



Brief report

Preschoolers' distress and regulatory behaviors vary as a function of infant–mother attachment security



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ABSTRACT

Children (N=98) with higher attachment security scores, and lower resistance and avoidance scores during the Strange Situation at 16 months demonstrated somewhat more adaptive observed and mother-reported emotion regulation as preschoolers independent of maternal behavior.

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The quality of the infant–mother attachment is an important predictor of children's early emotion regulation (Cassidy, 1994). Bowlby (1969/1982) theorized that infants develop an “internal working model,” or a schema about the self and the caregiver, that is constructed out of repeated early interactions. According to Cassidy (1994), secure infants experience maternal sensitivity in response to varied emotion signals, which promotes open communication of affect and adaptive regulation of emotion based on the nature of the situation. Avoidant infants experience maternal rejection, which promotes the minimization of affect, and a greater use of self-oriented regulation behaviors in an effort to prevent further rejection. Resistant infants, in contrast, experience inconsistent care, which promotes the maximization of affect and frequent use of mother-oriented regulation behaviors in an effort to elicit a response from the mother. These patterns of affect regulation are believed to generalize to other contexts. Recent research is consistent with this view, but is typically limited by a focus on concurrent associations (e.g., Leerkes & Wong, 2012).

In this study, we examined associations between continuous measures of attachment behaviors during the Strange Situation at 16 months and children's emotion regulation behaviors at age 3 years. To our knowledge, this is the first study to examine how continuous measures of attachment derived from the Strange Situation in infancy predict preschoolers' emotion regulation. Such an approach is ideal for methodological and conceptual reasons. That is, dimensional scoring allows for examination of hypotheses related to specific types of insecurity even when there are small groups of avoidant and resistant infants and has better statistical power for doing so (Fraley & Spieker, 2003). In addition, classifications do not capture the fact that some children engage in a blend of attachment behaviors. For example, some secure and resistant children engage in low levels of avoidant behavior. This approach considers the possibility that even low levels of prototypically insecure behaviors are related to differences in subsequent emotion regulation. To rule out competing hypotheses that early caregiving accounts for differences in emotion regulation rather than attachment schema that children carry forward, we examine maternal behavior at 16 months as a possible covariate.

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We hypothesized that higher security scores in infancy would correlate with more adaptive emotion regulation as evidenced by higher use of mother-oriented behaviors. Higher avoidant behaviors during infancy would correlate with fewer mother-oriented regulation behaviors and lower distress. Higher resistant behaviors in infancy would correlate with higher distress and more mother-oriented regulatory behaviors.

Participants were 98 mothers and their infants. Inclusion criteria included that the focal child be 16 months old, the mother's only or eldest child, and typically developing. Mothers' age ranged from 19 to 47 years old (M age = 29.8), 32% did not have a college degree, and mean annual income was \$59,736. Seventy-four mothers were European American, 19 African American, 2 Asian American, and 3 were multiracial. Infants were full term and healthy, and 50 were male. When children were 3 years old, participants were contacted by phone and invited to participate in a follow-up study. Of the original participants, 68 dyads participated in a lab visit and/or completed questionnaires. All procedures were approved by the university's internal review board and mothers provided written informed consent. There was differential attrition based on maternal demographic but not on child attachment or gender. Mothers who participated in the follow-up were older, were more likely to be European American, more sensitive and marginally more educated than mothers who did not participate.

At 16 months, dyads were videotaped during the Strange Situation procedure (Ainsworth, Blehar, Waters, & Wall, 1978). Sixty-eight infants were classified as secure (69%), 20 as avoidant (20%), and 10 as resistant (11%). Of these, 45 secure, 15 avoidant and 9 resistant children participated at age 3. We utilized Richters, Waters, and Vaughn's (1988) method to calculate continuous security scores. We standardized each child's scores on proximity seeking, contact maintenance, contact resistance, proximity avoidance, and crying from the two reunion episodes in the Strange Situation, multiplied them by the provided statistical weight for the B versus non-B dimension, summed the weighted scores together, then calculated the inverse such that children with higher scores are more secure. Avoidance and resistance scores were stable across the two reunion episodes ($r = 0.52$ for avoidance, and 0.58 for resistance, both $p < 0.001$), thus an average score was calculated for each. Inter-rater reliability based on 25 double rated cases was good; ICC ranged from 0.77 to 0.95 for the ratings.

At 16 months, mothers and infants were also videotaped during a frustration task (the experimenter locked an attractive toy in a jar that was impossible to open) and a fear-eliciting task (a researcher dressed in green ogre costume/mask approached and interacted with the child). Observational protocols and coding schemes are described in more detail in Leerkes and Wong (2012). Maternal behavior during each task was continuously coded using 12 mutually exclusive categories ($K = 0.89$). We created two summary scores focused on the key features of parenting that distinguish between attachment groups (Ainsworth et al., 1978) by summing the percent of time mothers engaged in the relevant behaviors. *Nonresponsiveness* is the sum of *monitor* (watches infant/situation without intervening), *withdraw* (abruptly moves away or ends interaction with infant), and *distracted* (engages in behaviors unrelated to parenting such as reading a magazine, filing nails). *Overtly negative behavior* is the sum of *negative* (directs negative affect towards infant), *intrusive* (forces own agenda on the infant), *mismatched affect* (laughs when infant is distressed), and *persistent ineffective* (continues to respond in the same ineffective manner).

When children were 3 years old, dyads visited the laboratory and children completed the lock-box task designed to elicit frustration. Children selected a toy, the experimenter locked it in a clear container, and gave the child a set of keys with the instruction that they could play with the toy when they opened the box. The correct key was not on the key ring. Mothers were instructed not to get involved. Coded behaviors and their reliability were as follows: frequency of *calm vocal bids*, including statements or questions to mother (e.g., "mom, can you help me?", $ICC = 0.94$); frequency of *negative vocal bids*, including questions or statements, directed to mother in a whiny or angry manner ($ICC = 0.89$); and frequency of *proximity seeking behaviors* such as walking to mother ($ICC = 0.96$).

Three regulation behaviors were rated on a 4-point scale ranging from 1 = never to 4 = often: *maintained proximity to mom* (e.g., standing or sitting near mother's chair; $ICC = 0.92$); *adaptive self-distraction* (e.g., playing with other objects, talking to self about something other than the locked box, $ICC = 0.74$); and *problem solving* related to actively trying to open the lock/box ($ICC = 0.85$). The extent to which children displayed *distress* (e.g., frowning, whining, grunting, or any negative facial expressions, vocalizations, or body gestures) was rated on the same 4 point scale ($ICC = 0.93$). Children's *latency to the first distress* was calculated in seconds by subtracting the time at which the task started from the time at which the child first displayed distress ($ICC = 0.82$).

To reduce the number of observed dependent variables, a factor analysis was calculated that yielded three factors with Eigen values greater than 1 that accounted for 64% of the variability. The factors and the item loadings follow. *Distress* consists of the average of observed distress (.81), latency to distress reversed (-0.77), and negative bids to mom (.79). *Proximity to mom* consists of the average of seek proximity (.71) and stay close to mom (.74). *Problem solving* is the average of problem solving (.85) and self-distraction reversed (-0.82). *Calm bids to mom* loaded on both distress (-0.40) and proximity to mom factors (.56); thus, it was retained as a separate category.

Mothers completed the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1998) yielding scores for negativity/lability (15 items, $\alpha = 0.80$) and emotion regulation (8 items, $\alpha = 0.60$).

Twenty-five percent of data were missing; the data was missing completely at random according to Little's test, $\chi^2(183) = 201.52$, $p = 0.17$. Twenty data sets were imputed using the multiple imputation feature in SPSS version 21 (IBM, Armonk, NY) to avoid "power falloff" (Graham, 2009). Demographic, independent, and dependent variables were included in the imputation model. Results were averaged across the twenty imputed data sets.

Table 1

Descriptive Statistics and Zero Order and Partial Correlations^p (Controlling for Maternal Behaviors) Between Attachment at 16 Months and Emotion Regulation at 3 Years.

Predictors	Mean	SD	Non-respons. Behavior	Negative Behavior	Richter's Security	Avoidant Behavior			Resistant Behavior	
Non-responsive	34.82	23.22	–	–0.20 [†]	0.17 [†]		0.40 ^{**}		–0.37 ^{**}	
Negative behavior	2.78	6.83		–	–0.03		–0.07		0.20 [*]	
Richter's security	0.00	2.89			–		–0.09		–0.35 ^{**}	
Avoidant behavior	2.55	1.40					–		–0.47 ^{**}	
Resistant behavior	1.67	1.01							–	
ER Outcomes										
Distress	0.00	0.79	–0.04	0.07	–0.24 [†]	r ^p	r ^p	r ^p	r ^p	r ^p
Proximity to mom	0.00	0.84	–0.04	–0.05	0.00	–0.24 [†]	0.11	0.13	0.10	0.09
Problem solving	0.00	0.86	0.05	0.05	0.07	0.01	–0.07	–0.06	0.05	0.05
Calm bids for help	9.61	7.67	–0.20 [†]	0.04	0.08	0.07	0.08	0.06	–0.00	0.01
ERC Negativity	1.94	0.47	–0.07	0.04	–0.07	0.12	–0.25 [†]	–0.19 [†]	0.02	–0.06
ERC Regulation	3.41	0.36	0.13	–0.05	0.40 ^{**}	–0.06	0.07	0.11	0.01	–0.01
						0.38 ^{**}	–0.08	–0.14	–0.24 [†]	–0.20 [†]

^{*} p < 0.05.

^{**} p < 0.01.

[†] p < 0.10.

Emotion regulation at 3 years did not vary based on infant gender, maternal minority status, education, or income. Mothers' non-responsive behavior was positively associated with children's avoidant behaviors, and negatively associated with children's resistant behaviors at 16 months, and with toddlers' calm bids for help (See Table 1). Mothers' negative behavior was positively associated with toddlers' resistant behavior. Thus, maternal behavior was controlled in the following analyses as planned.

Zero-order and partial correlations (controlling for non-responsiveness and negative maternal behavior at 16 months) were calculated between attachment behaviors and emotion regulation outcomes at 3 years (see Table 1). Consistent with hypotheses, higher security scores during infancy correlated with higher mother-reported emotion regulation skills. Higher security scores during infancy also correlated with lower observed distress. However, security was not associated with more mother-oriented and problem solving behaviors. Consistent with hypotheses, avoidant behaviors during infancy correlated with preschoolers' fewer calm bids to mothers, but the association was reduced to a trend when maternal behavior was controlled. As predicted, resistant behaviors during infancy correlated with lower reported emotion regulation abilities; however this association was reduced to a trend when maternal behavior was controlled. Significant associations were small to moderate.

Thus, the results provided somewhat limited evidence that toddlers with higher security scores in infancy demonstrated better emotion as indicated by lower distress regulation in a frustrating task with no maternal assistance and mothers' global ratings of regulation. However, security was not linked with specific regulatory behaviors. And, there was somewhat limited evidence of a unique effect of attachment avoidance and resistance on subsequent emotion regulation independent of early maternal behavior. Of note, the decrement in the associations between avoidance and calm bids (0.25–0.19) and resistance and reported emotion regulation (–0.24 to –0.20) was quite small after controlling for maternal behavior, and the residual associations would be significant in a slightly larger sample. Thus, links between specific types of insecurity and emotion regulation warrants continued investigation in larger samples.

Limitations of this study include reliance on a single, brief distress-eliciting task during which mothers were instructed not to get involved. Longer, more distressing, and in particular fear-inducing tasks may be more likely to activate attachment schema as they are more relevant to safety. Tasks that are less object-focused and include an interpersonal component with the mother or experimenter (i.e., gift delay task) may yield the expected patterns among avoidant and resistant infants. Although recommended procedures for handling missing data were employed, the small sample and attrition remain important limitations. That attrition at Time 2 was unrelated to attachment status somewhat limits this concern. In future research, concurrent maternal sensitivity and attachment classifications/scores should be assessed to rule out the possibility that they account for observed longitudinal associations. In addition, the association between disorganized attachment and children's emotion regulation should be examined. Strengths include the longitudinal design, multimethod assessment of regulation, the use of a dimensional approach to score attachment, and that maternal behavior at 16 months was covaried. The results add to accumulating evidence that early attachment relationships may have lasting implications for young children's emotion regulation.

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