, 2000). The

current study observed children's narratives when presented with similar episodes to the fear and distress episodes that would trigger seeking out an attachment figure situations and asked to complete how the story would end, focusing on novel and stressful situations. The narratives were coded to discern the nature of children's internal representations. Particularly, the different aspects of relational representations (Hesse, 2008), which included the narrative coherence (i.e., whether the narrative is organized and well-rounded) and, narrative affective content (i.e., whether the parent-child relationship is depicted as positive and supportive).

Secure representations. Children with secure representations were hypothesized to articulate complete and well-elaborated narratives with an overall positive affect. The narratives should include exemplars of interaction that are highly expressive and coherent. These narratives more readily contain secure-base interactions that are available to conscious awareness (e.g., Etzion-Carasso & Oppenheim, 2000; Pillemer, 1998; Thompson, 2000). For example, a child with a secure representation would likely express positive descriptors of relationships within family conflict situations.

Resistant representations. Next, children with resistant representations were expected to have difficulty retrieving and recounting specific memories of attachment-related events in their narratives (Hesse, 2008), and to suppress memories of negative relationship experiences (Fraley & Shaver, 1997). These children are reluctant to tell narratives; thus, their narratives are limited in expressed emotions and characterized by interpersonal avoidance that showed less coherence in the organization.

Anxious representations. Third, children with anxious representations were hypothesized to articulate incomplete, unelaborated narratives, characterized by

interpersonal conflict and a lack of coherence in their responses. Exemplars of negative or conflictual interactions should be readily available to conscious awareness, while fewer exemplars of secure base interactions should be available to conscious awareness. Specifically, these narratives more readily access negative rather than positive attachment-related memories, and show difficulty containing these memories (Hesse, 2008). For example, children with anxious representations project more negative experiences in the story stem content and these projections are articulated in their narratives.

Dysregulated representations. Finally, dysregulated representations are expected to be limited in content and have less well-integrated and organized attachment memories, interfering with the ability to provide a coherent narrative of these experiences (Hesse, 2008; Main, Goldwyn, & Hesse, 2002; Shaver, Belsky, & Brennan, 2000). Bowlby (1980) proposed that these individuals with non-secure internal representations are more inclined to defensively exclude discrepant information than individuals with secure internal representations. Please see the next section for a discussion of impacts of early parenting on children's internal representations of relationships.

Table 1: Conceptualization of Proposed Internal Representation Typologies

Proposed Typologies	*Conceptual Characteristics of Preschoolers' Narratives*
Secure Representations	- Clear and coherent regardless of whether experiences described are positive or negative - Demonstrate an ease of recall to positive attachment relationships
Resistant Representations	- Limited and incoherent expression of emotions - Demonstrate a tendency to minimize emotional needs
Anxious Representations	- Lengthy and incoherent expression of emotions - Tend to either wander off topic or reflect angry and conflicted memories concerning attachment
Dysregulated Representations	- Limited and speaks in odd ways - Exhibits dissociated thinking during discussions of loss

Note. For infant attachment classifications see Ainsworth et al., 1978; adult attachment classification see Main et al. 1985; Main et al., 2003; and emotional security patterns see Davies & Cummings, 1994; Davies & Forman, 2002.

Impacts of Early Parenting

Children's internal representations develop through early primary attachments and experiences in the social world (Bowlby, 1969/1982, 1973, 1980). Variations in sensitive and responsive parenting behaviors contribute largely to the individual differences in the quality of early attachments (Ainsworth, Bell, & Stayton, 1971; Ainsworth, Blehar, Waters, & Wall, 1978). The primary goal of the very young child is to keep the attachment figure present and available (Bowlby, 1969/1982, 1973, 1980). Particularly under stressful situations children are biologically predisposed to seek close proximity (e.g., crying or crawling) to and maintain contact (e.g., smiling) with their caregivers. However, beyond infancy the physical presence of the attachment figure becomes less essential and more emphasis relies on the psychological availability of the attachment figure (van IJzendoorn & Bakermans-Kranenburg, 1997). Securely attached children demonstrate confidence in the emotional availability of their parent, particularly when

distressed (Bowlby, 1969/1982), and are later more socially competent preschoolers (Arend, Gove, & Sroufe, 1979; Waters, Wippman, & Sroufe, 1979). This understanding supports the importance of studying the impacts of early experiences in toddlerhood on internal representations of attachment relationships in preschool-aged children. The goal of the current study was to further understand the variability in children's internal representations of attachment relationships among the interplay of multiple parenting factors in low-income families. The current study seeks to extend previous research by simultaneously examining multiple parenting factors from the domains of parenting behaviors, maternal psychosocial stressors, and home environment. Specifically, the early parenting predictors reflected the mothers' sensitivity and responsiveness towards the child, parent-child dyadic relationships, the mothers' emotional (psychological) availability, and distressed contextual factors related to living in poverty. Please see the following section for a detailed description of the early parenting effects on internal representations of relationships.

Parenting and Children's Internal Representations

According to Ainsworth (1969), sensitive and responsive parenting behaviors effect children's internal representations. Parenting behaviors that support sensitive or supportive parenting, as termed in the current study, include awareness of children's cues in the interaction. Therefore, early attachment-related parenting, as an intervention strategy for promoting parenting sensitivity in regards to understanding their child's underlying cognitive structures, may be important for supporting positive internal representations.

In recent years, attention has turned to the ways in which young children internalize and derive meaning from the parenting behaviors they experience. Particularly in the early childhood years, children are engaged in meaning-making processes through which they explore and internalize experiences concerning security in relationships and the expression of emotion (Emde, 2003; Oppenheim & Waters, 1995). Alternative to positive parenting, negative parenting behaviors also contributes to the affective communication exchange reflected in the quality of the parent-child relationship (Chang et al., 2003). Attachment theorists posit that interruptions of the child's aim to experience feelings of safety in the context of the parent-child relationship leave the child vulnerable to stressors in the environment. According to the Emotion Security Hypothesis (Davies & Cummings, 1994), harsh parenting and familial behaviors in the home may contribute to children's hypersensitivity to negative affect. This higher degree of reactivity in children is thought to lessen the child's ability to regulate emotion and handle negative emotions in a healthy manner and they report (in the context of interparental conflict) such children demonstrate frequent dysregulated emotions, including fear and distress. The next section provides a detailed discussion of salient family characteristics related to early parenting and multiple facets related to the complex nature of parenting in low-income families.

Early Parenting Processes in the Context of Poverty

Parents in poverty are at higher risk for demonstrating less positive parenting, thought to be driven by the stresses of poverty (Aunola, Nurmi, Onatsu-Arvilommi, & Pulkkinen, 1999; Ceballo & McLoyd, 2002), and such parenting practices are associated consistently with young children's less optimal development (Ackerman, Brown,

D'Eramo, & Izard, 2002; Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999; Adam, 2004). It is important to note that while parents in poverty are at higher risk there remains a wide variability in parenting among families in poverty (Brophy-Herb et al., 2013; Nelson et al., 2012), with evidence of strength and resilience in families demonstrated through positive parenting (Gross, Garvey, Julion, Fogg, Tucker, & Mokros, 2009; McGroder et al., 2000). Nevertheless, poverty affects children's development in multiple ways that include direct (e.g., poverty-related risks such as negative home environment) and indirect pathways (e.g., more negative parenting behaviors associated with maternal psychosocial risks related to poverty) (Richter, 2003). The indirect pathways assume that the more distal factors, such as maternal psychosocial stressors, affect the parenting components more proximal to the child, such as parenting behaviors. The progress towards understanding the processes leading to resilience requires analysis of the ways multiple components both within and outside the parent-child attachment relationship co-occur. Secure internal representations reflects an important mechanism of resilience; however, research is limited to variable-centered methods that examine the linear effects of a single parenting dimension, such as parenting behaviors (Posada et al., 2007) or maternal depression (Trapolini, Ungerer, & MacMahon, 2007), on internal representations in preschoolers. The current study explores the co-occurrence of multiple facets of parenting such as maternal psychosocial stressors and home environment with parenting behaviors reflecting the complex nature of parenting processes in low-income families. The multiple parenting factors seek to determine different combinations of parenting and the different relations to children's internal representations. Consistent with the ecological perspective, this approach

assumes that the environment in which children develops consists of a microsystem of psychosocial and physical stressors (Bronfenbrenner & Morris, 1998; Wachs, 2000).

Maternal psychosocial stressors. Psychosocial stressor indicators in the current study include maternal stress, maternal depression, and family conflict (or turmoil). Living in poverty often relates to family instability, which increases the prevalence of mental health problems, such as stress and depression, conflicts within the family and disruptions in the child relationship with attachment figures (Ackerman et al., 1999, 2002). Psychosocial stressors influence the child through more proximal factors relative to the mother's relationship with the child and parenting behaviors in the interactions. The effects of psychosocial stressors on negative parenting contributes to a lack of emotional availability, impacting the effectiveness of the parent-child relationship as a context in which young children can development emotional regulation skills (Kopp, 1982; Maccoby & Martin, 1983; McCauley, Kendall, & Pavlidis, 1995). The mother's difficulty in supporting the child's emotion regulation attempts creates an environment of sustained threat to the child and impacts how the child responds to negative parenting behaviors (Scheeringa & Zeanah, 2001). Persistent exposure to cumulative psychosocial stressors in very early childhood is particularly detrimental to children's internal representations (Campbell et al., 2004). Thus, the witnessing of escalating hostility, violence, unresolved endings, or disengagement increases children's negative internal representations concerning their own safety and the welfare of their family.

Mothers' depression also highlights a proximal pathway to children's emotional development (Blandon, Calkins, Keane, & O'Brien, 2008; Feng et al., 2008). While maternal depression reflects contextual family adversity, it also sustains a negative

presence represented in relationships with children. Brown and Ackerman (2011) note that maternal depressive symptoms contribute to the parent's negative affect and emotional lability, which are deleterious to the child's ability to contend with negative emotions and regulate emotion. Depression leads to a failure to activate positive parenting behaviors, which contributes to less optimal parenting and more negative emotionality (Dix & Meunier, 2009). These negative parenting behaviors lack the warmth and positive parenting behaviors found to support children's positive developmental outcomes (Eisenberg et al., 2005; Grolnick, McMenamy, & Kurowski, 2006).

Home environment. Children spend more time in the home than in other setting, therefore, development is known to be a product of children's transactions with the environment (Bronfenbrenner, 1979). Theoretically, children's home environment microsystem consists of two main components: the social environment, which includes social relationships with attachment figures; and the physical environment, which includes the setting that social relationships occur (Moos, 1973; Wachs & Gruen, 1982; Wohlwill, 1983; Yarrow et al., 1975). The current study explores these multiple components of the quality of the home environment, with the addition of an emotional component in the social environment, to further understand the effects on children's internal processes from early experiences.

Previous studies found relations between the social and emotional quality of the home and children's attachment security (e.g., Waters, Vaughn, Posada, & Kondo-Ikemura, 1995; Zevalkink, Riksen-Walraven, & Bradley, 2008). Zevalkink and colleagues (2008) found that children classified as insecure lived in homes with less

social support from parent and a lower emotionally stimulating environment than securely attached children. Zevalkink also confirmed that the children living in lower social and emotional quality home environments tended to be from poorer families. Although the attachment literature does not highlight the importance of studying the physical environment of the child, the body of literature does emphasis the broader home context when studying children's attachment relationships with a primary caregiver was proposed (e.g., Belsky, 1999). For example, the physical components of the home may encourage the child to separate from the attachment figure and explore the environment. Some research has shown that children with secure attachments also tend to live in homes with safer and hazard free play environments (Zevalkink et al., 2008). Unsafe physical home environments often lack a safe floor to crawl and, subsequently, young children are allowed less time to crawl and explore floor spaces. Although less studied, these changes in infant and toddler play and parenting (e.g. allowing less exploratory play on the floor) may impact parent-child interactions and relationships.

Maternal demographic risks. A recent meta-analysis found an increased probability of children with high socioeconomic risk to shift attachment styles from secure to insecure compared to their counterparts whose families were dealing with fewer socioeconomic risks (Pinquart et al., 2013). Socioeconomic risks indicators relative to families living in poverty and influence parenting have included several maternal demographic constructs, such as adolescent pregnancy, single parenthood, welfare status (low income), unemployment, and low education level (Sameroff & Fiese, 2000). The robust link between adolescent mothers and fewer resources related to more negative parenting (Nomaguchi & Brown, 2011). Single parenthood related to an increase in the

daily parenting demands and thus related to more negative parenting (Avison, Ali, & Walters, 2007). Less negative parenting behavior is related to higher family income (Mulsow et al., 2002), whereas more negative patenting is related to unemployment status and low education level (Goldsteen & Ross, 1989; Nomaguchi & Brown, 2011). Therefore, maternal cumulative demographic risk was included in the current study as a family level covariate. Please see the following section for a discussion of developmental risks prevalent in preschoolers with distorted internal representations.

Developmental Risks

Children's internal representations of the self, others, and relationships developed from early experiences contribute to emotional or behavioral responses in relationships (Bretherton & Munholland, 1999; Shields, Ryan, & Cicchetti, 2001), and, in the case of negative internal representations, to subsequent psychological disorders. Developmental research has linked children's internal representations of attachment relationships to a range of psychosocial stressors (Graziano, Reavis, Keane, & Calkins, 2007; Raver, Garner, & Smith-Donald, 2007; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Weinfield et al., 1999). Children with secure internal representations in infancy tend to be more flexible, and adaptive in response to inconsistencies between internal representations of relationships and changes that occur throughout the life span compared to their anxious counterparts (Arend, Gove & Sroufe, 1979; Lutkenhaus, Grossman, & Grossman, 1985; Matas, Arend, & Sroufe, 1978; Sroufe, 1983; Weinfield et al., 1999). These children's internal representations provide organized cognitive structures that assimilate novel experiences to the preexisting internal structure. Children with dysregulated internal representations demonstrate a lack of empathy, and increased conflictual and aggressive

behaviors (Weinfield et al., 1999). These children are also found to be more susceptible to conduct problems, personality disorders, and mental health problems. Dozier, Stovall, and Albus (2008) suggested children with dysregulated internal representations demonstrate more externalizing forms of psychopathological behaviors, such as, antisocial personality, eating disorders, and substance abuse. Resistant children tend to suppress negative emotions and neglect personal attachment needs, thus, limiting their responses in general to affectively-charged situations. Whereas, anxious children exhaust the previously mentioned suppressed attributes by demonstrating an overwhelming need for attachment and becoming consumed with negative emotions. Consequently, anxious children are at higher risk for internalizing clinical disorders, such as anxiety, borderline personality disorder, and depression, as well as somatic complaints and social withdrawal at preschool-aged (Lewis, Feiring, McGuffog, & Jaskir, 1984).

The literature on the long term effects of preschoolers' internal representations on later behavior and academic outcomes is lacking, particularly with relations to math and reading cognitive skills. According to the negative affectivity hypothesis (Davies, Harold, Goeke-Morey, & Cummings, 2002; Harold & Conger, 1997; Watson & Pennebaker, 1989), a general disposition to experience a variability of negative emotions may be manifested in higher levels of negative internal representations of attachment relationships, behavior problems, and academic adjustment problems. Thus, the current study examines the relations between preschool-aged children's internal representations of attachment relationships and developmental outcomes in middle childhood at approximately age 10 years. Please see the following section for a description of how to

quantitatively measure the different patterns in children's internal representations via their story stem narratives.

Internal Representations and Storytelling

The individual differences in children's internal representations of attachment patterns are specific to variations in early parenting. As children transition from infancy to early childhood, their internal representations of attachment guide their behaviors, and help children to understand and interpret others' behaviors. Children develop the ability to orally articulate a story at approximately three years of age (Emde, 2003). Cognitive and linguistic capacities develop into more sophisticated skills with age and allow children to reflect on and discuss emotional experiences related to their attachment relationships. Utilizing children's advances in cognitive and linguistics skills, patterns of internal representations are assessed via semi-structured projective storytelling measures and used in the current study. Projective techniques date back to the oldest psychological methods for investigating young children's inner worlds (Goldin, 1969; Stodgill, 1937). Over the past decade, narrative techniques (e.g., story stem narratives) have contributed novel information about the children's representations of their inner worlds (see reviews by Holmberg, Robinson, Corbitt-Price, & Wiener, 2007; Oppenheim, 2006). Using story beginnings (or stems) that depict dilemmas and emotional challenges that young children typically experience, children construct unique narrative story endings that reflect symbolic representations of their experiences (Emde, 2003). These semi-projective assessments contributed novel information about how children construct unique, symbolic emotional means of representing experiences (Emde, 2003). Content themes in story stems generally reflect issues of children's internal representations of attachment,

compliance, and conflict. The assumption of these assessments is that children will project their beliefs and emotions regarding internalized representations about their relationships during doll play, which will reveal the way they process attachment and related information (Bretherton & Munholland, 2008). While studies drop or add story stems depending on their focus, all story stems reflect similar semi-projective methods.

History of Storytelling Narratives

Beginning in the mid-1980s, several members of the MacArthur Research Network on Early Childhood Transitions developed a storytelling technique to assess the inner worlds of preschool children via attachment-related representations. Conceptualized in the literature as a type of schema specific to parent-child relationships, children's internal representation of attachments contains abstract, generalized, and organized representations of experience (e.g., Bretherton & Munholland, 2008; Neisser, 1967). The story stem narrative method uses dolls of people as a symbolic means of representing experience. Studies utilizing story stem approaches demonstrated significant contributions to attachment theory (e.g., Bretherton, Ridgeway, & Cassidy, 1990; Green, Stanley, Smith, & Goldwyn, 2000; Oppenheim & Waters, 1995; Steele et al., 2003; Verschueren, Marcoen, & Schoefs, 1996), early moral internalization (e.g., Buchsbaum & Emde, 1990; Emde, 1994; Oppenheim, Emde, Hasson, & Warren, 1997), and processes associated with child's behavioral regulation within the family (e.g., Grych, Wachsmuth-Schlaefer, & Klockow, 2002; Oppenheim, Emde, & Warren, 1997; Zahn-Waxler, Cole, Richardson, Friedman, Michel, & Belouad, 1994). Attachment researchers have proposed that children with secure internal representations of attachment have open access to thoughts, feelings, and memories related to attachment (e.g., Bretherton &

Munholland, 2008). In contrast, children with insecure (dysregulated) internal representations have limited, distorted, or even biased access to their attachment related thoughts, feelings, and memories (e.g., Bretherton & Munholland, 2008). Additional story stem narrative approaches have addressed similar research questions within samples of African American children (Robinson & Eltz, 2004), children in non-US cultures (e.g., Sher-Censor & Oppenheim, 2004; Shin, Lee, & Lee, 1999; Steele et al., 2003; von Klitzing & Burgin, 2005), and children who experienced violent behaviors within the family (e.g., Page & Bretherton, 2001; Toth, Cicchetti, Macfie, & Emde, 1997). Story stem narrative methods were also incorporated in studies for investigating intervention strategies in maltreated samples (Olds et al., 2004; Robinson, Herot, Haynes, & Mantz-Simmons, 2000; Toth, Maughan, Manly, Spagnola, & Cicchetti, 2002).

Unpublished studies of story stem narratives found robust replications of four story response patterns in low-income samples (Klute, 2004; Robinson, Oxford, Spieker, & Klute, 2006). Four pattern commonalities were 1) secure representation typologies where emotions were integrated into coherent stories, 2) resistant representation typologies with high positive and high negative, yet, limited thematic content, 3) anxious representation typologies with elevated interpersonal conflict and aggression in lengthy narratives, and 4) dysregulated representation typologies with high aggressive content and poor integration of emotions and low narrative coherence. Coherence in children's narratives included a clear and logical explanation related to the story stem, as well as, adding to rather than changing the original story stem. Specific to the emotional theme of the story, children with incoherent narratives had a sudden shift in emotions with no clear understanding as to why. The current study will assess the four typologies with six

distinct dimensions of children's internal representations via story stem narratives (i.e., interpersonal conflict, dysregulated aggression, empathy affiliation, avoidance strategies, dissociation, and negative or dysregulated performance) to operationalize the previously mentioned conceptualized proposed typologies. See Table 2 for the proposed internal representation typologies and how they are hypothesized to be articulated in children's verbal narratives at age five years.

Table 2: Operationalization of Proposed Internal Representation Typologies

Proposed Typologies	*Operational Characteristics of Preschoolers' Narratives*
Secure Representations	- High empathy - Low interpersonal conflict, dysregulated aggression, avoidant and dissociation - Low negative emotional integration and incoherent narratives
Resistant Representations	- High empathy - High interpersonal conflict and avoidant strategies - Low dysregulated aggression and dissociation - High negative emotional integration and incoherent narratives
Anxious Representations	- High empathy - High interpersonal conflict, dysregulated aggression, avoidant and dissociation - High negative emotional integration and incoherent narratives
Dysregulated Representations	- Low empathy - High interpersonal conflict, dysregulated aggression, avoidant and dissociation - High negative emotional integration and incoherent narratives

**Note.* For internal representation story stem codes see the MacArthur Narrative Coding Manual; Robinson, Mantz-Simmons, MacFie, Kelsay, Holmberg, & the MacArthur Narrative Working Group, 2004.

Conceptualization of Storytelling

Over the past decade, narrative techniques (e.g., story stem narratives) have contributed novel information about the child's representations of their inner worlds (see reviews by Holmberg, Robinson, Corbitt-Price, & Wiener, 2007; Oppenheim, 2006). Using story beginnings (or stems) that depict dilemmas and emotional challenges that young children typically experience, children construct unique narrative story endings that reflect symbolic representations of their experiences (Emde, 2003). Studies utilizing story stem approaches demonstrated significant contributions to attachment theory (e.g., Bretherton, Ridgeway, & Cassidy, 1990; Green, Stanley, Smith, & Goldwyn, 2000; Oppenheim & Waters, 1995), and processes associated with children's behavioral regulation within the family (e.g., Grych, Wachsmuth-Schlaefer, & Klockow, 2002; Oppenheim, Emde, & Warren, 1997; Robinson, Hérot, Haynes, & Mantz-Simmons, 2000; Zahn-Waxler et al., 1994). Story stem narrative methods enable researchers to analyze how children think and feel about important relationships (Robinson, 2007). The main goal of story stem narrative methods is to assess children's emotional competencies and developmental risks for emotional distress (Holmberg, Robinson, Corbitt-Price, & Wiener, 2007).

The MacArthur Story Stem Battery (Bretherton, Oppenheim, Buchsbaum, Emde, & the MacArthur Narrative Working Group, 1990), a storytelling technique that has been used in a number of studies with normative and at risk populations (e.g., children who are maltreated, anxious, or aggressive) to evaluate psychological and emotional development (e.g. Macfie, Cicchetti, & Toth, 2001a; Oppenheim, Emde, Hasson, & Warren, 1997; Solomonica-Levi, Yirmiya, Eral, Samet, & Oppenheim, 2001; Warren, Oppenheim, &

Emde, 1996), was used in the present study to evaluate young children's understanding of their worlds and relationships through their behavioral representations in their narrative responses. Children's representations were hypothesized to develop from real-life events, including their early experiences with caregivers and developed emotions in the context of these primary relationships early in life (Zahn-Waxler, Crick, Shirtcliff, & Woods, 2006). During the task, children were asked to complete a series of story beginnings with the use of dolls to complete the story. The stories often involved a range of emotionally laden themes that were relevant in the lives of children (Waldinger, Toth, & Gerber, 2001; see description in Methods section).

Overall previous studies using the story stem method demonstrated the reliability for examining children's internal representations of family relationships (Holmberg, Robinson, Wiener, & Corbitt-Price, 2007). However, as researchers continue to develop methods of story stem narratives, it is critical to move analysis of a child's response from a variable-centered to person-centered view, particularly within children from low-income families, with variations of poverty-related stressor exposure measurements. This study will utilize multilevel latent class analysis to model individual patterns of children's internal representations when faced with emotional challenges in oral narratives. Latent class analysis is a person-centered procedure that calculates differences in the means of continuous measures to generate probabilities for group membership (Bauer & Curran, 2004). Children's responses from their story stem narratives will formulate different typologies that allow a holistic examination of protective factors present in children's story stems that may reflect more maladaptive elements (Robinson, 2007). Please see the

following section for a description of how to quantitatively measure the different patterns in children's internal representations via their story stem narratives.

Quantitative Methodology for Internal Representation Typologies

The literature on internal representations measured via story stem narratives demonstrates the importance of identifying individual differences between children's responses. While the most frequently used methodological techniques with internal representations involve the variable as the dominant unit of analysis and is useful in mapping observed relations among variables, it remains difficult to translate into properties characterizing individuals (Bergman, Andershed, & Andershed, 2009). From a holistic-interactionistic perspective, the developmental process identifies individuals as irreducible wholes and the characteristics of a single subject cannot be decomposed into or understood as independent components (Magnusson, 2003). Person-centered approaches distinguish individuals with similar patterns among variables, thus, providing homogenous groups within a larger heterogeneous population. From a person-centered approach, the current study will determine (via latent class analysis) differing typologies (or classes) of children's internal representations. Please see the following for an understanding of a person-centered approach.

Person-Centered Approach

The *person approach* nomenclature traces back to Jack Block (1971), who stated the need to understand the systematic connection of variables within a particular person, and is further discussed by Magnusson and Allen (1983) and Magnusson (1985) from a holistic-interactionistic perspective. Contemporary researchers continue the evolution of

this topic by arguing the fundamentally different assumptions between variable and person approaches about the generalizations from data (Laursen & Hoff, 2006). While research continues to be saturated with probability models and statistical techniques, researchers devote interest to only part of the results. Statistical methods are almost exclusively restricted to variation between individuals, while neglecting variation within an individual (Molenaar, 2004). The process of ergodicity holds when the structure of intraindividual variation is equivalent to the structure of interindividual variation. Sufficient conditions for achieving erodicity in developmental studies include that the means are constant over time and the lagged covariances also remain constant over time (Molenaar & Campbell, 2009), however, these conditions are strict and rarely met in developmental research. According to classical theorems in ergodic theory, when either one or both conditions fail to be met then the psychological processes are considered to be nonergodic. The nonergodic process, complementary to the process of erodicity, yields results that differ between the structures of interindividual and intraindividual analyses. When contrasting these analyses, it is important to understand that individuals develop from a unique system of interacting dynamic processes of behavioral, emotional, cognitive, and other psychological processes that evolve overtime and place.

Person-centered approach defined. The person-centered approach "involves the identification of key configurations of values across a set of operating factors" (Bauer & Shanahan, 2007, p. 264). While methods of person-centered analyses vary, Laursen and Hoff (2006) state that there remains a consistent foundation of (1) the rejection of the assumption that the entire population is homogeneous with respect to how variables

influence each other and (2) a search for categories of individuals characterized by patterns of association among variables that are similar within groups and different between groups. The fundamental focus of a person-centered approach emphasizes that the individual develops, not the variables. At the theoretical level, the person-centered approach recognizes the necessity of factoring the individual as a systematized whole. This theoretical perspective translated at the methodological level emphasizes how person-centered methods concentrate on patterns of information designed to study individual development from the perspective of the individual as the consolidating principle. Ideally, instead of focusing on the variable as the main unit of analysis, the whole pattern of information should be identified as the indivisible unit of analysis (Bergman, Magnusson, & El-Khouri, 2003).

From the holistic-interactionist theoretical perspective, the core of person-centered approaches is to consider all components simultaneously (Bergman & Trost, 2006), emphasizing that an individual develops and functions as an integrated totality of multiple, interacting components (Magnusson, 1998). The holistic model integrates mental, behavioral, and biological characteristics of individuals for understanding developmental processes and functions. Magnusson and Allen (1983) states "the person-oriented approach to research (in contrast to the variable centered approach) takes a holistic and dynamic view; the person is conceptualized as an integrated totality rather than as a summation of variables" (p. 372). Thus, individual development emerges within a complex dynamic system and as a process involving many interacting factors at different levels of aggregation (Bergman, Magnusson, & El-Khouri, 2003).

Differences between variable-centered and person-centered approaches.

Although conceptually and methodologically different, variable and person centered analyses represent complementary approaches in developmental research (Bergman & Trost, 2006; Crosnoe & Needham, 2004; Laursen, Furman, & Mooney, 2006; Laursen & Hoff, 2006). At the theoretical level of variable-centered approaches, hypotheses involve causal relations between two or more variables (Bergman & Trost, 2006). At the methodological level, associations between variables are examined using linear statistics, such as hierarchical linear regression. Analyses are used to identify processes found to a similar degree among all members of a group, and they account for the proportion of variance in a given outcome explained by the independent variables; thus, predictive power is the strength of variable-centered strategies. As noted by Magnusson (1998), predictive power should not be the dominant criteria for the usefulness of an approach, but rather, how well the approach helps to better understand developmental processes. Variable-centered models fail to capture the configurations of factors that mutually explain behavioral processes, while also, lacking the consistency of variance distribution equality across the sample decreasing the validity for generalizability of the data (Laursen & Hoff, 2006). In contrast, person-centered approaches assume that the sample is heterogeneous using nonlinear statistics for analyses (Bergman & Magnusson, 1997; Cairns & Rodkin, 1998; Gest, Mahoney, & Cairns, 1999; Graber & Brooks-Gunn, 1996; Von Eye, & Bergman, 2003). The methodological challenges of studying interactions both within and between levels of a system target the need to capture hypothetically nonlinear interactions among many variables (Bauer & Shanahan, 2007). By identifying groups of individuals who share unique patterns of developmental attributes, person-

centered models address questions that concern group differences in patterns of development (Laursen & Hoff, 2006). The methodological aspect of this perspective identifies categories, whose groups vary in meaningful ways, rather than examining associations between variables removed from the social and personal contexts in which they occur (Bergman & Magnusson, 1997; Cairns & Rodkin, 1998; Denham et al., 2012; Richters, 1997). A person-centered approach allows for the possibility that relationships and characteristics of relationships may be connected in different ways for different individuals. This method suggests that there typically exist a small number of more frequently observed patterns of individuals based on shared similarities in several linked characteristics (Bergman & Magnusson, 1997; Laursen & Hoff, 2006). Therefore, results of person-centered analyses begin to provide a more complete, while at the same time an individualized, approach to developmental research.

Common misconceptions about person-centered models. Several common misconceptions emerge from the literature regarding the empirical richness of person-centered methods (Laursen & Hoff, 2006) and, as a result, researchers continue to be apprehensive when utilizing this approach. The first misconception capitalizes on the idea that specific variable-centered analyses (e.g., (1) interaction terms estimated in linear regression models; (2) between-group factors estimated in analysis of variance statistical methods) capture the diverse patterns among individuals, therefore, dismissing the necessity for person-centered techniques (Laursen & Hoff, 2006). However, variable-centered statistical methods limit the inclusion of variables when defining different categories of individuals. Person-centered models analyze a clustering of several variables designed to identify qualitatively different categories of individuals.

The second misconception involves an apparent lack of empirical guidelines when determining group membership in clusters of individuals sharing similar characteristics and interpreting results (Laursen & Hoff, 2006). Person-centered approaches, in fact, are well-developed with the utilization of empirically-sound statistical techniques for identifying meaningful clusters (known as types or taxa) within a heterogeneous sample. This leads into the third common misconception that draws on the nature of the data, which assumes that person-centered models exclusively examine qualitative data (Laursen & Hoff, 2006). While some researchers equate person-centered approaches with qualitative data, empirical literature suggests that the measurement of variables designed to cluster individual into different groups and the derivation of an individual's group membership is absolutely quantitative within person-centered models. Often when applying quantitative data in practice, variable-centered analyses identify antecedent or outcome variables from the typologies that were identified previously by person-centered methods (Bergman & Trost, 2006; Crosnoe & Needham, 2004; Laursen & Hoff, 2006; Laursen et al., 2006; Masten et al., 1999).

Statistical methods for person-centered analyses. Methodological applications in developmental research consist of probability models and statistical techniques (Molenaar, 2004) for studying individual development. When implementing person-centered models, specifically, to the study of individual developmental processes and interindividual differences, the methodological process extracts classes based on *a priori* set of indicators (Bergman, Magnusson, & El-Khouri, 2003). Bergman, Magnusson, and El-Khouri (2003) build on the work of Bergman and Magnusson (1997) and provide an overview of common, pattern-based methods for studying individual development from

an interindividual perspective. While Bergman, Magnusson, and El-Khouri restricted their overview to the study of interindividual differences, they mention the importance of methods focusing on the study of nonlinear dynamic systems for carrying out a person-centered approach. *Model-based* means there is "a model according to which the observed data are assumed to be generated" (Bergman, Magnusson, & El-Khouri, 2003, p. 44). Examples of model-based methods with latent variables are mixture models, specifically, latent profile analysis and latent class analysis that identifies subtypes of related cases (Bauer & Shanahan, 2007). Model-based clustering methods involve an explicit underlying statistical model, as previously mentioned, that allows clusters to overlap and individuals to have non-zero probabilities of belonging to several clusters (Bauer & Shanahan, 2007). Mixture models test the model's fit to the data, and estimate parameters to describe latent statuses and evolvement over time. Model-based methods without latent variables, however, continuing to test model's fit to the data, are known as, loglinear models (Bishop, Feinberg, & Holland, 1975). Loglinear modeling uses the effects of different variables belonging to specific categories to model the logarithms of the cell frequencies. Another technique for analyzing higher order contingency tables similar to loglinear modeling is configural frequency analysis approach (see Krauth & Lienert, 1973). However, configural frequency analysis is distinguished from loglinear modeling as a simpler, more exploratory method used when cells contain zeros and known as a special type of analysis of cell residuals.

Alternatively, descriptive methods (also known as 'not model-based') focuses on hypothesis testing on only important aspects of the expected structure in the data rather than testing the whole model of data. Examples of descriptive analytic techniques are

heuristic cluster analysis, which involve partitioning algorithms (e.g., *k*-means) and hierarchical clustering algorithms (Bauer & Shanahan, 2007). Cluster analysis is an empirically-based exploratory technique consisting of consecutive steps to generate the most reliable cluster solution when identifying homogenous groups with distinctive characteristics within a heterogeneous population. This process consists of identifying cases, variable selection, determining distance metric, choosing a hierarchical algorithm, deciding on the number of clusters, cluster interpretation, and the internal and external validation of clusters (Rapkin & Luke, 1993). Meehl (1992) argued that cluster analysis only sorts cases into clusters to obtain homogenous groups without necessarily identifying *natural* (also known as *taxa*; Meehl, 1992) clusters, whereas, latent profile techniques consider properties of taxa and attempt identification. Multidimensional scaling is another descriptive method, however, less often used when examining large samples, where graphical presentations represent similarities between different pattern solutions and most appropriately used when describing a fairly small number of cases. While the purpose of both model-based and descriptive methods focus on individual development, the probabilistic basis of model-based methods discards the need for the sample to be partitioned into disjoint sets, therefore, distinguishing model-based clustering from descriptive methods or, specifically, heuristic clustering algorithms.

Given the advantages to model-based methods, latent profile analysis has contributed novel information to the study of individual development by improving on the traditional grouping or clustering techniques. Gibson (1959) developed the latent profile model to challenge methodologists with a sustainable alternative to Thurstone (1935) previously developed continuous linear factor analysis model. This method is an

analytic person-centered procedure that generates probabilities for group membership, explained by differences in the means of the continuous measures (Bauer & Curran, 2004). Specifically, latent profile analysis is a variant of latent class analysis and developed as a continuous variable analog to this traditional latent class model for binary variables (Bauer & Curran, 2004). "According to classical test theory, the observed scores for each individual are assumed to reflect both 'true scores' on the characteristics of interest as well as random error due to imperfections of measurement or momentary disturbances" (Bauer & Curran, 2004, p. 265). The latent class or homogeneous cluster, in this method, represents individuals who share a common set of true scores. This method of analysis supports the current study emphasizing the classifications of children's internal representations at the preschool aged-period.

Purpose of Present Study

Identifying differing patterns of how children from low-income families internalize their representations of early experiences is a critical component to understanding broader developmental paths of risk and resilience. The current study tested a person-centered approach to the individual differences in preschool-aged children's internal representations typologies in a sample of low-income families. The person-centered technique used to generate typologies was Latent Class Analysis. Using children's internal representations typologies, the current study evaluated the associations with early parenting at 14 months and children's externalizing behavior problems and academic outcomes in middle childhood (5^{th} grade assessment = G5). Multilevel Latent Class Analysis was used to empirically test the proposed models of relations between the patterns of children's internal representations and early parenting typologies including

parenting behaviors, maternal psychosocial stressors, and home environment (see Figure 1). The data structure represents a nested or multilevel design in which children represent Level 1 of the hierarchy and parents represent Level 2. See Table 3 and Table 4 for summary of research questions, study variables, and analyses. The results are intended to inform future model development and research that informs policymakers, educational researchers, and practitioners on the development of early intervention techniques to support healthy child development and prevent adverse outcomes.

Research Questions

The overarching guiding research questions of this study were: 1) Do internal representations of attachment relationships differ as reflected in preschoolers' story stem narratives; 2) Does early parenting predict the different typologies of internal representations of attachment relationships in preschoolers; and 3) Do internal representation typologies differentially predict later externalizing behavior problems and academic achievement? The proposed study uses *a priori* research to inform children's hypothesized internal representation typologies. The current study addresses the following research questions and hypotheses:

1. What are the different *typologies of internal representations* of attachment relationships articulated in preschoolers' narratives at 5 years of age in a low-income population?

This study hypothesized that a latent profile model will confirm four internal representation typologies, 1) secure representations, 2) resistant representations, 3) anxious representations, and 4) dysregulated representations in preschool-aged children

living in low-income families, consistent with previous attachment classifications (Ainsworth et al., 1978; Davies & Cummings, 1994; Davies & Forman, 2002; Main et al., 1985; Main et al., 2003). Child characteristics (child age, child gender, child race, and child temperament) were included in the model as covariates to predict the probability that a child will belong to a certain internal representation latent class.

2. Does early parenting predict the different *typologies of internal representations* of attachment relationships articulated in preschoolers' narratives at 5 years of age in a low-income population?

The current study hypothesizes that supportive and sensitive parenting behaviors in the interaction with the child, as well as exposure to less maternal psychosocial stressors and high quality home environment, will relate to secure internal representations in children (Ainsworth, 1969; Ainsworth, Blehar, Waters, & Wall, 1978). The current study seeks to extend previous research by simultaneously examining multiple parenting factors from the domains of parenting behaviors, maternal psychosocial stressors, and home environment. Based on the theoretical understanding that attachment relationships have formed by 12 months and often assessed empirically for the first time between 12 and 18 months, parenting components were examined at 14 months. Negative parenting behaviors contribute to the affective communication exchange reflected in the quality of the parent-child relationship (Chang et al., 2003). For example, a child living in a family with high levels of negative parenting may be more likely to be classified in the insecure representation of attachment relationships latent classes than a child living in a family with low levels of negative parenting. Maternal psychosocial stressors and negative

home environment will undermine parenting behaviors (Dix & Meunier, 2009; Horowitz & Kerker, 2001; O'Brien, Asay, & McCluskey-Fawcett, 1999). Mothers' with mental health problems including stress (e.g., Baker et al., 2003; Jackson, Brooks-Gunn, Huang, & Glassman, 2000; Whiteside-Mansell et al., 1996) and depressive symptoms (e.g., Coyl, Roggman, & Newland, 2002; Embry & Dawson, 2002; Petterson & Albers, 2001), as well as family conflict (e.g., Johnston & Roseby, 1997), will relate to less secure internal representations. Mothers with more stress, depressive symptoms, and family conflict are more psychologically unavailable to meeting the emotional needs of their children. In addition, higher indicators of negative home environment, including an unsafe physical home environment and poor social and emotional climates in the home environment will relate to less secure internal representations (Evans & English, 2002; Evans & Kim, 2007).

EHS program status and maternal cumulative demographic risk were included in the model as covariates to predict the probability that a family will belong to a certain parenting latent class. Whereas poverty-related risk factors, including maternal demographic risks, were found to have negative effects on parenting (Knitzer & Perry, 2009), the consequences of cumulative poverty-related risks may be more significant. Therefore, the previously mentioned negative relations will be more robust in mother-child dyads with greater number of poverty-related risk indicators compared to the mother-child dyads with lesser poverty-related risk indicators (Pinquart et al., 2013).

3. Do the different *typologies of internal representations* of attachment relationships articulated in preschoolers' narratives at 5 years of age predict externalizing behavior

problems and academic outcomes in middle childhood at 10 years of age in a low-income population?

Previous literature found that children's internal representations of family relationships predicted externalizing behaviors (Yoo, Popp, & Robinson, 2014). Internal representations of attachments in early childhood were also linked to higher cognitive functioning during middle childhood (Jacobsen, Edelstein, & Hofmann, 1994).

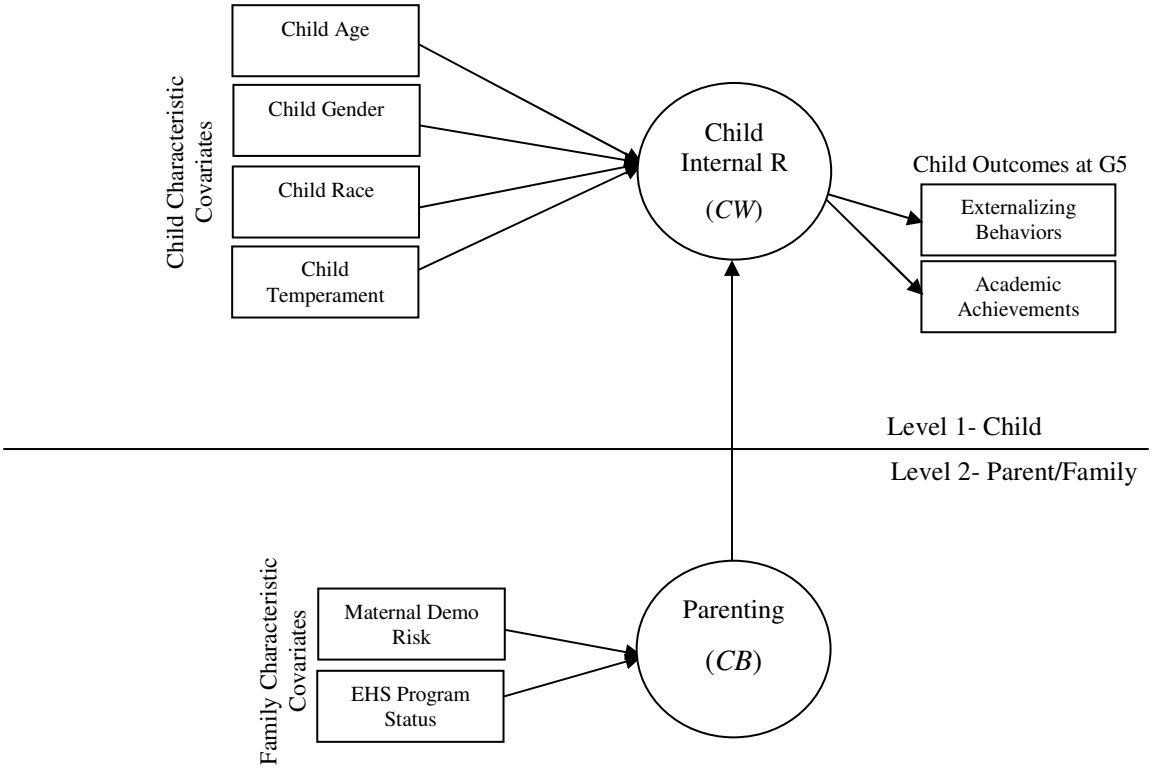


Figure 1: **Conceptual Multilevel Latent Class Model**. Child Internal R = Children's Internal Representations measured at TPK (Transition from Preschool to Kindergarten) when children were approximately 5 years of age. Parenting variables = parenting behaviors, maternal psychosocial stressors, and home environment variables measured at 14 month. (*CW*) = Latent Class (Level 1- within). (*CB*) = Latent Class (Level 2- between).

Table 3: Summary of Research Questions, Variables, and Analyses

Research Questions	*Analyses*	*Latent Variables**	*Covariates*
1. Model Fit *What are the typologies of internal representations?*	Single Level Latent Class Analysis	- Children's Internal Representations	- Child Age - Child Gender - Child Race - Child Temperament
2. Model Fit *What are the typologies of internal representations and early parenting predictors?*	Multilevel Latent Class Analysis	- Children's Internal Representations - Parenting Behavior - Maternal Psychosocial Stressors - Home Environment	- Child Age - Child Gender - Child Race - Child Temperament - EHS Program Status - Maternal Cumulative Demographic Risks
3. Group Differences *Do internal representation typologies predict later externalizing behavior and academic outcomes?*	Multivariate Analysis of Variance	- Children's Internal Representations - Children's Externalizing Behavior Problems - Children's Academic Outcomes	- Child Age - Child Gender - Child Race - Child Temperament

**Note.* Please see Table 4 for specific indicators corresponding with latent variables.

Table 4: Summary of EHSREP Variables Corresponding to Latent Constructs

Latent Constructs	*EHSREP Variables*	*EHSREP Data Source*
1. Children's Internal Representations	a. Interpersonal Conflict b. Empathy Affiliation c. Dysregulated Aggression d. Avoidance Strategies e. Dissociation f. Dysregulated Performance	a/b/c/d/e/f. MacArthur Story Stem Battery (MSSB; Bretherton, Oppenheim, Buchsbaum, Emde, & MacArthur Narrative Group, 1990) and Family Stories Task (Shamir, Schudlich, & Cummings, 2001) *- For internal representation codes see the MacArthur Narrative Coding Manual; Robinson, Mantz-Simmons, MacFie, Kelsay, Holmberg, & the MacArthur Narrative Working Group, 2004*
2. Parenting Behavior	a. Parent Supportiveness b. Parent Intrusiveness c. Dyadic Mutuality/ Connectedness	a/b/c. Three-Bag Semi-Structured Play Task
3. Maternal Psychosocial Stressors	a. Maternal Depression b. Maternal Stress c. Family Conflict	a. The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) b. The Parenting Stress Index-Short Form (PSI; Abidin, 1990) c. Conflict subscale of the Family Environment Scale (FES; Moos & Moos, 1994)
4. Home Environment	a. Physical Environment b. Social-Emotional Environment	a. HSFIS[1] and MPR[2] Tracking System (Parent Interviews) b. Home Observation for Measurement of the Environment (Bradley & Caldwell, 1984)

Table 4 (cont'd)

5. Children's Externalizing Behavior Problems	a. Externalizing Behaviors (Subscales: Delinquency; and Aggressive Behaviors)	a. Child Behavior Checklist for 6–18 Year Old Children (CBCL/6-18; Achenbach & Rescorla, 2001)
6. Children's Academic Outcomes	a. Mathematics b. Reading (Language/ Literacy)	a/b. Early Childhood Longitudinal Survey-Kindergarten Cohort of 1998-99 (ECLS-K)
7. Covariate Variables	Child Age; Child Gender; Child Race; Child Temperament; EHS Program Status; and Maternal Cumulative Demographic Risks	

Note. [1] HSFIS = Head Start Family Information System. [2] MPR = Mathematica Policy Research.

CHAPTER 3
METHODS

This chapter describes the methods used to address the research questions. A detailed description of the study design, sample, measures and variables, and data analyses are provided below.

Study Design

Data from the Early Head Start Research and Evaluation Project (EHSREP) (Love et al., 2005) developed under the sponsorship of the Administration for Children, Youth, and Families (ACYF), U.S. Department of Health and Human Services (HHS), was used to test the hypothesized models (The National Early Head Start Research and Evaluation Project funded under Contract 105–95–1936 to Mathematica Policy Research, Princeton, NJ, and Columbia University's Center for Children and Families, Teachers College, in conjunction with the Early Head Start Research Consortium).

Sample recruitment and random assignment for the larger EHSREP. The EHSREP recruited families and children who met the criteria of low-income status, according to government standards, and EHS eligibility. The criterion for low-income included families whose annual incomes met or fell below the Poverty Income Guidelines published annually by the HHS as mandated under 652 (a) (b) of Public law 99-425 of the Human Services Reauthorization Act (HHS ACYFIM- 87-13). Therefore, families reflected an economically vulnerable and highly diverse population. The EHSREP involved 17 research sites and 3,001 low-income families located in all regions of the United States and in urban (n = 1,784) and rural (n = 1,217) geographic locations.

During the sample intake period 3,001 eligible families were randomly assigned to either an EHS treatment intervention group, n = 1,513, (families received Early Head

Start services) or to a comparison group, n = 1,488, in which they did not receive EHS programming but could access other available community services. Early Head Start is a comprehensive, two-generation program focused on enhancing the health and development of children while strengthening families. The process of the study sample enrollment and random assignment began in 1996 and was completed in 1998.

Data collection. Through the implementation of a multi-method data collection process, the EHSREP provided a comprehensive description of child and family characteristics from multiple sources. When participants, initially, enrolled to participate in EHS baseline data were collected. Following enrollment, addition data continued over the course of the study. Since the subsequent data collection more likely related to child and family development administration linked with children's birth dates to account for the increasing age of the focus child over time. The primary methods of data collection were in-person interviews with the primary caregiver, and direct child assessments, videotaped child-parent interactions, and direct observations, which occurred during home visits.

The birth- related assessment data collection waves consisted of *14 month* when the study children were approximately 14 months of age, *24 month* when the study children were approximately 24 months of age, *36 month* when the study children were approximately 36 months of age, *TPK* (during the Transition from Preschool to Kindergarten) when the study children were approximately 5 years of age, and *G5* (Grade 5) when the study children were approximately 10 years of age. See Table 5 for the sample available at each data collection wave specific to the observed and parent

interview data used in this study. The current study focused only on the *14 month*, *TPK*, and *G5* data collection waves to address the proposed research questions.

Table 5: Overview of Data Collection and Retention Rates for Original EHSREP Sample

Data Collection Wave	**Data Source and Sample Size**	**Age of Study Child (in months)**	
		Mean	*SD*
14 month	*Parent Interviews*: n = 2,344 *Video Assessments*: n = 1,975	15.01	*SD* = 1.46
TPK	*Parent Interviews*: n = 2,063 *Video Assessments*: n = 1,808[a]	63.00	*SD* = 4.26
G5	*Parent Interviews*: n = 1,632 *Video Assessments*: n = 1,464	132.88[b]	*SD* = 3.82[b]

Note. TPK = during the transition from preschool to kindergarten when children were approximately 5 years of age; G5 = Grade 5.

[a] Story Stem Narrative Data Collection at TPK included n = 575.
[b] Children were an average of 10.57 years old (*SD* = .51 years) at Grade 5.

EHSREP Main Study Sample

The EHSREP population is a representative sample of low-income families with children up to 12 months old at time of enrollment, beginning in 1996 and completed at the end of 1998. A total of 3,001 families and children participated in the study during the initial wave of data collection, when families enrolled to participate in the EHSREP. Families and children were followed through kindergarten entry, when the study child transitioned from preschool to kindergarten, and school-aged, when the study child was in 5th grade. Children were primarily White (36.4%, *n* = 1,092), African American (33.8%, *n* = 1,015), and Hispanic (23.1%, *n* = 694); 1,510 children were male (50.3%). Caregivers were single (52.0%, *n* = 1,561), unemployed (53.0%, *n* = 1,590), and had an education level no higher than a high school diploma (or equivalent) (73.2%, *n* = 2,197). The majority of primary caregivers were biological mothers (99.4%, *n* = 2984), with a reported family gross income mean of $8,959.69 (*SD* = $8,186.22) and median of $7,320.00 at the study enrollment. Of those reported family gross incomes, a total of 2,051 (68.3%) families included only one adult who contributed to the income. Demographic information on the final study sample for the current study is presented in the following section.

EHSREP Subsample for the Current Study

Given the interest in the relationship between children's internal representations of attachment relationships measured via the story stem narrative task and early parenting, data from the six research sites (*n* = 575) that collected story stem data were included in the current study. No other exclusionary criteria were applied. A series of comparison tests were conducted on the included sample (*n* = 575, sample participated in

story stem task) and excluded sample (n = 2,426, sample not selected because the home research sites did not choose to collect story stem data) for several demographic, predictor, and outcome variables (see Table 6, Table 7, and Table 8). No significant differences were found between the included and excluded groups on geographic location, child gender, maternal cumulative demographic risk, dyadic mutuality/ connectedness, parent intrusiveness, maternal depression, family conflict, social-emotional environment, child temperament, and behavior problems. The differences that were significant were not of clinical importance. For instance, maternal stress mean scores represented a minimal difference of 1.09, between the included and excluded samples. Thus, the final sample used in the current study models consisted of 575 low-income families and children, discussed in the next section.

Table 6: Comparison of Demographic Information between Included and Excluded Samples

Characteristics	Included Sample (Research sites did collect story stem data.)[2]	Excluded Sample (Research sites did not collect story stem data.)[2]	Chi-Squared (*df*)
Total	575	2,426	
Early Head Start Treatment Group[1]	313 (54.4%)	1,190 (49.5%)	4.44 (1), $p = .035$*
Geographic Location			2.34 (1), $p = .126$
Urban Area	358 (20.1%)	1,426 (79.9%)	
Rural Area	217 (17.8%)	1,000 (82.2%)	
Child Gender			1.36 (1), $p = .244$
Male	281 (48.9%)	1,229 (51.6%)	
Female	294 (51.1%)	1,154 (48.4%)	
Child Race			92.23 (3), $p < .001$***
African American	137 (23.8%)	878 (37.1%)	
White	183 (31.8%)	909 (38.5%)	
Hispanic	215 (37.4%)	479 (20.3%)	
Other	37 (6.4%)	98 (4.1%)	
Physical Environment			62.30 (1), $p < .001$***
Unsafe Home	225 (39.1%)	517 (21.3%)	
Safe Home	210 (36.5%)	1,132 (46.7%)	

Note. [1] Early Head Start Treatment Group = families and children randomly assigned to receive early head start intervention. [2]Participants missing data on demographic items were not included in the comparison tests between included and excluded samples: *Included Sample*: $n = 3$ child race missing; and *Excluded Sample*: $n = 43$ child gender missing; $n = 62$ child race missing.

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

Table 7: Comparison of Predictor and Covariate Variables for Included and Excluded Samples

Variables	Included Sample (Research sites did collect story stem data.) Mean (*SD*)	Excluded Sample (Research sites did not collect story stem data.) Mean (*SD*)	Independent Samples *t*-test (*df*)
Parenting Behavior[1]			
Dyadic Mutuality/ Connectedness	3.56 (3.24)	3.63 (3.03)	.38 (2113), $p = .701$
Parent Supportiveness	4.06 (.96)	3.91 (1.08)	-2.66 (1955), $p = .008$*
Parent Intrusiveness	5.42 (1.19)	5.54 (1.24)	1.82 (1954), $p = .069$
Maternal Psychosocial Stressors			
Maternal Depression	12.60 (9.74)	13.57 (9.95)	1.93 (2298), $p = .054$
Maternal Stress	26.43 (9.05)	27.52 (9.54)	2.27 (2331), $p = .023$*
Family Conflict	1.70 (.54)	1.73 (.54)	.73 (1939), $p = .468$
Home environment			
Social-Emotional Environment	26.17 (3.20)	25.93 (3.71)	-1.24 (2113), $p = .214$
Family Characteristic			
Maternal Cumulative Demographic Risk	2.61 (1.16)	2.69 (1.21)	1.53 (2672), $p = .126$
Child Characteristics			
Child Temperament	2.94 (.95)	2.97 (.95)	.65 (2333), $p = .514$
Child Age at 14 month	14.84 (1.30)	15.07 (1.50)	3.22 (2416), $p <.001$***
Child Age at TPK (in months)	61.73 (3.51)	63.49 (4.42)	8.50 (2060), $p < .001$***
Child Age at G5 (in years)	10.51 (.52)	10.60 (.50)	3.01 (1552), $p =.003$**

Note. Maternal cumulative demographic risk, maternal psychosocial stressors, home environment, and parenting behavior variables were measured at 14 months. [1] Parenting behaviors: higher mean scores = positive parenting (scores recoded to reflect).

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

Table 8: Comparison of Developmental Outcome Variables for Included and Excluded Samples

Variables	Included Sample (Research sites did collect story stem data.) Mean (*SD*)	Excluded Sample (Research sites did not collect story stem data.) Mean (*SD*)	Independent Samples *t*-test (*df*)
Child Behavior Problems at G5			
Domain-Specific Syndrome Scales			
Delinquency	2.25 (2.57)	2.32 (2.67)	.43 (1620), $p = .664$
Aggressive Behavior	5.67 (5.73)	5.71 (5.73)	.13 (1620), $p = .895$
Higher-Ordered Scales			
Externalizing Problems	7.92 (7.89)	8.03 (7.97)	.24 (1620), $p = .811$
Child Academic Outcomes at G5			
Math Ability: Raw Scores	9.17 (4.55)	8.13 (4.66)	-3.76 (1549), $p < .001$***
Reading (Language and Literacy): IRT scores	131.15 (25.44)	126.43 (28.52)	-2.84 (1551), $p = .005$**

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

Final Sample for Current Study

The current study included a sample of low-income families and children from the original EHSREP dataset who were selected to participate in the story stem narrative task at TPK. The final sample consisted of 575 families and children. See Table 9 for the means and standard deviations of the study child ages at each time point. Children consisted of 281 males and 294 females, and were primarily Hispanic (37.4%, $n = 215$), White (31.8%, $n = 183$), and African American (23.8%, $n = 137$). Caregivers were

primarily biological mothers (99.7%, *n* = 573), single (53.9%, *n* = 310), unemployed (52.5%, *n* = 302), and reported a family gross income average of $9,958.79 (*Median* = $8,147.00; *SD* = $8,810.60) that contributed from a single adult income (69.2%, *n* = 398), at study enrollment. In terms of educational attainment, approximately 271 (47.1%) had received less than a high school diploma and 143 (24.9%) caregivers had received a high school diploma or equivalent at the time of study enrollment. See Table 10 for full demographic information of the current study.

Table 9: Overview of Data Collection for Final Sample (*n* = 575)

Data Collection Wave	**Age of Study Child (in months)**	
	Mean	*SD*
14 month	14.84	*SD* = 1.30
TPK	61.73	*SD* = 3.51
G5	131.99[a]	*SD* = 3.69[a]

Note. TPK = during the transition from preschool to kindergarten when children were approximately 5 years of age; G5 = Grade 5.

[a] Children were an average of 10.51 years old (*SD* = .52 years) at Grade 5.

Table 10: Demographic Characteristics for Final Sample (n = 575)

	Sample Total (N)	Sample Percent
Early Head Start Treatment Group[1]	313	54.4%
Child Gender		
Male	281	48.9%
Female	294	51.1%
Child Race		
African American	137	23.8%
White	183	31.8%
Hispanic	215	37.4%
Other	37	6.4%
No Response	3	0.5%
Adolescent Parenthood[2]	204	35.5%
Maternal Employment Status		
Unemployed	302	52.5%
Employed	146	25.4%
School/Training	118	20.5%
No Response	9	1.6%
Maternal Education		
Less than High School Diploma (<12)	271	47.1%
High School Diploma or GED	143	24.9%
More than High School Diploma (>12)	152	26.4%
No Response	9	1.6%
Maternal Marital Status		
Single	310	53.91%
Married	140	24.35%
Separated, Divorced, or Widowed	56	9.74%
Unmarried and Cohabitating	62	10.78%
No Response	7	1.22%
Physical Environment		
Unsafe Home	225	39.15%
Safe Home	210	36.55%
No Response	140	24.3%

Note. [1] Early Head Start Treatment Group = families and children randomly assigned to receive early head start intervention. [2]Adolescent Parenthood = mother was a teenager at the birth of the study child.

Missing data. Longitudinal research studies often have large amounts of missing data across the course of the entire study (Acock, 2005). Missing data varied across measurement time points with a consistent decline in retention rates across follow-up data collection waves (see Table 5). The Expectation Maximization (EM) algorithm (Dempster, Laird, & Rubin, 1977) was used for imputing missing values. An EM approach is considered an effective approach when data is missing at random (Musil, Warner, Yobas, & Jones, 2002; Schafer & Graham, 2002). The EM method implements a maximum likelihood (ML) approach to iteratively impute missing values by using expectation (E-step) and maximization (M-step) algorithms (Musil, Warner, Yobas, & Jones, 2002). Little's (1988) Missing Completely at Random (MCAR) test using the main study predictor variables produced a statistically non-significant value of χ^2/df = 1.08 ($p = .17$), which reveals a good fit between sample data with and without imputations. This suggests that data were likely missing at random. The missing data pattern summary was calculated from the number of study variables multiplied by the sample size (equation of the study variables multiplied by sample: 23 study variables (covariate, parenting predictor, and story stem outcome variables) * 575 sample size = 13,225 total data). Missing value analyses indicated that 12.41% of the data were missing across the sample. The range of missing data varied from 0.5 to 27.8% across the study variables. To understand the nature of the missing data in the EHSREP dataset of the final sample ($n = 575$), the totals and percentages of missing data across study variables were included in Table 11. Follow-up analyses with predictions on later children's externalizing behavior problems only included cases with outcome data.

Table 11: Descriptive Statistics of Data Missingness in Final Sample (n = 575)

	Data Missingness			
	Missing *N*	Missing %	Mean[2]	*SD*[2]
Parenting Behavior[1]				
Dyadic Mutuality/ Connectedness	152	26.4%	4.48	1.21
Parent Supportiveness	151	26.3%	4.06	.96
Parent Intrusiveness	151	26.3%	5.41	1.21
Maternal Psychosocial Stressors				
Maternal Depression	93	16.2%	12.60	9.74
Maternal Stress	78	13.6%	26.43	9.05
Family Conflict	160	27.8%	1.70	.54
Home environment				
Physical Environment	140	24.3%	---	---
Social-Emotional Environment	134	23.3%	26.17	3.20
Child Characteristics				
Child Age at 14 month	0	0%	14.84	1.30
Child Gender	0	0%	---	---
Child Race	3	0.5%	---	---
Child Temperament	77	13.4%	2.94	.95
Family Characteristics				
Maternal Cumulative Demographic Risk	43	7.5%	2.61	1.16
EHS Program Status	0	0%	---	---

Note. Maternal psychosocial stressors and parenting behavior variables were measured at 14 months. [1] Parenting behaviors: higher mean scores = positive parenting (scores recoded to reflect). [2]Means and standard deviations were based on the nonmissing sample (categorical variable means and standard deviations not included = child gender, child race, EHS program status, and physical environment; *refer to Table 10*).

Variables and Measures

Measures for key variables are organized and presented below according to the hypothesized, conceptual model. Six sets of measures are included in the analyses: children's internal representations, parenting behaviors, maternal psychosocial stressors, home environment, child outcomes (externalizing behavior problems and academic outcomes), and child and family characteristic covariates.

Children's internal representations. Children's internal representations of relationships were assessed via a projective, semi-structured story stem narrative task at the TPK data collection wave when children were approximately 5 years of age. Story stem narratives assessed the emotional content of children's responses across seven emotionally-charged dilemmas drawn from the MacArthur Story Stem Battery (MSSB; Bretherton, Oppenheim, Buchsbaum, Emde, & MacArthur Narrative Group, 1990), and an additional story (Band-Aid®) from the Family Stories Task by Shamir, Schudlich, & Cummings (2001). The procedure (generally lasting 25-30 minutes) was videotaped. The following, briefly, summarizes the story stems and themes in order of administration, according to the EHSREP standard protocol for story stem narrative task (Love et al., 2005) (*refer to appendices A and B for full descriptions of Story Stem Narratives*).

1.) Spilled Juice (Story Theme: attachment/authority): One of the children accidentally spills a pitcher of juice at the dinner table.

2.) Mom's Headache (Story Theme: moral dilemma): Mom has a headache, has to turn off TV to take a rest and asks child to do something quiet. While the child's friend stops by and wants to show him/her something neat on TV.

3.) Lost Keys (Story Theme: family conflict): Mom and dad argue about who lost the car keys.

4.) Hot Gravy (Story Theme: attachment/authority): Child doesn't follow Mom's direction and ignored Mom's warning about the hot gravy, ended up with burning his/her hand.

5.) Stolen Candy (Story Theme: moral dilemma): Child not successful in negotiating with parents for more candy, child then steals a candy bar at a checkout counter.

6.) Band-Aid® (Story Theme: attachment/authority (empathy and compliance with parent)): A child who is pretending to cook and knows he/she is not supposed to play with knives, but does so anyway. Then the child cuts his/her finger and starts to bleed.

7.) Departure (Story Theme: attachment- separation from parents): Mom and Dad are going on a trip leaving children with their Grandma, with one child upset about this separation.

8.) Reunion (Story Theme: attachment): Mom and Dad come back from their trip.

Each stem consisted of a brief story beginning presented with dolls and props, culminating in a dramatic moment when the child was invited to 'Show me and tell me how your story ends'. The following demonstrates a sample story stem (Lost keys story from the MSSB; Bretherton et al., 1990, pp. 389-390):

Interviewer: Rhonda/Robert comes into the room and sees Mom and Dad looking at each other like this. Look at my face (show angry expression).

Mother doll: (Angrily) 'You lost my keys!'

Father doll: (Angrily) 'I did NOT!'

Mother doll: 'Yes you did, you always lose my keys!'

Father doll: 'I did not lose them this time.'

Interviewer: Show me and tell me what happens next.

Content theme dimensions. The story stem narrative content theme dimensions were calculated from subcodes that were aggregates of individual content theme codes summed and averaged across the eight story stem narratives. The six content theme dimensions are as follows: 1) interpersonal conflict, 2) empathy affiliation, 3) dysregulated aggression, 4) avoidance strategies, 5) dissociation, and 6) dysregulated performance. Internal representation dimension indicators ranged from 0 to 1. Reliability across all dimensions at the item level (subcodes) was good, $\alpha = .82$. Please see below for further information on the five content theme dimensions of children's narrative responses.

Interpersonal conflict. The interpersonal conflict dimension reflected children's escalation of conflictual interpersonal moral reasoning. The codes were competition, jealousy, exclusion of others, the active refusal of empathy, verbal conflict, non-compliance, shame, blame, teasing, verbal and physical punishment, and dishonesty. The dishonesty code indicates lying or stealing in a child's narratives (e.g., the child has the doll hide a cookie and tells mom "I don't have anything").

Empathy affiliation. The empathy affiliation dimension included prosocial content themes and positive parental warmth representations. Prosocial content codes were sharing (e.g., child says "You can have it too" or "They can share it"), empathetic helping (e.g., one doll offers a toy to the injured party, child says "I cut my finger once, too", mom doll assisting child doll in wiping up the juice, or one child sticking up for a sibling of friend) and empathetic reassurance (e.g., child says "It's okay" or "Everything will be

all right"), affiliation (e.g., child says "Everyone gets a turn on the bike", "Everyone goes to the park", "They both go home", or "They go outside to play"), and affection (e.g., Mom telling child they did a good job, affection to an animal and vice-versa, kissing a person, or holding hands). The reparation/guilt code captures the process of a character making amends or displaying guilt feelings, or apologizing following some disagreement between the child and/or adult characters (e.g., child says "I'm sorry"). The final empathy affiliation code, parental warmth captures four distinct positive parental representations, 1) protective (e.g., child says "Be careful with the scissors"), 2) caretaking (e.g., parent put Band-Aid on finger, parent feeds the family, or parent carries child to bed), 3) affectionate, warm, caring (e.g., child says "She likes to be with her Mom and Dad" or "Give Mom and Dad a kiss"), and 4) helpful (e.g., parent helps child find lost dog), in the narratives.

Dysregulated aggression. The dysregulated aggression dimension included aggression, escalation of conflict, personal injury, danger, destruction, inappropriate child power, negative parenting, harsh parental discipline, and negative story endings codes. The aggression code was an average of four distinct aggressive themes: 1) verbal aggressive themes (e.g., "his brother said, 'you're stupid'"); 2) physical aggression (e.g., "he got angry and pushed him down"); 3) unmotivated/dysregulated aggression (e.g., "he flew at him and knocked him and kicked him like this and like this"); and 4) assaulting an adult (e.g., "the little boy knocked his mom over").

The additional codes captured escalation of conflict from verbal to physical or from physical to unregulated acts ("e.g., he killed him"), atypical negative story responses that were disorganized or unusual ("then the house burned down and killed

everyone"), and personal injury (e.g., "he broke his leg")). Three narrative emotion codes were used to identify the child's description of emotions experienced and several new themes (e.g., danger, loss), and an additional narrative emotion code to capture the child's negotiation of the ending of the stem response (Warren, Mantz-Simmons, & Emde, 1993). How the child ends the stories may potentially provide information about the child's expectations concerning the resolution of situations.

Avoidance strategies. The avoidance strategies dimension included codes that reflected the child "stepping back" from the storyline in a manner suggesting the need to de-intensify the drama (i.e., character self-exclusion, repetition, family departure, sudden sleep onset) or reflected a note-worthy gap in the story construction (i.e., denial of central story theme, passive refusal of empathy).

Dissociation. The dissociation dimension was when the child displayed dissociative themes or behaviors according to Macfie et al. (2001a; 2001b: e.g., intrusion of traumatic material, absorption/boundary confusion, fleeing painful subject, spacing out, fantasy proneness, and identifying /over-involvement with aggression).

Dysregulated performance. The dysregulated (or negative) performance dimension measured children's controlling of the examiner, anxious behaviors, and children's ability to maintain story coherence when the inclusion of emotional expressions increased. Controlling of the examiner indicates attempts by the child to control the presentation or the examiner's behavior during the narrative (e.g., child says "No, his name is Harry" or "this is a good place to end your story"). Anxious behaviors consist of the child's physical movements that indicate a sense of worry or apprehension, including self-soothing behaviors such as rocking or thumb sucking, fidgeting, and

chewing on either their lip or an object. Examples include, the child chewing on doll's head while examiner is talking, child says "I can't do this" or "I don't know" apprehensively.

Emotional incoherence of positive emotions (e.g., the child runs away from the dog and then becomes friend with the dog-- unclear how the fearful responses changed into a happy, friendly relationship) and negative emotions (e.g., the family is happy and kissing each other and then begins physically fighting suddenly without explanation; and if the children are playing and suddenly a monster appears and they are afraid) were used to identify the sudden shifts in the emotional tone of the stories and incongruent affect, indicating potential difficulties coping with certain emotions (Warren, Mantz-Simmons, & Emde, 1993). In addition, the emotion expressed performance codes were intensity of anger, distress, and sadness, and based on the child's verbal (e.g., "he's sad") and non-verbal responses (e.g., dolls are forcefully banged on table as child says "he got in trouble"). The emotion codes also included the displaying the emotions through facial (i.e., brow furrows indicative of the discrete emotions), and vocal intonation (e.g., "Mom said, 'you go to your room"' uttered with loud, forceful voice, or "he didn't know what to do" said with a hushed tone indicative of sadness). *Intensity of sadness* was scored based on verbalizations and facial affects expressed by the child during the telling of their story, ranging from 0 (no sadness); 1 (a single instance of sad face or vocal tone or stating a character was sad); 2 (repeated instances of sad face, vocal tone, or statements about sadness). The additional emotion codes were similarly coded (*intensity of anger*: 0 = no anger; 1 = a single instance of bossy vocal tone or stating a character was angry; 2 = repeated instances of bossy vocal tone or stating a character was angry; and *intensity of*

distress: 0 = no distress; 1 = a single instance of distress or fear, eyes enlarge, brow raises, or mouth opens slightly or withdrawal of a character or statements of fear; 2 = repeated instances of distress or fear, eyes enlarge, brow raises, or mouth opens slightly or withdrawal of a character or statements of fear. Emotion codes were calculated by .5 to represent equal weights prior to scale calculation.

***Coding procedures of story stem narratives*.** Scoring procedures for the story stems narratives followed a widely reported coding system development by Robinson and colleagues (see the MacArthur Narrative Coding Manual; Robinson, Mantz-Simmons, MacFie, Kelsay, Holmberg, & the MacArthur Narrative Working Group, 2004). The children's story stem narratives were evaluated using an adaptation of coding system development by the MacArthur Narrative Workgroup (Oppenheim, Nir, Warren, & Emde, 1997). Three areas were assessed from the transcripts as well as viewing of the videotapes of the procedure: content themes (e.g., aggression, competence, and comfort/help seeking), representations of parents (e.g., positive, negative, neutral, and mixed), and process codes (e.g., investment in performance, coherency, and emotional expressiveness). The approach to the story stem coding system emphasized four domains: 1.) Story content or themes; 2.) Theme organization or coherence; 3.) Emotional expression; and 4.) Interaction with the interviewer. These approaches evaluate how the child chose to interpret and finish the story. For this reason, stories with a moral focus, not only examined the presence of the moral issue, but rather, was how the child addressed or resolved the issue via meaningful narrative completions. The overall assessment also accounts for response narratives that the child enacted attachment themes during moral stories or moral themes during attachment stories.

***Reliability of story stem narratives*.** Story stem narratives were coded by four independent observers as part of the EHSREP protocol and led by JoAnn Robinson. Following training and extensive discussion of disagreements on specific cases, raters established an initial agreement level of 80% across codes for five cases. Subsequently, each observer completed a reliability rating for every 10 cases and inter-observer reliability was calculated based on intraclass correlation ($n = 63$).

Story stem narrative methods have established reliability and validity as assessments of the young child's representations of relationships (Robinson, 2007). Across some studies, interobserver reliability reported moderate to high estimations of Kappa and percent agreement statistics (e.g., Macfie et al. (2001a) reported Kappa ranging from .65 to 1.0; and Steele et al. (2003) reported Kappa ranging from .64 to .82 from only 18 of the 34 individual codes) for individual codes in individual stories (Macfie, Cicchetti, & Toth, 2001a; Macfie, Toth, Rogosch, Robinson, Emde, & Cicchetti, 1999; Steele et al., 2003; Toth, Cicchetti, Macfie, & Emde, 1997). In other studies, interobserver reliability reported adequate estimations of Kappa (e.g., Oppenheim et al. (1997) estimated the aggregated score of parent representations across all stories and reported a mean Kappa of .85) and intraclass correlations (e.g., Warren et al. (1996) reported intraclass correlations ranging from .80 to .96 for performance codes (e.g., sadness, anger, concern, and distress) and a correlation of .80 for an aggressive/destructive thematic aggregate) at the level of the index or after aggregation of individual codes across narratives (Oppenheim, Emde, & Warren, 1997; von Klitzing, Kelsay, Emde, Robinson, & Schmitz, 2000; Warren, Oppenheim, & Emde, 1996).

The infrequency of salience codes across story stem narratives posits difficulty in

in the interpretation of conventional reliability statistics. When applying story stem narrative methods to any sample, it is imperative to consider culture-specific and sample-specific adaptations. Additionally, story stem narrative require specific levels of linguistic and play skills for children to provide coherent responses to stories, therefore, intended for preschool children ages 3 years and older. While the upper limit on the age of children tested remains unclear, studies with children through age 7 years successfully used doll-based techniques. Children's skill levels include their ability to verbally express short narratives with an agent and action, typically developed by 3 ½ years of age, and to symbolically portray a sequence of events (e.g., "Show me the family eating dinner") (Holmberg, Robinson, Corbitt-Price, & Wiener, 2007). Story stem narratives differ in the functional interpretation in different populations; therefore, the lower limit on the age of children tested may differ across populations. For example, in economically at risk populations, the MSSB might be appropriate for ages 4 or 5 years and older due to the increase rate of children with potential delays in language and sequence skills. The current study uses the individual content themes codes that were computed for the discussed content theme groups to generate typologies of children's internal representations.

Parenting behavior. Observational measures of parenting behavior were obtained from videotaped semi-structured parent-child play interaction task at 14 month during home visits. Two separate indicators of parenting at 14 months were used in the current study to assess both positive and negative aspects of parenting. In addition, a single indicator construct of the mother-child dyadic interaction was included in the current study at 14 month to account for the degree of connectedness between the parent

and child. In general, the semi-structured play interaction task provided information on the quality and quantity of such interactive behaviors as parental negative regard, parental intrusiveness, and parental cognitive stimulation of the child and measured overall parent-child interactions that parents had with their children during the earliest stage of development at 14 months. The parent-child interactions have been found to contribute to positive child developmental outcomes in general (Magill-Evans, Harrison, & Burke 1999). Higher parenting scores represented a more positive parenting practices observed during the semi-structured play interaction task. Please see below for the descriptions of the parenting behaviors during a three-bag semi-structured play task with child, and including the individual parenting measures utilized from play task for the current study.

Three-bag semi-structured play task. The Three-Bag Interaction Task, administered when the child was 14 months of age. This assessment was adapted from the NICHD Study of early Child Care (U.S. Department of Health and Human Services, 2004). The Three-Bag Interaction Task consisted of a 10-minute session in which the parent was provided with three bags that contained three separate sets of toys and asked to play with them how the child wished (Love et al., 2005). Contents of the three bags were: Bag 1 contained the *Good Dog Carl* book; Bag 2 contained stove, pots, pans, and utensils set; and Bag 3 contained Noah's Ark and animals. Parents were told they had ten minutes to play with their child and instructed to play with the bags in numeric order. The parent and child dyads were videotaped and parent behavior was coded by trained research coders. Two parenting behaviors and one dyadic measure were coded on a 7-point Likert rating scale, which ranged from very low (1) to very high (7). The current study included (1) parent supportiveness, (2) intrusiveness (reverse coded to reflect

higher scores of less intrusiveness), and (3) dyadic mutuality/connectedness as indices of parenting behavior. Such parenting behavior displayed during semi-structured play interaction tasks have been identified as important to child development (Ispa et al., 2004), in young children, and thus, were appropriate given the current research questions. High scores were indicative of optimal parenting behavior. Specific measures were reverse coded to follow this pattern. Please see below for further information on the individual parenting behaviors that were used.

Parent supportiveness. The parent supportiveness scale used in the current study was a composite of the three highly inter-correlated (*r*'s = .50 to .71, see Brady-Smith, Fauth, & Brooks-Gunn, 2005) positive parenting subscales, parental sensitivity, parental cognitive stimulation, and parental positive regard. A single scale was computed summing the means of the three individual scales and dividing by 3. The three individual scales emphasized parental sensitivity (e.g. response to child cues), parental effortful teaching, and parental expression of love, warmth, and admiration for the child during the play activity. Parent supportiveness reflected overall positive aspects of parenting when the study child was 14 months of age. A high score on this composite represents indices of positive behavior demonstrated during the Three-Bag Semi-Structured Interaction Play Task.

Parent intrusiveness. The parent intrusiveness scale represented the degree to which the parent tried to control the child during the semi-structured play activity. Intrusiveness was coded from a child perspective, and therefore, the coder attended to the child's reaction and response to intrusive parenting behavior. This subscale was reverse

coded, a higher score represents less intrusive parenting and a low score reflects extremely intrusive parenting behaviors.

Dyadic mutuality/connectedness. The dyadic mutuality/connectedness scale measures the degree of synchrony, comfort, and mutual pleasure between the mother and the child's interaction during the three-bag semi-structured play task. This scale measures the mother and child as a unit, differing from the additional four previously mentioned parent behavior indicators. Mother-child dyads with high mutuality/connectedness appear to share perspectives, energy levels, and affective states, as well as, functioning in a consistently cohesive manner. In addition, these dyads demonstrate enjoyment with few or no ambivalent or anxious behaviors in the interaction. Mothers' appear relaxed and comfortable in their role as a parent and are able to anticipate the child's cues. There is a sense of familiarity and genuine closeness between these mother-child dyads. Indicators of dyadic mutuality/connectedness include, 'pleasure and comfort in being with each other'; 'matching of energy and affect levels throughout the interaction'; 'synchrony of flow in the interaction (i.e., shared perspectives and goals, easy give-and-take in behavioral and vocal interactions)'; 'parental or child behaviors indicating a desire to please the other'; 'parental acknowledgment of distress and attempts to relieve it'; and 'shared eye contact'. Alternatively, mother-child dyads with low mutuality/connectedness seem to operate as two separate entities, not sharing one another's goals nor presenting actions aimed at pleasing the other. There is a sense of little affective involvement with one another. Mothers' appear oblivious to the child's cues and/or display inappropriate reactions to the child's cues. As for the child, behaviors may appear as confused, unsure/unaware of, or

anxious in response to the situation, and unable to seek comfort in the parent. Indicators of lack of mutuality or disconnection include, 'parent ignoring the child's distress'; 'child turning away from parent to seek comfort from something or someone other than parent'; 'child not responding to parental propositions'; 'few or no behavioral and/or vocal turn-taking/; 'conflicting goals for play'; 'lack of eye contact'; 'few or no physical contact'; and 'not facing or orienting toward one another'.

Reliability of parenting behavior. A coding team at Columbia University was trained to view and code the parent-child interactions. Training included weekly meetings, discussions of the scales, and viewing of the training tapes that contained exemplars of high, medium and low scoring interactions for each scale. Coders were required to meet a standard of 85% agreement (exact or within one point) or higher before coding unique interactions (Brady-Smith, Fauth, & Brooks-Gunn, 2005). A randomly selected 15% to 20% of each coder's weekly tape assignments were used to ensure ongoing reliability. Coder reliability (percent agreement) averaged 90% at 14 months, with range of 83% to 97%. A total of 215 tapes (11% of n = 1,976 codable tapes) at 14 months served as reliability tapes. The current study demonstrated good reliability at 14 months (α = .80), between parenting indices. Researchers have used the observation of parenting behaviors as an assessment tool for examining the impact of parenting on child outcome (Zaslow, Weinfeld, Gallagher, Hair, Ogawa, Egeland, et al., 2006).

Maternal psychosocial stressors. Maternal psychosocial stressors consisted of maternal depressive symptoms, maternal stress, and family conflict. Previous studies found that mothers with lower ratings on distress associated with feeling of helplessness

and depression, which accounted for 38% of variance in maternal stress (Gelfand, Teti, & Fox, 1992). Depression mothers had more difficulty adjusting to their role as a parent (Gelfand, Teti, & Fox, 1992; Willinger et al., 2005). Please see below for further information on the indicators of the maternal psychosocial stressors.

Maternal depression. The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) measured the frequency of maternal depressive symptoms reported by mothers' at 14 month. The current study used the CES-D long form that included a list of the ways the participant might have felt or behaved and instructed to respond to how often they have felt this way during the past week. The 20 item scale asked respondents to choose from four possible responses with higher scores reflecting more frequent occurrences of depressive symptoms. Responses include the following: 'Rarely or none of the time (less than 1 day)' (1), Some or a little of the time (1-2 days) (2), 'Occasionally or a moderate amount of time (3-4 days)' (3), and 'Most or all of the time (5-7 days)' (4). Sample items included, *I did not feel like eating*; *My appetite was poor*; and *I felt depressed*. The CES-D 20 item scale had a total raw score range of 0 to 56 and an average test score was 12.60 (*SD* = 9.74). Coefficient alpha for the 20 items was acceptable for a measurement tool (.79). All the items had acceptable item-total correlations (*r*'s range from .43 to .62), noted to be medium and large effect sizes according to the Cohen's *d*, .5 and .8, respectively (Cohen, 1988)[2].

The CES-D has been known as an acceptable screening tool for the general population (Callahan & Wolinsky, 1994; Comstock & Helsing, 1976; Husaini et al.,

[2] Cohen (1988) formula to compute effect sizes is $d = M_1 - M_2 / \sqrt{[(s_1^2 + s_1^2) / 2]}$. The author proposes to define effect sizes as 'small' (d = .2 to .5), 'medium' (d = .5 to .8), and 'large' (d > .8).

1980; Myers & Weissman, 1980). The CES-D was found to reliably measure symptoms of depression and distinguish between depressed and non-depressed individuals (see Ross et al. 1983).

Maternal stress. The parental stress subscale of the Parenting Stress Index-Short Form (PSI; Abidin, 1990) measured mothers' level of stress at 14 month. The PSI used in the current study was a shorter version of the original 120-item version that divided items into three empirically derived domains: Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child. These subscales work in combination to produce a comprehensive, multidimensional measure that collectively represents parenting stress across parent and child domains (Reitman, Currier, & Stickle, 2002). For the purpose of the current study, only 12 items from the parental distress subscale were used. Items aimed at mothers' individual characteristics of parenting. Mothers rated their perceptions of how competence they feel in the parenting role. Items were rated on a 5-point Likert scale ranging from 1 (*strongly agree)* to 5 (*strongly disagree).* Sample items included, 1) *I often have the feeling that I cannot handle things well*; 2) *I find myself giving up more of my life to meet my children's needs than I ever expected.* Higher score reflected responses of higher stress, with a score continuum from a minimum of 12 to a maximum of 60.

Previous studies found good reliability for the PSI. Abidin (1990) found an internal consistency of .87 for the parental distress subscale and a .85 test-retest reliability across a normative sample. The current study indicated good reliability (α = .80). Additionally, in a sample of low-income, African American Head Start families, Reitman et al. (2002) reported a coefficient alpha, α, of .88 for the parental distress subscale.

Family conflict. Family conflict among family members was measured with the conflict subscale of the Family Environment Scale (FES; Moos & Moos, 1994) at 14 month. The family conflict subscale measures the extent to which the open expression of anger and aggression and generally conflictual interactions are characteristic of the family. The mean of five family conflict items were used in this study. Scores were on a four-point Likert-scale ranging from 1 (strongly disagree) to 4 (strongly agree). Items included, 1) *Family members sometimes get so angry they throw things*; 2) *Family members often criticize each other*; 3) *Family members fight a lot*; 4) *Family members hardly ever lose tempers*; and 5) *Family members sometimes hit each other.* Scores were recoded as needed and averaged to indicate higher means (i.e., closer to 4 = higher) as increased levels of conflict. The current study yielded a Cronbach's alpha (α) reliability coefficient of .69.

Home environment. The home environment dimension included the following two indicators: physical environment and social-emotional environment. Please see below for further information on the indicators of the home environment variable.

Physical environment. The physical safety of the home environment construct consisted of the living quality or physical stressors within the home. Safety quality of the home environment were developed by MPR to measure whether the parent is using standard safety practices to prevent accidents or to be prepared for common emergencies with infants and toddlers. Practices include keeping syrup of ipecac in the home in case of poison emergencies, having gates or doors in front of stairs, riding in a car seat in the car, and having covers on electrical outlets. The safe home environment variable is binary coded (0-1), indicating high scores as a safe home environment. The current study

included 210 (39.1%) families with a safe home environment and 225 (36.5%) families with an unsafe home environment.

Social-emotional environment. The Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell, 1984) measures the quality of stimulation and emotional support available to a child in the home environment at 14 month. Designed to assess whether the child's home is an environment that enhances intellectual and emotional development and helps to prepare him/her for the challenges of school, the HOME is a well validated and widely used assessment tool (Bradley et al., 1989; Bradley & Caldwell, 1984). The total score is a composite of 31 (1= yes or 0 = no) maternal report items and interviewer observations from the following subscales: Emotional Responsivity (Parental Warmth); Language and Cognitive Stimulation (Support of Learning and Literacy Stimulation), Absence of Punitive Interactions (Parental Lack of Hostility); and Maternal Verbal and Social Skills. The HOME items measure the regularity and structure of the family's daily routine, the amount of intellectual stimulation available to the child, and the degree of emotional support and warmth provided by the parent. Sample items include, *Parent spontaneously vocalized to child twice*; *Parent responds verbally to child's verbalizations*; *Parent tells child name of object or person during visit*; *Parent spontaneously praises child at least twice*; *Parent's voice conveys positive feelings toward child*; *Parent caresses or kisses child at least once*; and *Parent responds positively to praise of child offered by visitor*. The current study indicated good reliability (α = .81). Previous studies have found the HOME to predict children's cognitive development, academic performance, language skills, and health in a diverse range of cultural settings (e.g., Bradley et al., 1989; Bradley, Corwyn,

Burchinal, McAdoo, & García Coll, 2001; Bradley et al., 1996; Espy, Molfese, & DiLalla, 2001; Murray & Yingling, 2000; Wachs et al., 1992).

Child externalizing behaviors. The Child Behavior Checklist for 6–18 year old children (CBCL/6-18; Achenbach & Rescorla, 2001) was selected as a parent-reported measure of children's externalizing behavior problem outcomes at Grade 5. The CBCL/6-18 measures the frequency of children's externalizing and internalizing behavior problems, however, only externalizing was used in the current study. The CBCL reported parent's perceptions of their children's behavior problems and was administered to the parents orally by the trained interviewer (see Achenbach & Edelbrock, 1983 for recommendation when there is some doubt about a parent's reading level). This 113 item measure was rated as Not True (3), Sometimes True (2), or Very True (1). The current norms of the CBCL are based on a national U. S. sample of 1753 children of children between 6 and 18 years, their parents and teachers. The CBCL/6- 18 is a slightly modified revision of the Child Behavior Checklist for Ages 4–18 (CBCL/4-18; Achenbach 1991) that included changes such as new age norms, the replacement of ineffective items (e.g., items 2, 4, 5, 28, 78, 99), and the creation of six DSM-Oriented Scales (Affective Problems, Anxiety Problems, Attention/ Deficit/ Hyperactivity Problems, Conduct Problems, Oppositional Defiant Problems, and Somatic Problems) (Nakamura, Ebesutani, Bernstein, & Chorpita, 2009).

The scores were derived through factor analytic methods in eight domain-specific syndrome scales, Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Delinquency, and Aggressive Behavior. Impact analyses focused on two higher-ordered scales: Internalizing Behavior

Problems (comprised by the Anxious/Depressed, Withdrawn/ Depressed, and Somatic Complaints subscales) and Externalizing Behavior Problems (comprised by the Social Problems, Attention Problems, Delinquency, and Aggressive Behavior subscales). However, the EHSREP protocol included only the Delinquency and Aggressive Behavior subscales to compute the Externalizing Scale. Following this protocol the current study included the following in the hypothesized models, Delinquency and Aggressive Behavior subscales, and Externalizing scale. For each subscale, raw scores were calculated as the sum of all items. Prior to summing, items were reverse coded (higher scores indicate greater behavior problems) with values shifted to 0, 1, and 2. The raw scores were converted to T scores ranging from 0 to 100.

Reliability of externalizing behavior problems. The reliability and validity of the CBCL/6-18 has been thoroughly documented. The internal consistency between the items of the CBCL/6-18 was estimated by calculating Cronbach's alpha (α) reliability coefficient. The internal consistency of the externalizing scale was high with $\alpha = .91$. Strong validity and reliability evident of the CBCL/6-18 scores through multiple studies conducted over the last 20 years (Nakamura, Ebesutani, Bernstein, & Chorpita, 2009), across different cultures, including the Netherlands (De Groot, Koot, & Verhulst, 1994), Belgium (Hellinckx, Grietens, & Verhulst, 1994). Concurrent validity is often demonstrated via a comparison with the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), which is a brief measure aimed at screening behavioral and emotion problems in young children.

Child academic achievement. The Early Childhood Longitudinal Survey-Kindergarten Cohort of 1998-99 (ECLS-K) direct child assessment of mathematics and

reading (language and literacy) measured children's academic achievements at Grade 5. The mathematics assessment included questions in the following content areas: number sense, properties, and operations; measurement, geometry and spatial sense; data analysis, statistics, and probability; and patters, algebra, and functions. Only the routing form was administered in the EHSREP. Therefore, the mathematics assessment was a single form of 18 items administered to each child. The items from all content categories were present on the routing form, with the majority of items from the number sense, properties, and operations and measurement categories. Raw score on the routing form were computed for children.

The reading assessment emphasized children's reading comprehension abilities with the majority of the items based on one of several reading passages. The reading assessment also included children's basic skill levels, including decoding and vocabulary. The reading assessment included items in the following content areas: 17% basic skills, 11% vocabulary, 23% initial understanding, 26% developing interpretation, 5% personal reflection and response, and 18% demonstrating critical stance (Pollack et al., 2005). The test developers identified proficiency levels of the assessments, which describe the objectives of the assessments. The reading proficiency levels are as follows: letter recognition, beginning sounds, sight words, comprehension of words in context, literal inference, extrapolation, evaluation, and evaluating nonfiction. The Item Response Theory (IRT) scale scores estimated children's performance on the whole set of 186 assessment questions in each content domain.

Covariates. Child age, child gender, child race, and child temperament were included in the models as child characteristic covariates of internal representation class

membership. Maternal cumulative demographic risk and EHS program status were included as family characteristic covariates of parenting class membership (see previous section for full description of EHS program status). Please see below for detailed descriptions of child race, child temperament, and maternal cumulative demographic risk covariates.

Child race. Child race was computed into three binary variables from the composite child race variable. The child race variable consisted of parent report of child's race when the study child was 14 months of age. The three binary coded (yes=1, no=0) race variables included 1) African American, 2) White, and 3) Hispanic ethnoracial groups. This study had 137 children in the African American ethnoracial group, 183 children in the White ethnoracial group, and 215 children in the Hispanic ethnoracial group.

Child temperament. Children's temperament was assessed at 14 months by the Emotionality subscale of the Emotionality, Activity, Sociability, and Impulsivity Temperament Survey (EASI) developed by Buss and Plomin (1984). Children's temperament determines individual differences in emotions observed through immediate reactions, and includes elements of effortful control that inhibit a dominant response in order to engage in a less dominant responses (Posner & Rothbart, 2000). It was completed by primary caregivers to assess a child's temperamental dispositions. Emotionality refers to the individual's intensity of reaction to a given set of circumstances. It is measured by the mean score of 5 items: Cries easily; Tends to be somewhat emotional; Often fusses and cries; Gets upset easily; and Reacts intensely when upset. Responses ranged from 1 *(uncharacteristic)* to 5 *(characteristic),* with

higher scores suggesting that the particular trait was more characteristic of the child being observed. Buss and Plomin (1975) reported that test-retest reliabilities ranged from .75 to .91 across scales, with an average of .82. In this study, Cronbach's alpha for emotionality was .73. Based on findings from the existing literature aspects of children's temperament were related to parenting behavior (Calkins, Hungerford, & Dedmon, 2004; van den Boom, 1994), and was, thus, included in the current study.

Maternal cumulative demographic risk. Maternal cumulative demographic risks have been shown to be a powerful predictor of children's outcomes in general (Sameroff & Fiese, 2000). In the current study, cumulative risk is represented by a composite variable of risk indicators measured at enrollment in the EHSREP. Indicators of risk were: low education (mothers who did not complete high school), single parenthood, adolescent parenthood, unemployment, and welfare status. These variables were dummy coded into dichotomous variables (1 = yes or 0 = no) and summed to reflect a composite risk score. The scale ranges from 0 to 5 with a maximum score of 5, indicating higher cumulative risk, and a minimum score of 0, indicating no risk. The mean score was 2.61 (*SD* = 1.16) risks in the current sample.

Analytical Models

Two sequential latent class analyses address the two main research questions. First, latent class analysis was applied to children's narratives to identify different types of internal representations while controlling for child characteristics. Second, a multilevel latent class analysis, which simultaneously includes both internal representation types and parenting types, was used while accounting for child characteristics (child age, child race, child gender, and child temperament) and family

characteristics (maternal cumulative demographic risk and EHS program status) as control variables. The third research question examines how children's internal representation typologies predict later behavior and academic outcomes. After each model is described, the final section of this chapter explains the data analysis process.

Research question 1: Internal representation latent class analysis: *What are the different typologies of internal representations of attachment relationships articulated in preschoolers' narratives in a low-income population?*

To answer the first main research question, preschool-aged children's content theme dimensions in their narratives are used as indicators of the internal representation latent class analysis (*C*) (see Figure 2). The model controls for child characteristics.

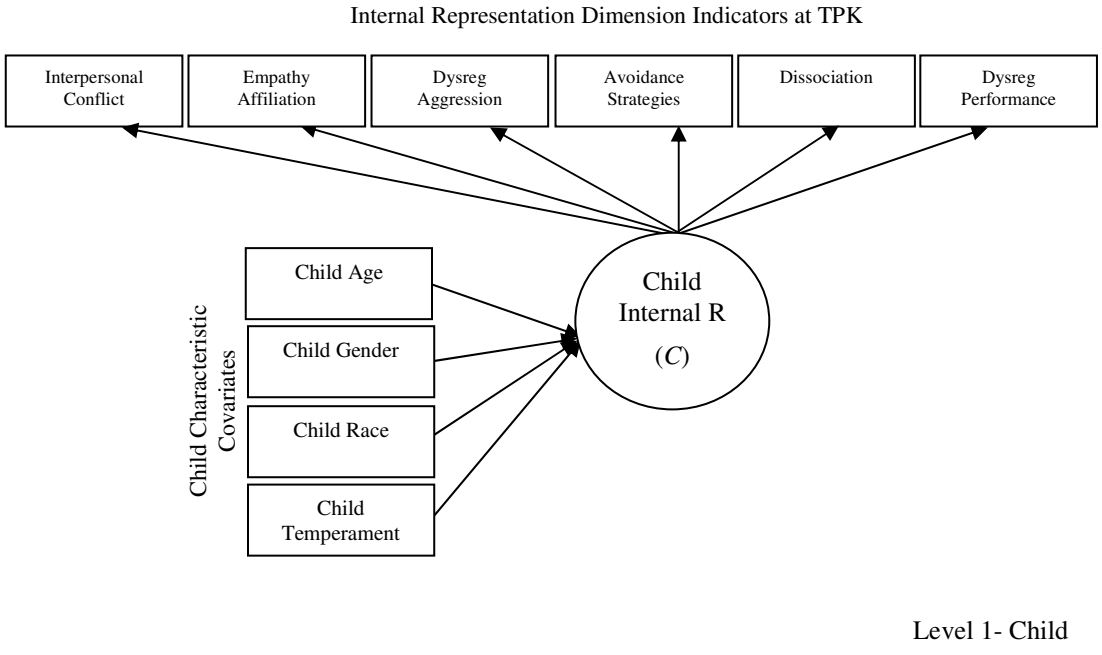


Figure 2: **Internal Representation Latent Class Analysis.**

Research question 2: Multilevel internal representation and parenting latent class analysis: *Does early parenting predict the different typologies of internal representations of attachment relationships articulated in preschoolers' narratives in a low income population?*

To answer the second research question, the two-level latent class analysis includes the different types of parenting on internal representation types (see Figure 3). This multilevel analysis tests the extent to which different types of early parenting based on parenting behaviors, maternal psychosocial stressors, and home environment predict different types of internal representations (*CW*) based on children's narratives in preschool (represented by the arrow from parenting latent class (*CB*) to internal representation latent class). This analysis allows the intercepts of the internal representation types to vary across parenting types to examine if and how parenting types influence internal representation types. The random intercepts allows the probability of membership in a particular internal representation type to vary across parenting types. In addition, the model allows variation across parenting types for the intercepts of each internal representation indicator to examine how parenting types influence the internal representation indicators that define the latent class membership.

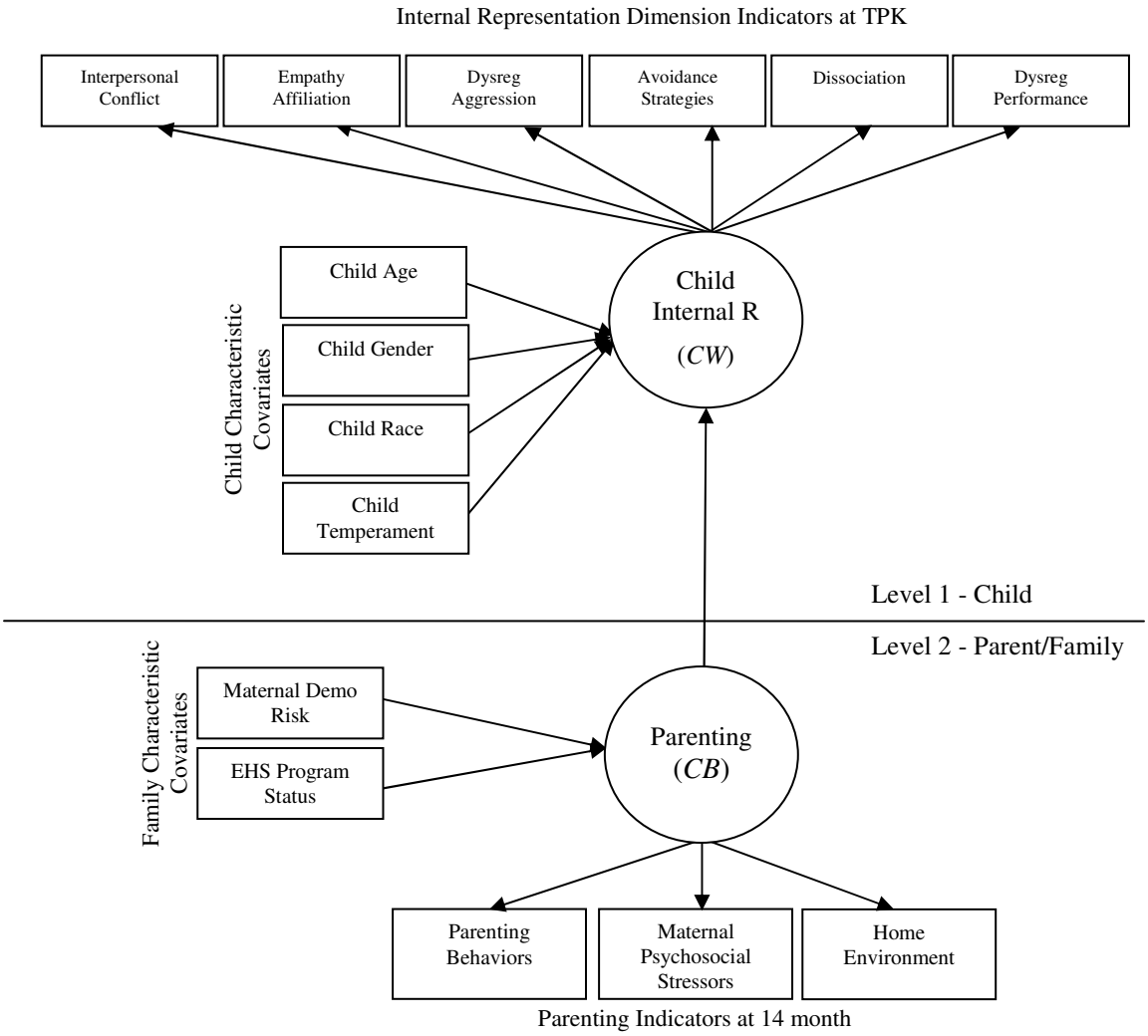


Figure 3: **Multilevel Internal Representation and Parenting Latent Class Analysis (Nonparametric Approach).**

Research question 3: *Do the typologies of internal representation differentially predict externalizing behavior problems and academic outcomes in a low-income population?*

In a final research question, the assigned internal representation typologies (*C*) are used as predictors on children's externalizing behavior problems and academic outcomes, math and reading, in middle childhood (see Figure 4). The model controls for child characteristics. To confirm the effects of internal representation typologies on later developmental outcomes the adjusted internal representation typologies (*CW*) in parenting typologies (*CB*) from the second research question analysis was examined.

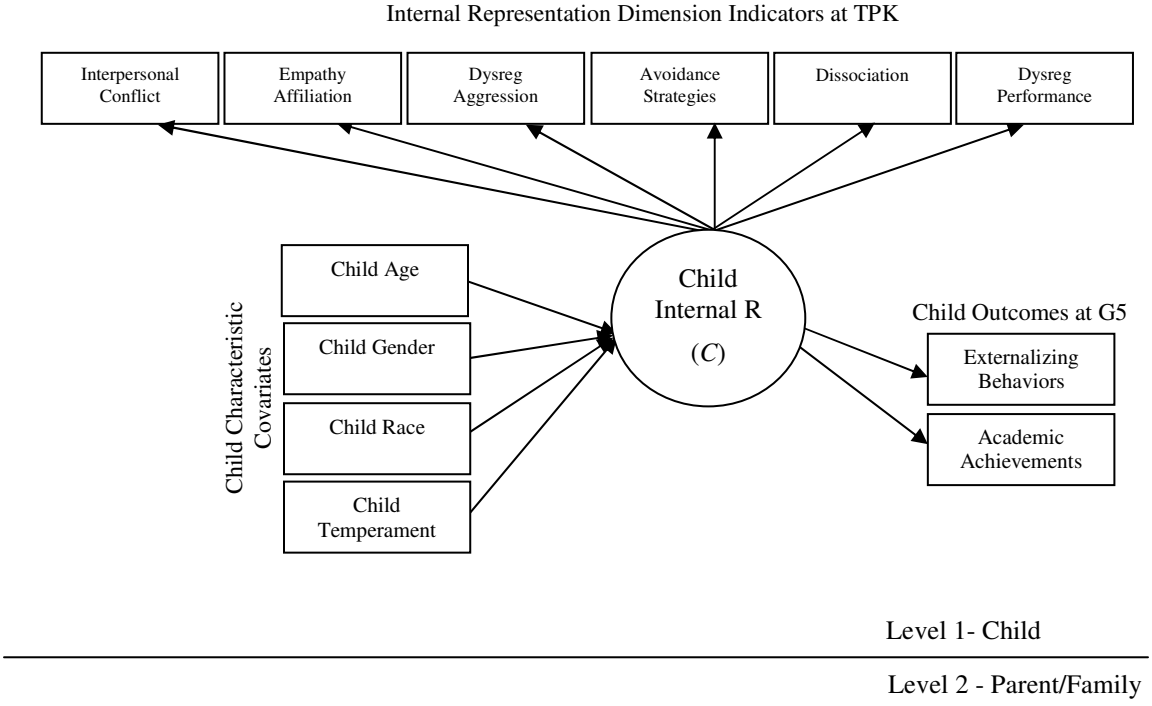


Figure 4: **Multivariate Model of Internal Representations Predicting Externalizing Behavior Problems and Academic Achievements in Middle Childhood.**

Data Analyses

Mplus version 6 (Muthén & Muthén, 2010) was used to extract latent profiles and model data, and Statistical Package for the Social Sciences (*SPSS*) version 18.0 was used to manage, describe, organize, prepare data, and run preliminary analyses. *Mplus* was chosen as the Latent Class Analysis software for the current study because of its ability to provide posterior class probabilities for each individual's likelihood of belonging to each latent class based on the estimated parameters. It also has the capacity to generate a specified number of random start values and corresponding likelihood solutions to guard against the well-known danger in latent class analysis and other mixture modeling approaches of arriving at a local rather than global maximum for the likelihood function (Hipp & Bauer, 2006). *Mplus* employs the Expectation-Maximization (EM) algorithm under the assumption that data are missing at random to compute maximum likelihood estimates of the given model parameters (Muthen & Shedden, 1999). Maximum likelihood estimation accounts for missing data via the integration of all observations associated with the dependent variable in a data set (Little & Rubin, 1987), assuming that the data are missing at random, rather than missing completely at random (e.g., listwise deletion). Researchers have recommended this as an appropriate way to accommodate missing data (Schafer & Graham, 2002). Investigators received approval for use of the EHSREP data set for this project by the Michigan State University Institutional Review Board (IRB).

Preliminary analyses. The data were selected to extract the participants with story stem narrative data at TPK. Data screening and descriptive statistics (see Table 12 and Table 13), including a correlation matrix (see Table 14) of parenting predictor and

internal representation latent class indicator variables, were conducted to better understand the EHSREP population and variables of interest. No study variables were highly correlated ($r > .85$), ruling out problems of multicollinearity (Kline, 2005), or obtained extreme outliers in the sample distribution. Descriptive analyses on the individual observed predictor and outcome variables were performed, without latent modeling (see Tables 12-13). Means, standard deviations, and ranges of the study variables are presented (see Table 12 for covariate, predictor, and outcome variables; and Table 13 for children's internal representation latent class indicator variables). Latent class variables represented the following constructs in the hypothesized models: parenting (parenting behaviors, maternal psychosocial stressors, and home environment), and children's internal representations ($n = 575$). Indicators for the latent variable are described under the measures and variables section above. Please see the following sections for detailed descriptions of the analytic techniques used in the current study.

Latent class analyses. In the current study, a latent class analysis of internal representations among 575 preschool-aged children living in low-income families is considered. Latent class (or referred to as *profile*) analysis (LCA) seeks to sort individuals into similar groups (latent classes) with respect to a set of observed or manifest continuous variables as measures of a single underlying (latent) categorical variable (Nylund, Asparouhov, & Muthén, 2007). LCA asserts that the observed variables are conditionally independent of one another given a particular latent categorical variable that accounts for relationships among the observed variables (Goodman, 2002). In addition, LCA allows for the estimation of two types of parameters: 1) the probability of a particular response for the observed variable

conditional on latent class membership; and 2) the probability of being in a specific latent class. For example, children are assigned a probability of being in a particular internal representation group, given his or her response pattern from five observed (or manifest) internal representation dimension variables. Children may have a higher probability of being in one class as compared to another class. The following equation (1) represents the probability *P* of being in class *c* given a particular response pattern:

Equation 1: **Multinomial Logistic Latent Class Model**

$$P\left(C_{ij}=c\right)=\frac{\exp(\alpha_{cj}+\beta_{cj}X_{ij})}{\sum_{c}\exp(\alpha_{cj}+\beta_{cj}X_{ij})}$$

where α_{cj} = random cluster level intercept, and $\beta_{cj}X_{ij}$ = differentiating effects for each latent class.

However, for research question 2 the data structure represents a nested or multilevel design in which children represent Level 1 of the hierarchy and families represent Level 2. This study demonstrates a non-parametric approach for assessing a multilevel latent class analysis, and also considers family level predictors of the internal representation typologies. The nonparametric approach demonstrates between-cluster structure in terms of latent classes at Level 2. In the nonparametric approach, the specification of the random means is different than in the parametric approach. Bijmolt, Paas, and Vermunt (2004) describe these random means as varying across the Level 2. Multilevel modeling emphasizes the variation of the parameters in Level 1 across the units in Level 2. Therefore, that variation is what defines the between-level latent classes

in a multilevel latent class analysis. Particularly, the random means from the Level 1 latent class solution define the Level 2 latent classes. The equation (2) for the Level 1 latent class solution is defined as follows:

Equation 2: **Nonparametric Multilevel Mixture Model**

$$P(C_{ij} = t \mid CB_j = m) = \frac{\exp(\gamma_{tm})}{\sum_{r=1}^{T} \exp(\gamma_{rm})}$$

where CB_j represents group *j*'s score on the latent class variable that defines the discrete mixture distribution and *m* represents a specific mixture.

The main findings of this study included two separate analyses. First, the internal representation latent class analysis is a single level LCA with continuous (*y*) internal representation indicators as outcomes of children's internal representation latent classes (*C*) on child characteristic variables (child age, child gender, child race, and child temperament variables) (*x*) (*refer to appendix C for Mplus input*). Second, two-level internal representation and parenting latent class analysis has two sets of latent classes, children's internal representation types and parenting types. Parenting types (*CB*), defined by parenting behaviors, maternal psychosocial stressors, and home environment (*yb*) are directly influenced by family characteristic variables (maternal cumulative demographic risk and EHS program status variables) (*w*). Children's internal representation types (*CW*), defined by five internal representations dimensions (*yw*) are directly influenced by child characteristics (*x*). The intercepts of internal representation

dependent variables (*yw*) of *CW* are allowed to vary, rather than fixed or constant across respondents and classes (*refer to appendix D for Mplus input*).

Determining model fit for latent class analyses. Similar to other multivariate latent modeling, latent class models consist of multiple statistical indictors of model fit. An iterative set of models are tested (Nylund, Asparouhov, & Muthén, 2007; Jung & Wickrama, 2008) in which the first model is a two group model, and then subsequent models are fit to the data, and model fit is assessed using a *k*-1 hypothesis test (likelihood difference test- Lo-Mendell-Rubin, 2001), the Lo-Mendell-Rubin (*LMR*) (Lo, Mendel & Rubin, 2001; Lo, 2005), along with negative loglikelihood, Akaike Information Criteria (*AIC*), and Bayesian Information Criteria (*BIC*; Schwartz, 1978). A determinant of class number involves fitting a sequence of models with increasingly more classes until reaching some criteria for stopping (Bauer & Curran, 2004). Simulation studies suggest that the *BIC* provides the most reliable indicators of true model fit (Nylund, Asparouhov, & Muthén, 2007). Model fit testing then proceeds iteratively with *k*+1 latent classes until the model does not have significant *LMR*, at which point the statistically significant *k*-1 model with the most latent classes and low *BIC* and *AIC* is interpreted (Nylund, Asparouhov, & Muthén, 2007; Jung & Wickrama, 2008). For example, a non-significant *LMR* (*p* value) for a four-class model indicates that the three-class model fits better than the four-class model. Entropy is also used as an indicator of how well the model classifies people, where values closer to or exactly 1 indicate better classification. The entropy should always be examined in conjunction with other model fit indices.

LCA allows for prediction of the probability of membership in profiles to be estimated in the same model as the estimation of the profiles. This flexibility yields the

possibility that there is uncertainty in class membership and allows one to predict the probability of membership in a group while estimating the classes simultaneously. Unlike traditional methods, such as cluster analysis, LCA does not force cases into groups, eliminating the risk of classification errors.

Summary. After the results of the LCA yield the most likely class membership for each child's internal representation, these class assignments are used as grouping variables to investigate the differences between each subgroup. Analysis of whether or not responses to internal representation indicators are statistically different across each class using one-way analysis of variance for continuous variables. Post hoc tests, Tukey b and *z*-test with Bonferroni adjustments to *p*-values, are utilized to identify the homogenous subsets of means or frequencies across classes so that each significantly different group response is identified with its own subscript letter in ascending order (Schüz et al., 2009). Post hoc tests demonstrate the significant secure, resistant, anxious, and dysregulated representations for each child internal representation indicator. In addition, the mean responses are incorporated into a line plot to visualize the differences between the classes. For both models, odds ratios are reported for the influence of child and family characteristic variables on each internal representation and parenting types. Finally, the influence of these internal representation typologies on children's externalizing behavior problems and academic outcomes were tested.

Table 12: Descriptive Statistics of Covariate, Predictor, and Outcome Variables for Final Sample

Variables	Mean	*SD*	Range
Parenting Behavior[1]			
Dyadic Mutuality/ Connectedness	4.47	1.21	1.00-7.00
Parent Supportiveness	4.05	.96	1.33-7.00
Parent Intrusiveness	5.42	1.21	1.00-7.00
Maternal Psychosocial Stressors			
Maternal Depression	12.57	9.74	0-56.00
Maternal Stress	26.37	9.05	12.00-58.00
Family Conflict	1.70	.54	1.00-4.00
Home Environment			
Social-Emotional Environment	26.19	3.20	12.40-31.00
Children's Behavior Problems			
Externalizing Behavior Scale	7.92	7.89	0-42.00
- Delinquency Subscale	2.25	2.57	0-15.94
- Aggressive Behaviors Subscale	5.67	5.73	0-30.00
Children's Academic Outcomes			
Math Ability: Raw Scores	9.17	4.55	0-18.00
Reading (Language and Literacy): IRT scores	131.15	25.44	33.83-180.56
Covariates			
Child Age	14.84	1.30	12.38-22.24
Child Temperament	2.93	.95	1.00-5.00
Maternal Cumulative Demographic Risk	2.61	1.16	0-5.00

Note. Descriptive statistics included the final sample (n = 575). Child race, child gender, and EHS program status, and physical environment variables were categorical (and binary) variables, and not included in table. Maternal psychosocial stressors and parenting behavior were measured at 14 month.

[1] Parenting behaviors: higher mean scores = positive parenting (scores recoded to reflect).

Table 13: Descriptive Statistics of Children's Internal Representation Dimension Subcodes

Variables	Mean	*SD*	Range (min-max)
Interpersonal Conflict Dimension	.062	.044	0-.24
1) Competition	.003	.019	0-.13
2) Rivalry/Jealousy	.003	.019	0-.25
3) Exclusion of Others	.154	.168	0-1.00
4) Active Refusal of Empathy	.023	.065	0-.63
5) Verbal Conflict	.034	.077	0-.63
6) Non-Compliance	.027	.062	0-.38
7) Average Shame	.047	.071	0-.38
8) Average Blame	.038	.057	0-.29
9) Teasing/Taunting	.015	.051	0-.50
10) Verbal Punishment	.243	.203	0-.88
11) Physical Punishment	.063	.105	0-.63
12) Dishonesty	.090	.117	0-.63
Empathy Affiliation Dimension	.210	.094	0-.53
1) Sharing	.021	.054	0-.29
2) Empathy/Help/Reassurance	.292	.188	0-.88
3) Affiliation	.372	.217	0-1.00
4) Affection	.104	.133	0-.63
5) Positive Parental Warmth	.189	.130	0-.58
6) Reparation/Guilt	.285	.152	0-.75
Dysregulated Aggression Dimension	.103	.073	0-.40
1) Aggression	.043	.058	0-.32
2) Personal Injury	.158	.175	0-.83
3) Danger	.084	.089	0-.44
4) Destruction of Objects	.052	.102	0-.75
5) Escalation of Interpersonal Conflict	.089	.123	0-.75
6) Child Power	.052	.061	0-.31
7) Negative Parent	.044	.073	0-.48
8) Parental Harsh Discipline	.134	.103	0-.46
9) Final Content: Negative Ending	.284	.233	0-1.00
Avoidance Strategies Dimension	.173	.076	.01-.42
1) Exclusion of Self	.147	.158	0-1.00
2) Repetition	.067	.078	0-.44
3) Denial	.357	.170	0-.94
4) Passive Refusal of Empathy	.132	.129	0-.75
5) Sudden Sleep Onset	.102	.143	0-.83
6) Mechanical Sensorimotor Play	.384	.304	0-1.00
7) Family Disruption	.023	.058	0-.43

Table 13 (cont'd)

Dissociation Dimension	.061	.064	0-.35
1) Intrusion of Traumatic Material	.084	.146	0-.86
2) Fantasy Proneness	.053	.118	0-.86
3) Spacing Out	.032	.111	0-1.00
4) Boundary Confusion	.064	.118	0-1.00
5) Fleeing Painful Subject	.090	.151	0-.88
6) Identifying with Aggressor	.040	.095	0-.50
Dysregulated Performance Dimension	.133	.090	0-.52
1) Controlling the Examiner	.218	.267	0-1.00
2) Intensity of Anger	.221	.192	0-.94
3) Intensity of Distress	.108	.129	0-.81
4) Intensity of Sadness	.110	.117	0-.57
5) Anxiety Behavior	.097	.099	0-.50
6) Emotion Incoherent to Positive	.085	.129	0-.67
7) Emotion Incoherent to Negative	.089	.126	0-.57

Note. n=575. Scales range from 0 to 1.

Table 14: Correlation Matrix of Study Variables for Final Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	---															
2	**.42**	---														
3	**.35**	**.32**	---													
4	**-.20**	**-.28**	**-.15**	---												
5	**-.11**	**-.13**	-.01	**.32**	---											
6	**-.13**	**-.13**	-.05	**.48**	**.71**	---										
7	**-.13**	**-.11**	**-.11**	**.17**	**.48**	**.45**	---									
8	.06	-.00	-.02	.02	-.01	-.00	-.06	---								
9	-.04	-.06	.02	.07	**.10**	.07	-.00	**.27**	---							
10	.04	.00	-.04	.01	**-.14**	**-.08**	-.08	**.42**	**-.20**	---						
11	.01	-.03	-.03	**-.10**	**-.20**	**-.18**	-.05	**.23**	-.04	**.42**	---					
12	.07	-.01	.06	.02	**-.18**	**-.15**	-.07	**.19**	**-.11**	**.58**	**.46**	---				
13	**.10**	-.02	.02	-.02	**-.14**	**-.15**	**-.12**	**.48**	**.13**	**.57**	**.52**	**.60**	---			
14	**.24**	**.14**	**.19**	.02	-.08	-.05	-.09	-.01	**-.14**	**.16**	.09	**.19**	**.14**	---		
15	-.07	-.07	**-.11**	**.15**	.10	**.15**	.09	.02	.05	-.02	**-.19**	**-.12**	**-.17**	**-.16**	---	
16	-.06	-.07	-.10	**.17**	**.17**	**.20**	.08	**.16**	**.17**	-.06	**-.20**	**-.13**	-.09	**-.20**	**.65**	---

Note. 1=maternal depression at 14 month; 2=maternal stress at 14 month; 3=family conflict at 14 month; 4=social-emotional environment at 14 month; 5=dyadic mutuality/connectedness at 14 month; 6=parent supportiveness at 14 month; 7=parent intrusiveness at 14 month; 8=interpersonal conflict at TPK; 9=empathy affiliation at TPK; 10=dysregulated aggression at TPK; 11=avoidance strategies at TPK; 12=dissociation at TPK; 13=dysregulated performance at TPK; 14=externalizing behavior scale at G5; 15=math scores at G5; 16=reading scores at G5. $p<.05$=bolded.

CHAPTER 4
RESULTS

This chapter is divided into three main sections which are structured to detail the findings from each of the sequential latent class analyses to answer the main research questions. Each typology or class resulting from the latent class analysis has been named based on the characteristics that distinguish that class from the other classes. Following the establishment of typologies in the models, class memberships were used as predictors of children's externalizing behavior problems and academic outcomes in middle childhood. Furthermore, post hoc analyses were used to determine between-class differences across internal representation and parenting indicators.

Models reflected a longitudinal approach in which predictor and outcome variables were measured at different data waves across the study. Parenting indicator variables included parenting behaviors (dyadic mutuality/connectedness, parental supportiveness, and parental intrusiveness[3]), maternal psychosocial stressors (maternal depression, maternal stress, and family conflict), and home environment (physical environment and social-emotional environment) and were measured in toddlerhood at 14 months. According to van IJzendoorn and Bakermans-Kranenburg (1997), early toddlerhood reflects a time when children begin to rely on the psychological availability of the attachment figure. Thus, early toddlerhood may be a vulnerable time for children to depend on the emotional support of parent and remain relatively stable across toddlerhood. Children's internal representations were measured at TPK, when children were transitioning from preschool to kindergarten at approximately 5 years of age. Child

[3] Parental intrusiveness scores were reverse coded to reflect higher scores as less intrusiveness.

externalizing behavior problems and academic outcomes were measured in middle childhood at 5th Grade (G5) when child was approximately 10 years of age.

In addition, child and family characteristic covariates were included as controls in the models with child characteristics controlling for child internal representation typologies and family characteristics controlling for parenting typologies. Child characteristics were child age, child gender, child temperament, and child race. The child race variable was dummy coded (1=yes; 0=no) into three individual dichotomous variables, African American ethnoracial group, White ethnoracial group, and Hispanic ethnoracial group. Family characteristics were EHS program status (1=EHS program group; 0=comparison group) and maternal cumulative demographic risk variables. Maternal cumulative demographic risk variable was a composite of the following five binary variables: low education (mothers who did not complete high school); single parenthood; adolescent parenthood; unemployment; and welfare status.

Internal Representation Latent Class Analysis

The results of this internal representation latent class analysis answers the following research question: *What are the different typologies of internal representations of attachment relationships articulated in preschoolers' narratives in a low-income population?* This model uses six indicators of children's internal representation of attachment relationships to define different types of internal representations while controlling for child characteristic variables (*refer to Figure 2 in methods*). The six indicators of children's internal representations are interpersonal conflict, empathy affiliation, dysregulated aggression, avoidance strategies, dissociation, and dysregulated

performance. Lastly, children's internal representation types were regressed on children's later externalizing behavior and cognitive development.

Determination of the number of latent classes. An interactive set of LCA models were tested following the recommendations of the mixture modeling literature (Jung & Wickrama, 2008). The first step, which involved comparing models with two through four class solutions, identified a four-class solution as the best fitting model, $p <$ .05. The four-class solution had the best in terms of model fit by log likelihood based estimates and interpretability of the patterns of latent classes (BIC = -.9242.17). Table 15 shows the model selection (BIC and other likelihood ratio estimates) parameters for the four-class solution and competing models. The four-class solution model yielded Entropy = 0.85 based on posterior class membership probabilities to measure how well the latent classes are separated.

Table 15: Internal Representation Latent Class Analysis: Indicators of Fit for the Models

Internal Representation Classes	*Entropy*	*AIC*	*BIC*	*Loglikelihood (LL)*	*Lo-Mendell-Rubin Test for k-1 classes*
Two-Class	.84	-8689.39	-8602.30	4364.69	691.11*
Three-Class	.84	-9038.05	-8894.36	4552.02	370.18
Four-Class	**.85**	**-9041.87**	**-9242.17**	**4667.09**	**227.37***

Note. BIC = Bayesian Information Criteria; AIC = Akaike Information Criteria. The four-class solution revealed the most meaningful and distinct subgroups.
* $p < .05$

Latent class characteristics. The four-class solution model, which included six indicators of the latent classes and six child characteristic covariates, revealed distinct and interpretable classes (see Table 16 for most likely class membership). The probability of the most likely latent class membership ranged from 89% to 93%, which demonstrates appropriate classification (see Table 17). Therefore, approximately 90% of children were assigned to their most likely latent class. Overall, the LCA indicated significant differences in the patterns of how children's narratives reflected variation among their internal representations of attachment relationships.

Table 16: Internal Representation Latent Class Analysis: Most Likely Class Membership

Internal Representation Class		*Class Count*	
1	(*Secure Representation*)	296	(50.0%)
2	(*Anxious Representation*)	54	(9.4%)
3	(*Resistant Representation*)	106	(19.3%)
4	(*Dysregulated Representation*)	119	(21.3%)

Table 17: Internal Representation Latent Class Analysis: Class Probabilities for Most Likely Latent Class Membership (row) by Latent Class (column)

Latent Class	1 (S)	2 (A)	3 (R)	4 (D)
1 (S)	.93	.00	.04	.04
2 (A)	.00	.92	.02	.06
3 (R)	.06	.01	.91	.02
4 (D)	.05	.03	.03	.89

Note. 1(S) = *Secure Representation;* 2(A) = *Anxious Representation*; 3(R) = *Resistant Representation*; 4(D) = *Dysregulated Representation*.

As seen in Figure 5, there were distinguishable indicator response patterns for each of the latent classes. The odds ratios presented in Table 18 describe the likelihood of a child with particular characteristics to be in either the *Secure*, *Anxious*, or *Resistant* representation groups in comparison to the *Dysregulated* representation group. Children in the *Dysregulated* representation group were slightly older than children in the *Secure* and *Resistant* representation groups. In addition, children in the *Secure* and *Resistant* representation groups had higher percentages of girls as compared to the *Dysregulated* representation group. Class characterization based on the aforementioned child characteristics (see Table 18) and internal representation dimension indicator variables (see Figure 5) are described below. Please see the following section for detailed descriptions of the child characteristics represented in each class and the internal representation dimension variables within each class.

Class 1 (secure representation; 50.0% (n=296) of the sample). This represented a subgroup of children consisting of 54.7% girls and 45.3% boys with a mean age of 14.8 months at enrollment into the EHSREP (see Table 18). A majority of children in this subgroup were identified as Hispanic (40.2%) with only 31.1% White and 20.6% African American. They exhibited low scores of interpersonal conflict, dysregulated aggression, avoidance strategies, and dissociation representations in the narratives (see Figure 5). In addition, secure children had low levels of emotional incoherence to positive and negative emotions, and demonstrated low levels of negative affect in the narratives. As expected, this subgroup showed a moderately high probability of empathetic representations in the narratives.

Class 2 (anxious representation; 9.4% (n=54) of the sample). This latent class consisted of mostly children who were identified as African American (40.7%), with a similar mean age of 14.8 months as compared to the previous class (see Table 18). Unlike the previous class, however, this class had a remarkably high percentage of boys (64.8%). Furthermore, these children exhibited a pattern of slightly higher interpersonal conflict, dysregulated aggression, avoidance strategies, and dissociation representation in the narratives (see Figure 5). While this group demonstrated moderately high empathetic representations, they also had the highest probability of emotional incoherent and negative affect in the narratives. This mixed pattern will be further examined in the following section to demonstrate how the effects of extremely high incoherent narratives are problematic to children's higher levels of empathic representations.

Class 3 (resistant representation; 19.3% (n=106) of the sample). Class 3 was heavily represented by girls (75.5%) who were identified as Hispanic (36.8%) and White

(30.2%), with a similar mean age of 14.6 months to the other classes (see Table 18). These children tended to moderately high incoherence to emotions, as well as avoidance strategies (see Figure 5). With encouragement these children demonstrate high empathetic relations. Thus, their mixed pattern of high empathy and moderately high emotional incoherence and interpersonal conflict (higher probability than Class 1 and Class 4 but lower than Class 2) demonstrates complexity in their representations that is further discussed.

Class 4 (dysregulated representation; 21.3% (n=119) of the sample). The final class represented a subgroup of children with a slightly higher mean age of 15.2 month compared to the other three classes, yet a similar representation of children who were identified as White (35.3%) and Hispanic (38.7%) (see Table 18). Notably, the gender composition consisted of mostly boys (72.3%). This subgroup tended to demonstrate low empathetic representations, accompanied by moderately high dysregulated aggression, avoidance strategies, and dissociation representations (lower that Class 2 but higher than Class 1 and Class 3) (see Figure 5). Furthermore, the probability of emotional incoherence and negative affect was mild to moderately high (higher than Class 1 but lower than Class 2 and Class 3). This subgroup represents preschool-aged children who evidenced a high probability of controlling and anxious behavior patterns in the narratives.

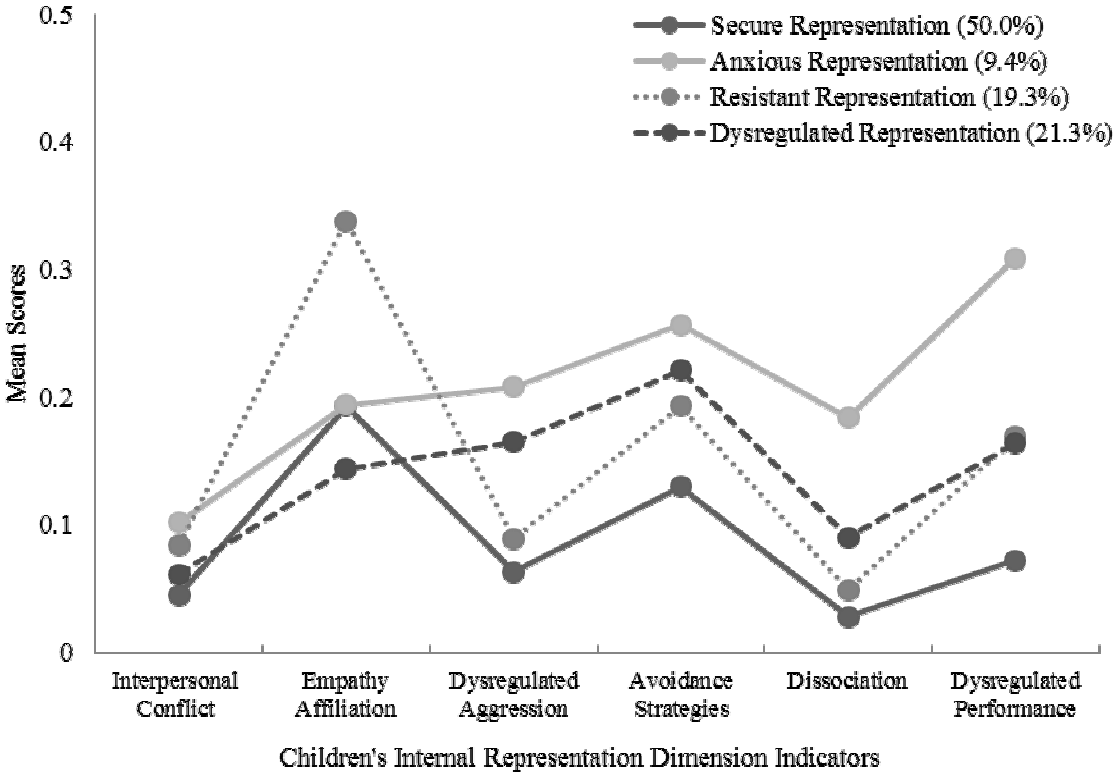


Figure 5: **Line Graph of Internal Representation Typology Classifications.**

Table 18: Internal Representation Latent Class Analysis: Means and Odds Ratios for Child Characteristics with Dysregulated Representation as the Reference Group

	Children's Internal Representation Typologies							
	Secure (50.0%)		Anxious (9.4%)		Resistant (19.3%)		Dysregulated (21.3%)	
Variable	*Mean (or n)*	*Odds Ratio*	*Mean (or n)*	*Odds Ratio*	*Mean (or n)*	*Odds Ratio*	*Mean (or n)*	*Odds Ratio*
Child Characteristics								
Child Age (months)	14.80	.82*	14.86	.90	14.56	.72*	15.19	---
Child Gender		3.31***		1.35		8.36***		---
Boys	*n*=134		*n*=35		*n*=26		*n*=86	
Girls	*n*=162		*n*=19		*n*=80		*n*=33	
Child Race								
African American	*n*=61	.80	*n*=22	1.35	*n*=29	1.25	*n*=25	---
White	*n*=92	.72	*n*=17	.66	*n*=32	.98	*n*=42	---
Hispanic	*n*=119	.88	*n*=11	.38	*n*=39	1.05	*n*=46	---
Child Temperament	2.95	.98	2.71	.73	2.97	1.01	3.00	---

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

Cross-class comparisons. After identifying the four distinct classes, difference tests were used to compare across the groups with respect to: (1) interpersonal conflict, (2) empathy affiliation, (3) dysregulated aggression, (4) avoidance strategies, (5) dissociation, and (6) dyregulated performance. Findings are described below. For further details on the internal representation dimension variables, including child

characteristic covariates, and significance test results, please see Table 19 for homogeneous subsets of dimension variables (*refer to appendix E for difference tests of dimension subcodes*).

Interpersonal conflict representations. The classes were compared on use of each of the following types of interpersonal (or moral) conflict: (1) competition, (2) jealousy, (3) exclusion of others, (4) active refusal of empathy, (5) verbal conflict, (6) non-compliance, (7) shame, (8) blame, (9) teasing, (10) verbal punishment, (11) physical punishment, and (12) dishonesty. The four internal representation latent classes significantly differed across the total interpersonal conflict dimension variable (F = 48.33, $p < .001$) (see Table 19). Specifically, the *Secure* representation class had a significantly lower interpersonal conflict dimension mean score (M = .05, SD = .03) than the other three classes (*see appendix E*). Children in the *Secure* representation class also had significantly lower refusal of empathy, verbal conflict, non-compliance, shame, teasing, verbal and physical punishment, and dishonesty representation subcodes compared to children in the *Anxious* representation class. In addition, *Secure* children had significantly lower exclusion of others, refusal of empathy, shame, verbal punishment, and dishonesty representation subcode mean scores.

Empathy affiliation representations. The latent classes were also compared on their representation of empathy, which was comprised from the following subcodes: (1) sharing, (2) empathy/helping, (3) affiliation, (4) affection, (5) positive parental warmth, and (6) reparation/guilt. There were significant differences regarding the empathy affiliation dimension variable between the four classes (F = 185.76, $p < .001$) (see Table 19). *Secure* children demonstrated higher positive parental representation than

Dysregulated children, and also higher reparation and guilt than *Anxious* and *Dysregulated* children (*see appendix E*).

Dysregulated aggression representations. Classes were compared on their dysregulated aggression representation. This dimension included the following representation subcodes (1) aggression, (2) personal injury, (3) danger, (4) destruction of objects, (5) escalation of interpersonal conflict, (6) child power, (7) negative parent, (8) harsh parental discipline, and (9) negative story ending. The four classes significantly differed on their representations of dysregulated aggression ($F = 208.62$, $p < .001$) (see Table 19). Children in the *Secure* representation class ($M = .06$, $SD = .04$) demonstrated significantly less overall dysregulated aggression than children in the *Anxious* ($M = .21$, $SD = .07$), *Resistant* ($M = .09$, $SD = .05$), and *Dysregulated* ($M = .17$, $SD = .06$) representation classes. The *secure* class also had significantly lower scores on all dysregulated aggression subcodes as compared to the *Anxious* class, and *Dysregulated* class as well, with the exception of representations of harsh parental discipline (*see appendix E*).

Avoidance strategies and dissociation representations. Classes were compared in terms of their avoidant and dissociation representations. These two dimensions significantly varied across class membership (avoidant strategies: $F = 120.82$, $p < .001$; dissociation: $F = 227.16$, $p < .001$) (see Table 19). The avoidance strategies dimension included the following subcodes: (1) exclusion of self, (2) repetition, (3) denial, (4) passive refusal of empathy, (5) sudden sleep onset, (6) mechanical sensorimotor play, and (7) family disruption. In addition, the dissociation dimension consisted of the following subcodes: (1) intrusion of traumatic material, (2) fantasy proneness, (3) spacing out, (4)

boundary confusion, (5) fleeing a painful subject, and (6) identifying with the aggressor. Children in the *Secure* representation class had significantly lower scores across the majority all subcodes between these two dimension than the other three classes (*see appendix E*).

Dysregulated performance representations. Cross-class comparisons also included children's performance in the narrative. The four classes significantly differed across the dysregulated performance dimension ($F = 390.58$, $p < .001$) (see Table 19). The *Secure* representation class had a significantly lower mean score than the other three classes. Representation subcodes included (1) controlling the examiner, (2) intensity of anger, (3) intensity of distress, (4) intensity of sadness, (5) anxiety behaviors, (6) emotion incoherent to positive, and (7) emotion incoherent to negative. Children in the *Secure* representation class also had significantly lower scores across all dysregulated performance subcodes compared to the other three classes (*see appendix E*).

Table 19: Internal Representation Latent Class Analysis: Means, Standard Deviations, and Difference Tests of Children's Internal Representation Dimensions Disaggregated by Latent Class

	Internal Representation Typologies					
Variable	*Secure (S) (50.0%)*	*Anxious (A) (9.4%)*	*Resistant (R) (19.3%)*	*Dysregulated (D) (21.3%)*	*F or χ^2*	*Post hoc*
Child Characteristics						
Child Age (months)	14.80_{ab} (.08)	14.86_{ab} (.18)	14.56_{a} (.13)	15.19_{b} (.12)	4.79**	D > S, R
Child Gender	$.55_{b}$ (.03)	$.35_{a}$ (.07)	$.76_{c}$ (.05)	$.28_{a}$ (.04)	58.24***	S > A, D; R > S; R > A, D
Child Race						
African American	$.21_{a}$ (.03)	$.41_{b}$ (.06)	$.27_{ab}$ (.04)	$.21_{a}$ (.04)	11.45**	A > S, D
White	$.31_{a}$ (.03)	$.32_{a}$ (.06)	$.30_{a}$ (.05)	$.35_{a}$ (.04)	.87	*ns*
Hispanic	$.40_{b}$ (.03)	$.20_{a}$ (.07)	$.37_{ab}$ (.05)	$.39_{b}$ (.04)	7.78*	S > A
Child Temperament	2.95_{a} (.05)	2.71_{a} (.12)	2.97_{a} (.09)	3.00_{a} (.09)	1.49	*ns*
Internal Representation Indicators						
Interpersonal Conflict	$.05_{a}$ (.00)	$.10_{d}$ (.01)	$.09_{c}$ (.00)	$.06_{b}$ (.00)	48.33***	A > S; A > R; A > D; R > S; R > D; D > S
Empathy Affiliation	$.19_{b}$ (.00)	$.19_{b}$ (.01)	$.34_{c}$ (.01)	$.14_{a}$ (.01)	185.76***	S, A > D; R > S, A; R > D
Dysregulated Aggression	$.06_{a}$ (.00)	$.21_{d}$ (.01)	$.09_{b}$ (.01)	$.17_{c}$ (.01)	208.62***	A > S; A > R; A > D; R > S; D > S; D > R
Avoidance Strategies	$.13_{a}$ (.00)	$.26_{d}$ (.01)	$.20_{b}$ (.01)	$.22_{c}$ (.01)	120.82***	A > S; A > R; A > D; R > S; D > S; D > R
Dissociation	$.03_{a}$ (.00)	$.19_{d}$ (.00)	$.05_{b}$ (.00)	$.09_{c}$ (.00)	227.16***	A > S; A > R; A > D; R > S; D > S; D > R
Dysregulated Performance	$.07_{a}$ (.00)	$.31_{c}$ (.01)	$.17_{b}$ (.01)	$.17_{b}$ (.01)	390.58***	A > S; A > R, D; R, D > S

Note. Standard errors are in parentheses. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_{a}$ = lowest mean scores. Post hoc comparisons used Tukey's HSD to control for alpha level, ''>'' refers to significantly larger whereas '','' refers to not significantly different at alpha = .05 level. $*p < .05$, $**p < .01$, $***p < .001$

Multilevel Internal Representation and Parenting Latent Class Analysis

The results of the multilevel (two-level) internal representation and parenting latent class analysis answers the research question: *Does early parenting predict the different typologies of internal representations of attachment relationships articulated in preschoolers' narratives in a low-income population?* This model utilized the nonparametric approach in which a Level 2 latent class model was included based on the random means from the Level 1 latent class solution (*refer to Figure 3 in methods*). The results of this model yields separate Level 1 and Level 2 latent classes. The probability of a child being in a specific Level 1 latent class differs across the Level 2 latent classes (i.e., child within families). In addition, this model allowed for the inclusion of covariates that might predict latent class membership at both levels. The purpose of this final multilevel LCA model is to better understand the pattern distribution of children's internal representation types across the parenting types. The identification of parenting types are based on the types of children (based on internal representations) they contain.

Internal representation adjusted class membership. The previous children's internal representation LCA model set the number of internal representation classes *a priori* for this final multilevel analysis since the LMR calculation cannot be performed (Muthén, 2012). While the specification of the same number of classes does allow for a comparison of results across the analyses in this study, there are not fit indices that provide evidence to confirm the number of internal representation and parenting classes with this model specification. The consistency between the prior models and this final analysis allows for a better understanding of the ways in which the simultaneous inclusion of an internal representation typology at the child level and a parenting

typology at the family level shift the interpretations of each class and their influence on later externalizing behavior problems and academic outcomes. The Entropy for this model was high, 0.87 (see Table 20).

Table 20: Multilevel Latent Class Analysis: Indicators of Fit for the Model

Parenting Classes	*Internal Representation Classes*	*Entropy*	*AIC*	*BIC*	*-Loglikelihood (-LL)*
Three-Class	Four-Class	.87	8924.10	9294.22	4377.05

Note. BIC = Bayesian Information Criteria; AIC = Akaike Information Criteria.

Latent class characteristics. The interpretation of the four adjusted internal representation classes remained relatively the same, with the inclusion of the internal representation and parenting interaction. As shown in Table 21, the adjusted internal representation typologies differ slightly from the previous internal representation latent classes (*refer to class count in table 16*). The distributions of membership across children's internal representation classes were, *Dysregulated* (20%)*, Secure* (52%)*, Resistant* (19%)*,* and *Anxious* (9%) representation types (see Table 21). As for the parenting types, the three-class solution had the best variability for pattern interpretation. Consistent with Brophy-Herb et al.'s (2013) typologies of parenting, the three parenting types were *Competent* parenting (40.9%), *Controlled* parenting (49.7%), and *Distressed* parenting (9.4%) (see Table 21). While the EHS program status was not overrepresented between the parenting groups, parents with less maternal cumulative demographic risk

were more likely in the *Competent* parenting typology than in the *Distressed* parenting typology (B = -.38, p = .008), according to the logistic regression results.

Table 21: Multilevel Latent Class Analysis: Most Likely Class Membership

Latent Class Variable	*Class*		*Class Count*	
Parenting Classes	1	*(Competent)*	235	(40.9%)
	2	*(Controlled)*	286	(49.7%)
	3	*(Distressed)*	54	(9.4%)
Adjusted Internal Representation Classes	1	*(Dysregulated Representation)*	117	(20%)
	2	*(Secure Representation)*	298	(52%)
	3	*(Resistant Representation)*	108	(19%)
	4	*(Anxious Representation)*	52	(9%)

Unique to this multilevel LCA model, the membership of adjusted internal representation types in parenting types is provided. There are twelve possible combinations, four types of child internal representations in a family with one of the three types of parenting. Each of these twelve class memberships, internal representation types with parenting types, is called *the latent class patterns of membership*. Table 22 summarizes the children's adjusted internal representation typologies in parenting typologies. The *Competent* and *Controlled* parenting classes have similar numbers of *Secure* (.7% difference) and *Resistant* (1.6% difference) children. However, *Controlled*

parents have higher numbers of *Dysregulated* (3.1% difference) and *Anxious* (3.3% difference) children compared to *Competent* parents.

Furthermore, the overall purpose of this internal representation and parenting latent class analysis is to better understand the differences across particular child internal representation types in a family with a particular parenting type, or the membership pattern. The class probabilities are presented for each of the twelve combinations of internal representation and parenting types (see Table 23). The probability of the assigned class membership as the most likely membership ranged from 80% to 94%. This demonstrates the likelihood that each internal representation in each membership pattern was appropriately classified.

When comparing internal representation types from the previous internal-representation-only model to internal representation types from the internal-representation- and-parenting model, 98.6% of children remained in the same group of internal representations. The inclusion of the random error in the multilevel model, which allowed the parenting types to influence internal representation types, may have contributed to this slight change in membership across groups. The 1.4% difference in internal representation class membership does not exceed a 95% confidence interval for a difference possibly due to random error. Therefore, no substantial change occurred in the internal representation types. Cross-class comparisons of the adjusted internal representation typologies and parenting typologies with internal representation and parenting indicators are discussed next.

Table 22: Multilevel Latent Class Analysis: Most Likely Class Membership by Pattern

Parenting Class	*Adjusted Internal Representation Class*		*Class Count*	
1 *(Competent)*	1	*(Dysregulated Representation)*	46	(8.0%)
	2	*(Secure Representation)*	134	(23.3%)
	3	*(Resistant Representation)*	44	(7.8%)
	4	*(Anxious Representation)*	11	(1.9%)
2 *(Controlled)*	1	*(Dysregulated Representation)*	64	(11.1%)
	2	*(Secure Representation)*	138	(24.0%)
	3	*(Resistant Representation)*	54	(9.4%)
	4	*(Anxious Representation)*	30	(5.2%)
3 *(Distressed)*	1	*(Dysregulated Representation)*	7	(1.2%)
	2	*(Secure Representation)*	26	(4.5%)
	3	*(Resistant Representation)*	10	(1.7%)
	4	*(Anxious Representation)*	11	(1.9%)

Table 23: Multilevel Latent Class Analysis: Class Probabilities for Most Likely Latent Class Pattern (row) by Latent Class Pattern (column)

Between/Within Pattern	*1/1*	*1/2*	*1/3*	*1/4*	*2/1*	*2/2*	*2/3*	*2/4*	*3/1*	*3/2*	*3/3*	*3/4*
1/1	*.80*	*.05*	*.03*	*.05*	*.06*	*.00*	*.00*	*.01*	*.00*	*.00*	*.00*	*.00*
1/2	*.03*	*.88*	*.03*	*.00*	*.00*	*.06*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*
1/3	*.02*	*.06*	*.87*	*.01*	*.00*	*.00*	*.04*	*.00*	*.00*	*.00*	*.00*	*.00*
1/4	*.06*	*.00*	*.02*	*.88*	*.00*	*.00*	*.00*	*.04*	*.00*	*.00*	*.00*	*.00*
2/1	*.03*	*.00*	*.00*	*.00*	*.88*	*.04*	*.02*	*.02*	*.02*	*.00*	*.00*	*.00*
2/2	*.00*	*.05*	*.00*	*.00*	*.04*	*.86*	*.04*	*.00*	*.00*	*.01*	*.00*	*.00*
2/3	*.00*	*.00*	*.01*	*.00*	*.02*	*.05*	*.91*	*.02*	*.00*	*.00*	*.00*	*.00*
2/4	*.00*	*.00*	*.00*	*.06*	*.05*	*.00*	*.01*	*.86*	*.00*	*.00*	*.00*	*.01*
3/1	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.91*	*.07*	*.02*	*.00*
3/2	*.00*	*.00*	*.00*	*.00*	*.00*	*.01*	*.00*	*.00*	*.04*	*.94*	*.01*	*.00*
3/3	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.01*	*.00*	*.07*	*.10*	*.81*	*.00*
3/4	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.05*	*.06*	*.00*	*.01*	*.88*

Note. 1/1 = *Dysregulated* child representations with *Competent* parenting; 1/2 = *Secure* child representations with *Competent* parenting; 1/3 = *Resistant* child representations with *Competent* parenting; 1/4 = *Anxious* child representations with *Competent* parenting; 2/1 = *Dysregulated* child representations with *Controlled* parenting; 2/2 = *Secure* child representations with *Controlled* parenting; 2/3 = *Resistant* child representations with *Controlled* parenting; 2/4 = *Anxious* child representations with *Controlled* parenting; 3/1 = *Dysregulated* child representations with *Distressed* parenting; 3/2 = *Secure* child representations with *Distressed* parenting; 3/3 = *Resistant* child representations with *Distressed* parenting; 3/4 = *Anxious* child representations with *Distressed* parenting.

Cross-class comparisons. Cross-class comparisons of adjusted internal representation types (see Table 24) and parenting types (see Table 25) included six internal representation indicators and eight parenting indicators. The six child internal representation indicators included interpersonal conflict, empathy affiliation, dyregulated aggression, avoidance strategies, dissociation, and dysregulated performance. *Please refer to appendix F for line graph of adjusted internal representation latent class characteristics and appendix G for subcodes of internal representation dimensions by adjusted internal representation typologies*. The three parenting dimensions consisted of

the following eight indicators: dyadic connectedness (parenting behavior dimension), parental supportiveness (parenting behavior dimension), parental intrusiveness (parenting behavior dimension), maternal depression (maternal psychosocial stressor dimension), maternal stress (maternal psychosocial stressor dimension), family conflict (maternal psychosocial stressor dimension), physical environment (home environment dimension), and social-emotional environment (home environment dimension). The following cross-class comparisons begin with the internal representation typologies and then concluding the section with the parenting typologies.

Cross-class comparisons of adjusted internal representation typologies. Cross-class comparisons of internal representation typologies were first examined. Child characteristics, internal representation and parenting indicator variables were disaggregated by children's adjusted internal representation latent class (see Table 24). *Resistant* children were younger in age ($F = 3.17$, $p = 03$) and consisted of more girls ($\chi^2 = 57.42$, $p < .001$) compared to the other classes. Class differences were not found for child temperament ($F = 1.88$, *ns*), however, *Resistant* children demonstrated more negative temperament style than children with *Secure, Anxious*, and *Dysregulated* representation typologies.

Similar to the previously discussed unadjusted internal representation typologies, the six internal representation indicators significantly differed across the adjusted internal representation typologies. *Secure* children demonstrated less interpersonal conflict ($F = 48.86$, $p < .001$), dysregulated aggression ($F = 210.37$, $p < .001$), avoidant strategies ($F = 115.74$, $p < .001$), dissociation ($F = 214.51$, $p < .001$), and dysregulated performance ($F = 388.15$, $p < .001$) than *Anxious, Resistant,* and *Dysregulated* children. While

Dysregulated children had less interpersonal conflict than *Resistant* children, the *Resistant* children displayed less dysregulated aggression, avoidant strategies, and dissociation in their narratives. No differences were found for dysregulated performance between *Dysregulated* and *Resistant* children. However, *Dysregulated* and *Resistant* children did differ from *Anxious* children on each of the previously mentioned internal representation indicators. Significant differences were found for empathy affiliation across internal representation typologies ($F = 194.37$, $p < .001$), with *Dysregulated* children demonstrating significantly less compared to the other classes. Finally, differences were found for dyadic mutuality/connectedness ($F = 7.61$, $p < .001$), parental supportiveness ($F = 6.69$, $p < .001$), and parental intrusiveness ($F = 2.40$, $p = .067$), parenting indicators across internal representation typologies. *Secure* children experienced the highest levels of dyadic mutuality/connectedness and parental supportiveness, and the least parental intrusiveness in early toddlerhood.

Cross-class comparisons of parenting typologies. Cross-class comparisons of the parenting types included internal representation and parenting indicators, as well as, family characteristics (see Table 25; *refer to appendix H for subcodes of internal representation dimensions by parenting typologies*). Family characteristics included maternal cumulative demographic risk and EHS program status covariate variables. The *Competent* parenting class had significantly less maternal demographic risks compared to the *Controlled* and *Distressed* parenting classes ($F = 21.92$, $p < .001$). No significant differences were found between parenting typologies for EHS program status. Results of the difference tests for internal representation and parenting indicators across parenting typologies are discussed next.

Competent parents had children who displayed less avoidant strategies ($F = 6.89$, $p < .001$) and dysregulated performance ($F = 2.46$, $p = .087$) in their story stem narratives compared to *Controlled* and *Distressed* parents. For parenting indicators, *Competent* parenting class had significantly lower maternal depressive symptoms ($F = 12.88$, $p < .001$) and maternal stress ($F = 26.67$, $p < .001$) than the other two classes. In addition, the *Competent* parenting class demonstrated significantly higher connectedness between the mother and child ($F = 46.52$, $p < .001$), parental supportiveness ($F = 97.62$, $p < .001$), and social-emotional environment of the home ($F = 964.95$, $p < .001$) compared to the other two classes. The *Competent* parenting class also showed significantly less parental intrusiveness behaviors during the interaction with the child than *Controlled* and *Distressed* parenting classes ($F = 22.49$, $p < .001$). While *Competent* and *Controlled* parenting classes reflected similar levels of lower family conflict ($F = 12.88$, $p < .001$) and higher quality of the physical environment ($F = 7.85$, $p = .02$), they significantly differed from the *Distressed* parenting class. *Controlled* parents also had significantly less maternal stress compared to *Distressed* parents, as well as, higher social-emotional environment of the home and parenting behaviors including dyadic mutuality/ connectedness and supportiveness.

Table 24: Multilevel Internal Representation and Parenting Latent Class Analysis: Means, Standard Deviations, and Difference Tests of Variables Disaggregated by Adjusted Internal Representation Latent Class

	Adjusted Internal Representation Typologies					
Variable	*Dysregulated (D) (20%)*	*Secure (S) (52%)*	*Resistant (R) (19%)*	*Anxious (A) (9%)*	*F or χ^2*	*Post hoc*
Child Characteristics						
Child Age (months)	15.10_{b} (.12)	14.83_{ab} (.08)	14.57_{a} (.12)	14.89_{ab} (.18)	3.17*	D > R
Child Gender	$.27_{a}$ (.04)	$.55_{b}$ (.03)	$.74_{c}$ (.05)	$.37_{a}$ (.07)	57.42***	S > D, A; R > D, A; R > S
Child Race						
African American	$.21_{a}$ (.04)	$.21_{a}$ (.02)	$.27_{ab}$ (.04)	$.42_{b}$ (.06)	12.57**	A > D, S
White	$.36_{a}$ (.04)	$.31_{a}$ (.03)	$.30_{a}$ (.05)	$.33_{a}$ (.07)	1.28	*ns*
Hispanic	$.38_{b}$ (.04)	$.41_{b}$ (.03)	$.38_{b}$ (.05)	$.17_{a}$ (.07)	10.29*	S > A
Child Temperament	2.99_{ab} (.08)	2.94_{ab} (.05)	3.00_{b} (.09)	2.67_{a} (.12)	1.88	*ns*
Internal Representation Indicators						
Interpersonal Conflict	$.06_{b}$ (.00)	$.05_{a}$ (.00)	$.09_{c}$ (.00)	$.10_{d}$ (.01)	48.86***	D > S; R > D; R > S; A > D; A > S; A > R
Empathy Affiliation	$.14_{a}$ (.01)	$.19_{b}$ (.00)	$.34_{c}$ (.01)	$.19_{b}$ (.01)	194.37***	S, A > D; R > D; R > S, A
Dysregulated Aggression	$.17_{c}$ (.01)	$.06_{a}$ (.00)	$.09_{b}$ (.01)	$.21_{d}$ (.01)	210.37***	D > S; D > R; R > S; A > D; D > S; D > R
Avoidance Strategies	$.22_{c}$ (.01)	$.13_{a}$ (.00)	$.20_{b}$ (.01)	$.26_{d}$ (.01)	115.74***	D > S; D > R; R > S; A > D; D > S; D > R

Table 24 (cont'd)

Dissociation	$.10_{c}$ (.00)	$.03_{a}$ (.00)	$.05_{b}$ (.00)	$.18_{d}$ (.01)	214.51***	D > S; D > R; R > S; A > D; D > S; D > R
Dysregulated Performance	$.17_{b}$ (.01)	$.07_{a}$ (.00)	$.17_{b}$ (.01)	$.31_{c}$ (.01)	388.15***	D, R > S; A > D, R; A > S
Parenting Indicators						
Maternal Depression	12.92_{a} (.83)	12.07_{a} (.52)	12.90_{a} (.87)	14.82_{a} (1.25)	1.49	*ns*
Maternal Stress	26.10_{a} (.78)	26.66_{a} (.49)	26.03_{a} (.81)	27.07_{a} (1.17)	.31	*ns*
Family Conflict	1.66_{a} (.04)	1.71_{a} (.03)	1.73_{a} (.05)	1.77_{a} (.06)	.76	*ns*
Physical Environment	$.52_{a}$ (.04)	$.47_{a}$ (.03)	$.49_{a}$ (.04)	$.47_{a}$ (.06)	.48	*ns*
Social-Emotional Environment	26.18_{a} (.26)	26.26_{a} (.17)	26.24_{a} (.27)	25.51_{a} (.39)	1.04	*ns*
Dyadic Connectedness	4.30_{ab} (.10)	4.61_{b} (.06)	4.55_{b} (.10)	3.94_{a} (.14)	7.61***	S > D, A; R > A
Parental Supportiveness	4.03_{b} (.08)	4.14_{b} (.05)	4.02_{b} (.08)	3.59_{a} (.12)	6.69***	D, S, R > A
Parental Intrusiveness[1]	5.26_{a} (.10)	5.48_{a} (.06)	5.47_{a} (.10)	5.16_{a} (.14)	2.40†	*ns*

Note. Standard errors are in parentheses. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_{a}$ = lowest mean scores. Post hoc comparisons used Tukey's HSD to control for alpha level, ''>'' refers to significantly larger whereas '','' refers to not significantly different at alpha = .05 level.

[1]Parental intrusiveness: higher scores = less intrusiveness.

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

Table 25: Multilevel Internal Representation and Parenting Latent Class Analysis: Means, Standard Deviations, and Difference Tests of Variables Disaggregated by Parenting Latent Class

	Parenting Typologies				
Variable	*Competent (B) (40.9%)*	*Controlled (C) (49.7%)*	*Distressed (D) (9.4%)*	*F or χ^2*	*Post hoc*
Internal Representation Indicators					
Interpersonal Conflict	$.06_a$ (.00)	$.06_a$ (.00)	$.06_a$ (.01)	.29	*ns*
Empathy Affiliation	$.22_a$ (.01)	$.21_a$ (.01)	$.20_a$ (.01)	1.42	*ns*
Dysregulated Aggression	$.10_a$ (.01)	$.10_a$ (.00)	$.11_a$ (.01)	.07	*ns*
Avoidance Strategies	$.16_a$ (.01)	$.18_{ab}$ (.00)	$.19_b$ (.01)	6.89***	C, D > B
Dissociation	$.06_a$ (.00)	$.06_a$ (.00)	$.06_a$ (.01)	.33	*ns*
Dysregulated Performance	$.12_a$ (.01)	$.14_a$ (.01)	$.15_a$ (.01)	2.46†	*ns*
Family Characteristics					
Maternal Demographic Risk	2.25_a (.07)	2.88_b (.06)	2.69_b (.15)	21.92***	C, D > B
EHS Program Status	$.55_a$ (.03)	$.54_a$ (.03)	$.57_a$ (.07)	.31	*ns*
Parenting Indicators					
Maternal Depression	10.57_a (.58)	13.68_b (.52)	16.22_b (1.20)	12.88***	C, D > B

Table 25 (cont'd)

Maternal Stress	23.83_a (.53)	27.65_b (.48)	31.62_c (1.10)	26.67***	C > B; D > B; D > C
Family Conflict	1.64_a (.03)	1.72_a (.03)	1.90_b (.06)	7.03***	D > B, C
Physical Environment	$.53_b$ (.03)	$.48_b$ (.03)	$.31_a$ (.06)	7.85**	B, C > D
Social-Emotional Environment	28.60_c (.09)	25.32_b (.08)	20.09_a (.19)	964.95***	B > C; B > D; C > D
Dyadic Connectedness	4.90_c (.06)	4.28_b (.06)	3.67_a (.13)	46.52***	B > C; B > D; C > D
Parental Supportiveness	4.52_c (.05)	3.81_b (.04)	3.24_a (.10)	97.62***	B > C; B > D; C > D
Parental Intrusiveness[1]	5.74_b (.07)	5.19_a (.06)	5.08_a (.14)	22.49***	B > C, D

Note. Standard errors are in parentheses. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_a$ = lowest mean scores. Post hoc comparisons used Tukey's HSD to control for alpha level, ''>'' refers to significantly larger whereas '','' refers to not significantly different at alpha = .05 level.

[1]Parental intrusiveness: higher scores = less intrusiveness.

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

Distribution of adjusted internal representation types across parenting types. In the multilevel LCA model, the relationship between parenting types and internal representation types was tested with a multilevel multinomial logistic regression of the between level, parenting, classes on the within level, internal representation, classes. Table 26 presents the odds ratios for each parenting class on each internal representation class. The multinomial logistic regression had two reference groups, *Distressed* parenting type for the predictor variable and *Anxious* representation type for the dependent variable.

Figure 6 depicts the relationship between parenting types and internal representation types by accounting for the proportion of each internal representation type in each parenting type. The three parenting typologies significantly differed across each internal representation typology ($\chi^2 = 17.44$, p .008). Specifically, *Competent* parents (57%) had significantly ($p < .05$) more *Secure* children than *Controlled* (48.3%) and *Distressed* (48.1%) parents. *Distressed* parents (20.4%) had significantly ($p < .05$) more *Anxious* children than *Competent* (4.7%) and *Controlled* (10.5%) parents.

Table 26: Multilevel Latent Class Analysis: Odds Ratios of Parenting Types Predicting Adjusted Internal Representation Types

Parenting Class	*Dysregulated Representation*	*Secure Representation*	*Resistant Representation*
Competent	1.14	1.18*	1.15
Controlled	0.79	0.31	0.50

*$p < .05$.

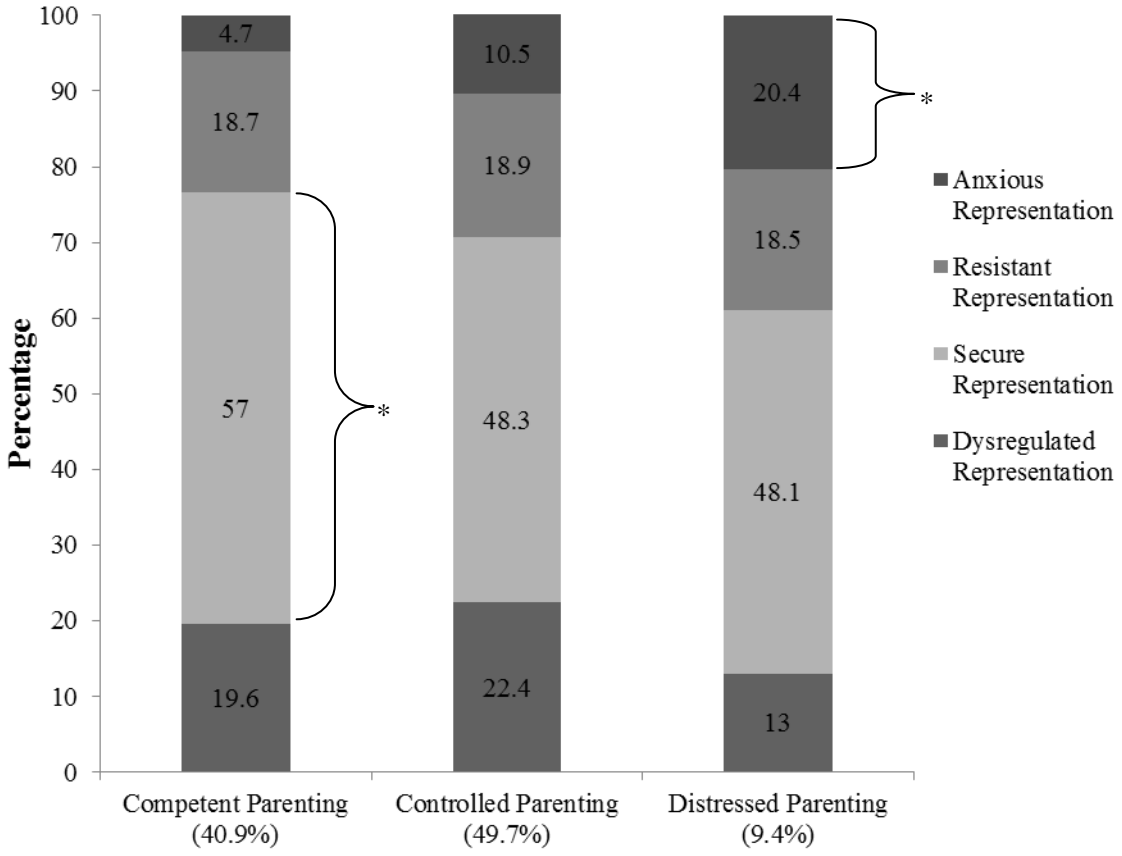


Figure 6: **Proportion of the Adjusted Internal Representation Typologies with Parenting Typologies.** *=parenting typologies that significantly differ at the .05 level**.**

Internal Representation Typologies and Developmental Outcomes

The results of internal representation typologies and developmental outcomes answer the following research question: *Do the different internal representation typologies predict externalizing behavior problems and academic outcomes?* The effects of different typologies of internal representations on children's externalizing behavior problems and academic outcomes (math and reading scores) in middle childhood were first tested (see Table 27). The internal representation typologies from the single-level latent class analysis model were used to predict developmental outcomes in middle childhood at approximately age 10 years. In addition to the higher-ordered externalizing behavior problems scale, the typologies were also examined across the externalizing behavior problem subscales: delinquency and aggressive behaviors. Participants with missing data on the selected outcome variables at G5 were excluded from the following analysis of variance tests. Thus, the final sample consisted of $n = 362$ families.

Children in the *Secure* and *Resistant* representation classes demonstrated less parent-reported CBCL externalizing behavior problems in middle childhood as compared to children in the *Anxious* and *Dysregulated* representation classes ($F = 5.64$, $p < .001$). In addition, *Secure* and *Resistant* children had lower delinquency scores than the *Anxious* and *Dysregulated* representation classes ($F = 9.70$, $p < .001$). While *Secure* ($M = 5.09$, $SD = 5.16$) and *Resistant* ($M = 4.71$, $SD = 4.38$) children demonstrated less aggressive behaviors than *Dysregulated* ($M = 6.94$, $SD = 6.64$) and *Anxious* ($M = 7.31$, $SD = 7.19$) children ($F = 3.64$, $p < .05$), homogeneity subsets found significant differences between *Resistant* and *Anxious* children. The effects on externalizing behavior problems findings demonstrated that children with either high incoherent narratives to emotions or slightly

high incoherent narratives to emotions with also low empathic representations are at risk for externalizing behavior problems in middle childhood.

For academic outcomes, children with *Secure* representations demonstrated significantly higher math scores than children with *Anxious* representations ($F = 4.00$, $p = .008$). Children with *Secure* representations also had higher scores on reading than children in the *Dysregulated* representation class ($F = 4.65$, $p = .003$). For additional analyses, please see the following section in which internal representation typologies in families with a particular parenting typology was examined as a predictor of later developmental outcomes.

Adjusted internal representation typologies in parenting typologies and developmental outcomes. To confirm the aforementioned findings, additional analyses included the examination of adjusted internal representation typologies in parenting typologies (*refer to appendix I*) as a predictor of developmental outcomes. Since the multilevel latent class analysis model used parenting typologies as a predictor of the adjusted internal representation typologies, this section also included parenting typologies (*refer to appendix J*). Significant differences were found for the adjusted internal representation typologies in parenting typologies on later externalizing behavior problems ($F = 6.29$, $p < .001$), academic math score ($F = 4.25$, $p = .006$), and academic reading scores ($F = 4.14$, $p = .007$). *Secure* and *Resistant* children had similar externalizing behavior scores, yet significantly lower scores than *Dysregulated* and *Anxious* children. Similar to the internal representation typologies unadjusted in parenting typologies, *Secure* children had higher academic scores, in general, than children with *Dysregulated, Resistant,* and *Anxious* representations. Specifically, for math scores,

Secure children had significantly higher scores than *Anxious* children, and significantly higher reading scores than *Dysregulated* children. *Secure* children did not significantly differ from *Dysregulated* and *Resistant* children on math scores, nor did *Secure* children differ from *Anxious* or *Resistant* children on reading scores. No significant differences were found between *Dysregulated, Resistant,* and *Anxious* children on academic outcomes. Finally, no differences across parenting typologies were found for later externalizing behavior problems. Differences were found on the effects of parenting typologies on academic math ($F = 5.44$, $p = .005$) and reading ($F = 6.64$, $p < .001$) scores. While *Competent* and *Controlled* parents had children with similar math and reading scores, *Competent* parents had children with significantly higher scores than children with *Distressed* parents. *Controlled* parents had children with significantly higher scores only on reading than children with *Distressed* parents.

Table 27: Difference Tests of Children's Externalizing Behavior Problems and Academic Outcomes in Middle Childhood by Internal Representation Latent Class

	Children's Internal Representation Typologies					
Variable	*Secure (S; n=181)*	*Anxious (A; n=36)*	*Resistant (R; n=70)*	*Dysregulated (D; n=75)*	*F*	*Post hoc*
Behavior Problems						
Externalizing Scale	6.83_{ab} (.56)	10.73_{c} (1.26)	6.57_{a} (.90)	10.05_{bc} (.87)	5.64***	A, D > S, R
Delinquency Subscale	1.73_{a} (.18)	3.43_{b} (.40)	1.85_{a} (.28)	3.11_{b} (.27)	9.70***	A, D > S, R
Aggressive Behaviors Subscale	5.09_{ab} (.42)	7.31_{b} (.93)	4.71_{a} (.67)	6.94_{ab} (.65)	3.64*	*ns*
Academic Outcomes						
Math Scores	10.01_{b} (.33)	7.75_{a} (.75)	8.64_{ab} (.54)	8.63_{ab} (.52)	4.00**	S > A
Reading Scores	135.37_{b} (1.86)	127.55_{ab} (4.16)	132.40_{ab} (2.98)	123.04_{a} (2.88)	4.65**	S > D

Note. Cases with no G5 data were excluded. Standard errors are in parentheses. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_{a}$ = lowest mean scores. Post hoc comparisons used Tukey's HSD to control for alpha level, ''>'' refers to significantly larger whereas '','' refers to not significantly different at alpha = .05 level.

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

CHAPTER 5
DISCUSSION

This longitudinal study used an attachment perspective to investigate preschoolers' internal representations of attachment relationships via story stem narratives, and the relations to early parenting and later externalizing behaviors and academic achievement in middle childhood. The three hypothesized models were empirically supported using a national representative sample of low-income families. First, results confirmed the four hypothesized internal representations typologies, secure, resistant, anxious, and dysregulated, from children's story stem narratives. Second, parenting typologies (competent parenting; controlled parenting; and distressed parenting), in early toddlerhood, predicted preschoolers' internal representations of attachment relationships. Third, preschoolers' internal representation typologies predicted externalizing behavior problems and academic outcomes in middle childhood at approximately 10 years of age. A closer examination of the current results, including brief discussions of the child and family characteristics relevant to internal representation and parenting typologies, follows.

Internal Representation Typologies

The goal of this study was to first identify the different internal representation typologies in high-risk preschoolers' narratives. Children's internal representation typologies were hypothesized to reflect early attachment relationships and to follow similar attachment classifications. Using the MacArthur Story Stem Battery (MSSB; Bretherton, Oppenheim, Buchsbaum, Emde, & the MacArthur Narrative Group, 1990), narrative responses to story stems were assessed for elements of conflict, empathy, dysregulated aggression, avoidance and dissociation of emotions, emotional affect in

responses, and dysregulated performance (i.e., anxious behaviors, controlling of the examiner, negative affect, emotional incoherence) in narrative responses. Results confirmed the four hypothesized internal representation typologies and found significant differences in narrative content themes across typologies. In addressing these differences, children with secure representation typologies exhibited coherent narrative responses that reflected regulated emotions when faced with a stressful situation. However, children with insecure typologies (resistant, anxious, and dysregulated) representations of attachment relationships demonstrated greater negative processing of conflictual family situations, as indicated by their tendencies to attribute hostile intent to the parent, interpret parents' emotions as reflecting negative motives, and endorse behavioral avoidance responses to distress. Interpreted in the emotional security hypothesis, these results suggest that children's internal representations of attachment relationships serve as analogs for detecting threats in other challenging interpersonal contexts (Davies, Winter, & Cicchetti, 2006). When faced with distress, children theoretically develop negative representational scripts characterized by unconscious processes predisposed toward perceiving, expecting, and interpreting potentially hostile contexts (Johnston & Roseby, 1997). Therefore, internal representations of attachment relationships may serve as a source for monitoring a novel situation for prior threats, particularly in stressful contexts. Through this process, children who use these negative representations to organize their processing in family contexts are likely to experience multiple dimensions of hostile information processing of relationships.

Individual differences between insecure typologies. The advantages of taking a person-centered approach to assessing children's internal representations of attachment

relationships are perhaps best illustrated by the distinctions between insecure typologies. Dysregulated children and anxious children demonstrated similarities across themes of interpersonal conflict, empathy, aggression, and avoidance. However, differences between these typologies were evident in their dissociative representations and behavioral performance responses. Anxious children were notably more likely to demonstrate dissociation than were dysregulated children. This demonstrates failure to develop organized patterns of early attachment relationships (e.g., Barnett, Ganiban, & Cicchetti, 1999; Cicchetti & Barnett, 1991). Previous research confirms that early disorganized attachment predicts the development of dissociation (Carlson, 1998; Ogawa et al., 1997). In addition, anxious children expressed more negative affect (e.g., anger, distress, and sadness) in their narratives compared to dysregulated children. This may result from anxious children having lengthy narratives and more expressive in regards to negative attachment-related memories (Hesse, 2008).

Resistant children, who comprised a little over a quarter of the children in this study, exhibited consistently high levels of negative internal representations of attachment relationships. Consistent with the dysregulated typology, the current study revealed that resistant children displayed signs of elevated negative affect, avoidance, and interpersonal conflict. However, their empathy-related responses, as well as anxious children's responses, were found to more closely resemble those of secure children than those of dysregulated children. This finding is consistent with previous studies that demonstrated similar patterns for the resistant children (e.g., Davies & Forman, 2002). Specifically, as noted earlier, empathy-related responses include the expression of moral emotions reflecting conscious development such as guilt and also found in the current

study to be represented more in resistant children's narrative. Previous literature has linked guilt and empathetic distress as related forms of moral emotions (Aksan & Kochanska 2005; Zahn-Waxler, Kochanska, Krupnick, & McKnew, 1990). Children's ability to empathize with other's distress has important implications for learning right from wrong. While the current study found resistant children to display moral emotions responses related to empathy, they also demonstrated the negative aspects related to moral emotions such as shame (Hoffman, 1998; Tangney, 1998; Tracy & Robins, 2006). This disruption in moral development may be a result of inconsistencies in parenting, since conscious emotions require forms of self-appraisal of behaviors (Lewis, 1998). This may explain why resistant children characterized by high positive and negative forms of conscious development such as guilt and shame demonstrate high adaptive emotion associated with reparation behaviors, as well as, distressing emotion associated with social withdrawal and negative self-attributions (Barrett et al., 1993).

Child characteristics. Children's characteristics based on temperament, age, gender, and race were found to vary across internal representation typologies. Mothers' reports of children's negative emotionality did not vary across internal representation typologies. However, in the current study results differed based on age and gender of the child. For example, older boys were more likely classified as dysregulated and anxious, demonstrating higher dysregulated aggression and negative affect in their narratives, than secure and resistant older boys. This could indicate that girls may be at less risk than boys for development insecure internal representations. Similarly, Zahn-Waxler et al. (2008) found that aggressive narratives increased with age, particularly among boys.

Future research might explore the role of gender in the links between early parenting and internal representations.

Finally, ethnoracial variation was found in children's internal representation typologies. Of the 40% Hispanic children in the study sample, slightly more than half were in the secure typology (*note*: approximately 22% of the 40% of Hispanic children were secure). Slightly fewer white children were in the secure typology as compared to Hispanic children- approximately half were classified as secure (*note*: approximately 17% of the 34% of White children in the study sample were secure). African American children were least likely to identify as secure with less than half of children in the secure typology (*note*: approximately 11% of the 26% of African American children in the study sample were secure). Although these variations in distributions suggest potential cultural differences in children's internal representations of attachment relationships, the probabilities of ethnoracial differences in typologies across the African American, White, and Hispanic ethnoracial groups were not statistically significant. Sher-Censor et al. (2013) found similar non-significant results when examining differences in children's internal representations measured via narratives across similar ethnoracial groups. Since this study had fewer African American children than White and Hispanic children, the unequal group sizes may have limited the power to detect differences in these typologies. Future research with balanced and larger ethnoracial group sizes is needed to further generalize this hypothesis. Future research should also explore the effects of acculturative processes, which was not included in the current study.

Parenting Typologies as Predictors of Internal Representation Typologies

The next goal of this study was to understand children's internal representation typologies in a family with a specific parenting typology. The complexities across parenting typologies (competent, controlled, and distressed parenting) were characterized by multiple parent and family systems that contribute to the overall functioning of parenting. This study simultaneously tested these multiple parenting attributes (i.e., parenting behaviors, maternal psychosocial stressors, and home environment) to provide statistical evidence of the complex disposition in which the parent and child interact, and the underlying mechanisms of children's internal representations of attachment relationships. Findings indicate that different parenting typologies in early toddlerhood predicted preschoolers' internal representation typologies. Results suggest that early parenting factors have long lasting effects on children's emotional development. Parenting typologies are discussed further in regard to their variability across children's internal representation typologies.

Internal representation typology in a parenting typology. Results provided support for the hypothesis that early multi-facets of co-occurring parenting factors are related to children's internal representations. Interestingly, across each of the three parenting typologies, about 50% of children had secure representations (57% of children were secure in the competent parenting group; 48.3% for the controlled parenting group and 48.1% for the distresses parenting group). These results suggest that despite exposure to early negative parenting, some children are able to create relatively secure internal representations. However, of the 52% of secure children in the current study, approximately 45% had either competent or controlled parents, respectively. Competent

and controlled parents had similar levels of physical safety in the home environment and exposure to family conflict which provides strong factors in discriminating controlled and distressed parents, while maternal depression and stress psychosocial stressors and negative parenting behaviors were relatively similar for the two parenting typologies.

When examining the parenting indicators individually across internal representation typologies, the differences were found to be limited. It is this consistency of high positive and high negative across multiple parenting and family systems that characterized two parenting typologies with the strongest effects on children's internal representations. These two pathways identify positive and negative developmental trajectories to children's internal representations. The current study found that children in families with parenting characterized as competent were significantly more likely to have secure internal representations in preschool. The competent parenting typology was characterized by positive parenting behaviors, decreased exposure to psychosocial stressors, and psychically safe, socially supportive and emotionally stimulating home environment. Secure children had competent parents with significantly higher parenting indictors related to parenting behaviors. The measures of parenting behaviors included observer ratings of quality of assistance relevant to the attunement of child's cues, supportive presence such as sensitivity, cognitive stimulation, and absence of hostility, and respect for autonomy during a semi-structured parent–child interaction task. This task was used in the NICHD Early Child Care Research Network (2001) study, which similarly found that parenting behaviors, assessed by these ratings, was related to secure attachment in early childhood. This developmentally relevant measure of parenting behaviors thus included the parent's ability to respond to their child's increasing capacity

for autonomy, while also providing support and assistance when needed. This finding is consistent with the contention that use of warm, responsive, and low power-assertive parenting may enhance children's ability to be attuned to the emotions of others (Hopkins, Gouze, & Lavigne, 2013; Kochanska, 1993, 1995). Thus, the quality of the parent's interactions with their child has important implications for children's secure attachment.

Finally, the alternative pathway reflects a negative trajectory between early parenting and internal representations. This study found that distressed parenting typologies were more likely to include children with an anxious representation typology, and characterized by consistently high negative components of parenting. Distressed parents had increased psychosocial stressors and poor physical and emotional quality in the home environment. Particularly, distressed parents demonstrated low attunement to their child's emotional needs within the dyadic relationship, as well as low sensitivity. Previous research notes that early negative parenting likely disrupts the attachment relationship at a time when, developmentally, toddlers are both better able to contribute to interactions with emerging autonomy but also display more challenging behaviors as they assert autonomy (Brownell & Kopp, 2007). According to the attachment perspective, insensitive and unresponsive parenting, can contribute to insecure internal representations of attachment representations (Lyons- Ruth & Jacobvitz, 1999; Weinfield, Sroufe, Egeland, & Carlson, 1999). Thus, early in development, toddlers learn that their primary caregivers, on whom they are dependent, can be unsafe and rejecting, laying the foundation for a negative parent-child relationship.

Family characteristics. Covariate predictors of parenting typologies included EHS program status and maternal cumulative demographic risk. No EHS program status group differences were found across parenting typologies. The current study demonstrated significant differences in maternal cumulative demographic risk across parenting typologies. Specifically, parents with less maternal cumulative demographic risks were more likely to be classified as more competent than controlled and distressed. This finding is consistent with previous research that found cumulative risk models to demonstrate the negative effects on families with cumulative risks related to poverty (e.g., Sameroff, Seifer, Baldwin, & Baldwin, 1993). However, by examining the accumulation of demographic risk factors rather than the content, results fail to consider the ways risks may be configured which disregards the concept that different combinations of risk factors may be differentially related to parenting and children's outcomes. Future research should examine the inclusion of both individual demographic risk factors, such as single parent family, and parenting factors from the current study, such as parenting behaviors, maternal psychosocial stressors, and home environment, using a person-centered approach for the co-occurrence of a wider array of hardships for families living in poverty.

Internal Representation Typologies and Developmental Outcomes

The current study sought to determine whether children's internal representations of attachment relationships have unique implications for child development in relation to externalizing behavior problems and academic achievements. Consistent with the attachment framework, the current study expected that the primary mechanism by which early attachment relationships are linked to later behavior and academic outcomes is

through children's construction of internal representations of attachment relationships (Bretherton & Munholland, 1999). Although the link between internal representations and adjustment is established (e.g., Davies, Cummings, & Winter, 2004; Yoo, Popp, & Robinson, 2014), long-term relations, similar to the current study, have not been adequately explored.

Results found that secure and resistant children had lower levels of externalizing behaviors than children with anxious or dysregulated representations. This is consistent with the notion that insecure attachment during the preschool period is related to externalizing behaviors (DeVito & Hopkins, 2001; Greenberg, Speltz, DeKlyen, & Jones, 2001). Anxious and dysregulated children, characterized by overt signs of elevated anger, avoidance, and hostile representations, demonstrated particularly high externalizing behaviors. A particularly interesting finding is that parent- ratings of externalizing behaviors were low for resistant children. As described earlier, resistant children had high moral reasoning representations, which may reduce their risk of externalizing behaviors particularly aggressive behaviors. Aksan and Kochanska (2005) support the link between moral emotions and low externalizing behaviors. This is consistent with the notion that disruptions in conscious development characterized by a lack of guilt and empathy are important in the development of externalizing behaviors (Frick & Dickens, 2006; Frick & Marsee, 2006). In addition, resistant children had parents with positive parenting behaviors similar to secure children. This suggests that early parenting behaviors, such as dyadic connectedness and parental supportiveness, may determine differences between children with similar dysregulated representations and later risks for externalizing behavior problems. Future research should statistically test the mechanisms of children's

internal representations as a mediator between early parenting in toddlerhood and later outcomes.

Next, this study examined the relations between internal representations and academic outcomes. Little research has examined the relations between preschoolers' internal representations and academic skills, particularly with math and reading scores. This study used the ECLS-K cognitive scale focusing on direct child assessments of math and reading abilities. By including a direct child assessment for examining child outcomes, this study seeks to provide a multi-informant design for the broader understanding of the effects on child outcomes. This study found that anxious children had lower math skills than secure children. Secure children were also found to have higher reading skills than the other three typologies, with a significantly higher score than dysregulated children. Previous studies have found a link between children's attachment representations and intelligence (e.g., Jacobsen & Hofmann, 1997). Secure representations facilitate children's readiness to learn and engage in academic tasks in school. Disruptions in children's attentional control and emotion regulation abilities, particularly when children allocate greater attention toward identifying potential threats across contexts, undermine children's ability to achieve important educational tasks by disrupting (e.g., Pollak & Tolley-Schell, 2004).

Practical Implications

The current study has implications for prevention and intervention efforts for children in low-income families. Perhaps the most important implications concern the early identification of impairments in the parent-child attachment-related relationship that contribute to or hinder subsequent developmental processes. The current study found

significant differences in early parenting for children's development of attachment-related representations. This supports the notion that success at each stage of development is built on successful competence at prior stages. Disruptions in the parent-child attachment relationship found in the current study may need to be reworked as a preventative measure for psychopathological development. Thus, preventive intervention efforts should be targeted at identifying early parenting processes that seem to be weaker in children with insecure internal representations. Results from person-centered analyses, similar to the current study, should be utilized to inform intervention and treatment planning to optimize early development in high-risk children.

The current findings also have important implications for the timing and content of intervention programs for parents. Children's cognitive structures relative to early attachment relationships within the home environment guide their later behaviors across multiple contexts. The current study found that parenting factors at 14 months of age exerted a strong influence on later internal representations of attachment relationships in all children. This result is promising and suggests that a responsive, sensitive, and stimulating caregiving context, with less psychosocial stressors and a positive home environment, can positively support cognitive development and growth in young children. Findings from this study also suggest that parents with secure children are interacting with their children differently when compared to parents with insecure children. This suggests that insecure children are more likely to be exposed to less optimal parenting behaviors. Helping parents build capacities to engage in sensitive, warm, supportive, and contingent interactions with their children early in development might be critical to promoting optimal growth and development (Bocknek, Brophy-Herb,

& Banerjee, 2009). Thus, it is feasible that through targeted parenting programs aimed at supporting parents and the environment in which a child interacts, we can optimize cognitive development, and in turn, influence subsequent outcomes in middle childhood.

Lastly, the current study has implications for early intervention services. Specifically, parenting factors related to children's internal representations of attachment relationships may be more malleable during the toddlerhood years and positive developmental trajectories may be more easily influenced in high-risk children, than compared to when they are older (Reid, 1994). Based on findings from the current study using a person-centered approach, early intervention services may consist of integrated, broad-based supports, such as attachment-based parenting programs, mental health services, and home-based contextual interventions, to promote early parenting. Attachment-based parenting programs are important because of the direct support of sensitive, emotionally-supportive parenting behaviors linked to children's secure internal representations in regards to understanding their child's underlying cognitive structures. Attachment-based parenting programs recognize and promote early parenting strengths, and identify potential risks to the parent-child relationship. In addition, mental health services identify and address maternal psychosocial stressors, and home-based, contextual intervention recognize and promote high physical and emotional quality of the home, as well as, exposure to positive family engagements. Supporting the development of early parent-child attachment relationships, through targeted, individualized, early intervention services may assist high-risk children in acquiring appropriate behavior and academic skills that influence long-term success.

Limitations and Future Research

Interpretation of the findings must consider the limitations of the study. In regards to the longitudinal design of the study, missing data continues to be problematic, as in the current study, which is common when using longitudinal datasets (Acock, 2005). A significant number of participants initially assessed at the 14 month data wave and followed through Grade 5 were missing data. Fortunately, missing data analyses revealed little to no significant differences between participants with missing and non-missing data on demographic variables and study variables of interest and determined to be missing at random. Nonetheless, in the context of the multi-method, multi-informant, latent class analysis, associations among study variables were regarded as substantively powerful and meaningful.

Next, although parenting indicators were carefully selected at the 14 month data wave with respect to the rationale that attachment relationship are thought to have formed by 12 months, the tested longitudinal design precluded an understanding of parenting across toddlerhood. Future studies should employ growth modeling techniques to extent the current model to examine unexplained variability and confirm the dynamic interplay of early parenting factors and children's internal representations that contribute to developmental outcomes.

Furthermore, the current study does not rule out the operation of extraneous third variables in accounting for effects of internal representations. Additional variables, including self-regulation (Hawkins & Haskett, 2014) and school environment (Bascoe, Davies, Sturge-Apple, & Cummings, 2009), may potentially mediate the relations between representations and developmental outcomes. Further research should examine

potential mediators to understand the mechanisms through which negative internal representations increase children's vulnerability to later academic and behavior problems. Because of the use of a pre-existing data set (refer to the EHSREP protocol), the study model could not control for expressive language which is known to effect children's internal representations as measured via story stem narratives (Steele et al., 2003). Approximately 20% of children in the current study reported to have a known speech problem by the age of five years; therefore, children's expressive language as a potential moderator is needed to examine unexplained variability in internal representations between children with and without speech problems. Given the paucity of knowledge on associations between the different internal representations typologies in a family with a specific, yet complex parenting typology, this study provides an important step toward conducting mixed modeling techniques of the interplay between early parenting and internal representations.

Conclusions and Future Directions

Despite the limitations, the results provide a novel understanding in how children's internal representations of attachment relationships are linked with early parenting typologies and subsequent child developments in low-income families. Consistent with attachment theory, these findings support the notion that children's internal representations of attachment relationships are a significant class of processes for understanding individual differences in children's social-emotional functioning and consequently their long-term development. It will be important for future researchers to continue to understand this relationship and how early experiences and attachment relationships unfold and influence subsequent developmental outcomes. Specifically,

future research should examine the extent to which long-term relations of early parenting typologies and behavior and academic outcomes in middle childhood are mediated by children's formation and processing structures of internal representations of early experiences in preschool. Future studies should also examine the interplay of early parenting with additional poverty-related risks outside the home environment to more clearly discern the mechanisms that interact and contribute to adverse outcomes, and thus inform preventative efforts that can ultimately mitigate risks associated with living in poverty. Thus, this study contributes to a developing area of research (e.g., Davies, Cummings, & Winter, 2004; Sturge-Apple, Davies, & Cummings, 2010) that advocates for integrating person-centered approaches in studying internal representations of attachment relationships across multiple parenting systems.

APPENDICES

Appendix A

Summary of the Story Stem Narratives

Table 28: Summary of the Story Stem Narratives

Story Stem Narratives	**Brief Description**	**Participants**	**Issues**
1. Spilled Juice	One of the children accidentally spills the pitcher of juice at the dinner table.	Two siblings, mother, father	Parent as attachment or authority figure in response to transgression; repairing "damage"
2. Mom's Headache	The mother has a headache, turns off the TV, and asks the child to be quiet. A friend comes over and asks to watch an exciting TV show (if the child says no, the friend asks again).	Mother, child, child's friend	Empathy with mother's headache/compliance with mother's request vs. compliance with friend's request, selfish pleasure; resistance to temptation
3. The Lost Keys	The mother accuses the father of having lost her keys, and argument ensues.	Mother, father, and one child	Child response to parental conflict

Table 28 (cont'd)

4. Hot Gravy	A child is warned by the mother not to touch the pot of gravy on the stove, but becomes impatient, touches the pot, and gets burned.	Two siblings, mother, father	Noncompliance with maternal request and parent as authority/attachment figure
5. Stolen Candy	A child asks the mother for the candy at the store, but she refuses. The child takes a candy bar while the mother is not looking and is discovered by the cashier.	Mother, child, storekeeper	Getting caught during a transgression, owning up to a misdeed
6. Band-Aid®	A child who is pretending to cook and knows he/she is not supposed to play with knives, but does so anyway. Then the child cuts his/her finger and starts to bleed.	Mother, father, child	Empathy with child's injury/compliance with parent's request to not play with knives
7. Departure	The parents go on an overnight trip while the grandmother babysits.	Mother, father, two siblings, grandmother	Separation anxiety
8. Reunion	The parents return from their trip.	Mother, father, two siblings, grandmother	Reunion quality

Appendix B

Story Stem Battery

NOTE: "CHILD" = target child, "child" = story child
BEFORE STARTING, <u>remove date and time from camera, focus the camera on child and all objects they can access (it is ok if data collector is in view</u>.
In transitioning to the task, say to the child:

Now we are going to do something different, something most kids think is fun. We are going to tell some stories together mildly dramatic, inviting tone. *These are special stories. For these stories, only you know how they end. I'm going to tell you the first part of each story while you listen. Then, when I stop, you'll get your turn to tell me all about the story and how it ends. Using your good, loud, story-telling voice I want you to finish each of the stories that I start.*

INTRODUCTION OF FIGURES

Story Theme: Introduction, modeling of narration with family figures
Props: All figures placed standing on a chair/Lego square
Characters: All the family characters (not including the friends and other non-family characters)

I: *First, I want to introduce you to the family in these stories. Look, who we have here* (bring out the family). *This is Grandma, this is the Mother, this is the Father, this is the big sister/brother and her/his name is Rhonda/Robert and this is the little sister/brother and her/his name is Michelle/Michael.* (Show the figures to the CHILD as you name them.)

I: *So, now who do we have here?* (get child to name each family member, with help if necessary).

Right CHILD *Left*
<u>C2 C1 F M G</u>
Interviewer

WARM-UP: RHONDA/ROBERT'S BIRTHDAY

Story Theme: Introduction, modeling of narration with family figures
Props: Table, birthday cake, all characters standing on chair Lego pieces
Characters: All the family characters (not including the friends and other non-family characters)

I: *You know what today is? It is Rhonda/Robert's birthday and Mother made her/him this beautiful cake* (bring out cake).
M: *Come on Grandma and Father, Michelle/Michael and Rhonda/Robert it's time to celebrate Rhonda/Robert's birthday.*
I: *Will you get the family ready at the table?*
I: *It's time for the party!*
Okay, you're turn, show me and tell me what happens next at the party.
Let the CHILD play with the figures or tell a story yourself, if the CHILD is in need of help. Really show the CHILD how the figures can move and talk, use lots of verbalizations and actions. Remember, however, that demonstrations or leading prompts should not be used for the subsequent story stems, which should be presented in the standard fashion described by the Manual.

Optional Prompts to get the child involved:
1. Get the child to join with you in singing the Happy Birthday song.
2. *"Show me how they eat the cake/blow out the candles"*
3. *"What might Rhonda/Robert say about her/his beautiful cake?"*

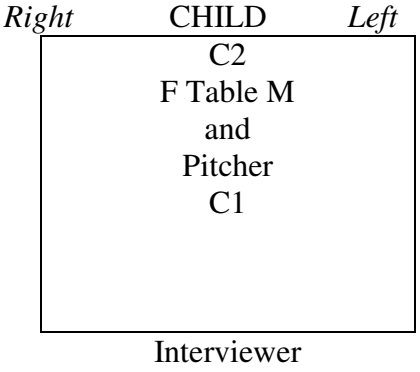
I: If no clear ending is presented *How does the birthday party end/stop/finish?*
Remember only the prescribed Issue or Elaboration prompts should be used from this point on. Non-leading Clarification and Elaboration prompts as appropriate are acceptable.

REMOVE: Cake, Grandma

1. SPILLED JUICE

Story Theme: Parental responses to accident
Props: Table, pitcher
Characters: Cl, C2, M, F (All same sex as CHILD).

I: *The family is thirsty and they are going to have some juice. Now put the family around the table so they can have some juice* (Wait until the figures are placed.)



I: *Here's the family drinking their juice. Rhonda/Robert gets up and reaches across the table and Uh-oh! she/he spilled her/his juice all over the floor.* (Make child spill the pitcher onto the floor so that it is visible to the CHILD.)

I: Give time to respond and if no response say *Show me and tell me what happens next.*

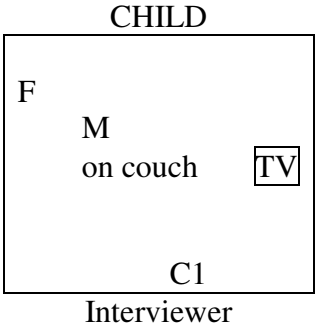
Issue Prompt: (If nothing is done about the juice)
I: *What happens about Rhonda/Robert spilling the juice?*

If no clear ending is presented: *Is this a good place to end your story?* Or *How does the story end?*

REMOVE: Nothing

2. MOM'S HEADACHE

Story Theme: Dilemma about empathy with mother vs loyalty to friend
Props: Couch, television
Characters: M, F, C1, C3 (friend, same sex as CHILD)
I: (Set out couch and TV as seen below - name objects as you set them up.) *We have a couch and a TV.*



I: *Mom and Rhonda/Robert are sitting and watching TV* (mom turns to child).
M: *"Oh Rhonda/Robert, I have such a headache! I just have to turn this TV off and lie down!"* (mom gets up and turns the TV off) *Click. "Rhonda/Robert, can you find something quiet to do for a while?"*
C1: *"Ok Mom, I'll read a book."* (Mom lies down on the couch and Rhonda/Robert sits down and reads a book).
I: *Ding-dong* (making a doorbell sound) *It's Rhonda/Robert's friend, Donna/David.* (Rhonda/Robert gets up and turns toward Donna/David.)
C3: *"There's this really neat show on TV, can I come in and watch with you?"*
I: *Show me and tell me what happens next.*

Required Issue Prompt 1: (If Rhonda/Robert doesn't turn on the TV)
C3: *"Oh come on! I know you'll really like it!"*
Required Issue Prompt 2: (If Rhonda/Robert or friend turn on the TV)
M: *"I have such a headache"* expressing mild pain

If no clear ending is presented: *Is this a good place to end your story?* Or *How does the story end?*

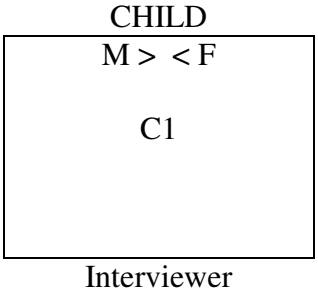
REMOVE: Couch, TV, C3

3. THE LOST KEYS

Story Theme: Parental conflict
Props: None
Characters: M, F, Cl

Setting: Mother and Father facing each other; child observing

I: *Rhonda/Robert comes into the room and sees Mother and Father looking at each other like this. Look at my face.* Show an angry expression



M: Angrily *You lost my keys!*
F: Angrily *I did NOT!*
M: *Yes you did, you always lose my keys!*
F: *I did not lose them this time.*
I: *Show me and tell me what happens next.*

Issue Prompt: If child does not enact an end, resolve the conflict, or says they forget about it
I: *What's going to happen about Mother and Father's argument?*

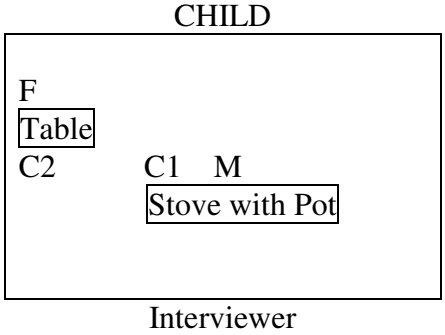
If no clear ending is presented: *Is this a good place to end your story?* Or *How does the story end?*

REMOVE: Nothing

4. HOT GRAVY

Story Theme: Disobedience/Parental Empathy versus Authority
Props: Pot, stove, table
Characters: M, F, Cl & C2

I: *Mother and Rhonda/Robert are at the stove. Father and Michelle/Michael are sitting at the table.*



M: "*We're going to have a good supper tonight, but it's not ready yet. Don't get too close to the stove, it's hot!"*
Cl: "*Mmmm, that smells soooo good. I don't want to wait, I want some now."*
Rhonda/Robert knocks the pot of gravy off the stove
Cl: *"Ow! Ow! I've burned my hand! It hurts!"*
I: *Oh my…* with concern in your voice *Show me and tell me what happens next.*

Required Issue Prompt: (If no one helps child)
I: *What do they do about the hurt hand?*

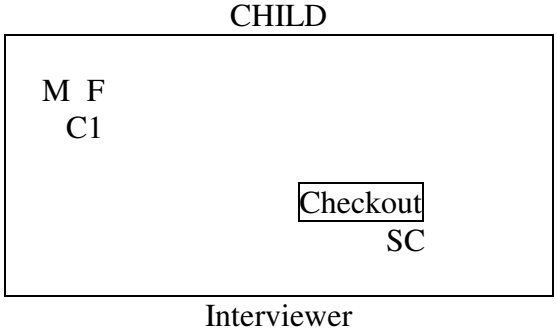
If no clear ending is presented: *Is this a good place to end your story?* Or *How does the story end?*

REMOVE: Table, Stove, Pot

5. STOLEN CANDY

Story Theme: Transgression/getting caught/shame
Props: Sales counter, candy wrapper
Characters: SC, M, F, Cl

I: *Now, Mother, Father and Rhonda/Robert are at the store. Here we have the store clerk, and over here we have a checkout counter. You know what's on the counter? Candy!*



I: *Here come Mother, Father and Rhonda/Robert.*
Cl: *Oh candy! Can I have some?*
M: *No, you already had one today. Let's go home*
Mother figure turns and walks away. The, Rhonda/Robert takes a candy bar and follows Mother and Father.
SC: *Hey, what are you doing there?* The parents turn around to look.
I: *So the parents turn around to look and…(if needed). Show me and tell me what happens next.*

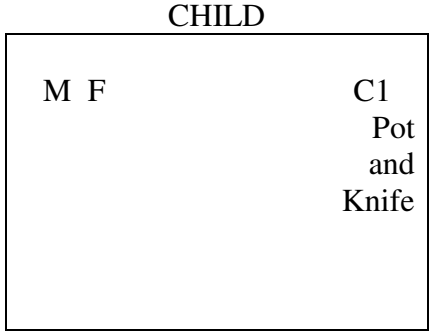
Required Issue Prompt 1: (If no response to the stealing)
SC: *Hey, you took a candy bar!*
Required Issue Prompt 2: (If still no response to the stealing)
M: *I told you not to take candy and you did*

If no clear ending is presented: *Is this a good place to end your story?* Or *How does the story end?*

REMOVE: Sales Counter, Candy, SC

6. BAND-AID®

Story Theme: Empathy and compliance with parent
Props: Small pot and tiny, non-sharp pretend knife
Characters: M, F, Cl



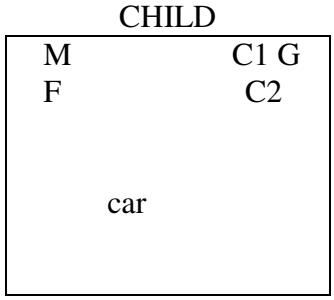
I: *Show me and tell me what happens next.*

If no clear ending is presented: *Is this a good place to end your story?* Or *How does the story end?*

7. DEPARTURE STORY

Story Theme: Separation from Parents
Props: Car
Characters: M, F, G, Cl & C2

I: *Rhonda/Robert and Michelle/Michael go outside to play.*



I: *You know what it looks like to me? It looks like Mother and Father are going on a trip. The car is parked in front of the house.* bring out car
M: "*Okay girls/boys, your Father and I are leaving on our trip now. See you tomorrow, Grandma will stay with you."* bring out Grandma
C2: "*But, I don't want you to go!"* whining
I: *Show me and tell what happens next*

IMPORTANT: If the CHILD initiates it, let the CHILD put the figures in the car and make them drive off. Only intervene if CHILD seems unable to make the car drive off. If the CHILD puts the children in the car, say: *No, only the Mother and Father are going.* After the CHILD (or if necessary, the Interviewer) makes the car drive off, the Interviewer puts the car under the table, out of sight.

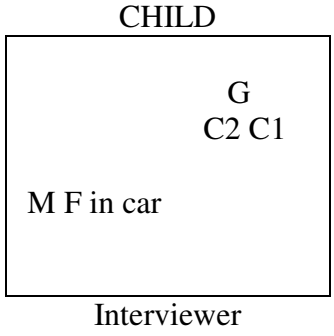
If the CHILD wants to retrieve the car, the Interviewer replies: *No, they're not coming back yet*

I: *And away they go!* as the car is moved under the table
I: *Show me and tell me what happens next.*

Required prompt: If the CHILD does not spontaneously enact an activity with C1&C2
I: *What are the children doing while the parents are gone?*

8. REUNION

Story Theme: Attachment
Props: Car
Characters: Cl & C2, G, M, F



I: In a neutral voice say: Guess what? It's the next day and Grandma looks out the window and she says:

G: "Look girls/boys, I think your Mother and Father are home from their trip. I think I can see their car."

I: Bring out car from under the table. Move it a bit toward the CHILD!
Show me and tell me what happens next.

Required Issue Prompt: If CHILD does not spontaneously take the figures out of the car.
I: *What do they do now that the Mother and Father are home?*

If no clear ending is presented: *Is this a good place to end your story?* Or *How does the story end?*

I: Well that is all the stories, good job! You worked really hard.
Now it is time for _____.

APPENDIX C

Mplus Input for Single Level Latent Class Analysis

```
TITLE: SINGLE LEVEL INTERNAL REPRESENTATION LCA

DATA: FILE = N:\...txt;

VARIABLE: NAMES = id cage cgender crace caa cwh chis ctemp program mderisk
meffic mcesd mstress fcon safe home dyad msup mint mdet mnegr ic_mean compet rj
exoth reha vc nc shame blame tease pdrat pdhit dshon emp_mean share empathy affil
affect warm rg dya_mean waggwt pi danger des esc pow negadul Disadul final2
aw_mean exself repet wdenial rehp sso msp famdep itm fantas space abc fps iwa
np_mean  control wanger wdistress wsad separ incpo incng avoid_m with_m;

MISSING = ALL (-9);
IDVARIABLE = id;

USEVARIABLES = cage cgender caa cwh chis ctemp ic_mean emp_mean dya_mean
avoid_m with_m np_mean;

CLASSES = C(4);

ANALYSIS: TYPE = MIXTURE;
STARTS = 500 50;
PROCESSORS = 8 (STARTS);

MODEL:
%OVERALL%
C ON cage cgender caa cwh chis ctemp;

OUTPUT: SAMPSTAT STANDARDIZED TECH1 TECH4 TECH7 TECH11 TECH12;

PLOT:
type = plot3;
series = ic_mean emp_mean dya_mean avoid_m with_m np_mean (*);

SAVEDATA: SAVE = CPROBABILITIES;
FILE IS CPROBSAV04W.txt;
FORMAT IS FREE;
ESTIMATES = MIXESTIMATES04W.txt;
```

APPENDIX D

Mplus Input for Two-Level Internal Representation and Parenting Latent Class Analysis

```
TITLE: TWO-LEVEL INTERNAL REPRESENTATION AND PARENTING LCA

DATA: FILE = N:\...txt;

VARIABLE: NAMES = id cage cgender crace caa cwh chis ctemp program mderisk
meffic mcesd mstress fcon safe home dyad msup mint mdet mnegr ic_mean compet rj
exoth reha vc nc shame blame tease pdrat pdhit dshon emp_mean share empathy affil
affect warm rg dya_mean waggwt pi danger des esc pow negadul Disadul final2
aw_mean exself repet wdenial rehp sso msp famdep itm fantas space abc fps iwa
np_mean  control wanger wdistress wsad separ incpo incng avoid_m with_m;

MISSING = ALL (-9);

USEVARIABLES = cage cgender caa cwh chis ctemp ic_mean emp_mean dya_mean
avoid_m with_m np_mean program mderisk safe mcesd mstress fcon home dyad msup
mint;
CATEGORICAL = safe;

CLASSES = cb(3) cw(4);
WITHIN = cage cgender caa cwh chis ctemp ic_mean emp_mean dya_mean avoid_m
with_m np_mean;
BETWEEN = cb program mderisk safe mcesd mstress fcon home dyad msup mint;
CLUSTER = id;

ANALYSIS: TYPE = TWOLEVEL MIXTURE;
STARTS = 500 50;
PROCESSORS = 8 (STARTS);

MODEL:
%WITHIN%
%OVERALL%
cw on cage cgender caa cwh chis ctemp;

%BETWEEN%
%OVERALL%
cb on program mderisk;
cw#1-cw#3 on cb;

MODEL cw:
%WITHIN%
%cw#1%
```

```
[ic_mean emp_mean dya_mean avoid_m with_m np_mean];

%cw#2%
[ic_mean emp_mean dya_mean avoid_m with_m np_mean];

%cw#3%
[ic_mean emp_mean dya_mean avoid_m with_m np_mean];

%cw#4%
[ic_mean emp_mean dya_mean avoid_m with_m np_mean];

MODEL cb:
%BETWEEN%
%cb#1%
[mcesd mstress];
[fcon home];
[safe$1];
[dyad msup mint];

%cb#2%
[mcesd mstress];
[fcon home];
[safe$1];
[dyad msup mint];

%cb#3%
[mcesd mstress];
[fcon home];
[safe$1];
[dyad msup mint];

OUTPUT: SAMPSTAT STANDARDIZED TECH1 TECH4 TECH7 TECH12;

SAVEDATA: SAVE = CPROBABILITIES;
FILE IS CPROBSAV04CWCB.txt;
FORMAT IS FREE;
```

APPENDIX E

Internal Representation Subcodes by Internal Representation Latent Class

Table 29: Internal Representation Latent Class Analysis: Means and Standard Deviations for the Subcodes of the Internal Representation Dimensions, Estimated Separately by Internal Representation Latent Class Membership

	Internal Representation Typologies								
	Class 1: Secure (50.0%)		*Class 2: Anxious (9.4%)*		*Class 3: Resistant (19.3%)*		*Class 4: Dysregulated (21.3%)*		
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	*F*
Interpersonal Conflict Dimension Subcodes									
Competition	$.00_{a}$	.01	$.01_{b}$	.04	$.01_{ab}$	.03	$.00_{a}$	.02	6.99***
Rivalry/Jealousy	$.00_{a}$	.02	$.00_{a}$	.00	$.01_{a}$	.03	$.00_{a}$	.00	2.31*
Exclusion of Others	$.11_{a}$	.14	$.28_{c}$	.19	$.20_{b}$	.17	$.16_{ab}$	.17	19.27***
Active Refusal of Empathy	$.01_{a}$	.04	$.04_{b}$	.07	$.05_{b}$	.09	$.03_{ab}$	.06	9.78***
Verbal Conflict	$.02_{a}$	.05	$.07_{b}$	.14	$.05_{ab}$	.07	$.04_{ab}$	.08	8.53***
Non-Compliance	$.02_{a}$	.05	$.04_{b}$	.07	$.04_{ab}$	.08	$.03_{ab}$	.07	5.22***
Average Shame	$.03_{a}$	.06	$.08_{b}$	.09	$.09_{b}$	.09	$.03_{a}$	.05	23.72***
Average Blame	$.03_{a}$	.05	$.04_{ab}$	.06	$.05_{b}$	.06	$.04_{ab}$	.06	4.49**
Teasing/Taunting	$.00_{a}$	.03	$.04_{b}$	.09	$.02_{a}$	.06	$.02_{a}$	.05	12.11***
Verbal Punishment	$.19_{a}$	.18	$.37_{b}$	.23	$.34_{b}$	.22	$.22_{a}$	.18	25.12***
Physical Punishment	$.05_{a}$	.10	$.13_{b}$	.13	$.05_{a}$	.08	$.08_{a}$	.12	9.84***
Dishonesty	$.07_{a}$	.11	$.13_{b}$	.10	$.12_{b}$	.14	$.10_{ab}$	.11	7.78***
Empathy Affiliation Dimension Subcodes									
Sharing	$.01_{a}$	.04	$.01_{a}$	.04	$.06_{b}$	.08	$.01_{a}$	.04	20.53***
Empathy/Help/ Reassurance	$.28_{b}$	.17	$.26_{b}$	.17	$.46_{c}$	.19	$.20_{a}$	.15	48.31***
Affiliation	$.34_{b}$	.20	$.32_{ab}$	.18	$.61_{c}$	.18	$.26_{a}$	.15	78.13***
Affection	$.08_{a}$	.11	$.13_{b}$	.16	$.21_{c}$	.17	$.07_{a}$	.09	33.52***
Positive Parental Warmth	$.16_{b}$	.10	$.20_{c}$	.12	$.34_{d}$	.12	$.12_{a}$	.10	98.07***
Reparation/Guilt	$.29_{b}$	.14	$.23_{a}$	.13	$.39_{c}$	.16	$.21_{a}$	.14	34.49***

Table 29 (cont'd)

Dysregulated Aggression Dimension Subcodes									
Aggression	$.02_a$	.03	$.12_c$	.07	$.03_a$	.04	$.09_b$	.06	147.06***
Personal Injury	$.09_a$	.13	$.27_b$	.19	$.14_a$	.15	$.28_b$	.19	51.03***
Danger	$.05_a$	.06	$.18_d$	.10	$.09_b$	.09	$.13_c$	.09	65.69***
Destruction of Objects	$.03_a$	.07	$.12_b$	.15	$.02_a$	.06	$.11_b$	.14	32.34***
Escalation of Interpersonal Conflict	$.03_a$	.07	$.12_c$	.15	$.02_a$	.06	$.15_b$	.15	70.47***
Child Power	$.04_a$	.05	$.09_c$	.08	$.06_b$	.06	$.07_b$	.07	19.57***
Negative Parent	$.02_a$	.04	$.14_d$	.10	$.04_b$	.05	$.07_c$	.09	64.19***
Parental Harsh Discipline	$.11_a$	.08	$.20_b$	.12	$.19_b$	.12	$.12_a$	.09	25.95***
Final Content: Negative Ending	$.19_a$	.17	$.54_b$	.23	$.17_a$	.16	$.50_b$	.20	134.60***
Avoidance Strategies Dimension Subcodes									
Exclusion of Self	$.11_a$	.13	$.20_b$	.14	$.19_b$	.16	$.18_b$	.19	12.27***
Repetition	$.05_a$	.07	$.07_{ab}$	.08	$.08_b$	.08	$.08_b$	.09	7.41***
Denial	$.32_a$	.15	$.46_b$	.17	$.28_a$	.12	$.49_b$	.17	56.71***
Passive Refusal of Empathy	$.09_a$	.09	$.24_c$	.16	$.14_b$	.14	$.17_b$	.14	27.59***
Sudden Sleep Onset	$.07_a$	.13	$.12_b$	.14	$.18_c$	.18	$.09_{ab}$	.11	17.62***
Mechanical Sensorimotor Play	$.24_a$	.23	$.65_c$	.26	$.47_b$	.29	$.54_b$	.31	63.64***
Family Disruption	$.02_a$	.05	$.05_b$	.09	$.02_a$	.05	$.02_a$	.06	5.40***
Dissociation Dimension Subcodes									
Intrusion of Traumatic Material	$.02_a$	.07	$.32_c$	.20	$.05_a$	.09	$.15_b$	.16	128.27***
Fantasy Proneness	$.02_a$	.06	$.15_c$	.21	$.04_a$	.08	$.10_b$	.15	28.39***
Spacing Out	$.03_a$	.11	$.05_a$	.11	$.02_a$	.09	$.04_a$	.12	1.11, *ns*
Boundary Confusion	$.04_a$	.09	$.14_c$	.19	$.06_{ab}$	.09	$.09_b$	.14	14.23***
Fleeing Painful Subject	$.05_a$	.09	$.30_c$	.24	$.12_b$	.15	$.08_{ab}$	.13	57.37***
Identifying with Aggressor	$.01_a$	.04	$.15_c$	.15	$.02_a$	.07	$.09_b$	.12	64.65***

Table 29 (cont'd)

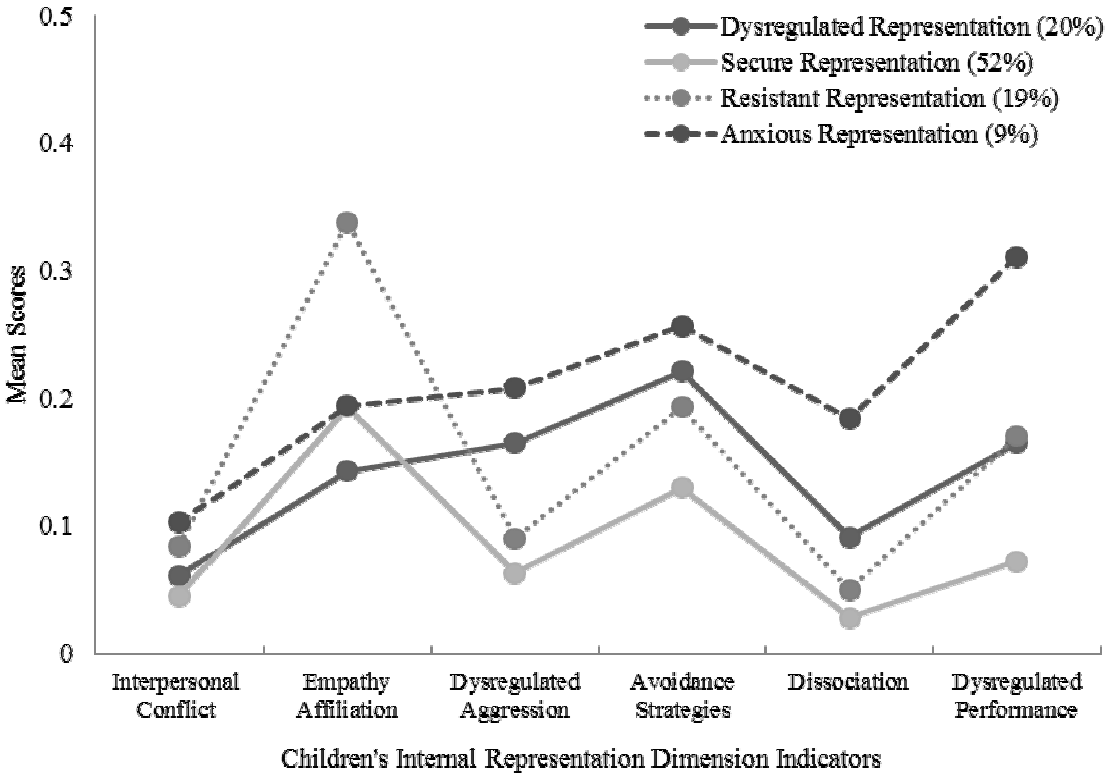
	Dysregulated Performance Dimension Subcodes								
Controlling the Examiner	$.10_{a}$	.17	$.60_{c}$	.27	$.28_{b}$	.25	$.28_{b}$	.29	85.56***
Intensity of Anger	$.13_{a}$	.13	$.51_{d}$	.20	$.25_{b}$	.14	$.31_{c}$	.18	118.12***
Intensity of Distress	$.05_{a}$	.07	$.25_{c}$	.18	$.14_{b}$	.13	$.15_{b}$	.14	59.27***
Intensity of Sadness	$.08_{a}$	.09	$.23_{c}$	.14	$.15_{b}$	.11	$.10_{a}$	.11	39.82***
Anxiety Behavior	$.08_{a}$	.09	$.16_{c}$	.12	$.10_{ab}$	.09	$.12_{b}$	.10	14.40***
Emotion Incoherent to Positive	$.03_{a}$	.07	$.21_{c}$	.16	$.18_{c}$	.16	$.08_{b}$	.11	73.54***
Emotion Incoherent to Negative	$.04_{a}$	.07	$.23_{c}$	.14	$.11_{b}$	.13	$.13_{b}$	.15	56.01***

Note. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_{a}$ = lowest mean scores.
*$p < .05$. **$p < .01$. ***$p < .001$.

APPENDIX F

Line Graph of Adjusted Internal Representation Typology Characteristics

Figure 7: Multilevel Internal Representation and Parenting Latent Class Analysis: Line Graph of Adjusted Internal Representation Typology Characteristics



APPENDIX G

Internal Representation Subcodes by Adjusted Internal Representation

Table 30: Multilevel Internal Representation and Parenting Latent Class Analysis: Means and Standard Deviations for the Subcodes of the Internal Representation Dimensions, Estimated Separately by Adjusted Internal Representation Latent Class Membership

	Adjusted Internal Representation Typologies								
	Class 1: Dysregulated (20%)		*Class 2: Secure (52%)*		*Class 3: Resistant (19%)*		*Class 4: Anxious (9%)*		
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	*F*
				Interpersonal Conflict Dimension Subcodes					
Competition	$.00_{a}$	.00	$.00_{a}$	.01	$.01_{b}$	.03	$.01_{b}$	.04	8.85***
Rivalry/Jealousy	$.00_{a}$	.00	$.00_{a}$	.02	$.01_{a}$	.03	$.00_{a}$	.00	2.23†
Exclusion of Others	$.16_{ab}$	.17	$.11_{a}$	.14	$.20_{b}$	.18	$.27_{c}$	.20	18.46***
Active Refusal of Empathy	$.03_{ab}$	.06	$.01_{a}$	.04	$.05_{b}$	.09	$.04_{b}$	.07	10.02***
Verbal Conflict	$.04_{a}$	.08	$.02_{a}$	.06	$.05_{ab}$	.07	$.07_{b}$	.14	8.77***
Non-Compliance	$.03_{ab}$	.07	$.02_{a}$	.05	$.04_{ab}$	.08	$.04_{b}$	.07	5.07**
Average Shame	$.03_{a}$	.05	$.03_{a}$	.06	$.09_{b}$	.09	$.08_{b}$	.09	24.26***
Average Blame	$.04_{ab}$	.06	$.03_{a}$	.05	$.05_{b}$	.06	$.05_{ab}$	.06	4.87**
Teasing/Taunting	$.02_{a}$	.05	$.01_{a}$	.03	$.02_{a}$	.06	$.05_{b}$	.09	12.72***
Verbal Punishment	$.22_{a}$	.18	$.19_{a}$	.18	$.34_{b}$	.21	$.38_{b}$	.23	25.99***
Physical Punishment	$.07_{a}$	.12	$.05_{a}$	.10	$.05_{a}$	.08	$.13_{b}$	.13	9.92***
Dishonesty	$.11_{ab}$	.11	$.07_{a}$	.11	$.12_{b}$	.14	$.13_{b}$	.10	7.93***
				Empathy Affiliation Dimension Subcodes					
Sharing	$.01_{a}$	.04	$.01_{a}$	.04	$.06_{b}$	.08	$.01_{a}$	.04	21.26***
Empathy/Help/ Reassurance	$.20_{a}$	.15	$.28_{b}$	.17	$.46_{c}$	.18	$.26_{b}$	.17	50.40***
Affiliation	$.26_{a}$	.15	$.34_{b}$	.20	$.61_{c}$	.18	$.32_{ab}$	.18	79.74***
Affection	$.07_{a}$	.09	$.08_{a}$	.11	$.21_{c}$	.17	$.13_{b}$	.15	33.82***
Positive Parental Warmth	$.11_{a}$	.09	$.16_{b}$	.10	$.34_{d}$	.12	$.21_{c}$	.12	101.90***
Reparation/Guilt	$.20_{a}$	.14	$.29_{b}$	.13	$.38_{c}$	.16	$.23_{a}$	.13	34.76***

Table 30 (cont'd)

Dysregulated Aggression Dimension Subcodes									
Aggression	$.09_{b}$	.07	$.02_{a}$	.03	$.03_{a}$	.04	$.12_{c}$	.06	150.28***
Personal Injury	$.28_{b}$	.19	$.09_{a}$	.13	$.14_{a}$	.15	$.27_{b}$	.19	52.82***
Danger	$.13_{c}$	.09	$.05_{a}$	.06	$.09_{b}$	.09	$.19_{d}$	.10	64.78***
Destruction of Objects	$.11_{b}$	.14	$.03_{a}$	.07	$.03_{a}$	.06	$.12_{b}$	.15	32.81***
Escalation of Interpersonal Conflict	$.16_{b}$	.15	$.03_{a}$	.07	$.06_{a}$	.10	$.22_{c}$	.16	72.16***
Child Power	$.07_{bc}$	.07	$.04_{a}$	.05	$.06_{b}$	.06	$.09_{c}$	.08	19.32***
Negative Parent	$.07_{c}$	.10	$.02_{a}$	.04	$.05_{b}$	.06	$.13_{d}$	.10	59.11***
Parental Harsh Discipline	$.12_{a}$	.09	$.11_{a}$	.08	$.19_{b}$	.12	$.21_{b}$	.12	27.31***
Final Content: Negative Ending	$.50_{b}$	.20	$.19_{a}$	.17	$.18_{a}$	.16	$.54_{b}$	.23	132.13***
Avoidance Strategies Dimension Subcodes									
Exclusion of Self	$.18_{b}$	.19	$.11_{a}$	.13	$.19_{b}$	.16	$.20_{b}$	.14	12.05***
Repetition	$.08_{b}$	.09	$.05_{a}$	.07	$.09_{b}$	.08	$.08_{ab}$	.08	7.40***
Denial	$.49_{b}$	.17	$.32_{a}$	.15	$.28_{a}$	.12	$.46_{b}$	.17	54.58***
Passive Refusal of Empathy	$.17_{b}$	.14	$.10_{a}$	.09	$.15_{b}$	.15	$.23_{c}$	.15	24.06***
Sudden Sleep Onset	$.08_{ab}$	.11	$.08_{a}$	.13	$.18_{c}$	.18	$.13_{b}$	.14	16.77***
Mechanical Sensorimotor Play	$.53_{b}$	.31	$.25_{a}$	.23	$.47_{b}$	.29	$.66_{c}$	.26	63.35***
Family Disruption	$.02_{a}$	.06	$.02_{a}$	.05	$.02_{a}$	.05	$.05_{b}$	.10	5.87**
Dissociation Dimension Subcodes									
Intrusion of Traumatic Material	$.16_{b}$	.17	$.02_{a}$	.07	$.06_{a}$	.10	$.31_{c}$	.19	111.76***
Fantasy Proneness	$.10_{b}$	.15	$.02_{a}$	.06	$.05_{a}$	.09	$.14_{b}$	.21	26.94***
Spacing Out	$.04_{a}$	.12	$.03_{a}$	.11	$.02_{a}$	.09	$.05_{a}$	.12	1.28, *ns*
Boundary Confusion	$.09_{b}$	.14	$.04_{a}$	.09	$.06_{ab}$	.09	$.15_{c}$	.19	15.56***
Fleeing Painful Subject	$.08_{ab}$	.13	$.05_{a}$	.09	$.12_{b}$	.15	$.30_{c}$	.25	57.39***
Identifying with Aggressor	$.09_{b}$	.12	$.01_{a}$	.04	$.02_{a}$	.07	$.15_{c}$	.16	63.47***

Table 30 (cont'd)

	Dysregulated Performance Dimension Subcodes								
Controlling the Examiner	$.29_{b}$	.29	$.10_{a}$	.17	$.28_{b}$	.25	$.59_{c}$	.27	82.59***
Intensity of Anger	$.31_{c}$	.18	$.13_{a}$	.13	$.25_{b}$	.14	$.52_{d}$	.20	120.27***
Intensity of Distress	$.15_{b}$	.13	$.05_{a}$	.07	$.15_{b}$	.14	$.25_{c}$	.17	60.13***
Intensity of Sadness	$.10_{a}$	.12	$.08_{a}$	.09	$.15_{b}$	.11	$.23_{c}$	.14	38.07***
Anxiety Behavior	$.12_{b}$	.10	$.08_{a}$	.09	$.10_{ab}$	.09	$.16_{c}$	.12	14.01***
Emotion Incoherent to Positive	$.08_{b}$	.11	$.03_{a}$	.07	$.18_{c}$	.16	$.21_{c}$	.16	74.81***
Emotion Incoherent to Negative	$.13_{b}$	.15	$.04_{a}$	.08	$.11_{b}$	.13	$.24_{c}$	.14	55.96***

Note. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_{a}$ = lowest mean scores.
†$p < .10$, *$p < .05$. **$p < .01$. ***$p < .001$.

APPENDIX H

Internal Representation Subcodes by Parenting

Table 31: Multilevel Internal Representation and Parenting Latent Class Analysis: Means and Standard Deviations for the Subcodes of the Internal Representation Dimensions, Estimated Separately by Parenting Latent Class Membership

	Parenting Typologies						
	Class 1: Competent (40.9%)		*Class 2: Controlled (49.7%)*		*Class 3: Distressed (9.4%)*		
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	*F*
	Interpersonal Conflict Dimension Subcodes						
Competition	$.00_a$	.02	$.00_a$	.02	$.01_b$	.03	3.16*
Rivalry/Jealousy	$.00_a$	.02	$.00_a$	.03	$.00_a$	.00	.66, *ns*
Exclusion of Others	$.16_a$	.17	$.16_a$	.17	$.12_a$	.15	.97, *ns*
Active Refusal of Empathy	$.03_a$	.06	$.02_a$	.07	$.03_a$	.07	.00, *ns*
Verbal Conflict	$.03_a$	.07	$.04_a$	.09	$.03_a$	.07	.58, *ns*
Non-Compliance	$.03_a$	.06	$.03_a$	.07	$.01_a$	.04	1.37, *ns*
Average Shame	$.04_a$	.07	$.05_a$	.07	$.04_a$	.07	.49, *ns*
Average Blame	$.04_a$	.05	$.04_a$	.05	$.06_b$	.07	3.54*
Teasing/Taunting	$.02_a$	.05	$.01_a$	.05	$.01_a$	.04	.19, *ns*
Verbal Punishment	$.24_a$	.19	$.25_a$	.21	$.24_a$	.22	.18, *ns*
Physical Punishment	$.05_a$	.09	$.07_{ab}$	.11	$.09_b$	.11	4.45*
Dishonesty	$.10_a$	.13	$.08_a$	.11	$.09_a$	.11	.89, *ns*
	Empathy Affiliation Dimension Subcodes						
Sharing	$.02_a$	.05	$.02_a$	.05	$.02_a$	.05	.06, *ns*
Empathy/Help/ Reassurance	$.32_b$	.20	$.28_{ab}$	.18	$.26_a$	.18	4.35*
Affiliation	$.37_a$	.21	$.37_a$	.22	$.37_a$	.21	.03, *ns*
Affection	$.11_a$	.14	$.10_a$	.13	$.09_a$	.13	.40, *ns*
Positive Parental Warmth	$.20_a$	.13	$.18_a$	.13	$.18_a$	.13	.47, *ns*
Reparation/Guilt	$.30_a$	.16	$.28_a$	.15	$.26_a$	.13	1.26, *ns*

Table 31 (cont'd)

	Dysregulated Aggression Dimension Subcodes						
Aggression	$.04_a$	.06	$.04_a$	.06	$.05_a$	.06	.99, *ns*
Personal Injury	$.16_a$	.18	$.15_a$	.17	$.16_a$	.16	.38, *ns*
Danger	$.08_a$	.09	$.08_a$	.09	$.09_a$	.10	.40, *ns*
Destruction of Objects	$.05_a$	.10	$.06_a$	.11	$.04_a$	.08	.91, *ns*
Escalation of Interpersonal Conflict	$.07_a$	.11	$.08_a$	.13	$.10_a$	.15	1.43, *ns*
Child Power	$.06_b$	.06	$.05_{ab}$	.06	$.04_a$	.04	2.37†
Negative Parent	$.04_a$	.07	$.05_a$	.08	$.04_a$	.07	.16, *ns*
Parental Harsh Discipline	$.12_a$	.09	$.14_a$	.11	$.14_a$	.11	2.10, *ns*
Final Content: Negative Ending	$.29_a$	.24	$.28_a$	.23	$.30_a$	.24	.43, *ns*
	Avoidance Strategies Dimension Subcodes						
Exclusion of Self	$.14_a$	.16	$.16_a$	.16	$.14_a$	.14	1.03, *ns*
Repetition	$.06_a$	.08	$.07_a$	.08	$.06_a$	.07	.60, *ns*
Denial	$.34_a$	.17	$.37_a$	.17	$.38_a$	.16	3.17*
Passive Refusal of Empathy	$.11_a$	.13	$.14_a$	.13	$.15_a$	.14	3.90*
Sudden Sleep Onset	$.09_a$	.12	$.11_a$	.16	$.11_a$	.14	1.22, *ns*
Mechanical Sensorimotor Play	$.35_a$	.29	$.40_{ab}$	.31	$.47_b$	.33	4.22*
Family Disruption	$.03_a$	.06	$.02_a$	.06	$.02_a$	.05	.50, *ns*
	Dissociation Dimension Subcodes						
Intrusion of Traumatic Material	$.10_a$	.16	$.08_a$	.14	$.07_a$	.13	1.50, *ns*
Fantasy Proneness	$.06_a$	.11	$.05_a$	.13	$.03_a$	.08	1.01, *ns*
Spacing Out	$.03_a$	.10	$.03_a$	.11	$.05_a$	.14	.53, *ns*
Boundary Confusion	$.05_a$	.10	$.07_a$	.12	$.08_a$	.17	1.39, *ns*
Fleeing Painful Subject	$.07_a$	.13	$.10_a$	.17	$.09_a$	.15	3.27*
Identifying with Aggressor	$.04_a$	.09	$.04_a$	.09	$.05_a$	.11	.31, *ns*

Table 31 (cont'd)

	Dysregulated Performance Dimension Subcodes						
Controlling the Examiner	$.19_a$	.25	$.23_a$	.28	$.26_a$	.29	2.00, *ns*
Intensity of Anger	$.21_a$	.19	$.23_a$	.19	$.22_a$	.23	1.02, *ns*
Intensity of Distress	$.10_a$	.11	$.12_a$	.14	$.12_a$	.14	1.99, *ns*
Intensity of Sadness	$.10_a$	.10	$.12_a$	.13	$.12_a$	.11	2.39†
Anxiety Behavior	$.10_a$	.09	$.09_a$	.10	$.09_a$	.11	.95, *ns*
Emotion Incoherent to Positive	$.07_a$	.11	$.09_a$	.14	$.10_a$	.15	1.94, *ns*
Emotion Incoherent to Negative	$.09_a$	.12	$.09_a$	.13	$.10_a$	.15	.51, *ns*

Note. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_a$ = lowest mean scores.
†$p < .10$, *$p < .05$.

APPENDIX I

Difference Tests by Adjusted Internal Representation Latent Class

Table 32: Difference Tests of Children's Externalizing Behavior Problems and Academic Outcomes in Middle Childhood by Adjusted Internal Representation Latent Class

	Children's Adjusted Internal Representation Typologies					
Variable	*Dysregulated (D; n=73)*	*Secure (S; n=183)*	*Resistant (R; n=72)*	*Anxious (A; n=34)*	*F*	*Post hoc*
Behavior Problems						
Externalizing Scale	10.45_{b} (.88)	6.96_{a} (.56)	6.62_{a} (.89)	10.56_{b} (1.29)	6.29***	D, A > S, R
Delinquency Subscale	3.20_{b} (.28)	1.72_{a} (.18)	1.87_{a} (.28)	3.44_{b} (.41)	10.42***	D, A > S, R
Aggressive Behaviors Subscale	7.25_{a} (.65)	5.03_{a} (.41)	4.75_{a} (.66)	7.12_{a} (.96)	4.16**	D > S, R
Academic Outcomes						
Math Scores	8.89_{ab} (.52)	9.95_{b} (.33)	8.69_{ab} (.53)	7.27_{a} (.77)	4.25**	S > A
Reading Scores	123.69_{a} (2.93)	135.10_{a} (1.85)	132.50_{a} (2.95)	126.40_{a} (4.29)	4.14**	S > D

Note. Cases with no G5 data were excluded. Standard errors are in parentheses. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_{a}$ = lowest mean scores. Post hoc comparisons used Tukey's HSD to control for alpha level, ''>'' refers to significantly larger whereas '','' refers to not significantly different at alpha = .05 level.

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

APPENDIX J

Difference Tests by Parenting Latent Class

Table 33: Difference Tests of Children's Externalizing Behavior Problems and Academic Outcomes in Middle Childhood by Parenting Latent Class

	Parenting Typologies				
Variable	*Competent (B; n=160)*	*Controlled (C; n=166)*	*Distressed (D; n=36)*	*F*	*Post hoc*
Behavior Problems					
Externalizing Scale	8.04_{a} (.61)	7.54_{a} (.60)	8.28_{a} (1.29)	.24	*ns*
Delinquency Subscale	2.21_{a} (.19)	2.20_{a} (.19)	2.25_{a} (.41)	.01	*ns*
Aggressive Behaviors Subscale	5.82_{a} (.45)	5.34_{a} (.45)	6.03_{a} (.94)	.40	*ns*
Academic Outcomes					
Math Scores	9.95_{b} (.35)	8.95_{ab} (.35)	7.39_{a} (.75)	5.44**	B > D
Reading Scores	135.91_{b} (1.97)	129.61_{ab} (1.94)	120.25_{a} (4.16)	6.64***	B > D

Note. Cases with no G5 data were excluded. Standard errors are in parentheses. Subscripts: $_{a, b, c, d,}$ are homogeneous subsets that indicate significant differences between typologies, $_{a}$ = lowest mean scores. Post hoc comparisons used Tukey's HSD to control for alpha level, ''>'' refers to significantly larger whereas '','' refers to not significantly different at alpha = .05 level.

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

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