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Predicting Infant/Toddler Social-Emotional Outcomes from Intrapersonal Caregiver
Characteristics and Child Care Quality

A dissertation submitted in partial satisfaction
of the requirements for the degree Doctor of Philosophy
in Education

by

Catherine Tsao

2015

ABSTRACT OF THE DISSERTATION

Predicting Infant/Toddler Social-Emotional Outcomes from Intrapersonal Caregiver Characteristics and Child Care Quality

by

Catherine Tsao

Doctor of Philosophy in Education

University of California, Los Angeles, 2015

Professor Carollee Howes, Chair

This study examines the effects of intrapersonal caregiver characteristics on infant/toddler social-emotional outcomes and if these relations are mediated by the level of sensitive and responsive care within the context of center-based child care. Data come from 111 caregivers and 114 children from 41 Early Head Start and community infant/toddler classrooms in California. Path analyses estimated direct and indirect effects of caregiver emotion regulation and internal representations of care and revealed that sensitive and responsive care mediated the association between these intrapersonal caregiver characteristics and children's social-emotional outcomes. Results suggested that caregivers' ability to form a positive affective and relational community within the group of infants and toddlers was more important than their ability to attend to children solely on an individual basis.

The study provides evidence for the value of developing early childhood professional development strategies aimed at helping caregivers understand the importance of child-level and group-level attunement as well as recognize child- and group-level indicators of security, regulatory capacity, engagement, and sense of community.

The dissertation of Catherine Tsao is approved.

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DEDICATION

This dissertation is dedicated to Gilbert, Nancy, and Ann Tsao for their enduring support and encouragement as well as to Carollee Howes for her guidance, mentorship, and outstanding example of how to be a researcher and friend.

It is also dedicated to the caregivers, children, and families who so generously welcomed me into their programs.

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Jung, Y., Tsao, C., & Vu, J. (2011). What do state quality rating systems say about early childhood education competencies and professional development? In C. Howes & R. C. Pianta (Eds.), *Foundations for Teaching Excellence: Connecting Early Childhood Quality Rating, Professional Development, and Competency Systems in States* (pp. 95-116). Baltimore: Paul H. Brookes Publishing Co.

Tsao, C., & Howes, C. (in press). Assessment of caregiver-child interactions and relationships in infant/toddler classrooms. In O. Saracho Ed.), *Contemporary Perspectives on Educational Assessment and Evaluation in Early Childhood Education*. Charlotte, NC: Information Age Publishing.

Selected Presentations

Tsao, C., Howes, C., Marcella, J., & Baldanza, M. (2013, April). *The contribution of preschool children's engagement with pre-academic classroom activities, teacher engagement, and teaching practices to school readiness*. Poster presented at the biennial meeting of the Society for Research in Child Development, Seattle.

Tsao, C., & Howes, C. (2011, November). *Predicting infant/toddler social-emotional outcomes from intrapersonal caregiver characteristics and child care process quality*. Invited poster presented at the Head Start Early Care and Education Research Scholars Grantee Meeting, Bethesda, MD.

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In the past few decades, we have learned a great deal about quality in early childhood education; there is compelling evidence that high-quality early education experiences are associated with positive child outcomes across developmental domains, especially for children who are considered to be “at risk” because of living in homes impacted by poverty (Burchinal & Cryer, 2003; Burchinal, Roberts, Nabors, & Bryant, 1996; Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Heckman & Masterov, 2007). Furthermore, there is a vast and relatively consistent body of research that defines quality, as well as valid tools for measuring it in a variety of early education settings, especially at the preschool level. Although there is certainly always more to be learned, a lack of scientific knowledge about what quality looks like, and how it impacts child outcomes, no longer appears to be the primary impediment to delivering high-quality care.

However, there continues to be a discouraging lack of quality in early childhood programs in the United States, particularly in programs serving infants and toddlers. A landmark study in the mid-1990s found 40% of infant/toddler classrooms in a four-state sample to be of such low quality as to risk children’s health and safety, and no studies contradicting these findings have been published to date (Cost, Quality, & Child Outcomes Study Team, 1995). Although educational policy and investments have begun to reflect an acknowledgment that the prekindergarten period is an important window for interventions aimed at improving child outcomes and school readiness, the first few years of life continue to exist largely off the radar of researchers, policymakers, and early childhood educators. Why, then, is there such a disparity between what we *know* and what we are able or willing to *do*?

Sensitive and Responsive Care Within a Group Context

Because development during the infant/toddler period is deeply rooted in children's relationships with their caregivers, a critical aspect of child care quality is the quality of dyadic interactions between caregivers and children, characterized by *sensitivity* and *responsiveness* (Howes, in press). Sensitive and responsive care is that which responds to children's cues and meets their needs in timely, contingent, and predictable ways. To provide sensitive and responsive care, caregivers must be attuned to children's developmental goals, individual needs, and cultural context (Fox, Henderson, Marshall, Nichols, & Ghera, 2005). There is a vast research literature establishing the link between sensitive and responsive care and child outcomes, both with regard to parents and nonparental caregivers (Ahnert, Pinquart, & Lamb, 2006).

In contrast to the view that caring for young children is an innate ability requiring little education and few qualifications, providing this level of sensitive and responsive care within a group-care setting places significant demand on caregivers, who must be able to simultaneously attend to the needs of several very young children and to meet those needs largely through one-on-one interactions. Caregivers must also be responsive to individual and group needs in ways that build a community within the early education setting, one in which children develop a sense of self in relation to others, acquire notions of group identity and belonging, and care for rather than compete with each other.

Why are some infant/toddler caregivers more effective at providing sensitive and responsive care than others? Recently, some researchers have begun asking similar questions at the preschool and early elementary levels, seeking to provide explanations for why, across large and small samples, some teachers have been able to maintain positive emotional classroom climates while others have resorted to harshness, anger, hostility, detachment, or withdrawal in

their interactions with children (Raver, Blair, & Li-Grining, 2012). Research, policy, and intervention efforts have attempted to define and address caregiver competencies by describing certain core knowledge, skills, or dispositions that are thought to characterize effective caregivers (Administration for Children and Families Office of Family Assistance Child Care Bureau, U.S. Department of Health & Human Services, 2007; Center for the Study of Child Care Employment, 2008). Some of this work has led to more stringent licensing regulations or agency requirements for caregiver education or training, articulation of caregiver preparation curricula, and the implementation of state or local early childhood quality improvement systems.

Many of these efforts are aimed at improving children's early childhood education experiences by strengthening caregivers' knowledge (e.g., information about developmental stages, familiarity with the major developmental theories), skills (e.g., strategies for facilitating children's language development, classroom organization and management), and beliefs (e.g., beliefs about the role of play). For example, we may attempt to help caregivers understand the importance of sensitive and responsive care for child outcomes by providing resources and training or by offering incentives to encourage caregivers to pursue formal education in child development. Similarly, we may try to change caregiver behaviors through coaching, technical assistance, or the articulation of recommended practices in the form of program guidelines, accreditation criteria, or quality rating systems.

It is possible, however, that simply intervening at the level of caregiver knowledge, skills, and beliefs is not sufficient. Caring for young children is a complex process to which caregivers bring their own social-emotional competencies and experiences of being cared for. Not all caregivers demonstrate equal levels of social-emotional competence and not all caregivers experienced early caregiving relationships that were sensitive and responsive. We would expect

this variability to inform caregiver support for young children's social-emotional development. Likewise, the ability of caregivers to take up the information and skill-based support offered through intervention efforts may be influenced by what they bring to the work.

This study addresses the existing research gap on infants and toddlers in child care classrooms by investigating the effects of certain *intrapersonal caregiver characteristics*, not yet fully explored in the context of infant/toddler care, on young children's social-emotional outcomes. In addition, it determines whether the relation of intrapersonal caregiver characteristics to child outcomes is mediated by caregiver sensitivity and responsiveness toward the child in the group context. Intrapersonal caregiver characteristics are defined as psychological characteristics associated with the formation of relationships; they play an especially significant role during the infant/toddler period when so much of children's development takes place within the context of the caregiver-child relationship (Cassidy, 1994). Intrapersonal caregiver characteristics are involved in the processes by which caregivers perceive, evaluate, and act on events and are hypothesized to influence *interpersonal* processes (i.e., caregiver-child interactions). They are distinguished from knowledge, skills, and beliefs.

Previous research in child care centers and family child care homes has found that caregivers' psychological characteristics, such as depression or attitudes about children and childrearing, are significantly associated with the quality of caregiver-child interactions (Clarke-Stewart, Vandell, Burchinal, O'Brien, & McCartney, 2002; Hamre & Pianta, 2004; NICHD ECCRN 1996; Pianta et al., 2005). This emerging body of work, as well as a rich research literature from the parenting field, suggests that intrapersonal caregiver characteristics may be important factors to consider in a deeper investigation into the predictors of sensitive and

responsive care and child outcomes (e.g., Hamre & Pianta, 2004; NICHD ECCRN, 1996; Pianta et al., 2005).

Intrapersonal Caregiver Characteristics

This study examined caregiver characteristics within two areas of the social-emotional domain of development: emotion regulation and internal representations of care.

Emotion regulation. Self-regulation is seen as a major developmental task and a cornerstone for learning and development in all domains, both influencing and influenced by social interactions (Calkins & Hill, 2007; Morris, Silk, Steinberg, Myers, & Robinson, 2007). Caring for infants and toddlers, then, certainly involves providing support for children's emerging regulatory capacity. During the infant/toddler period, children progress from displaying largely reactive regulatory capacities (e.g., crying, seeking physical proximity) to demonstrating some degree of control and initiative in regulating their affective states. As well, during this period children progress from being almost completely dependent on adults for regulation to being able to employ some strategies on their own. The dramatic developmental changes in self-regulation during the infant/toddler period, and their relevance for children's outcomes across domains, point to the importance of having caregivers who are able to facilitate children's acquisition of regulatory skill within a group setting (Sroufe, 2000). Caregivers' skill in responding appropriately and flexibly to the cues of infants and toddlers becomes incorporated into children's growing repertoire of strategies and approaches for regulating their own affective states and those of others.

Emotion regulation is understood in terms of the specific context and individual and interactional goals (Gratz & Roemer, 2004; Thompson, 1994). In the context of early education settings, effective caregivers must recognize whether each child in a group is regulated or

dysregulated (or somewhere in between), identify the circumstances that support self-regulation for young children and plan environments and experiences accordingly, intervene when children require assistance, use language that promotes self-regulation in very young children, and (especially in the case of infants and toddlers) deal with often-intense displays of emotion repeatedly throughout the day. Facilitation of young children's developing self-regulation is a complex set of responsibilities. A great deal is asked of caregivers and a great deal is assumed about them, including the expectation that caregivers themselves have access to strategies for managing their own emotional responses.

In this work I assessed caregiver emotion regulation using a self report measure. Observational studies of child care environments tend to find low frequencies of caregiver dysregulation, perhaps because of the presence of an observer in the room. By asking caregivers to rate their own emotion regulation difficulties I expected to better assess caregiver access to emotion regulation strategies.

Internal representations of care. Through repeated early experiences, infants begin to develop expectations of self and caregiver that form the basis for Bowlby's (1973) notion of *internal working models* of self and other (Thompson, 2008). However, internal working models of self and other are not only meaningful during childhood; rather, Bowlby (1973) argued that human beings throughout the life span are best able to function at their fullest capacities when they have secure representations of supportive interpersonal relationships. Within this theoretical framework, when adults construct attachment relationships with young children, they draw upon their own internal representations of caregiving relationships. These representations influence caregiving behaviors as well as the caregiver's ability to consider the child's perspective in interactions (Ainsworth et al., 1978; Belsky & Fearon, 2008; Berlin, Cassidy, & Appleyard,

2008; Bretherton & Munholland, 2008; Cassidy et al., 2005; Slade, Belsky, Aber, & Phelps, 1999; van IJzendoorn, 1995). No extant study has examined internal representations of caregivers of infants and toddlers. However, the practices involved in caring for young children in a group context (e.g. feeding, sleeping, diapering) are similar to parenting practices and suggest that caregiver representations may map well onto parenting practices.

Personality. Personality is defined as broad tendencies in an individual's mental states, affective experience, and behavior. The Big Five taxonomy was derived from analyses of the “natural-language terms” that people use to describe themselves and defines five personality traits: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness (John, Naumann, & Soto, 2008).

To date, no studies have examined caregiver personality in the context of infant/toddler care. In a meta-analysis investigating associations between the Big Five personality traits and dimensions of parenting (average child age 4 years 8 months), Prinzie and colleagues (2009) found that higher levels of extraversion, agreeableness, conscientiousness, and openness and lower levels of neuroticism predicted greater parental warmth and behavioral control. Higher levels of agreeableness and lower levels of neuroticism were associated with greater support for autonomy. Again the similarities between parenting and infant-toddler caregiving suggest that these personality characteristics may play a role in caregiving practices.

Child Outcomes

Self-regulation. The broad construct of self-regulation encompasses physiological, behavioral, attentional, and emotion-related developmental processes; for example, infants' sleep-wake cycles become more predictable and children may deal with over-stimulation by

employing strategies such as gaze aversion or proximity-seeking to a caregiver (Calkins & Hill, 2007).

For the purposes of this study, I looked at children's self-regulation in terms of the degree to which they were able, within the context of the caregiver-child relationship, to sustain attention for developmentally reasonable periods of time and manage their observed emotional arousal. Engagement and disengagement of attention may be both an indication of children's level of emotional arousal and an important regulatory tool. Children who are under- or over-stimulated often have difficulty sustaining appropriate levels of attention and may appear either disengaged or hyper-focused. Children also learn to shift their attention as a way of modulating their emotional experiences, particularly when faced with negative or unpleasant events.

Throughout the infant/toddler period, children experience and express a range of affective states. Their increasing cognitive, motor, and language skills allow them to become more active participants in understanding and managing their emotions; however, by no means do toddlers have full control over their emotions or behavior.

Although we use the term *self*-regulation, the management of attentional and emotion-related arousal is also social in nature. Children learn about expectations for the expression and management of emotions from other members of their cultural communities, and regulatory support from others is important not just during the infant/toddler period but throughout life. In a supportive caregiver-child relationship, we would expect to see levels of stimulation that are appropriate for the child as well as infrequent and short-lived episodes of distress or dysregulation (Sroufe, 2000).

Attachment security. Investigations of attachment theory in the context of nonmaternal (and, more broadly, nonparental) caregivers have found that young children can form distinct

and significant relationships with their child care providers (Ahnert, Piquart, & Lamb, 2006).

The developmental processes and behaviors that children exhibit are similar in attachment relationship with both parents and child care providers. In both cases, children demonstrate attachment-related behaviors such as following or tracking their attachment figures, crying to communicate distress, maintaining social contact through gestures or vocalizations, and using the caregiver as a secure base from which to explore. Relationship formation seems to happen when children and caregivers spend enough time together, giving both partners opportunities to learn about the cues and responses of the other.

A core principle of attachment theory is that secure attachment relationships are built upon caregivers' internal working models as well as their sensitivity and responsiveness, but these processes may work differently according to context (Ahnert, Piquart, & Lamb, 2006; Howes & Spieker, in press). In center-based care, caregiver sensitivity toward the group of children as well as with individual children may be more important for constructing secure relationships than in informal settings, where sensitivity toward individual children is the best predictor.

A transactional model of development suggests that child functioning is influenced by multiple factors at multiple levels of the child's ecological context and that these influences are not unidirectional; rather, there is a dynamic and reciprocal interaction between adult and child where each has the capacity to influence the other (Calkins & Hill, 2007; Raver, Blair, & Li-Grining, 2012; Sameroff & Fiese, 2000). Within this framework, caregiver-child relationship quality in child care may be influenced by factors such as the age and gender of the child, ethnic match between caregiver and child, caregiver education, and poverty (Howes & Spieker, in press).

Age. Compared with older children, infants and toddlers are, by definition, more dependent on caregiver support in all areas of development, including the social-emotional domain. However, even within the infant/toddler period there are dramatic developmental shifts and considerable variability in children's functioning based, in part, on their age and developmental stage; for example, young infants use more simple strategies for modulate their arousal levels (such as looking at a caregiver when distressed) than older toddlers, who have access to a broader repertoire of more complex strategies (such as asking a caregiver to get a favorite blanket) (Calkins & Hill, 2007; Morris et al., 2007).

Gender. Some, but not all, research into child-caregiver attachment relationships finds girls to form more secure relationships with their child care caregivers than boys, perhaps because of girls' greater likelihood of maintaining proximity to their caregiver (Howes & Spieker, in press). There may also be gender-related individual differences in how children express their emotions; even as toddlers, girls may be more emotionally expressive than boys (Ayoub, Vallotton, & Mastergeorge, 2011; John & Gross, 2007).

Ethnic match. Some, but not all, studies have found more positive caregiver-child relationships when there is an ethnic match (Howes & Shivers, 2006; Saft & Pianta, 2001). These studies suggest that similarities in caregiving practices between parents and caregivers enhance relationship formation. Some researchers have suggested that different cultural communities engage in caregiving practices that reflect the values and beliefs of that community but that cultural community may be defined by much more than just ethnicity (Howes, 2010). In the group care context, there may or may not be similarities between the caregiving practices that children experience in the classroom and those that they experience at home, or across caregivers in a program depending on the philosophy of the program. For example, in programs for children

at risk due to child welfare concerns, classroom practices may be purposely distinct from practices in the home; in campus-based programs, caregiving practices may be determined by the instructional curriculum for student teachers.

There is abundant research evidence to suggest that cumulative risk affects an individual's functioning (Raver, Blair, & Li-Grining, 2012; Sroufe, 2000); Calkins and Hill (2007) have suggested that environmental factors such as poverty that place stress on the caregiver-child attachment relationship are also likely to have a negative effect on the child's development of emotion regulation. Previous research has examined the impact of psychosocial risk on parents; however, the role of cumulative risk of poverty in nonparental caregiving quality has not been the focus of as much inquiry. To begin with, caregivers in early education settings tend to earn low salaries on average and work in environments that can be stressful. Furthermore, in high-risk communities marked by poverty and other stressors, caregivers may experience the same conditions as the children and families that they serve (Raver, Blair, & Li-Grining, 2012). For young children, this could indicate increased vulnerability as a result of having both parents and child care providers experiencing similar levels of chronic stress.

Child temperament. Temperament encompasses individual differences in emotional reactivity and management (by self and others) as well as the bidirectional regulation between attention- and emotion-related systems; it both influences how children respond to caregiver behaviors and shapes the nature of those behaviors (Calkins & Hill, 2007; Cassidy, 1994; Rothbart & Sheese, 2007). Children with reactive temperaments tend to be easily and intensely distressed, difficult to comfort, and stressed by changes in routine; they may be predisposed to difficulties with emotion regulation and social relations (Crockenberg & Leerkes, 2005; Leerkes, Blankson, & O'Brien, 2009). However, the contribution of temperament to caregiver-child

relationship quality and child outcomes in the early education context has not been fully explored because research has traditionally tended to ask “*whether and under what conditions of care—not for whom—child care confers risk or protection*” (Phillips, Fox, & Gunnar, 2011, p. 44). Although the effect of infant temperament on sensitive and responsive care, caregiver-child relationships, and child outcomes is likely not a simple one, I included it for investigation in the study.

Classroom characteristics. In order to investigate the role of contextual factors, a limited number of classroom characteristics were included in the analyses. These included program type (Early Head Start, community, campus child development center, or laboratory school) and implementation of a formal primary care system. Program type may be an indicator of program philosophy and classroom practices; for example, in addition to state licensing regulations Early Head Start programs are accountable to Head Start Performance Standards. The assignment of each child in a group to a particular caregiver may reflect a particular program philosophy that emphasizes relationship formation (Ritchie & Howes, 2003).

The Current Study

In the current study, I investigated the relations among intrapersonal caregiver characteristics, sensitive and responsive care, and children’s social-emotional outcomes for a sample of infants and toddlers in California. More specifically, I assessed (a) the relation of caregivers’ self-reported difficulties in emotion regulation to children’s attentional and emotion-related regulation, (b) the relation of caregivers’ internal representations of care to children’s attachment security, (c) the relation of caregiver sensitivity and responsiveness to children’s social-emotional outcomes, and (d) the extent to which the associations between caregiver characteristics and child outcomes were mediated by sensitivity and responsiveness. The

conceptual model for the study is presented in Figure 1.

I expected caregivers with better emotion regulation to be associated with less dysregulation in children, and caregivers with more secure representations of care to be associated with higher child attachment security. I also expected that caregiver sensitivity and responsiveness would predict children's social-emotional outcomes. Finally, I expected caregiver internal representations and emotion regulation to be predictive of sensitivity and responsiveness and thus indirectly linked to child outcomes. Further, because there is evidence that the security of children's attachment to their nonparental caregivers is shaped by caregiver sensitivity toward the child within the group context and not just by one-on-one caregiver-child interactions (Ahnert, Pinquart, & Lamb, 2006), I expected that this mediated pathway would be a stronger model fit than the direct pathway between caregivers and children.

Method

Participants

Participants included a well-educated, ethnically diverse caregiver sample caring for infants and toddlers from ethnically and linguistically diverse backgrounds. The sample included 111 caregivers (5 males) and 114 children (53 girls) from 41 Early Head Start and community infant/toddler classrooms in California. Table 1 provides descriptive information for caregiver and child demographic characteristics. Among the participating caregivers, 46% were white, 29% were Latino, 11% were Asian, 7% were biracial or multi-racial, and 6% were African-American. Forty-three percent of the children in the study were white, 36% were biracial or multi-racial, 14% were Latino, 4% were African-American, and 2% were Native American. More caregivers (39%) than children (29%) lived in poverty as determined by income-to-needs ratio.

On average, caregivers had 3.5 years' experience working with infants and toddlers ($M = 3.53$ years, $SD = 4.60$, range = .08 – 25 years). Over one-third of the caregivers had at least a bachelor's degree. Close to half of the caregivers had a degree in child development or early childhood education.

At the time of observation, children were between seven and 27 months of age ($M = 19.18$, $SD = 4.59$). The majority of children spoke English at home while one-third spoke one or more languages in addition to English; only 3% of parents reported a language other than English as their child's home language.

Missing data. The sample included 89 matched caregiver-child dyads with complete data. All available data were used for each type of analysis, and cases with missing data were imputed to decrease the risk of bias in the findings.

Procedures

Sampling procedures. Participants were recruited to participate in the study using three steps. First, letters were sent to the directors of all center-based child care programs in California licensed to serve infants (defined by the California Department of Social Services, Community Care Licensing Division as up to 2 years of age). Second, a meeting was held with each interested center and the study was fully described. Third, if directors agreed, they were asked to explain the study and distribute informed consent materials to infant/toddler caregivers and parents. The informed consent materials included a letter describing the study as well as a consent form and stamped, self-addressed envelope. Once the consent forms were received, the directors were contacted to determine caregiver-child matches and schedule data collection.

Each child was paired with only one caregiver. In order to accurately assess children's attachment security and overall caregiver-child relationship quality, several criteria were used in

order to match target children with caregivers who served, at least theoretically, as attachment figures. In order to be included in the study, children had to be between 10 and 24 months of age and enrolled in the classroom with their caregiver for at least two months at the time of the observation (Howes & Oldham, 2001). In programs that used a primary caregiver system (i.e., a subset of children in each classroom is assigned to one main caregiver), caregiver-child dyads were selected based on the classroom's primary care assignments. If multiple parents within a primary care group gave permission for their children to participate in the study, the child closest in age to 18 months was selected as the dyad child for that caregiver. In programs where children were not assigned to primary caregivers, target children were randomly selected from among those with parent permission and matches were made based on caregiver report and a brief observation to determine which caregiver the target child used for help, comfort, or exploration. As an incentive, each participating caregiver was given a children's board book.

The sample size was selected to provide enough power (.80, $\alpha \leq .05$) to detect the expected meditational effects (Arnold & Doctoroff, 2003; Bulotsky-Shearer, Fantuzzo, & McDermott, 2008; Cohen, 1992).

Data collection procedures. For the purposes of collecting measures of sensitive and responsive care and child attachment security, classroom observations were scheduled in advance with the center director or designee. Each caregiver-child dyad was observed in the course of their normal classroom routines during a period of at least one hour. The researcher tried to be as unobtrusive as possible and allowed time for the target child (as well as the other children in the classroom) to adjust to the presence of a visitor prior to beginning the observation. Time-sampled observations were recorded on a code sheet during the observation. After leaving the classroom, the researcher completed the Attachment Q-Set (AQS; Waters, 1987) based on

the entire visit (including the initial period when the researcher entered the classroom as a stranger). After the AQS had been recorded, a parent survey (marked only with the child ID number), consisting of a demographic questionnaire and a parent-report measure of child temperament, was left in the target child's cubby or mailbox along with a stamped, self-addressed envelope that families used to mail the survey back to the principal investigator.

Caregiver interviews were scheduled at the convenience of the program and caregiver and were conducted in a private setting. Caregiver surveys (consisting of a demographic questionnaire and the two self-report caregiver measures) were administered along with the interview; together, both took approximately 60 minutes and interviews were digitally recorded. Participants were informed in advance that the interviews would be recorded and that they could request to hear or delete the recordings at any time. The order of the surveys and interview were counterbalanced such that half of the participants completed the survey first and half completed the interview first. Since multiple visits were often made to the same center, the same interviewer conducted all of the caregiver interviews in order to maintain the sample.

Measures

Caregiver measures. Intrapersonal caregiver characteristics were measured using the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991), the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), and the Teacher Relationship Interview (TRI; Pianta, 1997). The BFI and DERS were administered along with the demographic questionnaire at the time of the interview.

Big Five Inventory. The BFI is a 44-item self-report measure that provides a score for each of the Big Five personality traits (Extraversion, Agreeableness, Conscientiousness,

Neuroticism, and Openness). John, Naumann, and Soto (2008) reported average alpha reliabilities above .80 and average three-month test-retest reliabilities of .85.

Difficulties in Emotion Regulation Scale. The DERS is a 36-item self-report questionnaire designed to assess multiple aspects of emotion dysregulation such as awareness, understanding, and acceptance of emotions; the ability to engage in goal-directed behavior and refrain from impulsive behavior when experiencing negative emotions; and access to subjectively effective emotion regulation strategies. The measure yields a total score as well as scores on six scales derived through factor analysis: (1) nonacceptance of emotional responses, (2) difficulties engaging in goal-directed behavior, (3) impulse control difficulties, (4) lack of emotional awareness, (5) limited access to emotion regulation strategies, and (6) lack of emotional clarity. Higher scores on the DERS indicate greater difficulties in emotion regulation. Gratz and Roemer (2004) reported internal consistency of .93 and test-retest reliability of .88 over a period ranging from 4 to 8 weeks.

Teacher Relationship Interview. The TRI is an 11-item relationship-focused, semi-structured interview that examines caregivers' internal representations of their relationships with particular children and of themselves as caregivers. It elicits relationship narratives encompassing nine dimensions of a caregiver's relationship, what caregivers say about their interactions, how caregivers talk about their relationships with children, and the emotions they express during these conversations. The nine dimensions assessed are: sensitivity of discipline, secure base, perspective-taking, neutralizing negative affect, agency/intentionality, helplessness, anger/hostility, positive affect, and global coherence. Each dimension is scored on a 7-point scale (with the exception of global coherence, which is coded on a 5-point scale) based on all of the information in the interview. In order to maintain the independence of the data, a different

researcher coded the interviews; this researcher was an expert in attachment theory and had achieved gold-standard reliability on the TRI.

The TRI is grounded in attachment theory and based on the conceptualization of caregiver-child relationships as dyadic systems that are affected not only by the actual behaviors and characteristics of the relationship partners, but by each individual's mental representation of the relationship (Stuhlman & Pianta, 2001; Spilt & Koomen, 2009). Since these processes are thought to operate largely outside of conscious awareness, interview-based measures are more appropriate for accessing caregivers' internal working models of caregiving as compared to questionnaires, which tend to capture respondents' conscious thoughts. The TRI is based on a similar conceptual and methodological approach as has been used in parent-child research (Spilt & Koomen, 2009).

Because the nine dimensions of the TRI were highly intercorrelated (see Table 2), a principal component analysis (PCA) with Varimax rotation was conducted. The Kaiser-Meyer-Olkin test verified the sampling adequacy for the PCA, $KMO = .88$ (Field, 2009). Bartlett's test of sphericity, $\chi^2(36) = 592.55, p < .001$, indicated that correlations between items were sufficiently large for PCA. The analysis gave two components with eigenvalues greater than 1 that, together, explained 79.39% of the variance. Table 3 shows the factor loadings after rotation. Component 1 reflects caregiver internal representations associated with the Promotion of Security and Component 2 reflects internal representations associated with Negativity. Agency/intentionality loaded onto both components but had a higher loading under Component 1 and was therefore considered to reflect Promotion of Security.

Sensitive and responsive care within a group context. The measures of caregiver sensitivity and responsiveness were drawn from the M-ORCE ratings. The M-ORCE is a

modified version of the Observational Ratings of the Caregiving Environment (ORCE), a standardized instrument developed by the NICHD Early Child Care Research Network for early education settings (NICHD ECCRN, 1996). The ORCE examines the characteristics of the child's experiences in the early education setting by observing the frequency of specific kinds of behavior directed by the identified caregiver toward the target child as well as specific behaviors displayed by the target child; by rating the quality of the caregiver's behavior and the target child's behavior in the environment; and by rating the overall climate of the early education setting. The modified version of the ORCE (M-ORCE) was developed to capture the kinds of interactions that should predict children's social-emotional development in child care programs and includes both frequency counts and qualitative ratings (Kryzer, Kovan, Phillips, Domagall, & Gunnar, 2007). M-ORCE observations and scales capture the quality of the caregiver's sensitivity, intrusiveness, detachment, and regard for the child and served as the measure of caregiver sensitivity and responsiveness toward the target child. The scales for the overall climate of the child care setting—in the areas of level of control and order, emotional climate, and community building—served as the measure of caregiver sensitivity and responsiveness toward the group of children. Because the M-ORCE is an observation instrument at the individual child level, the sensitivity measures to both the child and the group were collected at the individual caregiver-child level and not the classroom level; together, they capture caregiver sensitivity and responsiveness toward the target child within the context of the infant/toddler classroom.

The M-ORCE is based on a 44-min observation, divided into four 10-min cycles. In the first three 10-min cycles, observers alternate between 30-s observe-and-record intervals for coding the frequency counts. At the end of the first two 10-min cycles observers make brief

notes and tentative qualitative ratings for 2 min. The final 10-min cycle focuses exclusively on qualitative ratings, which are made regardless of the frequency of behaviors and are based on 4-point scales ranging from *not at all characteristic* to *highly characteristic*.

The principal investigator of this study collected all of the data using the M-ORCE. The training procedure for the M-ORCE began with a discussion of the measure's manual and all constructs between a group of experts in child development, graduate students, and faculty. Following this introduction to the M-ORCE, we practiced administering the instrument using video clips and in live classrooms. Interrater reliability was calculated with another principal investigator who was using the M-ORCE prior to beginning data collection and in the middle of data collection to prevent observer drift. For the nominal data of the behavioral scales, we reached average kappas of 0.73 or above, indicating substantial or good interrater reliability (Hallgren, 2012; Landis & Koch, 1977). For the ordinal data of the behavioral scales, we reached average ICCs of .87 or above, indicating excellent interrater reliability (Hallgren, 2012). For the ordinal data of the qualitative ratings, we achieved average ICCs of 0.73 or above, indicating good or excellent interrater reliability (Hallgren, 2012).

Two individual items from the M-ORCE were included as measures of caregiver sensitivity and responsiveness. *Mutual exchange* rates the level of reciprocity and responsiveness in caregiver-child interactions. *Positive emotional climate* rates the climate of the classroom as experienced by the target child while being observed with the caregiver. Principal component analysis (PCA) with Varimax rotation was conducted on ten additional ratings from the M-ORCE: sensitivity, intrusiveness, detachment, positive regard for the child, chaotic, over-control, negative emotional climate, community building, and expressed community. The Kaiser-Meyer-Olkin test verified the sampling adequacy for the PCA, $KMO = .71$ (Field, 2009). Bartlett's test

of sphericity, $\chi^2(36) = 302.79, p < .001$, indicated that correlations between items were sufficiently large for PCA. The analysis yielded three components with eigenvalues greater than 1 that, together, explained 64.96% of the variance. Table 4 shows the factor loadings after rotation. Component 1 reflects Attunement, Component 2 reflects Intrusiveness, and Component 3 reflects a Sense of Community.

Child outcomes. Child attachment security and self-regulation were assessed based on information gathered during the classroom observation. Parent report of child temperament was gathered along with the family demographic questionnaire.

Self-regulation. One individual item from the M-ORCE, *attention*, was included as a measure of attentional regulation. Principal component analysis with Varimax rotation was conducted on four child mood ratings that captured the degree of emotional arousal or dysregulation. PCA revealed two components with eigenvalues greater than 1 that, together, explained 70.23% of the variance. Component 1 reflects Anxious Mood and Component 2 reflects Unhappy Mood. The Kaiser-Meyer-Olkin test verified the sampling adequacy for the PCA, $KMO = .56$ (Field, 2009). Bartlett's test of sphericity, $\chi^2(6) = 44.46, p < .001$, indicated that correlations between items were sufficiently large for PCA. Table 5 shows the factor loadings after rotation.

Attachment security. Children's attachment security with their caregivers was assessed using the observer Attachment Q-Set (AQS; Waters, 1987), which consists of 90 behavior items that are theoretically indicative of the nature of the caregiver-child relationship (Waters, 1995). Following the classroom observation, the observer sorted the AQS items into nine equal piles ranging from least to most characteristic of the child. Each item was assigned a 1 – 9 rating based on its pile. We obtained security scores by correlating the raw AQS scores with the

criterion scores provided for security (based on experts' sorts of a prototypically securely attached child) by Waters (1995). These correlation coefficients are the children's security scores, which can range from -1.0 to 1.0. A higher score indicates greater security. In this sample, AQS security scores ranged from -.22 to .77. The AQS itself does not yield categories of secure or insecure attachment relationships, but AQS scores of .33 and above are used as a cut-point for security (Ahnert, Pinquart, & Lamb, 2006). Individual items have been used to form five subscales: avoids, resists, seeks comfort, secure base, and harmonious interactions (Howes & Ritchie, 1999). In addition to the AQS security score, I included the subscales of *avoids* and *resists* to capture the three basic classifications commonly used to describe attachment quality.

AQS security scores have reasonable associations with Strange Situation classifications of child–mother attachment quality (van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004; Vaughn, Lefever, Seifer, & Barglow, 1989). Observations can take place in a variety of everyday settings; therefore, the AQS is considered to be less situation-specific than the Strange Situation and has been used widely in early education programs (Ahnert, Pinquart, & Lamb, 2006; Howes & Wishard Guerra, 2009). Posada and colleagues (Posada, Carbonell, Alzate, & Plata, 2004; Posada et al., 1995) have completed extensive cross-cultural validation work on the AQS and consider it valid in Latino samples.

The principal investigator of this study collected all of the data using the AQS. Training on the AQS was conducted by a senior faculty member who was an expert in attachment theory and had achieved gold-standard reliability on the AQS. Following training, the principal investigator reached 88 percent agreement with the criterion sort.

Caregiver- and child-level covariates. A number of demographic characteristics for both caregivers and children were included in the analyses. These included (a) child age, (b)

gender, (c) race/ethnicity, (d) languages spoken to the child at home, (e) languages spoken by the caregiver in the classroom, (f) caregiver education/major, and (g) income-to-needs ratio.

Caregiver and child family poverty were measured using an income-to-needs ratio, which is calculated by dividing the total family income by the appropriate poverty guideline for the family size (adjusted annually by the U.S. Department of Health and Human Services). Poverty is defined as an income-to-needs ratio of 1 or less. Caregiver and child family income were gathered as part of a brief survey about caregiver and family backgrounds. Since some of the participating programs were based on college campuses, the caregiver sample includes college students. Caregivers who identified themselves as students were asked to report their own income if they filed income taxes as individuals and to report their family income if their parents still claimed them as dependents.

Over half of the caregivers reported speaking one or more languages, in addition to English, in the classroom. However, anecdotal information gathered during the classroom observations and semi-structured interviews suggested that this statistic might have been over-reported in the demographic surveys. In order to support children's language acquisition in general and dual-language development in particular, early childhood educators are often encouraged to incorporate American Sign Language (or other signs and gestures) into their interactions with children or to learn a few words in children's home languages; however, their familiarity with these languages may not have met the level of proficiency intended by the survey question. Since there was doubt as to the validity of this item, it was not considered for further analysis.

Temperament. Children's temperament was measured using the Emotionality, Activity, and Sociability Temperament Survey for Children (EAS; Buss & Plomin, 1984), a 20-item

parent-report measure with four 5-item scales assessing the dimensions of emotionality, activity, sociability, and shyness (Boer & Westernberg, 1994; Singh & Waldman, 2010). The EAS was placed in children's cubbies or parent mail boxes upon completion of the classroom observation and families mailed the survey back to the principal investigator. Follow-up emails were sent to parents who did not return their surveys within 2 weeks of the classroom observation and approximately once a month subsequently. In some cases, assistance from program staff was also enlisted in order to maximize the return rate for parent surveys.

Site-level covariates. As a test of the role of contextual factors, a limited number of classroom-level covariates were considered for analysis. These covariates included program type (Early Head Start, community, campus child development center, or laboratory school) and implementation of a formal primary care system.

Overview of Analysis

The first step in the analysis was to compute descriptive statistics and bivariate correlations for all variables. The second step was to test for associations and covariates. The third step was to test the multilevel path models.

Results

Descriptive Analyses

Table 6 provides descriptive statistics and intercorrelations for all predictor variables. Caregivers' internal representations during the semi-structured interview tended to be rated as high in Promotion of Security and low in Negativity. On average, caregivers' scores on the BFI were within the normative range and they reported few difficulties in emotion regulation (DERS), although the ranges for scores on these measures were wide.

Scores on the BFI and the DERS tended to be modestly intercorrelated both within and

across measures. Because the DERS was more directly related to the conceptual framework of the study and due to the interrelatedness of the measures, as well as the fact that the BFI was not significantly correlated with any of the mediator ($r = -.13$ to $.23$) or child outcome variables ($r = -.19$ to $.24$), only the DERS scores were used in subsequent analyses. TRI representations of security and DERS scores for non-acceptance of emotional responses were significantly and negatively correlated. There were no other significant associations between TRI and DERS scores.

Table 7 provides descriptive statistics and intercorrelations for all outcome variables. On average, children's AQS security scores fell in the secure range and they displayed low levels of emotional arousal or dysregulation (i.e., Anxious or Unhappy Mood). As expected, ratings of attention were associated with observed Anxious Mood. AQS security scores were independent of observed emotional arousal or dysregulation and, as expected, AQS resist subscale scores were significantly associated with observed Anxious and Unhappy mood.

Table 8 provides descriptive statistics and intercorrelations for all mediators. Caregiver-child interactions tended to be low in Intrusiveness and high in positive emotional tone, Attunement, and Sense of Community; however, interactions tended to be somewhat one-sided, reflecting mutuality or reciprocity only 15% of the time. The majority of programs were campus-based child development centers (35%) and laboratory schools (37%); 3% were Early Head Start and 25% were community-based (non-Early Head Start). Primary care assignments were implemented in 89% of classrooms overall, 100% of Early Head Start, campus child development center, and lab school classrooms, and 56% of community-based classrooms.

I selected variables to be used in subsequent analyses according to the following criteria: conceptual relevance to the proposed model, independence of other relevant measures, and

sufficiently large range to permit analysis. Scores for five of the six DERS scales were highly related ($r = .43 - .77, p = .01$); therefore, I selected “limited access to emotion regulation strategies” as the scale to include for further analysis, both because it was most highly correlated with the other scales and because it was conceptually most relevant to my research questions. For the measures of sensitivity and responsiveness, the Attunement component from the M-ORCE was significantly correlated ($r > .3$) with mutual exchange, positive emotional climate, and Sense of Community. For this reason, and because it was conceptually most relevant to my research questions, I selected Attunement as the variable to include in my models. The Intrusiveness component from the M-ORCE was not significantly correlated with any of the child outcome measures; therefore, because there was no evidence of mediation, I removed Intrusiveness from further analysis.

Testing for Associations and Covariates

I then considered the influence of a number of possible covariates: child age, caregiver and child gender, child temperament, caregiver and child ethnicity, child home language, caregiver and child income-to-needs ratio, caregiver experience working with infants and toddlers, and caregiver education/major. Overall, there were fewer significant associations and differences than would be expected by chance. Child age was unrelated to the factors in the study ($r = -.18$ to $.17$). Independent t tests found no significant differences in predictors, mediators, or child outcomes by gender; there were also no significant differences in parent report of child temperament by gender $t(98)$ ranged from -0.75 to $1.32, p > .05$. Parent-report of child temperament was unrelated to Attunement ($r = -.06$ to $.13$).

To examine the effects of ethnicity and language, I conducted one-way analyses of variance (ANOVA) in which children’s ethnicity and home language served as the predictors of

sensitivity and responsiveness, attachment security, and self-regulation; all were nonsignificant. Similarly, caregiver ethnicity did not predict differences in difficulties in emotion regulation, internal representations of care, or sensitivity and responsiveness.

Child income-to-needs ratio did not significantly predict attachment security, self-regulation, or most aspects of sensitivity and responsiveness. Caregiver income-to-needs ratio did not significantly predict difficulties in emotion regulation, internal representations reflecting negativity, or most aspects of sensitivity and responsiveness. Caregivers with higher income-to-need ratios were more likely to reflect internal representations consistent with promotion of security during their semi-structured interviews ($r = .23, p < .05$). There were significant effects of both caregiver ($r = .23, p < .05$) and child ($r = .35, p < .01$) income-to-needs ratio on intrusiveness during dyadic interactions.

Caregiver education and major had no significant influence on caregiver DERS, TRI, or BFI. Nor were there significant associations between caregiver education/major and positive emotional climate, Attunement, Intrusiveness, or Sense of Community; however, caregivers with higher levels of education engaged in more mutual exchanges with their target child $F(1,90) = 4.77, p < .05, R^2 = .04$. The amount of experience that caregivers had working with infants and toddlers was not significantly associated with DERS, TRI, or any measures of sensitivity and responsiveness.

For the sake of parsimony, I then removed all potential covariates from my models: child age, caregiver and child gender, child temperament, caregiver and child ethnicity, child home language, caregiver and child income-to-needs ratio, and caregiver education/major. I also removed the primary care site-level covariate due to insufficient range for analysis.

Path Analyses

Path analyses, using structural equation models, make it possible to simultaneously examine the direct effects of intrapersonal caregiver characteristics on child social-emotional outcomes and the indirect effects of these caregiver characteristics through the level of sensitive and responsive care. Since the design of this study involved approximately three caregiver-child dyads per classroom, a multilevel approach was required in order to account for the nested structure of the data (Luke, 2004). Using Mplus software (v.7; Muthén & Muthén, 2012), I specified separate two-level models for self-regulation (M-ORCE ratings of attention, Anxious Mood, and Unhappy Mood) and attachment security (AQS security, avoid, and resist scores). Mplus estimated missing data for all predictor variables using multiple imputation procedures that created five complete data files. The multilevel analyses were conducted for each of the five imputed data files, and coefficients and standard errors resulting from each analysis were averaged to provide estimates of the associations between intrapersonal caregiver characteristics, sensitivity and responsiveness, and two aspects of child social-emotional outcomes. Maximum likelihood estimation with robust standard errors (MLR) was used in calculating all paths.

To determine goodness of fit between the data and my models for attachment security and self-regulation, I used the following fit indices: Root Mean Square Error of Approximation (RMSEA; values less than .05 indicate good fit), Comparative Fit Index (CFI; values greater than .95 indicate good fit), and Tucker-Lewis Index (TLI; values greater than .08 indicate good fit) (Hu & Bentler, 1999). If model fit was acceptable, I examined the parameter estimates and the ratio of each parameter estimate to its standard error (significant at $p \leq .05$ for values greater than 1.96 and at $p \leq .01$ for values greater than 2.56; Hoyle, 1995) to determine the significance of direct and indirect effects. Effect size for the direct effects was considered small if the standardized path coefficients were less than 0.10, medium if around 0.30, and large for values

greater than 0.50 (Suhr, 2008). The full proposed models are shown in Figures 2 (for self-regulation) and 3 (for attachment security).

Self-regulation. The model testing whether caregivers' self-reported difficulties in emotion regulation contributed directly and indirectly through sensitivity and responsiveness (attunement) to children's self-regulation appears in Figure 2 with standardized coefficients. Model fit indices indicated good fit (RMSEA = .00, CFI = 1.00, TLI = 1.00). The path analysis indicated that caregivers' difficulties in emotion regulation contributed indirectly to children's attention, Anxious Mood, and Unhappy Mood through the level of Attunement in their interactions. The model accounted for 16% of the variance in children's attention, 10% of the variance in Anxious Mood, and less than 1% of the variance in Unhappy Mood. Table 9 provides intercorrelations for all variables in the path model predicting children's self-regulation.

Direct effects on self-regulation. There was a direct effect of caregivers' difficulties in emotion regulation on children's Anxious Mood, such that caregivers who reported having greater access to emotion regulation strategies had children who demonstrated lower levels of Anxious Mood ($\beta = -.29, p < .05$). In addition, higher levels of Attunement during caregiver-child interactions predicted children's attention ($\beta = .37, p < .001$). Children in Early Head Start classrooms were less likely to demonstrate Unhappy Mood than children in community, campus-based, and lab school classrooms ($\beta = -.24, p < .001$).

Indirect effects on self-regulation. In addition to examining the direct pathways in the model, I also sought to determine the significance of the mediational pathways by which caregivers' self-reported difficulties in emotion regulation influence children's self-regulation. For all three measures of child self-regulation, effects of caregiver emotion regulation were mediated through the level of Attunement at the between level (indirect effects estimate $\beta = .01$,

$p < .001$). There were no significant indirect effects of caregivers' difficulties in emotion regulation on children's self-regulation at the within level.

Attachment security. The model testing whether caregivers' internal representations of care contributed directly and indirectly through sensitivity and responsiveness (Attunement) to children's attachment security appears in Figure 3 with standardized coefficients. Model fit indices indicated good fit (RMSEA = .00, CFI = 1.00, TLI = 1.00). The path analysis indicated that caregivers' internal representations of care contributed indirectly to children's attachment security through the level of Attunement in their interactions. The model accounted for 21% of the variance in AQS security scores, 24% of the variance in avoid scores, and 9% of the variance in resist scores. Table 10 provides intercorrelations for all variables in the path model predicting children's attachment security.

Direct effects on attachment security. Higher levels of Attunement during caregiver-child interactions predicted children's security ($\beta = .36, p < .001$), avoid ($\beta = -.46, p < .001$), and resist ($\beta = -.20, p < .01$) scores. After accounting for the indirect effects of caregivers' internal representations through the modeled mediator, no direct relation of internal representations to any of the attachment outcomes was observed.

Indirect effects on attachment security. In addition to examining the direct pathways in the model, I also sought to determine the significance of the mediational pathways by which caregivers' internal representations of care influence children's attachment security. For both dimensions of the TRI and all three measures of the AQS, the effects of caregivers' internal representations on children's attachment security were mediated through the level of Attunement between caregiver and child within the classroom context (indirect effects estimate at the between level: $\beta = .01, p < .001$).

Discussion

The importance of early relationship experiences for children's social-emotional outcomes has been established in the contexts of both parental and nonparental care. Less well investigated, however, is the role of caregivers' psychological characteristics in predicting child outcomes. Given the low quality of infant/toddler care in the United States and its implications for children's short- and long-term well-being, understanding the factors that contribute to responsive care and positive child outcomes is important. This study focused on a sample of caregiver-child dyads in infant/toddler classrooms in California, and examined the relations among intrapersonal caregiver characteristics, sensitive and responsive care, and children's social-emotional outcomes. The results confirm some of my hypotheses and fail to find evidence for others.

Interestingly, very few of the caregiver or child demographic variables played a role in caregiver attunement or child outcomes. In terms of ethnicity and home language, a possible explanation might be the fact that many of the observations took place on college campuses in California, where ethnic and linguistic diversity are common characteristics of the campus environment and surrounding communities. Furthermore, over one-third of parents identified their children as biracial or multiracial, which suggests that the children's cultural experiences and identities might be more complex than simple ethnic or linguistic labels.

As expected, caregivers who reported having greater access to emotion regulation strategies had children who demonstrated lower levels of Anxious Mood. Although no studies to date have examined these processes in early education settings, this finding is consistent with the literature on family context and emotion regulation and points to a promising area for future research (Morris et al., 2007; Thompson & Meyer, 2007). There was no direct effect of

caregivers' internal representations of care on children's attachment security, which runs contrary to previous findings of an association between parents' and foster parents' internal working models and children's attachment security (Bretherton & Munholland, 2008; Dozier, Stovall, Albus, & Bates, 2001; van IJzendoorn, 1995); however, it is possible that these processes operate differently in caregiver-child relationships than they do in parent-child relationships, and to date there have been no published studies of associations between child care providers' internal working models and children's attachment security.

I also found evidence for the expected direct effects of Attunement on children's attentional control and AQS security, avoid, and resist scores, which is consistent with previous research in family and child care contexts (Howes & Spieker, in press; Morris et al., 2007).

Finally, I found evidence that sensitive and responsive care mediates the association between intrapersonal caregiver characteristics and children's social-emotional outcomes. The indirect effects for both models were significant at the between level but not at the within level, which suggests that caregivers' ability to form a positive affective and relational community within the group of infants and toddlers is more important than their ability to attend to children solely on an individual basis. This is consistent with the extant literature on the topic; for example, a meta-analysis by Ahnert and colleagues (2006) of more than 2,800 children (average age 29.6 months) over 40 studies revealed that caregiver sensitivity within the classroom context was a better predictor of attachment security than sensitivity to individual children.

Limitations

One of the major limitations of this study has to do with sampling bias. Data were collected between January 2012 and September 2014, a period when many infant/toddler classrooms in California had closed their doors as a result of the Great Recession and many of

those that remained open were still facing significant programmatic and fiscal challenges. Recruitment was difficult, with many center directors responding to my outreach efforts by stating that they (or their caregivers) were simply too stressed to consider participating in a research study. Anecdotally, the programs that tended to be receptive to having a researcher in their classrooms seemed to be programs that had greater resources and a more stable infrastructure, were not operating in crisis, and were providing a relatively higher level of quality overall. As a result, the sample lacks the range of quality that other studies would suggest and includes overrepresentation of campus-based child development centers and lab schools. Therefore, it is difficult to generalize these findings beyond the specific sample in the study.

Another limitation has to do with the measures of caregiver emotion regulation and child self-regulation. Self-report measures are easy to administer but provide limited information about observable aspects of emotion regulation. Caregivers reported few difficulties in emotion regulation on the DERS; their responses may reflect the influence of the cultural community of early childhood education, which tends to value emotional control (although testing this hypothesis is beyond the scope of the current study). For example, when facing potentially emotionally arousing events (such as being hit in the face by a toddler), caregivers would tend to maintain fairly neutral or stoic facial expressions and tone, responding calmly with statements such as, “That hurts my body.” Similarly, given the complexity of the construct and the developmental considerations required by the age period, naturalistic assessment of self-regulation in infants and toddlers is challenging and the measures derived from the M-ORCE may not fully capture key aspects of attentional and emotion-related regulatory processes. The literatures on self-regulation in the developmental and adult fields has been growing, but there has been relatively little integration across these age ranges (Gross & Thompson, 2007); despite

the limitations of measurement, this study contributes to a broader discussion of self-regulation by considering both caregiver- and child-level processes.

Implications

The current study was designed to examine a model of the caregiver-child relationship, within the context of the infant/toddler classroom, by including some factors that have not commonly been the direct focus of research. The significant direct and indirect effects suggest that future research is needed on defining the intrapersonal caregiver characteristics that play a role in relationship formation and children's social-emotional outcomes. Furthermore, the evidence presented here suggesting a mediated pathway from caregiver characteristics through sensitivity and responsiveness to child outcomes tells us that context matters. Infants and toddlers in child care centers do not construct relationships with their caregivers in a vacuum; as members of a classroom community, they also influence—and are influenced by—caregiver sensitivity and responsiveness toward the group.

This study only begins to delve into some of the complex processes that may contribute to child outcomes but suggests several implications for professional development and intervention. Although infant/toddler programs continue to struggle with providing high-quality care, in many communities there are significant resources to support caregivers. However, professional development providers, trainers, and coaches comment that changes in practice are not easily sustained, which they attribute to issues such as high staff turnover or inadequate buy-in from program leadership. In response, they may develop new trainings geared especially for program leaders or provide repeat services to programs who have experienced high staff turnover since the original training and therefore have a large percentage of new, untrained staff. Rather than increasing the *amount* of professional development designed to address low quality by

improving caregivers' generalized knowledge and skills, early childhood systems could consider whether intrapersonal caregiver characteristics might play a role in low take-up of professional development and intervention. For example, a caregiver's own attachment history, rather than a lack of child development knowledge, may be getting in the way of her ability to provide the kind of sensitive and responsive care that promotes security.

The quality of the attachment relationship has been a target of successful intervention, particularly in the parenting field, but not as much work has been done specifically with regard to intervening in the relationships that very young children form with their child care providers (Cassidy, Woodhouse, Sherman, Stupica, & Lejeuz, 2011; Hoffman, Marvin, Cooper, & Powell, 2006). New interventions could be developed for infant/toddler caregivers in center-based programs or existing professional development activities could be modified to incorporate a focus on intrapersonal caregiver characteristics. For example, trainers and coaches could provide strategies for supporting children's emotion regulation through the attachment relationship or through the use of conversation and emotion-rich language (Thompson, 2011).

The findings presented here are consistent with previous evidence indicating that context matters in the construction of relationships between children and their caregivers. In center-based classrooms, it is important that caregivers are able to provide sensitive and responsive care at the group level as well as with individual children within the group; in other words, they must see the forest *and* the trees. A potential future area for professional development might focus on helping caregivers understand the importance of child-level and group-level attunement and how these processes are similar or different. Other areas for future professional development work might involve helping caregivers recognize child- and group-level indicators of security,

regulatory capacity, engagement, and sense of community as well as identifying specific caregiving behaviors or strategies that contribute to attunement in the group context.

Figure 1
Conceptual Model

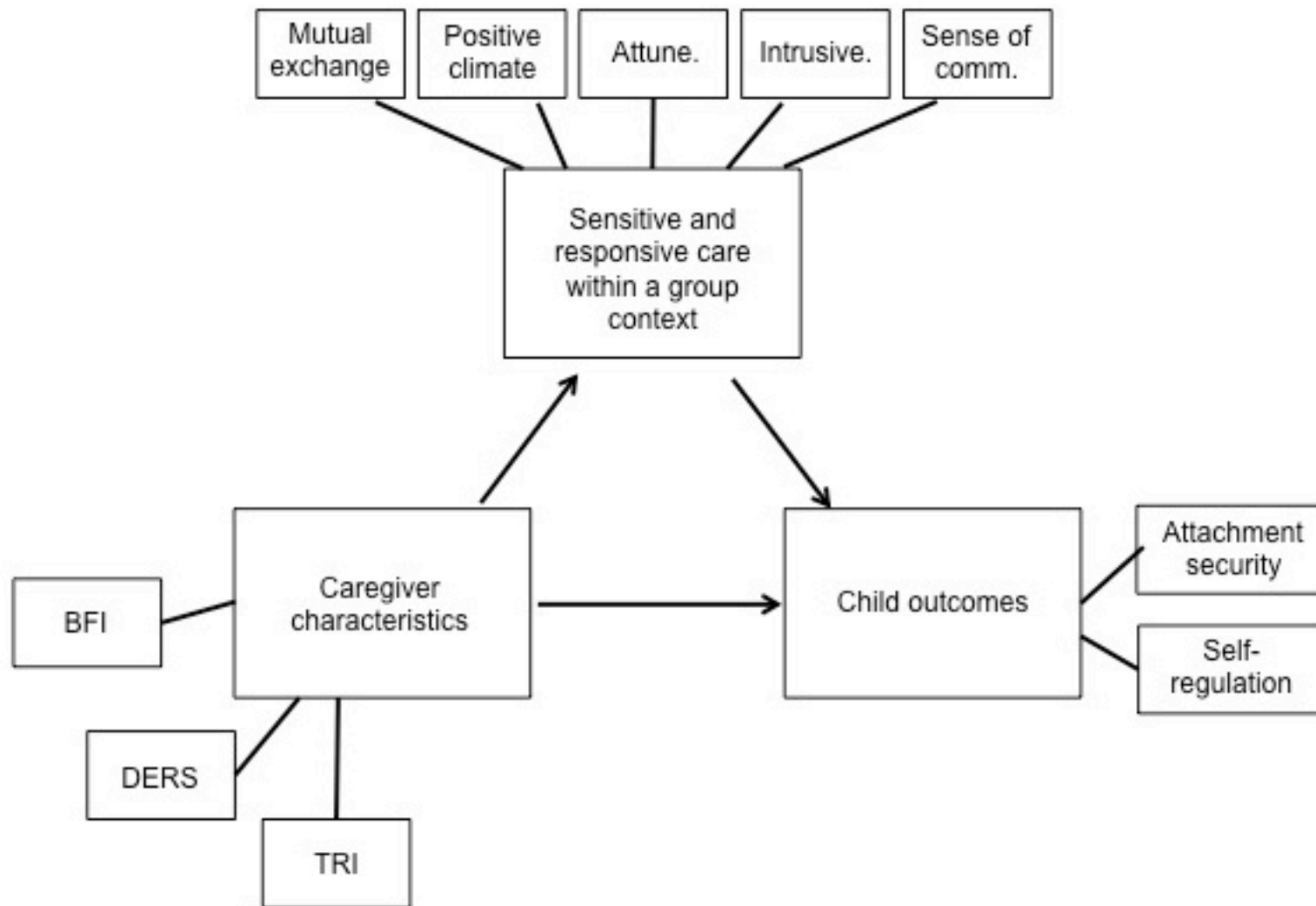


Figure 2
Standardized Path Coefficients for the Model Predicting Emotion Regulation

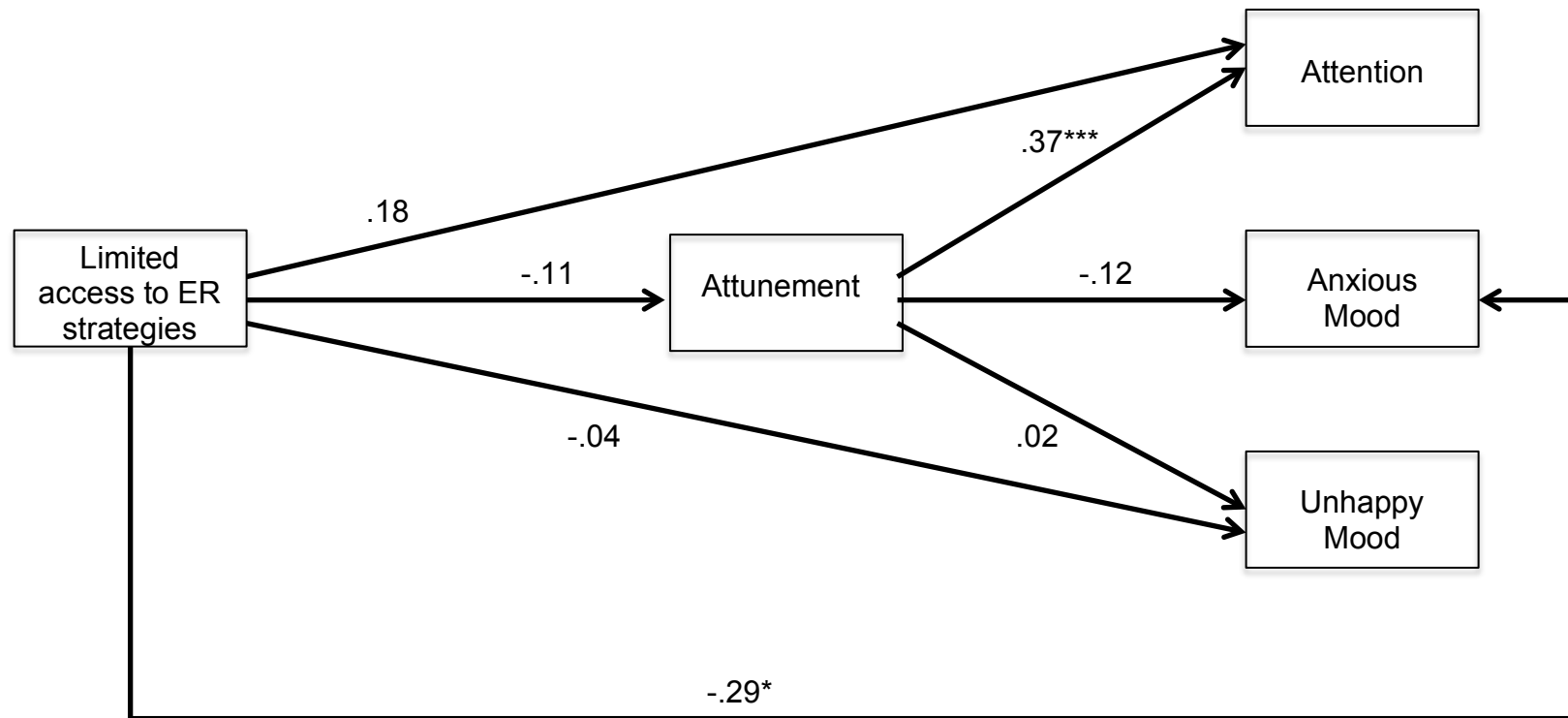


Figure 3
 Standardized Path Coefficients for the Model Predicting Attachment Security

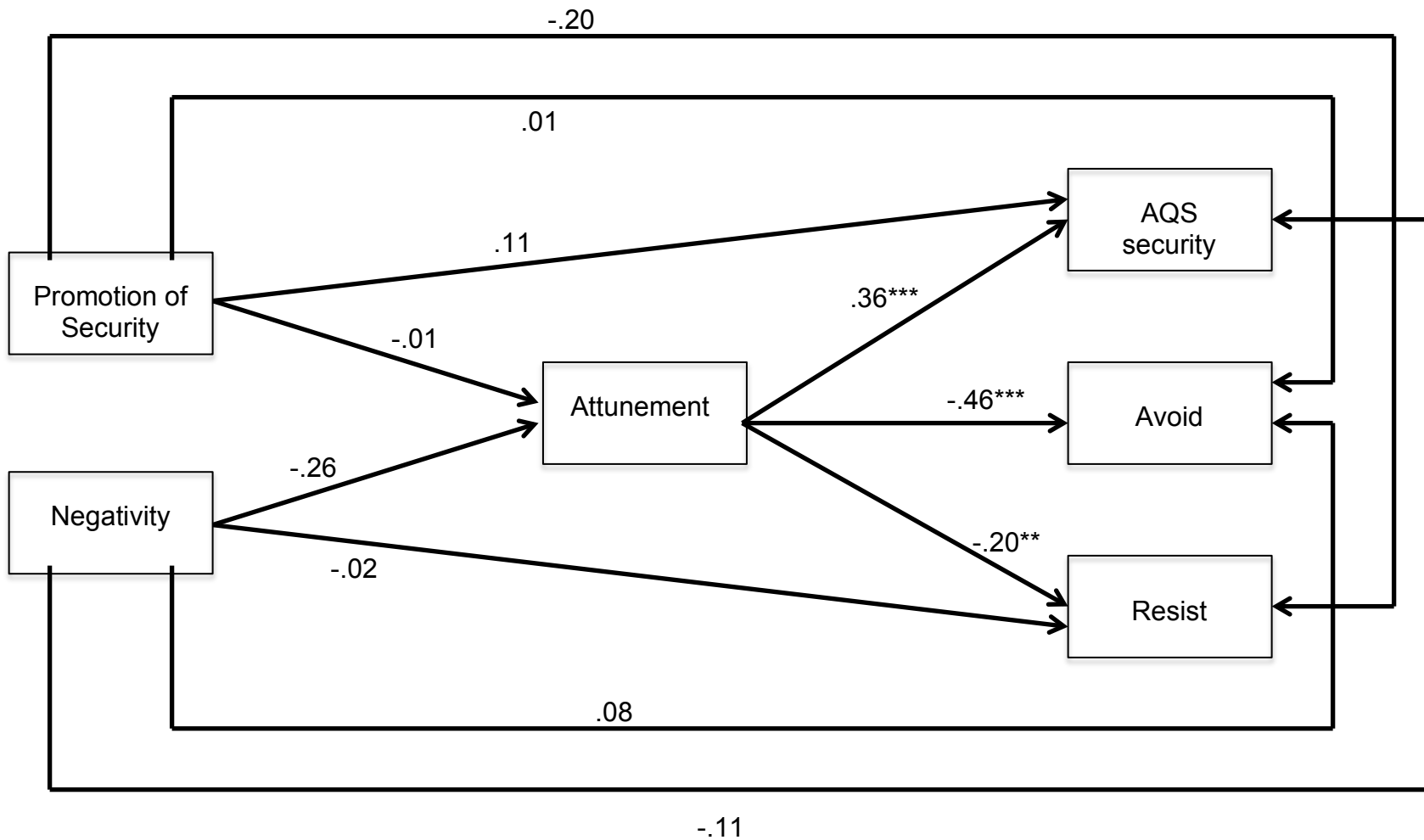


Table 1
Descriptive Statistics for Caregiver and Child Demographic Characteristics

Characteristic	Caregiver (N = 111)		Child (N = 114)	
	M(SD)	%	M(SD)	%
Gender (female)		95.49		53.00
Ethnicity				
African-American		6.30		4.00
Asian		10.31		
Biracial/multi-racial		7.21		36.00
Latino		28.83		14.00
Native American				2.00
White		45.95		43.00
Other or no answer		0.90		1.00
Poverty (income-to-needs ratio)	1.98(1.85)	39.00	3.57(3.32)	29.10
Experience with infants and toddlers (years)	3.53(4.60)			
Education				
No degree		42.34		
Two-year degree		18.02		
Bachelor's degree or higher		28.83		
Master's degree		10.81		
Major				
Child development		39.00		
Early childhood education		10.00		
Other or no degree/major		59.00		
Age (months)			19.18(4.59)	
Home language				
English only				64.00
Spanish only				1.00
Other language only				2.00
English and Spanish				20.00
English and other				12.00
English, Spanish, and other				1.00
EAS Temperament Survey for Children (EAS)				
Sociability			3.73(0.59)	
Shyness			2.85(0.63)	
Activity			3.41(0.52)	
Emotionality			2.40(0.47)	

Table 2
Summary of Intercorrelations for Scores on the Teacher Relationship Interview (n = 103)

Dimension	1	2	3	4	5	6	7	8	9
1. Sensitivity of discipline	–								
2. Secure base	.78**	–							
3. Perspective-taking	.82**	.76**	–						
4. Neutralizing negative affect	-.46**	-.52**	-.48**	–					
5. Agency/intentionality	.70**	.62**	.60**	-.44**	–				
6. Helplessness	-.60**	-.53**	-.50**	.50**	-.73**	–			
7. Anger/hostility	-.42**	-.38**	-.35**	.46**	-.26**	.49**	–		
8. Positive affect	.71**	.66**	.69**	-.37**	.55**	-.40**	-.30**	–	
9. Global coherence	.62**	.62**	.62**	-.44**	.43**	-.38**	-.21*	.54**	–

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

Table 3

Principal Component Analysis with Varimax Rotation for the Teacher Relationship Interview (n = 103)

Dimension	Promotion of security	Negativity
Sensitivity of discipline	.83	
Secure base	.80	
Perspective-taking	.84	
Neutralizing negative affect		.68
Agency/intentionality	.65	-.45
Helplessness		.74
Anger/hostility		.85
Positive affect	.82	
Global coherence	.77	
Eigenvalues	5.30	1.04
% of variance	58.86	11.52

Note: Only factor loadings over .40 are included in the table.

Table 4

Principal Component Analysis with Varimax Rotation for Sensitive and Responsive Care (n = 103)

Rating	Attunement	Intrusiveness	Sense of community
Sensitivity	.88		
Positive regard for the child	.91		
Detachment	-.84		
Expressed community			.65
Intrusiveness		.70	
Over-control		.79	
Chaotic			-.66
Negative emotional climate		.65	
Community building			.83
Eigenvalues	2.98	1.79	1.07
% of variance	33.16	19.91	11.89

Note: Only factor loadings over .40 are included in the table.

Table 5

Principal Component Analysis with Varimax Rotation for Child Mood Ratings from the M-ORCE (n = 113)

Rating	Anxious mood	Unhappy mood
Vigilant/anxious	.86	
Positive mood	-.76	
Angry/irritable	.84	.89
Sad/unhappy		.70
Eigenvalues	1.69	1.12
% of variance	42.29	27.94

Note: Only factor loadings over .40 are included in the table.

Table 6
Descriptive Statistics and Intercorrelations for Predictor Variables

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13
BFI (<i>n</i> = 111)													
1. Extraversion	–												
2. Agreeableness	.04	–											
3. Conscientiousness	.19*	.31**	–										
4. Neuroticism	-.27**	-.38**	-.24*	–									
5. Openness	.30**	.16	.21*	-.27**	–								
DERS (<i>n</i> = 111)													
6. Non-acceptance of emotional responses	-.15	-.15	-.33**	.55**	-.08	–							
7. Difficulties engaging in goal-directed behavior	-.09	-.26**	-.36**	.58**	-.24*	.54**	–						
8. Impulse control difficulties	.09	-.29**	-.26**	.62**	-.21*	.57**	.67**	–					
9. Lack of emotional awareness	-.35**	-.18	-.22*	.11	-.28**	.12	.04	.01	–				
10. Limited access to emotion regulation strategies	-.10	-.18	-.34**	.63**	-.15	.77**	.70**	.76**	.01	–			
11. Lack of emotional clarity	-.12	-.11	-.34**	.37**	-.08	.44**	.48**	.43**	.24*	.55**	–		
TRI (<i>n</i> = 99)													
12. Promotion of security	.26**	.13	.05	-.25*	.04	-.32**	-.15	-.15	-.14	-.21*	-.21*	–	
13. Negativity	-.11	0.11	.20*	.13	.03	.12	.10	.00	.03	.03	.02	-.63**	–
<i>M</i>	3.50	4.34	4.08	2.41	3.72	1.80	2.16	1.31	2.02	1.55	1.47	4.30	2.16
<i>SD</i>	0.75	0.51	0.58	0.75	0.50	0.88	0.98	0.45	0.63	0.70	0.53	1.39	1.31

Note: **p* < .05, ***p* < .01, ****p* < .001; BFI = Big Five Inventory; DERS = Difficulties in Emotion Regulation Scale; TRI = Teacher Relationship Interview

Table 7
Descriptive Statistics and Intercorrelations for Outcome Variables

Measure	AQS security	AQS avoid	AQS resist	Attention	Anxious mood	Unhappy mood
AQS (<i>n</i> = 114)						
Security	-					
Avoid	-.82**	-				
Resist	-.76**	.50**	-			
M-ORCE (<i>n</i> = 113)						
Attention	.11	-.15	-.04	-		
Anxious mood	-.17	.01	.39**	-.30**	-	
Unhappy mood	-.20*	.01	.31**	.07	.20*	-
<i>M</i>	.45	5.35	2.82	1.48	1.27	1.31
<i>SD</i>	.17	1.48	.59	.26	.44	.31

Note: * $p < .05$, ** $p < .01$, *** $p < .001$; AQS = Attachment Q-Set; M-ORCE = Modified Observational Ratings of the Caregiving Environment

Table 8
Descriptive Statistics and Intercorrelations for Mediators (n = 113)

Measure	Mutual exchange	Positive emotional climate	Attunement	Intrusiveness	Sense of community
Mutual exchange	-				
Positive emotional climate	.02	-			
Attunement	.37**	.36**	-		
Intrusiveness	-.13	-.48**	-.08	-	
Sense of community	.24*	.60**	.31**	-.30**	-
<i>M</i>	.15	3.81	3.51	1.17	3.10
<i>SD</i>	.18	.47	.66	.34	.50

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

Table 9
Intercorrelations for Variables in the Path Model Predicting Self-Regulation

Measure	DERS	Attunement	Attention	Anxious mood	Unhappy mood
DERS limited access to emotion regulation strategies	-				
Attunement	-.11	-			
Attention	.10	.34**	-		
Anxious mood	-.28**	-.14	-.30**	-	
Unhappy mood	-.08	.06	.07	.20*	-

Note: * $p < .05$, ** $p < .01$, *** $p < .001$; DERS = Difficulties in Emotion Regulation Scale

Table 10
Intercorrelations for Variables in the Path Model Predicting Attachment Security

	Promotion of security	Negativity	Attunement	AQS security	AQS avoid	AQS resist
TRI promotion of security	-					
TRI negativity	-.63**	-				
Attunement	.16	-.25*	-			
AQS security	.26*	-.31**	.37**	-		
AQS avoid	-.10	.21	-.47**	-.82**	-	
AQS resist	-.19	.16	-.18	-.76**	.50**	-

Note: * $p < .05$, ** $p < .01$, *** $p < .001$; TRI = Teacher Relationship Interview; AQS = Attachment Q-Set

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