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Dimensions of Parenting Associated with Child Prekindergarten Emotion Regulation and Attention Control in Low-income Families

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Abstract

Delays in emotion regulation and attention control are common among children growing up in poverty, and they contribute to significant socio-economic gaps in school readiness and later school attainment. In this study, the emotion regulation and attention control skills of 210 prekindergarten Head Start participants were assessed (M age = 4.80 years old). Home interviews and videotaped parent-child interactions were used to evaluate three aspects of parenting (e.g., warm-sensitive, directive-critical, and parenting stress). Structural equation models documented significant, unique associations linking directive-critical parenting and parenting stress with poor child emotion regulation skills. Directive-critical parenting was also uniquely associated with low levels of child attention control. Warm-sensitive parenting was not uniquely related to either emotion regulation or attention control at this age. The findings suggest that, by prekindergarten, parent stress management and reduced directiveness emerge as the primary correlates of child emotion regulation and attention control, whereas warm-sensitive parenting plays a diminished role.

Growing up in poverty increases the likelihood that children will experience significant delays in school readiness; at school entry, over 40% have underdeveloped language skills and over 20% exhibit disruptive behaviors (Macmillan, McMorris, & Kruttschnitt, 2004). Developmental researchers have long sought to better understand how poverty disadvantages school readiness, in hopes that new insights will inform early prevention and intervention programs (Chazan-Cohen et al., 2009).

Recent research on school readiness has highlighted the importance of child emotion regulation and attention control skills for school success (Blair, 2002). At school entry, children must function effectively in a group, follow rules, and cooperate with others – competencies that require the adaptive regulation of emotion (Graziano, Reavis, Keane, & Calkins, 2007). In addition, they are expected to follow directions, engage effectively in classroom learning activities, and complete assigned tasks – learning behaviors that require attention control (McClelland, Acock, & Morrison, 2006). Accumulating research suggests that delays in child emotion regulation and attention control skills at school entry indicate risk for sustained social and academic difficulties (McClelland et al., 2006) and may reflect,

to some extent, exposure to parenting that is compromised by factors associated with poverty (Bernier, Carlson, & Whipple, 2010). Specifically, prior research suggests that low levels of warm-sensitive parenting, an over-reliance on directive and critical strategies, and elevated levels of parental stress may impede the development of child emotion regulation and attention control during early childhood (Bernier et al., 2010).

However, the existing research base is limited in several critical ways. First, research linking parenting with emotion regulation and attention control has focused primarily on the very early childhood years (Calkins & Johnson, 1998; Crockenberg & Leerkes, 2004); relatively little research has examined associations between parenting and prekindergarten classroom functioning. Second, the parenting correlates of child emotion regulation and attention control are typically studied separately, leaving unanswered questions about the extent to which these two aspects of school readiness have unique (versus common) associations with different parenting dimensions. This study addressed these issues by evaluating hypothesized associations between three aspects of parenting (e.g., warm-sensitive parenting, directive-critical parenting, and parenting stress) and two school readiness skills (e.g., emotion regulation and attention control) among prekindergarten children in Head Start.

Developing School Readiness: The Role of Emotion Regulation and Attention Control

Emotion regulation and attention control both grow dramatically during the preschool years, fostering adaptive approaches to learning in the classroom, and promoting social adjustment and reduced behavior problems (Cole, Martin & Dennis, 2004). Emotion regulation is the ability to initiate or change the intensity and/or duration of an activated emotion, depending on his or her goals and circumstances (Cole et al., 2004). Emotion regulation skills promote school adjustment by fostering social success, enhancing the inhibition of aggressive behavior, and promoting the frustration tolerance needed to sustain persistence in effortful learning tasks (Cole et al. 2004).

Attention control is the ability to focus attention and ignore distractions, to sustain attention over time, and to flexibly shift attention to enhance problem-solving (Blair, 2002). Attention control is fostered by the rapid neural growth and increased connectivity in the prefrontal cortex that occurs during the preschool years, and associated advances in executive function skills (e.g., working memory, inhibitory control, and attention set-shifting). In the classroom setting, attention control fosters adaptive approaches to learning, positive classroom engagement, and reduced distractibility (Blair, 2002; Calkins & Marcovitch, 2010).

Early childhood researchers are increasingly recognizing the developmental interdependency of emotion regulation and attention control. Although they are typically studied separately, these regulatory processes share neural pathways and each benefits from the executive capacity for inhibitory control and set-shifting (Blair, 2002). Conceptually, the capacity to strategically deploy attention fosters emotion regulation during the early childhood years (Gross & Thompson, in press). For example, preschool children who are able to withdraw their attention from threatening or upsetting stimuli (avoidance) or shift

and focus their attention to calming stimuli (distraction) are more able to regulate emotional arousal (Raver, Blackburn, Bancroft, & Torp, 1999). Conversely, the capacity to regulate emotion may help children allocate attention strategically in the classroom, coping effectively with frustrating social or learning challenges (Blair, 2002). For example, Graziano et al. (2007) found that kindergarten children with better emotion regulation skills were more productive and accurate when completing assignments than their dysregulated peers, even with IQ and concurrent behavior problems controlled. In experimental studies, measures of emotion regulation and attention control are moderately correlated (Eisenberg et al., 2010). Given this evidence of the developmental interdependence of emotion regulation and attention control in early childhood, a better understanding of the similarities (or differences) in their parenting correlates is needed.

Parent-Child Interaction Quality and Child Emotion Regulation and Attention Control

Existing theory and research suggest that the pace of the child's development of emotion regulation and attention control skills is associated with the quality of parent-child interaction (Calkins & Johnson, 1998; Cole et al., 2004). Specifically, as noted below, prior studies suggest that warm-sensitive parenting is positively associated with child emotion regulation and attention control, whereas directive-critical parenting is negatively associated with child emotion regulation and attention control in early childhood.

Parental warmth, sensitivity and responsiveness

Multiple studies document links between warm-sensitive parenting and emerging child emotion regulation during the infant and toddler years (Calkins & Johnson, 1998; see review by Calkins & Marcovitch, 2010). The prevailing conceptualization of this process is that parents who display positive affect and express affection, and who respond appropriately to their child's cues serve as effective emotion co-regulators in early childhood. These parents provide external soothing and support to assist children directly as they cope with frustrating or frightening events, and they model self-regulatory strategies that children internalize to support self-calming (Dennis, 2006).

Researchers have also postulated that warm-sensitive parents scaffold the development of attention control, by directing and responding to child interests to promote joint attention, and by using gestures and verbal comments to selectively reinforce and extend the infant's gaze and interest (Hughes & Ensor, 2009). Supporting this link during the toddler years, Bernier, Carlson and Whipple (2010) found that observations of maternal sensitivity were significantly correlated with child attention set-shifting skills on a modified Stroop task. Extending into the preschool years, Hughes and Ensor (2009) found that warm-sensitive parenting observed during a structured parent-child play task when the child was 2 predicted child executive function skills at age 4.

Directive-critical parenting

Conversely, the frequent use of parental directives may impede developing emotion regulation and attention control. Parents who initiate high levels of directives also tend to be

more critical of their children than less directive parents, and less likely to provide explanations, rationales, and reasoning in parent-child interactions (Calkins & Johnson, 1998; Eisenberg et al., 2010). Researchers have speculated that a focus on obtaining obedience and corresponding reliance on directive-critical parenting strategies increases the child's developmental dependence on adults, thereby attenuating the child's efforts and ability to self-regulate their emotions or solve problems on their own (Calkins & Johnson, 1998; Eisenberg et al., 2010). In addition, critical comments and directive commands may increase, rather than decrease frustration in learning tasks (Grolnick, 2009). For example, Calkins and Johnson (1998) found that mothers who gave frequent directives and were more critical and threatening evoked elevated child distress during parent-child interactions, which was in turn associated with the child's limited use of self-soothing and coping strategies during frustration challenges.

A reliance on directive-control, rather than the use of strategies that scaffold child efforts at independent problem-solving, may also impede the development of child attention skills (Hughes & Ensor, 2009). For example, as an alternative to directive-control (e.g., telling their children how to proceed), preschool and prekindergarten children whose parents asked questions, explained the task, and suggested strategies for problem-solving during teaching tasks showed enhanced attention skills (Eisenberg et al., 2010; Neitzel & Stright, 2003).

It is also important to note that, although most research has focused on how parenting affects the child's developing regulatory control, bidirectional influences may also occur. For example, Eisenberg et al. (2010) found that when toddlers were less self-regulated at 30 months, their mothers used more directive teaching strategies a year later, perhaps because they felt their dysregulated children needed more directive support.

Developmental shifts in optimal parenting

Although existing research, as noted above, suggests that warm-sensitive parenting may facilitate and directive-critical parenting may impede the development of emotion regulation and attention control skills during early childhood, the relative influence of each of these parenting strategies may vary developmentally, changing as the child moves through toddlerhood and into the later preschool years. For example, in contrast to the studies of toddlers cited above, Dennis (2006) found no significant correlations between observed parental warmth and child emotion regulation (persistence, frustration tolerance) during challenge tasks for preschool-aged children. Similarly, associations between directive-controlling parenting and child emotion regulation and attention control may shift with development. For example, Landry, Smith, Swank, and Miller-Loncar (2000) found *positive* links between maternal directiveness and child social competence during the toddler years, but this association *reversed* during the preschool years. Developmental theorists have suggested that directive parental control may be appropriate for very young children who lack the skills to self-regulate in challenging contexts, but may undermine self-regulation during the preschool years when children are ready for more autonomy (Eisenberg et al., 2010). However, relatively little research has examined the associations between parenting and child emotion regulation and attention control in the preschool years, creating a need for

additional research. In addition, the context of poverty may affect typical and optimal parenting strategies in ways that deserve closer empirical attention.

Poverty, Parenting Stress, and Child Emotion Regulation and Attention Control

Socio-economically disadvantaged parents face multiple challenges, including financial stress, limited employment and housing options, and social isolation. Relative to their economically advantaged counterparts, they are more likely to feel depressed (Feng, Shaw, Skuban & Lane, 2007), experience parenting frustrations and hassles (Barry, Dunlap, Cotten, Lochman, & Wells, 2005), and feel less satisfied with their parenting role (Arnold, O'Leary, Wolff, & Acker, 1993). Emerging evidence suggests links between parental stress and the development of child emotion regulation and attention control skills. Prospectively, Chazan-Cohen and colleagues (2009) found that, if parents expressed stress about their parental role when children were 14 months old, observers rated their children as less emotionally regulated when they were 5 years old. Similarly, Barry et al. (2005) and Tervo (2010) each found links between parent reports of daily parenting hassles and child attention problems. The developmental mechanisms associated with this link remain unclear; hypotheses have included both direct and indirect influences.

Direct influence

Researchers have hypothesized that parents who are experiencing stress in the parenting role may directly promote maladaptive regulation strategies in their children, both by exposing children frequently to heightened emotional distress (affective contagion) and by modeling maladaptive coping strategies (Arnold et al., 1993, Halberstadt, Crisp & Eaton, 1999; Sroufe, 1995). In addition, stressed parents may display worry and irritability in ways that convey threat to their children, activating their stress response systems, including the hypothalamic-pituitary-adrenal axis (HPA axis). For example, researchers have documented links between parent reports of stressful daily hassles and atypical patterns of child daily cortisol (Brennan et al., 2008). Chronic stress exposure in early childhood may hinder the development of executive function skills and corresponding regulatory control (Blair, 2002). Through one or more of these mechanisms (e.g., modeling, affective contagion, the evocation of heightened stress responding), parenting stress may directly affect the development of child emotion regulation and attention control skills.

Direct, bidirectional influences may also emerge, particularly if emotionally dysregulated children display concurrent externalizing behaviors. For example, Williford, Calkins and Keane (2007) found that, among the subgroup of children who exhibited externalizing problems, difficulties regulating emotion at age 2 predicted subsequent increases in parenting stress.

Indirect influence

Alternatively (or in addition) parenting stress may affect emotion regulation and attention control development indirectly, by reducing parent's levels of warm-sensitive parenting and increasing parent's reliance on directive-critical. In support of an indirect influence model,

Patterson and Fisher (2002) found that parents who experienced minor daily parenting stresses exhibited more negative responses to their children, which in turn, were associated with higher levels of oppositional and emotionally dysregulated child behavior.

Interestingly, although Crnic, Gaze, and Hoffman (2005) and Anthony et al. (2005) both found that high levels of parenting distress (daily hassles, parenting stress) undermined positive parent-child interactions and promoted child oppositional behaviors, neither study found evidence that parent-child interactions mediated the association between parenting daily hassles and child behavior problems. Given these findings, additional research is needed to examine the degree to which direct and/or indirect pathways best characterize the association between parenting stress and child emotion regulation and attention control during the prekindergarten year.

The Current Study

This study examined links between three dimensions of parenting (warm-sensitive parenting, directive-critical parenting, and parenting stress) and two aspects of child school readiness (emotion regulation, attention control) in prekindergarten children from economically-disadvantaged families. Aim 1 was to examine the direct associations between these three dimensions of parenting and child emotion regulation and attention control. It was hypothesized that directive-critical parenting and parenting stress would each show negative associations with emotion regulation and attention control skills. It was less clear whether warm-sensitive parenting would show positive associations with emotion regulation or attention control at this age; extensive research on younger children has documented this link, but the limited research available suggests this association may diminish by prekindergarten. Hence, no hypothesis was made, but the association was explored in this study. Aim 2 was to explore evidence for indirect links between parenting stress and child emotion regulation and attention control mediated by associations with warm-sensitive parenting and directive-critical parenting. It was hypothesized that parenting stress would be negatively associated with child emotion regulation and child attention control, but that these associations would be mediated, at least in part, by the impact of parenting stress on parenting quality.

Method

Participants

Two cohorts of prekindergarten children were recruited in two years (2008 and 2009) from 26 Head Start classrooms (total $N = 210$, 55 % girls; 20 % Hispanic, 25 % African-American, 55 % European American). On average, children were 4.80 years old ($SD = .29$, range = 4.26–5.36). Participating parents were primary caregivers and included 89% mothers, 4% fathers, 5% grandmothers, and 2% other (e.g. other relative or foster parent). Household income ranged from \$2,400 to \$72,000 with a median household income of \$18,000. Slightly over half of the participating parents (54%) were unemployed; 39% were married, 25% were living with a committed partner, and 36% were single parents. Children were excluded from the study only if they lacked sufficient English or had a disability that prevented them from completing the assessments.

Data Collection Procedures

At the start of the school year, recruitment letters were distributed to parents describing an intervention study evaluating two alternative parent support programs. Of the eligible Head Start parents, 52% indicated interest in the study and agreed to the randomization process. This study used baseline data, collected prior to the initiation of intervention. Interested parents were visited in their homes to attain informed consent, as well as collect parent ratings, and a structured parent-child interaction was videotaped (described below). Following the home visit, the two researchers who conducted the home visit completed rating forms on the family (described below). Approximately two months into the school year, a research assistant delivered and explained the teacher-rating measures and obtained the teacher's informed consent. All head-teachers and assistant-teachers in the Head Start Classroom agreed to participate. Head-teacher and assistant-teacher ratings were averaged. Teachers completed the ratings on their own time, and mailed them back to the project office. Child assessments were conducted at school by trained research assistants during two individual 'pull-out' sessions (30–45 minutes each). Parents were compensated \$50 and teachers were compensated \$10 per student. The research was conducted in full compliance with the APA standards for ethical practice in research, under the review of the university Institutional Review Board.

Parents and children were videotaped engaging in three tasks: a non-word book reading, a novel play task (Fischer Price castle), and a teaching task (helping the child with tangram puzzles). Subsequently, the videotapes were coded in the laboratory by an independent set of research assistants. The coding system was developed for this study and was designed to parallel a system used in the larger project to code teacher-child interactions in the classroom, the Classroom Language and Literacy Environment Observation (CLEO; Holland Coviello, 2005). It focused on the quality of language use and emotional tone of interactions. First, coders recorded specific speech forms used by parents, separating directives/commands from other conversation forms (e.g., statements and questions). Coders then watched each tape and made qualitative ratings, judging the emotional valence of the parent-child interaction (items described below). Prior to coding tapes, research assistants participated in a training workshop and attained a minimum of 80% agreement on standardized practice tapes. Subsequently, during the coding process, 20% of the videotapes were monitored to maintain reliability and remediate any observer drift. If disagreement between coders occurred, the master coder's score was used.

Measures

Warm-sensitive parenting—The videotapes of parent-child interactions were rated on 8 items reflecting warm-sensitive parenting using 5-point Likert scales (e.g., “verbal interactions are warm and reflect a loving relationship”, “parent responds promptly and sensitively to the child's initiations”; ICCs = .61 – .75; $\alpha = .94$). The three parent-child tasks were rated separately and ratings were then averaged across task; the average item score was used in analyses.

After the home visit, the two research assistants completed the *Post-Visit Inventory (PVI)* and the *Coders Impressions Inventory* (see www.fasttrackproject.org), rating 11 positive

parenting behaviors (e.g. parent spoke to the child with a positive tone, paid attention when the child talked, showed affection) on a 3-point scale (didn't occur, occurred once, occurred more than once; inter-rater $r = .60$; $\alpha = .87$). In addition, they rated the quality of the parent-child interactions on 8 items used by the videotape coders (inter-rater $r = .61$, $\alpha = .88$). The moderate inter-rater reliability on these ratings likely reflects the fact that research assistants had overlapping but also unique observations to evaluate parenting, as one completed the parent interview as the other played with the child. Ratings were averaged across the two assistants, and standardized across the three measures to create a total score for observed warm-sensitive parenting during the home visit.

Directive-critical parenting—As noted above, videotapes of parent-child interactions were segmented into parent utterances, and coded to discriminate directives/commands (statements that tell the child what to do) from other child-directed utterances (questions, statements). Inter-rater reliability was adequate, $\kappa = 0.87$. The total number of directives during all three tasks served as the indicator of parental directive control.

In addition, at the end of the home visit, the two research assistants rated 5 items on the *PVI* describing observed *negative parental control* attempts (e.g., parent shouted at the child; parent was very strict and controlling.) Each item was rated on a 3-point scale (didn't occur, occurred once, occurred more than once). These ratings were summed and averaged across raters (inter-rater $r = .71$) to assess directive-critical parenting. This scale was positively skewed so it was log transformed before being used in analyses.

Parenting stress—Three measures assessed feelings of stress in the parental role. On the *Parenting Daily Hassles* measure (Crnic & Greenberg, 1990), parents indicated the degree of stress felt about 12 daily events (e.g., cleaning up messes, trouble getting children ready for school) using a 4-point scale (ranging from “rarely” to “almost always”). Item responses were averaged, with higher scores indicating elevated parenting hassles ($\alpha = .77$). On the *Parenting Stress Index* (Loyd & Abidin, 1985), parents used a 5-point scale (ranging from “strongly agree” to “strongly disagree”) to rate 9 items reflecting their satisfaction with and gratification in their role as parent (e.g., “When I do things for my child I get the feeling that my efforts are not appreciated very much.”; “My child makes more demands on me than most children.”) Item responses were averaged, with higher scores indicating more feelings of dissatisfaction with the parent-child relationship ($\alpha = .77$). Finally, parents completed the over-reactivity subscale of the *Parenting Scale* (Arnold, O’Leary, Wolff, & Acker, 1993), which presented parents with 10 scenarios. Parents used a 7-point rating scale to describe the reaction most like their own. For example, for the item “When I’m upset and under stress” parents note whether they are: “picky and on my child’s back” or “no more picky than usual”. Items tapped parental feelings of resentment and frustration, and over-reactive behaviors such as yelling at and arguing with the child. The item responses were averaged, with higher scores indicating negative over-reactivity in the parenting role ($\alpha = .66$).

Child emotion regulation—Child emotion regulation was assessed using two teacher rating scales. Teacher ratings were used because the child’s ability to regulate their emotion in the classroom is an important aspect of school readiness. In addition, this allowed for testing the relations between parenting stress (using parent-ratings) and child emotion

regulation without a shared method bias. Teachers completed the *Social Competence Scale* (CPPRG, 1995), which included a 6-item emotion regulation scale. Teachers used a six-point Likert rating (from “almost never” to “almost always”) to describe the frequency of child behaviors such as, “accepts things not going his or her way” and “stops and calms down when frustrated or upset” ($\alpha = .91$). Item responses were averaged. Teachers also rated 6 items describing children’s *emotional symptoms* (e.g., “many worries or often seems worried”, “acts younger than his or her age”; $\alpha = .79$) drawn from the *Strengths and Difficulties Questionnaire* (Goodman, 1997) and the *Social Competence Scale* (CPPRG, 1995). Item responses were averaged.

Child attention control—Child attention control was assessed with three. On the *Peg Tapping Task* (Diamond & Taylor, 1996) children tapped a peg twice when the interviewer tapped once, and vice versa. Scores represented the number of trials (out of 16) that the child did correctly. In addition, teachers rated child attention control in the classroom using five items from the *ADHD Rating Scale* (DuPaul, 1991) that specifically assessed problems with inattention (e.g. “easily distracted”; “has trouble staying focused”) using a six-point scale ($\alpha = .94$; inter-rater $r = .76$). These attention problem ratings were reverse-scored and combined with three additional items reflecting attention control, drawn from an inventory developed for this study (e.g., “is careful with his or her work”, “can work independently”) and rated by teachers using a four-point scale ($\alpha = .96$). Average item scores were used in analyses, with higher scores representing better attention control. After completing each child assessment session, the examiner rated the child’s task orientation using the *Interviewer Checklist* (Roid & Miller, 1997). The 13 items focus on the child’s attention, sustained concentration, conscientiousness, and compliance in the testing situation; each item was rated on a 4-point scale ($\alpha = .95$). Item responses were averaged so that higher numbers indicated that the child had a higher level of attention control. This scale was negatively skewed so it was log transformed for analyses.

Results

Descriptive Analyses

Descriptive statistics, including means, standard deviations, and number of participants for all measures included in this study are presented in Table 1. Correlations among all measures are shown in Table 2. Measures selected to reflect the same construct showed moderate inter-correlations ($p < .05$), as follows: the three measures of parenting stress ($r = .28$ to $.40$), the two measures of warm-sensitive parenting ($r = .45$), the two measures of directive-critical parenting ($r = .38$), the two measures of child emotion regulation ($r = .57$), and the three measures of child attention control ($r = .43$ to $.50$). Anticipated associations also emerged across constructs, with most measures of parenting stress, warm-sensitive parenting, and directive-critical parenting correlated in the expected direction. The magnitude of these associations was in the small to medium range, suggesting that these dimensions of parenting were inter-related, but distinct. Measures of child emotion regulation and attention control were significantly inter-correlated, but mostly in the small to medium range, with the exception of the teacher ratings which were more highly inter-correlated ($r = .61$).

Measurement Models

All children had parent ratings and direct assessments, but 2% were missing teacher ratings due to teacher turnover and 8% were missing videotape data due to technical difficulties or parent opt out from the videotaping process. All models used AMOS 21 with maximum likelihood estimation to impute missing data. First, latent measurement models were estimated for each outcome (attention control and emotion regulation). This analysis is equivalent to a confirmatory factor analysis that determines whether the hypothesized measurement model adequately fits the data. The measurement model for child emotion regulation is presented in Figure 1. Fit indices were at or better than recommended levels, χ^2 (df = 21, N= 210) = 19.80, $p = 0.53$, Comparative Fit Index (CFI) = 1.00, Tucker–Lewis Index (TLI) = 1.00 and the Root Mean Square Error of Approximation (RMSEA) = .00. All relations between observed measures and latent constructs were statistically significant ($p < .01$) and most factor loadings were above .55. Relations between all pairs of latent constructs ranged from small ($\phi = -0.15$) to moderate ($\phi = -0.43$) in magnitude, all $p < .05$. Hence, the overall model fit was good.

The measurement model for child attention control outcome is presented in Figure 2. Fit indices also indicated an overall good fit, χ^2 (df = 29, N= 210) = 33.12, $p = 0.27$, CFI = .99, TLI = .97, and RMSEA = .03. All relations between observed measures and latent constructs were statistically significant ($p < .001$), and all of the other factor loadings were above .55, with a single exception. Relations between all pairs of latent constructs ranged from moderate ($\phi = -0.23$) to large ($\phi = -0.66$) in magnitude and were statistically significant, $p < .05$.

Structural Equation Models

Structural equation models were computed to test the study hypotheses. To test the first hypothesis, direct associations between the three dimensions of parenting (e.g., parenting stress, warm-sensitive parenting, and directive-critical parenting) and the two aspects of child school readiness (e.g., emotion regulation and attention control) were examined. As shown in Figure 3, significant paths ($p < .05$) emerged documenting unique links between parenting stress and directive-critical parenting and lower levels of child emotion regulation. As shown in Figure 4, a significant negative path ($p < .001$) emerged between directive-critical parenting and child attention control.

Next, we evaluated whether these models varied by gender by testing for invariance in the factor loadings and structural paths. In this process, the factor loadings and structural paths were constrained to be the same for boys and girls, and compared to a model in which these parameters were allowed to vary across groups. The chi-square difference test for the emotion regulation and attention control models comparing boys and girls showed that the fully constrained model was not significantly different from the unconstrained model,

$\chi^2_{\text{emotion regulation model}}$ (df = 6, N= 210) = 6.72, $p = 0.35$, $\chi^2_{\text{attention control model}}$ (df = 6, N= 210) = 7.36, $p = 0.29$, demonstrating no significant sex differences in either model.

Next, analyses were undertaken to test Aim 2, exploring evidence for indirect paths linking parenting stress and child emotion regulation. Given the lack of a significant direct

association between parenting stress and child attention control, indirect paths were explored only for child emotion regulation (Holmbeck, 2002.) It was hypothesized that the link between parenting stress and child emotion regulation would be mediated partially by directive-critical parenting. To test this hypothesis, a structural equation model was estimated that included only the latent constructs of parenting stress and child emotion regulation. In this model, parenting stress was a significant predictor of child emotion regulation with a standardized path coefficient of -0.34 , $p < 0.01$. When directive-critical parenting was added as a mediator in this model, the model failed to converge. Instead, it was necessary to add a direct path from parenting stress to emotion regulation. This finding suggests a direct association between parenting stress and child emotion regulation, as well as a direct association between directive-critical parenting and child emotion regulation, but no indirect or mediated path.

An alternative model was also run to test for the opposite direction of effects, in which child emotion dysregulation led to parenting stress and mediated the association between directive-critical parenting and parenting stress. This alternative model failed to converge.

Discussion

In recent years, substantial evidence has accumulated documenting the importance of emotion regulation and attention control skills for school readiness. In addition to knowing letters and numbers, a child's capacity to control attention and manage their emotions plays a central role in fostering success at the kindergarten transition (McClelland et al., 2006). For this reason a better understanding of the developmental correlates of emotion regulation and attention control is needed, particularly the link with parenting during the preschool years. This study adds to the empirical literature on this topic, extending it by examining associations between parenting and child regulatory functioning in the year prior to kindergarten transition, and by testing parallel models to examine commonalities and differences in parenting associations with child emotion regulation and attention control skills.

In this study, directive-critical parenting and parenting stress were both significantly and uniquely related to child emotion regulation. The associations were independent, with no evidence of an indirect path in which directive-critical parenting mediated the association between parenting stress and child emotion regulation. Directive-critical parenting was also uniquely associated with child attention control. Warm-sensitive parenting did not show unique associations with either form of self-regulation.

Directive-critical Parenting and Child Emotion Regulation and Attention Control

Given the cross-sectional nature of the data, it is not possible to infer causality, but existing theory and empirical research offer a basis for speculating about the association between directive-critical parenting and emerging child emotion regulation and attention control. In past research, harsh and punitive parenting has been studied as a correlate of child school readiness, by way of its association with child aggression (Anthony et al., 2005; Patterson & Fisher, 2002). Interpreted within a social-learning theory model, the hypothesis guiding this research is that parents model hostile behavior (e.g., complaining, yelling, threatening) and

then unwittingly reinforce the child by giving in (positive reinforcement) or giving up (negative reinforcement). This social learning theory model of parenting influence thus emphasizes the ways in which directive-critical parenting may shape child interpersonal behavior.

However, it seems unlikely that the association between directive-critical parenting and child emotion regulation and attention control skills found in this study can be explained only by this same process of behavioral shaping. First, the assessment of directive-critical parenting used here did not focus on discipline practices, per se, but rather a more general style of parent-child interaction. The measure derived from the videotape was a count of the number of directives given during the interaction tasks, and hence reflected the parent's tendency to tell the child what to do to complete the structured tasks, rather than using statements and questions to help the child explore the materials and consider options. In only a very few cases did parents exhibit punitive behavior during the research home visit (e.g., spanking or yelling), and so the home visit ratings primarily reflected critical or negatively-toned comments made to the child rather than negative discipline per se. Second, the measures used to represent emotion regulation and attention control did not include a focus on problem behaviors. For example, emotion regulation was assessed with teacher ratings of emotional control and emotional distress (e.g., "stops and calms down when frustrated or upset"; "feelings are easily hurt", "many worries or often seems worried"). Attention control was assessed with an executive function task (Peg Tapping), teacher ratings of classroom inattention, and observer ratings of task orientation. Focusing on how directive-critical parenting might affect these aspects of emotional and attentional regulation, two hypotheses have been offered by developmental researchers, as alternatives (or in addition) to social learning theory. First, directive-critical parenting may impede the development of emotion regulation and attention control because it evokes frequent negative affect (distress, anxiety, sadness, anger) from children, activating stress responses from the HPA axis and overwhelming their regulatory capacities (Gunnar & Quevedo, 2007). Frequent exposure to cortisol may alter sensor receptivity in their brain, resulting in hyper-vigilance and heightened stress reactivity, with diminished cognitive resources to allocate for the executive function processes that support emotion regulation and attention control (Brennan et al., 2008; Gunnar & Quevedo, 2007).

A second possibility is that exposure to high rates of directive-critical parenting may reduce the child's opportunities to learn strategies for regulating their emotions in contexts that elicit frustration or disappointment. Although directive parenting may provide useful regulatory support in early childhood, the need for this external support typically diminishes during the preschool years, as children develop the capacity for autonomy and self-regulation (Eisenberg et al., 2010). Normatively, parents decrease their use of directives in parent-child interactions as children age, in response to the child's increasing capacity for self-regulation and self-direction (Eisenberg et al., 2010). When parents sustain a high level of directive-critical parenting, they may undermine autonomous functioning, by limiting the child's opportunity to practice and refine their anticipatory planning, reasoning, or problem-solving skills (Grolnick, 2009).

However, it should also be noted that the influence may be bidirectional. That is, it may also be the case that children who are more emotionally dysregulated or more inattentive elicit more directive control from their parents who perceive a need for external management. For example, Eisenberg et al. (2010) found that mothers of children with lower levels of effortful control at 30 months used higher rates of directive teaching strategies with their children at 42 months than did mothers whose children had higher levels of effortful control. The results of this study document the link between directive-critical parenting and low levels of child emotion regulation and attention control, but cannot determine which of these various mechanisms account for this link. Additional longitudinal research is needed in this regard.

Parenting Stress and Child Emotion Regulation and Attention Control

In this study, parenting stress had a significant, unique association with child emotion regulation, but not attention control. Additional analyses revealed that this path was independent of the association between directive-critical parenting and child emotion regulation, and was not mediated by directive-critical parenting. These findings are consistent with studies that have documented difficulties with emotion regulation in younger children whose parents are experiencing elevated distress and stress in the parenting role (Chazan-Cohen, 2009), and also with studies that have found a direct path from parenting stress to child emotion regulation difficulties, without evidence of mediation by parenting practices (Anthony et al., 2005; Crnic et al., 2005). Denham, et al. (1997) argued that high levels of parenting stress are often associated with emotional reactivity, irritability, and the frequent expression of negative emotions by the parent, which may affect children by way of affect contagion. The parent's mood may directly affect the child's mood. Alternatively, or in addition, stressed parents may model maladaptive emotional expression and fail to teach effective emotion coping strategies. More research is needed to examine the developmental mechanisms underlying this association. In addition, bidirectional effects require further study in this domain. For example, Williford, Calkins and Keane (2007) found that the child's level of emotional reactivity and emotion regulation at age 2 (assessed in laboratory challenge tasks) was associated with parent stress and predicted change in parenting stress levels over the next three years among children who also had externalizing problems, suggesting that emotionally dysregulated children may increase parenting stress. In this study, we tested an alternative model in which child emotion regulation predicted parenting stress and mediated the association between directive-critical parenting and parenting stress, and this alternative model failed to converge. However, given the cross-sectional nature of the data, this null finding should not be interpreted as evidence for a lack of bi-directional effects.

Developmental researchers have speculated that parenting stress may also impede the development of attention control skills (Barry et al., 2005). In this study, a few statistically-significant correlations emerged among the individual measures of attention control and parenting stress; however, these were small in magnitude, and in the structural model, the association between the latent constructs of parenting stress and attention control was negligible. Although researchers have theorized that exposure to stress may impair the development of child attention control by its impact on neural pathway canalization and by

depleting the child's available cognitive resources for regulatory functioning (Blair, 2002; Gunnar & Quevedo, 2007), this may not be the case when the stress is being experienced by the parent instead of the child. In contrast, this effect may be stronger when stress is experienced by the child, for example during directive-critical interactions with caregivers.

Warm-sensitive Parenting and Child Emotion Regulation and Attention Control

In this study, warm-sensitive parenting was not significantly related to child emotion regulation or attention control. Although warm-sensitive parenting has been linked with the development of both emotion regulation and attention control during the infant and toddler years (Bernier et al., 2010; Hughes & Ensor, 2009), a few emerging studies suggest that the developmental function of warm-sensitive parenting may change during the preschool years. For example, Eisenberg, et al. (2010) found that children who experienced unsupportive parenting at 18 months had lower levels of effortful control at 30 months relative to children who experienced more supportive parenting, but unsupportive parenting at 30 months had no association with child effortful control at 42 months. Similarly, Dennis (2006) found no significant associations between parental warmth and child emotion regulation in preschool children. It may be that warm-sensitive parenting plays an important role in fostering emotional security and providing regulatory support when the child is still dependent upon the parent for regulatory assistance. However, as children age, become more autonomous in their functioning, and face the demands for social collaboration and goal-oriented learning that characterize the preschool classroom, internalized regulatory controls are needed. To promote the internalized regulatory controls that support independent emotion coping and goal-oriented learning, the provision of autonomy support rather than simply the provision of warm affection may be of central importance (Grolnick, 2009).

Strengths, Limitations and Future Directions

Relatively few studies have examined the unique and shared parenting correlates of emotion regulation and attention control skills during the preschool years in a socio-economically disadvantaged sample of children at risk for delayed school readiness. Strengths of the study include the use of multiple methods of assessment to evaluate the various constructs including parent report, teacher report, and direct observation, reducing the possibility that shared method variance might inflate associations between parenting and child outcomes.

However, the study also had limitations. A primary limitation is that the study included only cross-sectional data, so that causal mechanisms and the direction of effects could not be determined. Future studies should use longitudinal data to examine the direction of these associations. In addition, the measurement frame used in the current study did not provide multi-method indicators for every construct; parenting stress was measured by parent report only, and child emotion regulation was measured by teacher rating only. Direct observations of parenting stress and child emotion regulation might help eliminate any possible reporter bias, and provide additional information regarding the mechanisms underlying observed associations. The current sample included only socio-economically disadvantaged families, and so the findings are not necessarily representative of the larger population. Within this low-income sample, 11% of the children had primary caregivers other than their mothers (e.g., fathers, grandmothers, relatives, or foster care). The sample was not sufficiently large

to assess whether links between parenting and child self-regulation differed for these different types of primary caregivers, which could be assessed in future research. In addition, the sample was diverse in terms of ethnic/racial background, but not sufficiently large to assess possible variations in the model across the three major groups represented (e.g., Hispanic, African American, and European American).

Implications for Practice and Policy

Developmental theorists have conceptualized emotion dysregulation and attention control as distinct but developmentally intertwined facets of the self-regulatory system (Calkins & Marcovitch, 2010). The results of this study are consistent with this conceptualization. Whereas directive-critical parenting emerged as a common correlate of both child emotion regulation and attention control in prekindergarten, parenting stress had unique associations only with child emotion regulation, suggesting emotion regulation and attention control may have both common and distinct developmental roots.

In general, the promotion of warm-sensitive parenting has been a core focus of many parenting programs focused on improving child school readiness (see review by Welsh, Bierman, & Mathis, 2014.) The current study suggests that, by the preschool years, parenting programs may need to address directive-critical strategies, specifically, and encourage parents to use more questions, induction strategies, and problem-solving dialogue. Rather than telling children what to do, parents who spend more time asking questions, providing information, responding to and clarifying their children's questions, and engaging children in problem-solving discussions may more effectively support self-regulation skills, including emotion regulation and attention control skills (Eisenberg et al., 2010; Neitzel & Stright, 2003). Parent-focused interventions designed to enhance child self-regulation may need to emphasize these interaction strategies, rather than focusing primarily on providing warm-sensitive parenting or reducing coercive discipline strategies. Certainly, this is an area that needs additional research.

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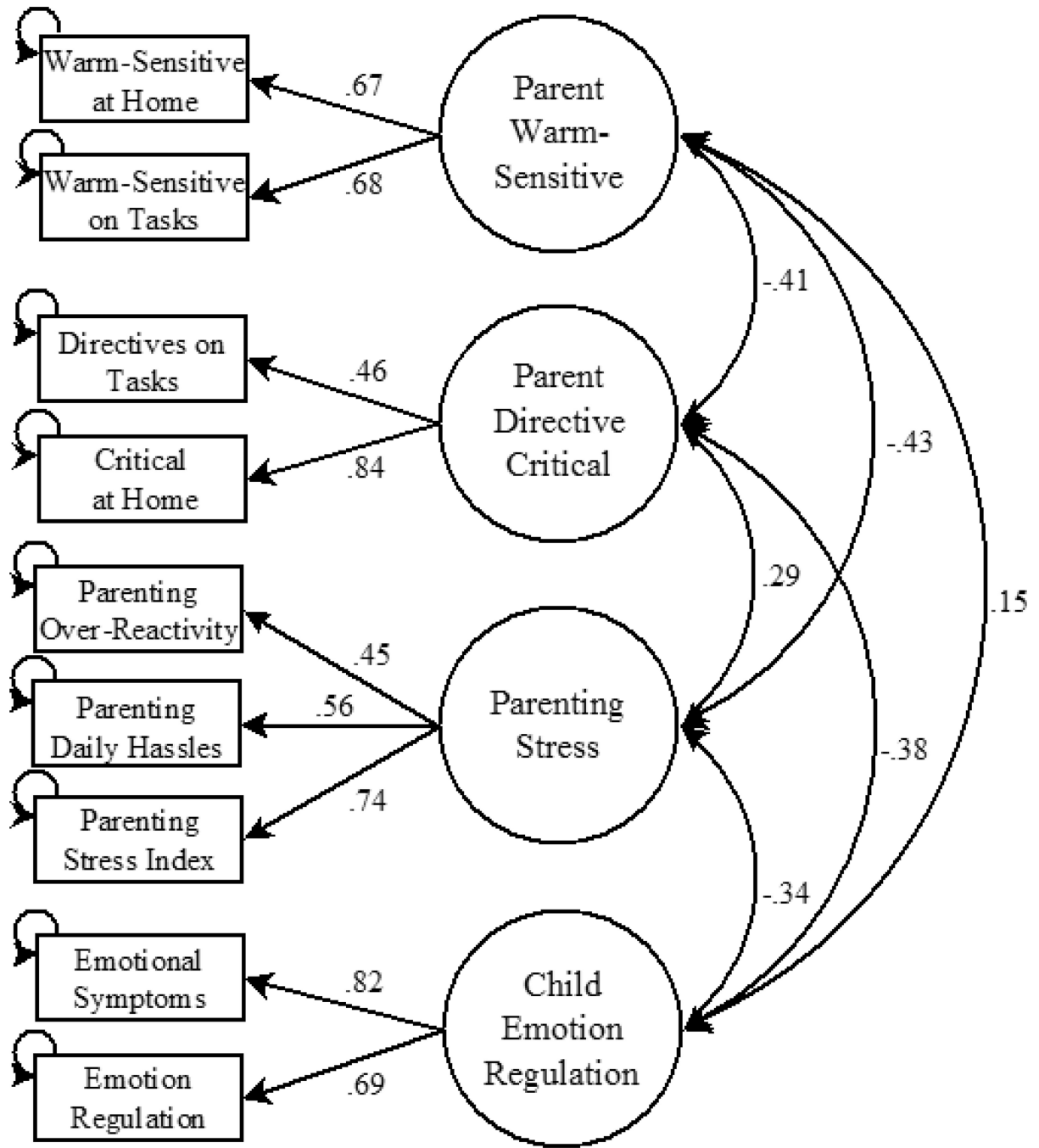


Figure 1. Measurement Model for Emotion Regulation

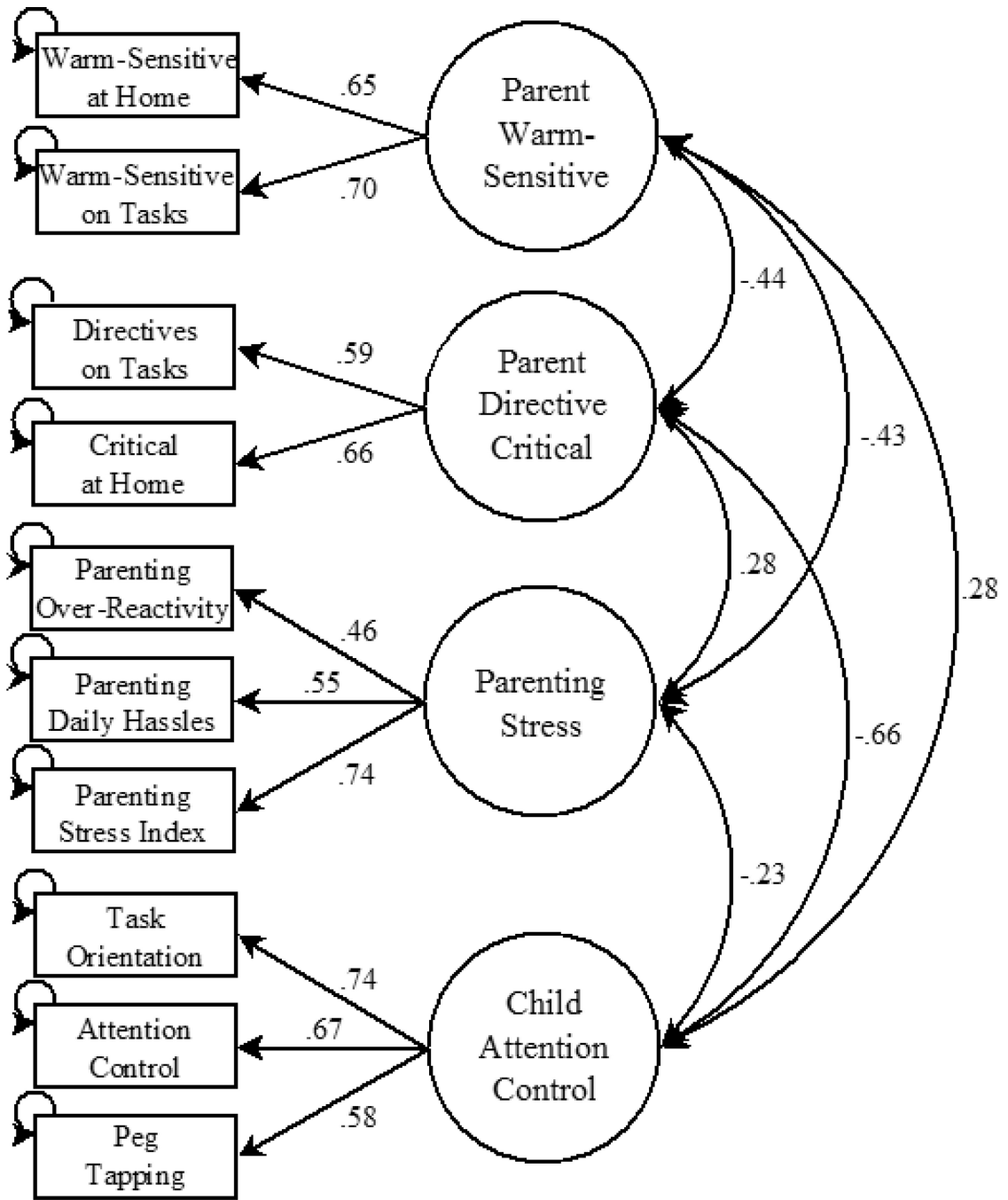


Figure 2. Measurement Model for Attention Control

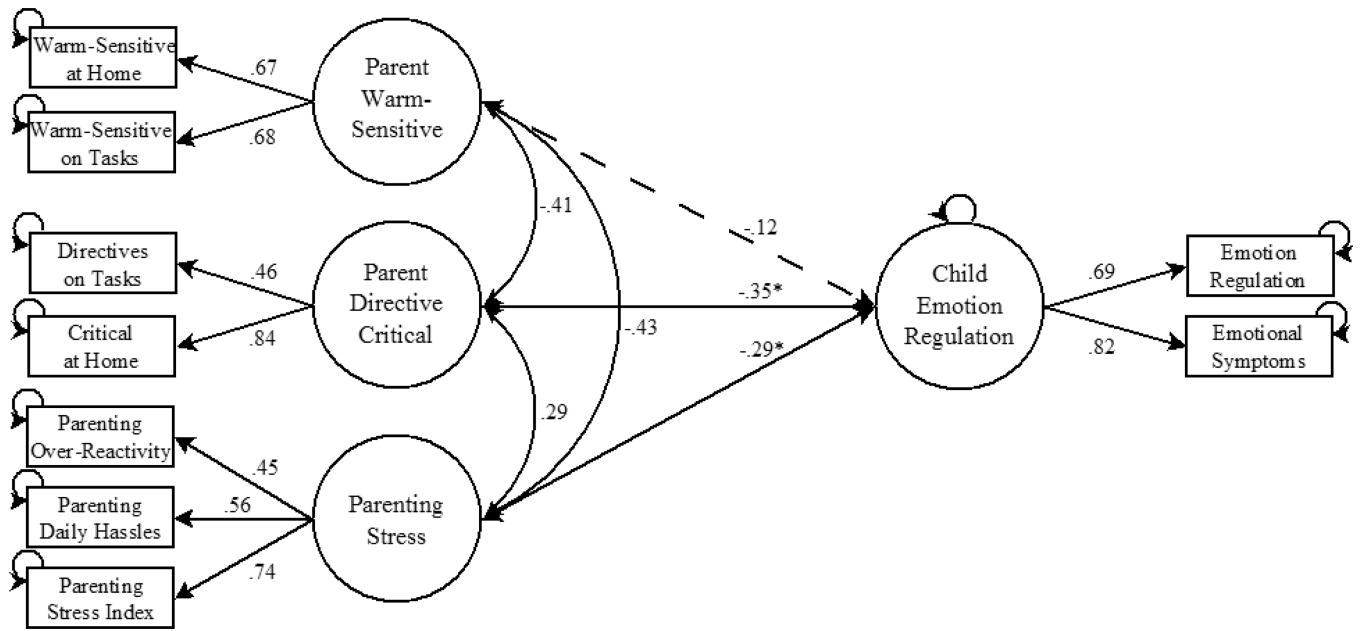


Figure 3. Parenting Variables and Emotion Regulation

Note. Solid pathways are significant; dashed pathways are non-significant. * $p < .05$.

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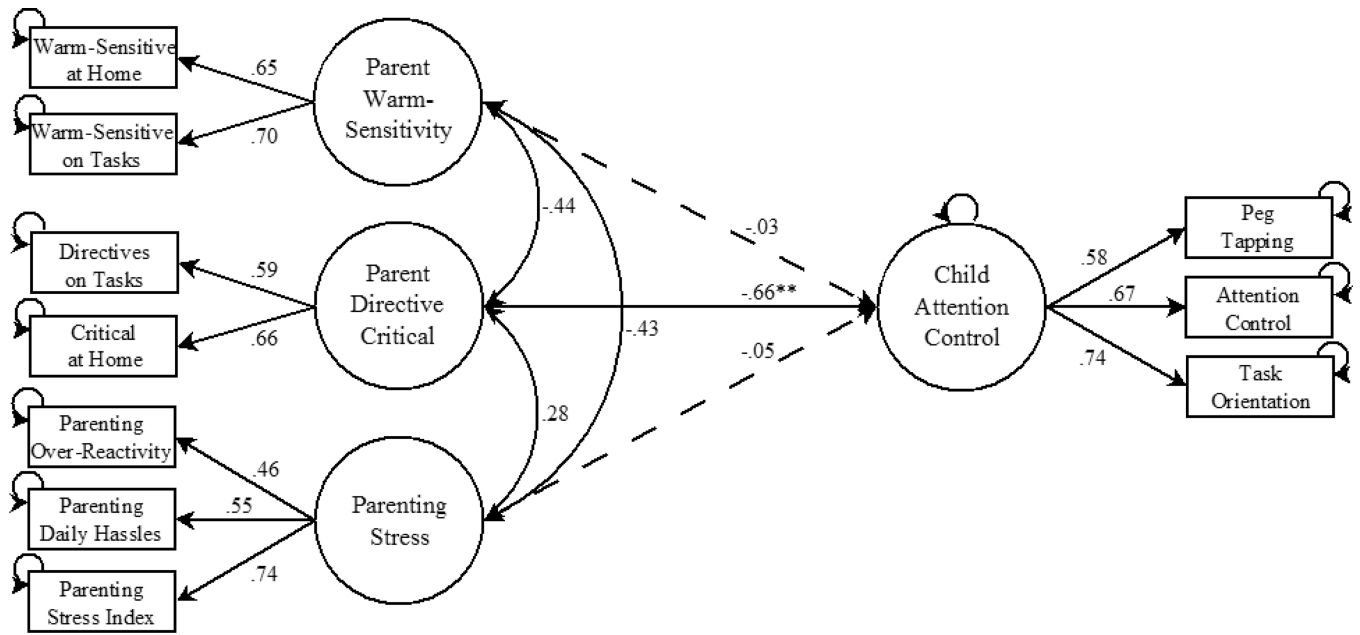


Figure 4. Parenting Variables and Attention Control

Note. Solid pathways are significant; dashed pathways are non-significant. ** $p < .01$.

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Table 1

Descriptive Statistics for all Variables

	Mean	SD	Minimum- Maximum	N
<u>Parenting Stress</u>				
Parenting Daily Hassles (P)	1.91	.50	1.00 – 4.00	210
Parenting Stress Index (P)	1.78	.57	1.00 – 3.44	210
Parenting Over-Reactivity (P)	5.54	.79	3.22 – 7.00	210
<u>Parent Warm-Sensitive</u>				
Warm-Sensitive on Tasks (V)	.01	.94	-2.10 – 3.01	190
Warm-Sensitive at Home (O)	2.68	.53	1.33 – 3.83	210
<u>Parent Directive-Critical</u>				
Directives on Tasks (V)	2.39	1.26	.13 – 6.90	194
Critical at Home (O)	.04	.08	.00 – .38	210
<u>Child Emotion Regulation</u>				
Emotion Regulation (T)	4.02	.94	1.67 – 6.00	206
Emotional Symptoms (T)	.54	.37	.17 – 1.83	205
<u>Child Attention Control</u>				
Peg Tapping (A)	9.07	6.17	.0 – 16	210
Attention Control (T)	.00*	.88	-2.85 – 1.00	206
Task Orientation (E)	2.65	.47	.58 – 3.19	210

Note. P = Parent rating; V = Videotape interaction; O = Home Visit Observation; T = Teacher rating; A = Direct assessment; E = Examiner ratings.

* = Standardized scores

Table 2

Correlations Among all Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
<u>Parenting Measures</u>											
1. Parenting Hassles	--										
2. Parenting Stress	.40**	--									
3. Parenting Over-Reactivity	.28**	.34**	--								
4. Warm-Sensitive - <i>V</i> ^a	-.12	-.22**	.12	--							
5. Warm-Sensitive - <i>O</i> ^b	-.16*	-.22**	-.10	.45**	--						
6. Directives on Tasks ^a	-.01	.05	-.04	-.15*	-.07	--					
7. Critical at Home ^b	.21*	.18**	-.05	-.20**	-.25**	.38**	--				
<u>Child Measures</u>											
8. Emotion Regulation	-.11	-.21**	-.02	.01	.08	-.06	-.24**	--			
9. Emotionality	-.20*	-.20**	-.10	.11	.10	-.22**	-.25**	.57**	--		
10. Peg Tapping	-.14*	-.11	.03	.16*	.13	-.25**	-.12	.18**	.33**	--	
11. Attention Control	-.15*	-.13	.00	.11	.13	-.30**	-.28**	.61**	.61**	.43**	--
12. Task Orientation	-.05	-.14*	-.05	.16*	.12	-.35**	-.36**	.32**	.34**	.40**	.50**

^a Videotape.

^b Home observation.

* $p < .05$.

** $p < .01$.