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Sequelae of infants' negative affectivity in the contexts of emerging distinct attachment organizations: Multifinality in mother-child and father-child dyads across the first year

Danming An and Grazyna Kochanska
Department of Psychological and Brain Sciences, The University of Iowa, Iowa City, IA 52242, USA

Abstract

Infants' high negative affectivity often initiates maladaptive parent-child relational processes that may involve both the parent's and the child's sides of the relationship. We proposed that infants' high negative affectivity triggers distinct sequelae in dyads classified as avoidant, resistant, and disorganized, compared to secure dyads. In 200 community families, at 8 months, we observed infants' negative affectivity; at 16 months, we assessed attachment organization and collected observations and reports of parent-related (responsiveness, resentment of child, power assertion, and intrusiveness) and child-related (social-emotional competence, opposition, and anger) constructs. In mother-child avoidant dyads, infants' high negative affectivity was a significant precursor of mothers' higher resentment and intrusiveness and children's lower social-emotional competence. Those associations were significantly different than in secure dyads (in which none were significant). In father-child disorganized dyads, infants' high negative affectivity was a significant precursor of fathers' lower responsiveness and higher resentment; there were no association in secure dyads. Regardless of infants' negative affectivity, compared to secure dyads, parents in resistant dyads expressed more resentment of child, and avoidant and resistant children were more oppositional to their fathers. The study illustrates multifinality in parent- and child-related processes that characterize unfolding early relational dynamics in dyads differing in just-emerging attachment.

Keywords: attachment; infant negative affectivity; parenting; mothers; fathers; longitudinal studies

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Large bodies of literature in developmental psychology and psychopathology have characterized infant difficult or hard-to-manage temperament as an early starting point for maladaptive future trajectories. In particular, such temperament has often been portrayed as a trigger for mutually adversarial parent-child dynamics that include both parent- and child-related processes. The concept of a "difficult" child – a combination of certain early traits (e.g., negative quality of mood, low adaptability) – dates back to Thomas and Chess (1977), but it has since been deployed extensively in developmental psychology and psychopathology. Over time, the "child difficulty" construct has become notoriously broad and variously defined, but essentially all definitions include the child's high negative affectivity or negative emotionality as a central feature (Bates, 1980; Kiff et al., 2011; Lengua & Wachs, 2012; Rothbart & Bates, 2006; Sanson et al., 2004; Slagt et al., 2016; Zhang et al., 2021; van Zeijl et al., 2007).

Many studies have supported the key role of infants' early high negative affectivity in the origins of maladaptive developmental trajectories. Parents of difficult infants often come to engage in negative, coercive control at toddler age, and they report increased parental stress. Those factors become intertwined with children's increased opposition and dysregulation. Such bidirectional adversarial dynamics often become entrenched and cascade over time (e.g., Bates et al., 2012; Dadds & Salmon, 2003; Dishion & Patterson, 2006; Lipscomb et al., 2011; Pardini, 2008; Pettit & Arsiwalla, 2008; Rothbart & Bates, 2006; Scaramella & Leve, 2004; Shaw & Bell, 1993).

The findings, however, have been far from consistent and not always replicated (Kim & Kochanska, 2021; Lorber & Egeland, 2011; Paulussen-Hoogeboom et al., 2007; Putnam et al., 2002). The evidence of divergence in outcomes – the gist of that overall literature – illustrates well the principle of multifinality in developmental psychopathology (Cicchetti & Rogosch, 1996) in that some, but not all highly affectively negative infants and their parents embark on maladaptive developmental paths. Consequently, the study of circumstances that influence sequelae of early negative affectivity has become a vigorous enterprise that has identified multiple factors, at several levels, that determine emotionally negative infants' future unfolding trajectories (Brooker et al., 2014; Campbell et al., 2000; Lengua & Kovacs, 2005; McElwain et al., 2012; Shaw et al., 2000).

Several investigations have focused on the early parent-child relational context as key in determining multifinality with regard to trajectories of young children's difficult temperament, or negative affectivity. Bowlby's attachment theory (1969/1982) has played

Corresponding author: Danming An, email: danming-an@uiowa.edu

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a particularly valuable role in informing that research. The early attachment organization that emerges between the child and the caregiver has proved to be a critical context in which to study distinct paths followed by infants differing in their negative affectivity. Because the attachment system has evolved as a source of protection from threat and stress, studying infants' proneness to experience negative affectivity is especially relevant in the context of secure and insecure attachments. A secure attachment enhances infants' effective regulation of negative arousal, eases the concerns about threat and stress, and frees up the child's attentional and coping resources; insecure attachments tend to undermine effective regulation of negative emotions. Those processes take place at multiple levels, from biological regulation to cognitive representations (e.g., Cassidy, 2021; Cassidy & Berlin, 1994; Thompson, 2016).

Decades of research have supported the role of secure and insecure attachment in fostering children's and parents' positive, adaptive and negative, maladaptive behaviors and characteristics, respectively (e.g., An et al., 2021; Boldt et al., 2020; DeKlyen & Greenberg, 2016; Groh, Fearon et al., 2017; Hughes et al., 2005; Kok et al., 2013; Matas et al., 1978; Sroufe, 2021; Thompson, 2006, 2015, 2016; Thompson et al., 2021). In addition, Sroufe and colleagues (Sroufe, 2005, 2016; Sroufe et al., 1999) have argued that early attachment might substantially influence future developmental cascades even if it does not have a direct long-term effect itself; it can do so by altering relational processes between the parent and the child. Others have also emphasized the need to study such "hidden," or complicated, effects of early attachment (Cox et al., 2010; DeKlyen & Greenberg, 2016; Fearon & Belsky, 2011; Keller et al., 2005; Kuczynski & De Mol, 2015; Masten & Cicchetti, 2010; Thompson, 2016), often in the context of early difficult temperament and its sequelae (Shaw et al., 2000).

Empirical research that has examined such effects, using correlational and experimental designs, across many ages and vastly ranging measures of constructs, has coalesced into a robust body of evidence (Kochanska et al., 2019). Multiple longitudinal studies have consistently shown that children's difficult temperament, typically assessed using various measures of negative affectivity, has been indeed associated with future negative parenting and children's maladaptive behavior, but only in those parent-child dyads in which child-parent attachment in infancy had been insecure. Early insecure attachment clearly appears to be a context that increases the probability that the infant's difficulty or negative affectivity would trigger future maladaptive, adversarial transactions unfolding within the parent-child dyad. By contrast, secure attachment appears to offset or counter such a scenario. In most of those studies, security has been assessed in Strange Situation Paradigm (SSP, Ainsworth & Wittig, 1969), but other measures of the quality of the parent-child relationship, closely aligned with the construct of attachment, have also been used.

Those effects were found both for parent- and for child-related measures. Child difficulty initiated a path to power-assertive and negative parenting, and consequently, to future negative child outcomes, but only in insecure dyads (Boldt et al., 2017; Brock & Kochanska, 2019; Kochanska et al., 2009, 2019; Kochanska & Kim, 2012). Examining trajectories of infants' anger proneness up to early school age, Brock and Kochanska (2019) found that highly angry infants embarked on a trajectory of negativity and opposition in insecure, but not in secure, parent-child dyads, according to their attachment assessment in SSP at 15 months. Several other studies have reported similar interactions of early anger proneness and attachment security, such that anger-prone children embarked on a negative trajectory if they were in insecure or otherwise negative relationships, but not when they were in secure relationships (Edwards & Hans, 2015; Keller et al., 2005). The patterns of finding, however, were often complicated (e.g., Lickenbrock et al., 2013), suggesting the need for more studies.

Limitations of the extant research

In sum, research to date has convincingly shown that security of attachment at the beginning of the second year of life moderates associations between child negative affectivity and future parent and child measures (negative, power-assertive parenting, children's disregard for rules, externalizing behavior problems), obtained up to early preadolescence (Boldt et al., 2017). That research, however, has been subject to three important constraints.

The first constraint involves the nature of parent and child measures. To date, studies of the developmental sequelae of early difficulty have focused mostly on a limited set of outcomes for parents and children, and generally, on negative outcomes. The measures of parenting have mostly included power assertion. The measures of child outcomes have also typically focused on behavior problems. Whereas evidence has supported the model of early negative affectivity triggering negative outcomes in insecure but not secure relationships, that approach is incomplete. On the parental side, it does not provide information on several other key parenting dimensions, both negative and positive (e.g., responsiveness, intrusiveness, emerging representations of the child, particularly resentment). On the child's side, we have limited knowledge of how early difficulty may influence positive child outcomes – for example, social-emotional competence – in addition to negative outcomes in secure vs. insecure relationships.

The second constraint involves attachment-related inferences. Several above-cited longitudinal studies, due to their relatively small sample sizes, made possible only the comparisons of secure parent-child dyads with those that were insecure; but the samples were too small to allow comparisons of secure dyads with those in specific insecure groups (avoidant, resistant, and disorganized). This is unfortunate, as such research may provide a more fine-grained understanding of the past findings of the role of secure vs. insecure attachment moderating the developmental cascades following early difficulty, such that the associations between difficult temperament and specific parent-child behaviors would vary across secure, avoidant, resistant, and disorganized categories.

Indeed, parents and children have been found to display behavioral patterns unique to each insecure attachment category (avoidant, resistant, and disorganized). We note, however, that the extant evidence is mixed and complex. Avoidant attachment has been associated with intrusive and overstimulating parenting (Fuertes et al., 2009; Isabella & Belsky, 1991) and lower quality of mother-child emotional interactions (Martins et al., 2012). Avoidance has also been linked to poor social competence and heightened externalizing and internalizing problems of the child (Groh, Fearon et al., 2017), less compliance and more negativity toward the parent (van Bakel & Riksen-Walraven, 2002), and active opposition to parental control (Kok et al., 2013). Resistant attachment has been associated with parental under-involved care, low or inconsistent availability (Cassidy & Berlin, 1994), inconsistent parenting (Fuertes et al., 2009; Isabella & Belsky, 1991), disrupted affective communication (Ariav-Paraira et al., 2022), and with the child's less compliant and less positive, enthusiastic reactions to the parent (An et al., 2021; Frosch et al., 2001) and poor

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emotion regulation (Zimmer-Gembeck et al., 2017). Disorganized attachment has been associated with insensitive, frightened/frightening, atypical parenting, disrupted affective communication (Ariav-Paraira et al., 2022; Hesse & Main, 2006; van IJzendoorn et al., 1999), and moderately predictive of a host of child problems, including less compliance and more negativity (van Bakel & Riksen-Walraven, 2002), and psychopathology, mostly externalizing problems (Fearon & Belsky, 2011; Granqvist et al., 2017; van IJzendoorn et al., 1999).

Those findings, despite being not fully consistent across studies (e.g., van IJzendoorn et al., 1999) and overlooking the role of early difficulty, indicate attachment category-specific patterns in parent and child adjustment, and suggest the continued benefits of examining different insecure categories separately when examining the developmental sequelae from early difficulty to parent and child adjustment. Furthermore, the literature consists largely of studies of mother-child relationships, with much less known about the role of child difficulty in specific father-child attachment groups.

The third constraint involves the timing of assessments. The studies to date have typically examined the different trajectories of difficult – or highly affectively negative – children in secure vs. insecure attachment relationships by collecting data on child difficulty and developmental outcomes at timepoints that *followed* attachment assessments in SSP conducted at the beginning of the second year. As an example, Kochanska and Kim (2012) reported two studies. In one, they assessed child difficulty at age 3, mothers' and fathers' power assertion at 4.5, and child outcomes at 6.5 years. In the other, they measured child difficulty at 22 months, maternal power assertion at 33 months, and child outcomes at 6 years. Attachment security in both studies was observed in SSP at 15 and 14 months, respectively. Brock and Kochanska (2019) did assess anger in infancy, and then examined its divergent implications for children who were secure or insecure at 15 months; however, they obtained their outcome measures at preschool age.

Consequently, we do not know much about early origins of such dynamics. Do they already begin to unfold during the early part of the developmental trajectory, particularly across the first year, prior to and concurrent with the process of the coalescence of attachment? Associations between the infant's negative affectivity in the first year of life and parent and child measures at the beginning of the second year, and thus along with the emerging attachment, in various attachment groups, have rarely been studied. As attachment patterns begin to organize over the course of the first year, coalescing at the onset of the second year, examining those associations in the first year is important. Doing so would elucidate the early co-evolvement of parent and child behaviors in the context of their forming bond, especially in the presence of early child difficulty, adding to the historically significant – and still evolving – discussion of the interplay of parent and child characteristics and attachment (Groh, Fearon et al., 2017; Kagan, 1982; Sroufe, 1985; Vaughn & Bost, 2016).

The current study

The current work aims to address all three constraints. In a large community sample of 200 community infants, mothers, and fathers, we measured infants' negative affectivity at 8 months, assessed parent-child attachment organization at the average age of 16 months, concurrently to the parent and child measures. The parent and child measures encompassed observations and reports, targeting both adaptive (parental responsiveness and enjoyment of parenting, child social-emotional competence) and maladaptive characteristics (parental negative representations, or resentment of child, power assertion, intrusiveness; child opposition, anger) that have been suggested by the literature as characterizing the specific insecure categories. All measures were parallel for mother- and father-child dyads.

Using a large sample allowed us to adopt a two-prong analytic approach, for both mother- and father-child dyads. First, we compared the secure group with the insecure group. Second, we compared the secure group separately with the avoidant, resistant, and disorganized group. Although some insecure groups were modest in size, nevertheless, we believed this approach allowed for more fine-grained insights into potentially unique characteristics of the insecure groups.

This work also addressed the aforementioned age gap in the literature by examining divergent sequelae from infants' negative affectivity at 8 months to a host of parent- and child-related measures at 16 months when the attachment categories start to emerge. Of course, this design precluded any inferences with regard to attachment playing a *causal* role in the potential differences. But if differences in the studied associations were found, they would document early origins of maladaptation, worthy of study in more long-term designs.

Hypotheses

For the first set of analyses that compared the secure and insecure groups, consistent with the literature, we expected more adaptive parent and child patterns in the former, compared to the latter. For example, we expected secure parents to be more responsive and less resentful, power-assertive and intrusive, and children more competent and less oppositional or anger-prone. With regard to associations with early child negativity, we expected to replicate the findings obtained in other studies at older ages that indicated that early child difficulty is associated with poor outcomes in insecure but not secure relationships (Kochanska et al., 2019).

For the second set of the more fine-grained comparisons of secure groups with each insecure category, we expected to identify patterns unique to avoidant, resistant, and disorganized parent-child dyads, although those expectations were more tentative, as suggested by the review of the literature. For parent-related variables, we anticipated that all insecure attachment categories would be associated with less responsiveness and enjoyment of parenting and increased parental stress or resentment of their child. Additionally, there may be unique associations between avoidant attachment and parental intrusiveness (Fuertes et al., 2009; Isabella & Belsky, 1991) and between disorganized attachment and parental power assertion (Granqvist et al., 2017; van IJzendoorn et al., 1999).

For child-related variables, we expected all three insecure categories to be associated with low social-emotional competence and high opposition to the parent (An et al., 2021; Groh, Fearon et al., 2017; van Bakel & Riksen-Walraven, 2002). Further, resistant attachment may be uniquely associated with child anger because of the specific pattern of emotion dysregulation (Cassidy & Berlin, 1994; Zimmer-Gembeck et al., 2017).

We also expected interaction effects between early difficulty and attachment, such that infant negative affectivity may be a precursor of maladaptive developmental cascades – for both the parent and child measures – that are particularly relevant to the specific insecure category. However, as indicated earlier, because our assessments of parent and child variables were concurrent to attachment and reflected the still-unfolding early dynamics, the

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findings may not fully replicate past studies that have focused on the long-term *consequences* of the organization of attachment. Still, if the expected differences were found, they would indicate that the associations between infant difficulty and problematic parent-child dynamics, demonstrated in past work for insecure dyads, are already emerging in the first year.

Method

Participants

Two-parent families with infants born mostly in 2017 and 2018 ($N = 200$, 96 girls) volunteered for this longitudinal study in response to flyers, posters, social media, and mass emails. To be eligible, both parents (not required to be married) had to be willing to participate and speak English during sessions, and not planning to move in the next 5 years. The child had to be a typically developing infant and a biological child. Demographic characteristics varied: 14.5% of mothers and 24.0% of fathers had no more than a high school education, 46.5% of mothers and 43.5% of fathers had an associate or college degree, and 39.0% of mothers and 32.5% of fathers had a postgraduate education. The median household income was \$85,000 ($SD = \$44{,}530$, range = \$4,000–\$320,000). In terms of race, 88.5% of mothers and 88.5% of fathers were White, 1.5% of mothers and 3.0% of fathers African American, 5.5% of mothers and 3.5% of fathers Asian, and 4.5% of mothers and 3.5% fathers multiracial. Three (1.5%) fathers did not disclose their race. In terms of ethnicity, 4.5% of mothers and 1.5% of fathers identified as Latino, with the rest identifying as non-Latino (95.0% of mothers and 98.5% of fathers) or not reporting their ethnicity (0.5% of mothers). As for children (per parent report), 82.5% children were White, 2.5% African American, 3.0% Asian, and 10.5% multiracial. Three (1.5%) families did not report the child's race. Eleven (5.5%) of the children were identified as Latino, 94.0% as non-Latino, or were missing ethnicity information (0.5%). In 20% ($N = 40$) of families, one or both parents self-identified as Latino and/or not White.

Overview of design

At Time 1 ($N = 200$, 96 girls), children were aged on average 8 months, and at Time 2 ($N = 194$, 93 girls), 16 months. At Time 1, during a home session, we observed the infants' negative affectivity with each parent. At Time 2, each mother-child and father-child dyad was observed during a 2–2.5-hr, carefully scripted laboratory session, conducted by a female experimenter (E), typically scheduled within a few weeks apart (average time between mother-child and father-child sessions = 12.46 days, $SD = 7.68$). We counterbalanced the session order (mother first versus father first). The laboratory includes a naturalistically furnished Living Room and a sparsely furnished Play Room. The sessions encompassed multiple scripted contexts in which we observed parents' and children's behavior. Those contexts included a broad range of typical childrearing situations at toddler age (e.g., preventing the child from touching attractive but off-limits objects, displayed on a low, easily accessible shelf, waiting for a snack, cleaning up toys, playing, free time). The measure of parent-child attachment, the SSP (Ainsworth & Wittig, 1969), was also administered. Parents provided self-reports of their parenting and the child. Children who returned for Time 2 did not differ in their Time 1 measures or in distribution of gender from those who did not return.

The sessions were videotaped through one-way mirror for later coding. Multiple teams coded behavioral data. Between 15% and 20% of cases were sampled for reliability. Coders also frequently realigned to prevent observers' drift. Kappas, weighted kappas, and intra-class correlations were used to compute reliability, as appropriate. The University of Iowa IRB approved the study (Children and Parents Study, 201701705). Parents signed informed consents at the entry to the study. Questionnaire data were managed using REDCap electronic data capture tools hosted at the University of Iowa (Harris et al., 2019; Harris et al., 2009).

Measures

Infants' negative affectivity, Time 1

Paradigms and coding. For each mother- and father-child dyad, the infant's affect was coded for every 30s of 30 min of observations across four contexts (play, parent "busy," snack, and routine caregiving). Each segment was coded as 0 = *not present* (infant shows no sign of negative affectivity), 1 = *neutral negative affectivity* (not a "full-blown" negative affectivity, but signs of fatigue, subtle discomfort, a minor whimper, negatively "tinged" affect, etc.), 2 = *discrete negative affectivity expression* ("full-blown" distress, cry, fussiness, anger, etc.), or 3 = *intense, strong negative affectivity* (a discrete affect that lasts for 15 s or more, is intense, or escalates). Reliability, across five teams of coders, weighted kappas, ranged from .87 to .97 (average .88), intra-class correlations ranged from .98 to 1.00 (average .99).

Data aggregation. For each context, we added the codes across all segments. Then we averaged those scores across the four contexts into the final negative affectivity score, mothers, $M = 9.44$, $SD = 6.60$, range 0.00–36.75, fathers, $M = 12.83$, $SD = 7.06$, range 0.00–33.00. The difference was significant, $t(199) = -5.80$, $p < .001$. There were no significant differences for infants' negative affectivity to either parent among the four attachment groups or between girls and boys.

Parent-child attachment organization, Time 2

Paradigm. The SSP was conducted according to the standard guidelines, as the first paradigm in the laboratory, in a room that met the required dimensions and using standard toys and chairs. Two professional attachment coders, not affiliated with our university, were blind to all other information about the participants. Each coder coded a given child with one parent only. Each child's attachment was classified as avoidant (A), secure (B), or resistant (C), and received a disorganization rating (1-9). Children rated as 5 or higher received "disorganized" (D) as their leading classification and were combined with "unclassifiable" (U) into one category (D/U).

Coding. The same coders had previously coded over 200 SSPs of children and their parents in another study, conducted in our laboratory by a team of research assistants who had received an identical training. The coders' reliability, kappa, had been .78 for the four main attachment categories (A, B, C, and D/U). We conducted an additional reliability check using data from 17% of the families in the present study. Kappa was .88. All cases coded with low confidence by one coder were double-coded and adjudicated.

Parent-related measures, Time 2

Self-reported parental responsiveness. Mothers and fathers completed *Parenting Inventory* (Brock & Kochanska, 2015), a 26-item measure that targets responsiveness to the child's needs, warmth,

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and enjoyment of parenting (e.g., "I simply must comfort my child at the first sign of distress," "I often let my child take the lead when we are playing or interacting," "I tend to have a hard time understanding what my child wants," reversed; "My child and I have warm, intimate times together"; "I find it interesting and educational to be with my child for long periods"). A few items had been adapted from the Child-rearing Practices Report (Block, 1981). Responses ranged from 1 = *not at all true* to 6 = *highly true*. After reversing 11 items, Cronbach's αs were adequate, .78 and .76 for mothers and fathers, respectively. For mothers, $M = 4.36$, $SD = 0.48$, range 2.96–5.46, fathers $M = 3.96$, $SD = 0.46$, range 2.88–5.27. The difference was significant, $t(179) = 10.81$, $p < .001$.

Self-reported parental resentment toward the child. Mothers and fathers completed the very well-established Parenting Stress Inventory (Abidin, 2012). We used the score of the overall amount of stress, negative impact on one's life the parent attributes to various qualities of the child, and a sense of disappointment in the child (encompassing scales such as unadaptable, failing to reciprocate affection, falling short of parental expectations and hopes, highly negative mood, imposing high demands on the parent). Although the scales assess various characteristics, they all converge on the parent's feelings of resentment, disappointment, and challenge associated with the child (Cronbach's alphas were .82 and .80 for mothers and fathers, respectively); mothers, $M = 93.56$, $SD = 17.70$, range 55–166, fathers $M = 96.30$, $SD = 16.67$, range 50–147. The difference was not significant. Those scales have been used as measures of resentment or negative appraisal of the child (Callender et al., 2012).

Observed parental power assertion. ***Paradigms and coding.*** Each parent-child dyad was observed in three 5-min scripted contexts: Introduction to the Living Room (including the initial prohibition regarding the prohibited attractive toys and objects), free time, and snack prohibition (following the earlier instructions from E, the parent placed snacks, fruit, drinks, plates, and napkins on a table in preparation for a meal and asked the child to wait for several minutes). Coding was done for each 20-sec segment. Coders rated the parent's control using a scale that reflected the increasing amount of power or pressure. The codes were as follows: *no control* (no interaction, purely social exchange, play), *gentle guidance* (gentle, subtle, polite, pleasant control), *control* (firm, no-nonsense, matter-of-fact, relatively assertive control), and *power-assertive, negative, harsh control* (control delivered in forceful, impatient, threatening, angry, negative manner). The verbal, affective, and physical markers of each rating were clearly described, based on extensive past research (e.g., Kochanska et al., 2012). Reliability, weighted kappas, between the master coder and two other coders were .85 and .86.

Data aggregation. We tallied the number of the occurrences of each code. We then considered only the segments in which control did occur (i.e., omitting the segments coded as *no control*), and divided each tally (of *gentle guidance, control*, and *power-assertive control*) by the remaining number of segments. Finally, we weighed those relative scores by multiplying *gentle guidance* by 1, *control* by 2, and *power-assertive control* by 3, and summed those figures into the overall power assertion score for each parent, mothers, $M = 2.11$, $SD = 0.67$, range 0.79–4.50, fathers, $M = 2.20$, $SD = 0.79$, range 0.53–4.50. The difference was not significant.

Observed parental intrusiveness. ***Paradigms and coding***. For each parent-child dyad, intrusiveness was coded for the 5-min play context. The coding was adapted from Eisenberg et al. (2015) and Taylor et al. (2013), with intrusiveness defined as behavior that is parent centered rather than child centered, with the parent imposing own agenda on the child and ignoring or overriding the child's agenda, cues, or needs. For each 30s segment, coder rated the parent's intrusiveness as *none*, *low* (one instance), *moderate* (more than one instance or a prolong instance), or *high* (parent very or extremely intrusive). Reliability of coding, weighted kappas, between the master coder and three other coders, ranged from .70 to .82.

Data aggregation. We tallied the instances of each code, and then weighed the tally of *none* by 1, *low* by 2, *moderate* by 3, and *high* by 4, added those figures, and divided by the number of coded segments, mothers, $M = 1.42$, $SD = 0.36$, range 1.00–2.90, fathers, $M = 1.45$, $SD = 0.36$, range 1.00–2.80. The difference was not significant.

Child-related measures, Time 2

Parent-rated child social-emotional competence. Mothers and fathers completed Infant–Toddler Social and Emotional Assessment, an instrument that has shown excellent psychometric qualities in several large studies (Briggs-Gowan et al., 2006; Carter et al., 2003). We used the overall score for Competence Domain that encompasses six scales describing positive, adaptive behaviors, markers of good social-emotional functioning in the toddler period (numbers of items in parentheses): Compliance (8), Attention (5), Imitation/Play (6), Mastery Motivation (6), Empathy (7), and Prosocial Peer Relations (5). Parents rated each item as 0 = *not true/rarely*, 1 = *somewhat true/sometimes,* or 2 = *very true/often*. The final scores, for each parent, were the means of the six scales, mothers, $M = 1.24$, $SD = 0.24$, range 0.58–1.82, fathers, $M = 1.17$, $SD = 0.21$, range 0.58–1.91. The difference was significant, $t(176) = 3.36$, $p = .001$.

Observed child opposition. ***Paradigms and coding.*** Child opposition was observed, with each parent, during the same contexts as parental power assertion, and coded for the same 20-s segments. In this article, we focus on *committed compliance* and *defiance*. *Committed compliance* was defined as genuine, self-regulated, willing compliance with the parent's directive. *Defiance* was defined as overt opposition or noncompliance, accompanied by poorly controlled anger (e.g., fussing, crying, whining, arching back, throwing toys, kicking, temper tantrum, deliberately and angrily taking toys off the display shelf, throwing cups and napkins on the floor). Reliability, kappas, were .82 and .84 for two pairs of coders (other types of child response were coded, but not considered in this article).

Data aggregation. The *committed compliance* and *defiance* codes were tallied and divided by the number of coded segments. Those scores correlated, for mother-child dyads, $r(191) = -.42$, and father-child dyads, $r(184) = -.34$, both $ps < .001$; consequently, they were aggregated (having reversed the *committed compliance* score) into the child's overall *opposition* score with each parent, mothers, $M = -0.04$, $SD = 0.14$, range −0.37 to 0.37, fathers, $M = -0.06$, $SD = 0.12$, range −0.33 to 0.33. The difference was significant, $t(185) = 2.29$, $p = .023$.

Observed child anger. ***Paradigm and coding***. The child was observed in the Car Seat episode from Laboratory Temperament Assessment Battery (Goldsmith & Rothbart, 1999). The child was buckled tightly in a commercially available car seat for 60 s. Coders rated the child's bodily, facial, and vocal expressions of

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anger in 5 s segments. Range for bodily anger were from 0 = *none,* to 4 = *high intensity struggle*; for facial anger, from 0 = *none,* to 3 = *strong expression in all three facial regions*; for vocal anger, from 0 = *none,* to 3 = *full intensity cry or scream*. The latency to express anger was also coded. Reliability, kappas, ranged from .63 to .79; intra-class correlations ranged from .84 to 1.00.

Data aggregation. We summed the codes for discrete anger expressions, reversed the latency score, standardized, and aggregated into an overall score of observed child anger (Cronbach's $\alpha = .80$), $M = 0.00$, $SD = 0.78$, range −1.60 to 2.16. The descriptive data for all constructs separately by attachment category are in Table 1.

Results

Preliminary analyses

Correlations among the constructs

We examined correlations among the studied constructs (presented in Table 2). In mother-child dyads, there were multiple significant correlations, all in expected direction, although modest in magnitude. Mothers of infants who had been highly affectively negative at Time 1, at Time 2 reported being less responsive and more resentful of the child, and those infants were more oppositional. At Time 2, mothers who reported more resentment of the child saw him or her as less competent and themselves – as less responsive, and they resorted to more power assertion. Mothers who were more power-assertive saw their children as less competent and had children who showed more opposition.

There were fewer significant correlations in father-child dyads. Like mothers, fathers who expressed more resentment of the child saw him or her as less competent and themselves – as less responsive. As for mothers, paternal power assertion and child opposition were positively associated.

All assessed constructs – child negative affectivity in infancy and parental and child adjustment at Time 2, self-reported and observed, were positively associated across mother- and father-child dyads. Those correlations, although significant, were modest in size.

Children's attachment organization with one parent was associated significantly but weakly with that with the other parent, kappa = .26, $SE = .06$, $p < .001$. Such modest concordance between mother-child and father-child attachments is comparable with several past studies (Fox et al., 1991; Steele et al., 1996).

In mother-child dyads, there was a significant association between children's gender and attachment category, $\chi^2(3) = 9.08$, $p = .028$. The association was due to more boys (14) than girls (5) being avoidant and more girls (13) than boys (4) being disorganized. There was no association in father-child dyads, $\chi^2(3) = 2.20$, ns.

In addition, we computed the correlations between Time 1 infant negative affectivity and Time 2 dependent variables, separately for each attachment category. Those are available in supplemental Table S1 for descriptive purposes.

Predicting parenting and child measures from infant negative affectivity in parent-child dyads differing in their attachment organization

Using structural equation modeling, we modeled the parent and child constructs (Time 2) as endogenous variables. Infant negative affectivity, assessed with the given parent (Time 1), attachment categories (Time 2), and the interaction between negative affectivity and attachment were modeled as exogenous variables. The models were estimated separately for mother-child and father-child dyads. We included child gender and session order (mother first or father first) as covariates, as the latter has been found important in past research (Granqvist et al., 2016), but did not discuss their effects, as those were not germane to our focus. We also standardized Time 1 infant negative affectivity and the Time 2 parent and child constructs for ease of interpretation.

For each parent-child dyad, we inspected two models. In the first model, we compared secure group with the insecure group. We coded attachment security as a dichotomous variable (secure = 0 vs. insecure = 1).

In the second model, we adopted a more fine-grained approach and examined the differences between secure group and each insecure group by coding A, B, C, and D/U as dummy variables (i.e., comparison of A vs. B, comparison of C vs. B, and comparison of D/U vs. B). The secure category served as the reference group. Thus, in the second model, a significant main effect for any of the dummy variables indicated that, for a given parent or child Time 2 dependent variable, the specific insecure group (A, C, D/U) was significantly different from secure (B). A significant interaction between infant negative affectivity (with the given parent) and a dummy variable indicated that the association between the infant's negative affectivity at Time 1 and the given dependent variable at Time 2 was significantly different in the specific insecure group represented by the dummy variable (A, C, D/U) from that association in the secure group (B). In other words, the second model allows us to explore the emerging patterns of associations between infant negative affectivity and parent and child measures that are specific to A, C, and D/U groups.

Because multiple tests were conducted for exploratory purpose, we used Benjamini and Hochberg's (1995) procedures to control for the false discovery rate (FDR) across each set of dependent variables we explored. We then probed the simple slopes (Aiken & West, 1991) for the interaction effects that remained significant after the FDR controlling procedures. We estimated the models in Mplus (Muthén & Muthén, 19982022) using the maximum likelihood estimator that is robust to nonnormality. We used the full information maximum likelihood to account for the missing data.

With standardized dependent variables, the main effects of attachment categories in our models are analogous to Cohen's *d*. We additionally computed the effect sizes of the interactions between infant negative affectivity and attachment (Shieh, 2019; see Supplementary Tables S2–S5).

Mother-child dyads

Associations among infant negative affectivity, attachment category, and mother measures. The findings for the mother-related measures are in Table 3. For the model that compared secure vs. insecure groups, we found no significant differences for any of the Time 2 endogenous variables attributable to the attachment organization (main effects). Attachment security also did not moderate the relations between infant negative affectivity and mother-related measures.

However, the model that separately examined B vs. A, C, and D/U groups indicated some attachment-related effects for two maternal measures. For mothers' self-reported resentment of child, the main effect of the comparison C vs. B was significant. Mothers in resistant dyads reported more resentment of the child than those in secure dyads. The interaction effect between the infant's negative affectivity and A vs. B comparison was also significant for resentment of the child. We probed the interaction using simple slopes,

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Table 1. Descriptive data for all constructs

	T1 infant behavior		T2 parenting outcomes								T2 child outcomes					
	Negative affectivity[a]		Responsiveness[b]		Resentment of child[b]		Power assertion[a]		Intrusiveness[a]		Social-emotional competence[b]		Opposition[a]		Anger[a]	
Mother-child dyad	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
T2 attachment category with mother																
B ($N = 137$, 71%)	9.29	6.89	4.36	0.48	92.69	16.05	2.12	0.69	1.42	0.35	1.24	0.25	−0.04	0.14	0.01	0.76
A ($N = 19$, 10%)	9.96	7.97	4.30	0.51	89.33	18.94	2.09	0.71	1.45	0.34	1.27	0.28	−0.08	0.11	0.01	0.70
C ($N = 19$, 10%)	10.55	5.33	4.46	0.44	106.89	25.81	1.99	0.68	1.33	0.26	1.25	0.21	0.02	0.14	0.13	0.92
D/U ($N = 17$, 9%)	7.85	3.43	4.30	0.47	91.93	12.87	2.11	0.50	1.56	0.49	1.17	0.19	−0.02	0.14	−0.41	0.68
	T1 infant behavior		T2 parenting outcomes								T2 child outcomes					
	Negative affectivity[a]		Responsiveness[b]		Resentment of child[b]		Power assertion[a]		Intrusiveness[a]		Social-emotional competence[b]		Opposition[a]		Anger[a]	
Father-Child Dyad	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
T2 attachment category with father																
B ($N = 125$, 67%)	12.59	7.12	3.96	0.46	94.52	17.11	2.14	0.70	1.45	0.35	1.17	0.22	−0.09	0.11	−0.01	0.75
A ($N = 22$, 12%)	13.47	7.76	3.83	0.36	102.35	10.98	2.60	0.91	1.47	0.46	1.09	0.17	−0.02	0.11	−0.19	0.71
C ($N = 16$, 9%)	12.34	4.02	3.91	0.37	103.19	14.56	2.30	0.75	1.42	0.38	1.15	0.22	0.02	0.08	0.01	0.98
D/U ($N = 23$, 12%)	14.73	7.69	4.08	0.53	95.29	17.29	2.05	1.07	1.40	0.25	1.20	0.19	−0.04	0.16	0.13	0.85

Note. [a]Behavioral observation. [b]Parent report. T1 = Time 1, 8 months ($N = 200$). T2 = Time 2, 16 months (Ns = 193 and 186 for mother-child and father-child dyadic observations, respectively; Ns = 183–185 and 180–182 for mothers' and fathers' reports, respectively; $N = 187$ for child anger). B = secure. A = avoidant. C = resistant. D/U = disorganized/unclassifiable. One child did not complete SSP with the mother.

Table 2. Inter-correlations among all constructs

	T1 infant negative affectivity	T2 parental responsiveness	T2 parental resentment of child	T2 parental power assertion	T2 parental intrusiveness	T2 child social-emotional competence	T2 child opposition	T2 child anger
T1 infant negative affectivity	.27***	−.16*	.17*	.13^{+}	.06	−.14^{+}	.21**	.06
T2 parental responsiveness	−.02	.45***	−.26***	−.14^{+}	−.08	.27***	−.05	−.04
T2 parental resentment of child	.02	−.29***	.29***	.18*	−.03	−.41***	.10	.10
T2 parental power assertion	−.02	−.04	.08	.16*	.14^{+}	−.24**	.30***	−.04
T2 parental intrusiveness	−.02	−.00	−.04	.03	.33***	−.04	.05	−.07
T2 child social-emotional competence	−.04	.17*	−.32***	−.06	.09	.24**	−.22**	.01
T2 child opposition	−.12	.01	.12	.22**	.08	−.14^{+}	.35***	.03
T2 child anger	−.11	−.03	.04	.05	−.13^{+}	.13^{+}	−.02	–

Note. Correlations for mother-child dyads are above the diagonal, and correlations for father-child dyads are below the diagonal. Correlations across mother-child and father-child constructs are on the diagonal. $^{+}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. T1 = Time 1, 8 months. T2 = Time 2, 16 months.

presented in Figure 1, Panel A. In avoidant mother-child dyads, there was a positive association between the infant's negative affectivity at Time 1 and the mother's resentment at Time 2, $B = 0.52$, $SE = 0.12$, $p < .001$. That association was not significant in secure dyads, $B = 0.11$, $SE = 0.07$, $p = .140$.

For mothers' intrusiveness, the interaction between infant negative affectivity and A vs. B comparison was also significant. Simple slopes are in Figure 1, Panel B. In avoidant mother-child dyads, there was a positive association between the infant's negative affectivity at Time 1 and the mother's intrusiveness at Time 2, $B = 0.51$, $SE = 0.14$, $p < .001$. That association was not significant in secure dyads, $B = -0.02$, $SE = 0.08$, $p = .836$.

Associations among infant negative affectivity, attachment category, and child measures. The findings for the child measures are in Table 4. For the model that compared secure vs. insecure groups, no significant main or interaction effects were found.

The model that separately examined B vs. A, C, and D/U groups, however, revealed one significant interaction effect between infant negative affectivity and the A vs. B comparison. Specifically, the simple slopes (Figure 1, Panel C) supported a negative association between the infant's negative affectivity at Time 1 and mother-reported child social-emotional competence at Time 2 in the avoidant dyads, $B = -0.51$, $SE = 0.15$, $p = .001$. That association was not significant in secure dyads, $B = -0.05$, $SE = 0.09$, $p = .533$.

Father-child dyads

Associations among infant negative affectivity, attachment category, and father measures. The findings for the father-related measures are in Table 5. For the model that compared secure vs. insecure groups, attachment security significantly moderated the association between infant negative affectivity and fathers' self-reported responsiveness. Simple slopes are in Figure 2. In insecurely attached dyads, fathers of children who had been highly higher negative as infants expressed lower responsiveness at Time 2, $B = -0.29$, $SE = 0.10$, $p = .004$. This association was not significant in secure dyads, $B = 0.10$, $SE = 0.08$, $p = .223$. We found no other significant effects in the secure vs. insecure model.

The model that separately examined B vs. A, C, and D/U groups also indicated an analogous significant moderation effect for the association between infant negative affectivity and fathers' responsiveness. Specifically, this moderation effect was unique to the D/U vs. B comparison. Simple slopes are in Figure 3, Panel A. In disorganized father-child dyads, fathers of highly negative infants reported less responsiveness at Time 2, $B = -0.52$, $SE = 0.17$, $p = .002$. That association was not significant in secure dyads, $B = 0.10$, $SE = 0.08$, $p = .210$.

The model that separately examined B vs. A, C, and D/U groups also revealed several additional findings. The comparisons of A vs. B and C vs. B were significant for fathers' self-reported resentment of child. Fathers in avoidant and resistant dyads reported more resentment than those in secure dyads. In addition, the D/U vs. B comparison moderated the association between infant negative affectivity and fathers' resentment of their child. Simple slopes are in Figure 3, Panel B. In disorganized father-child dyads, fathers of highly negative infants expressed more resentment of child at Time 2, $B = 0.31$, $SE = 0.13$, $p = .020$. That association was not significant in secure dyads, $B = -0.08$, $SE = 0.09$, $p = .404$.

For fathers' power assertion, the main effect of the comparison A vs. B was significant. Fathers in avoidant dyads were more power-assertive than those in secure dyads. In addition, the C vs. B comparison moderated the association between infant negative affectivity and fathers' power assertion. Simple slopes are in Figure 3, Panel C. Somewhat surprisingly, in resistant father-child dyads, fathers' of highly negative infants used less power assertion when controlling their children at Time 2, $B = -0.70$, $SE = 0.22$, $p = .001$. That association was not significant in secure dyads, $B = 0.02$, $SE = 0.08$, $p = .852$. No main or interaction effects were found for fathers' intrusiveness.

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Table 3. Mother-child dyads: infant negative affectivity, 8 months and parenting measures, 16 months

	Mother responsiveness, self-reported			Mother resentment of child, self-reported			Mother power assertion, observed			Mother intrusiveness, observed		
	B	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
Model for secure (B) vs. all insecure (I) attachments												
Child sex	0.16	0.15	.267	0.07	0.14	.646	**0.49**	**0.14**	**<.001**[a]	0.00	0.14	.978
Session order	−0.10	0.14	.506	0.32	0.14	.024[b]	0.26	0.14	.064	−0.07	0.14	.643
Infant negative affectivity	−0.10	0.08	.223	0.10	0.08	.190	0.10	0.08	.187	−0.02	0.08	.839
I vs. B	−0.02	0.16	.898	0.25	0.16	.119	−0.06	0.15	.700	0.06	0.16	.706
Infant negative affectivity × I vs. B	−0.30	0.17	.081	0.29	0.17	.081	0.08	0.16	.640	0.33	0.17	.058
Model for B vs. A/C/D attachments												
child sex	0.15	0.15	.302	0.11	0.14	.429	**0.52**	**0.14**	**<.001**[a]	0.06	0.14	.691
Session order	−0.08	0.14	.557	**0.38**	**0.14**	**.007**[a]	0.25	0.14	.070	−0.09	0.14	.530
Infant negative affectivity	−0.10	0.10	.326	0.11	0.07	.140	0.10	0.07	.124	−0.02	0.08	.836
A vs. B	−0.11	0.24	.631	−0.26	0.20	.206	−0.17	0.24	.465	0.03	0.19	.857
C vs. B	0.28	0.21	.176	**0.84**	**0.32**	**.008**[a]	−0.16	0.22	.473	−0.27	0.19	.166
D vs. B	−0.13	0.32	.688	0.04	0.29	.901	0.24	0.21	.256	0.57	0.34	.097
Infant negative affectivity × A vs. B	−0.37	0.19	.049[b]	**0.41**	**0.14**	**.004**[a]	0.13	0.20	.507	**0.53**	**0.16**	**.001**[a]
Infant negative affectivity × C vs. B	−0.41	0.20	.046[b]	0.02	0.36	.965	−0.01	0.31	.970	−0.01	0.23	.966
Infant negative affectivity × D/U vs. B	0.07	0.42	.871	−0.17	0.34	.620	0.28	0.27	.303	0.65	0.82	.432

Note. B = secure. A = avoidant. C = resistant. D = disorganized/unclassifiable. I = insecure (A, C, and D/U). Z-tests were used for examining the statistical significance of the coefficients in the structural equation framework.

[a]Bold font represents statistically significant findings as indicated by the False Discovery Rate (FDR) controlling procedure (Benjamini & Hochberg, 1995). [b]$p < .05$, but not significant under the FDR-adjusted alpha levels.

The FDR controlling procedure ranks the *p*-values in multiple tests from the smallest to the largest (denoted as p_i, where $i = 1, 2, \ldots, m$, for m tests conducted; in our case, $m = 4$), and compares the ranked *p*-values against a series of adjusted alpha levels by looking for the largest i (denoted as k) that satisfies $p_i \leq \frac{i}{m}\alpha$. The corresponding tests 1, 2, . . . , k are then considered statistically significant. Because the alpha levels were adjusted for each test, some tests that met the traditional significance level of alpha <.05 were considered nonsignificant with the FDR controlling procedure.

Associations among infant negative affectivity, attachment category, and child measures. The findings for child measures are in Table 6. For the model that compared secure vs. insecure groups, there was a main effect of security for child opposition: Insecure children exhibited higher opposition to their fathers. Unexpectedly, this model also revealed two main effects of infant negative affectivity, such that it was associated with lower opposition to their fathers and with less anger at Time 2. However, because the zero-order correlations between infant negative affectivity at Time 1 and child opposition to fathers and anger at Time 2 were not significant, these two main effects need to be interpreted with caution. There were no significant findings for father-reported child social-emotional competence.

The model that compared B vs. A, C, and D/U groups revealed the same two main effects of child negative affectivity on opposition and anger (recall those call for caution and should not be interpreted). The model further indicated that the previously reported main effect of attachment insecurity on the child's opposition was specific to the A vs. B and C vs. B comparisons. Children in avoidant and resistant dyads exhibited higher opposition to their fathers than those in secure dyads.

Discussion

For almost five decades, research has continued to demonstrate the vibrancy and heuristic richness of Bowlby's (1969/1982) attachment theory. Large bodies of literature have supported significant correlates and implications of early attachment organization, increasingly suggesting that those processes and pathways may be more complex than simple direct effects; rather, early attachment may serve a conditional or probabilistic role by altering parent-child relational processes (Boldt et al., 2017; DeKlyen & Greenberg, 2016, Kochanska et al., 2019; Kochanska & Kim, 2012; Sroufe, 2005, 2016; Sroufe et al., 1999).

As we have emphasized earlier, although attachment organization was modeled as an exogenous variable in the analyses, we do not make any causal attributions with regard to attachment, given that it was assessed at the same time as the parent and child measures of interest. The main focus of our study was to examine whether the very early trajectories that unfold from infants' negative affectivity across the first year, concurrently with the still-organizing parent-child attachment, are different in dyads that are on the paths to being classified as secure or insecure, giving us a potential descriptive glimpse into early (mal)adaptations. A tentative answer appears to be "yes" – although only for some of the measures, some comparisons, and not the same for mother- and father-child dyads.

Previous studies that have considered both the parent's and the child's characteristics in the context of attachment organization in SSP have yielded notoriously complex findings that have yet to coalesce into a coherent pattern (e.g., Mangelsdorf et al., 2000; Mills-Koonce et al., 2007; Planalp et al., 2013; Planalp et al., 2019). The current study is no exception, as it produced a complex set of findings that depended on the comparison deployed (secure vs. insecure or secure vs. each of the insecure groups), the endogenous measure considered, and the dyad (mother-child vs. father-child).

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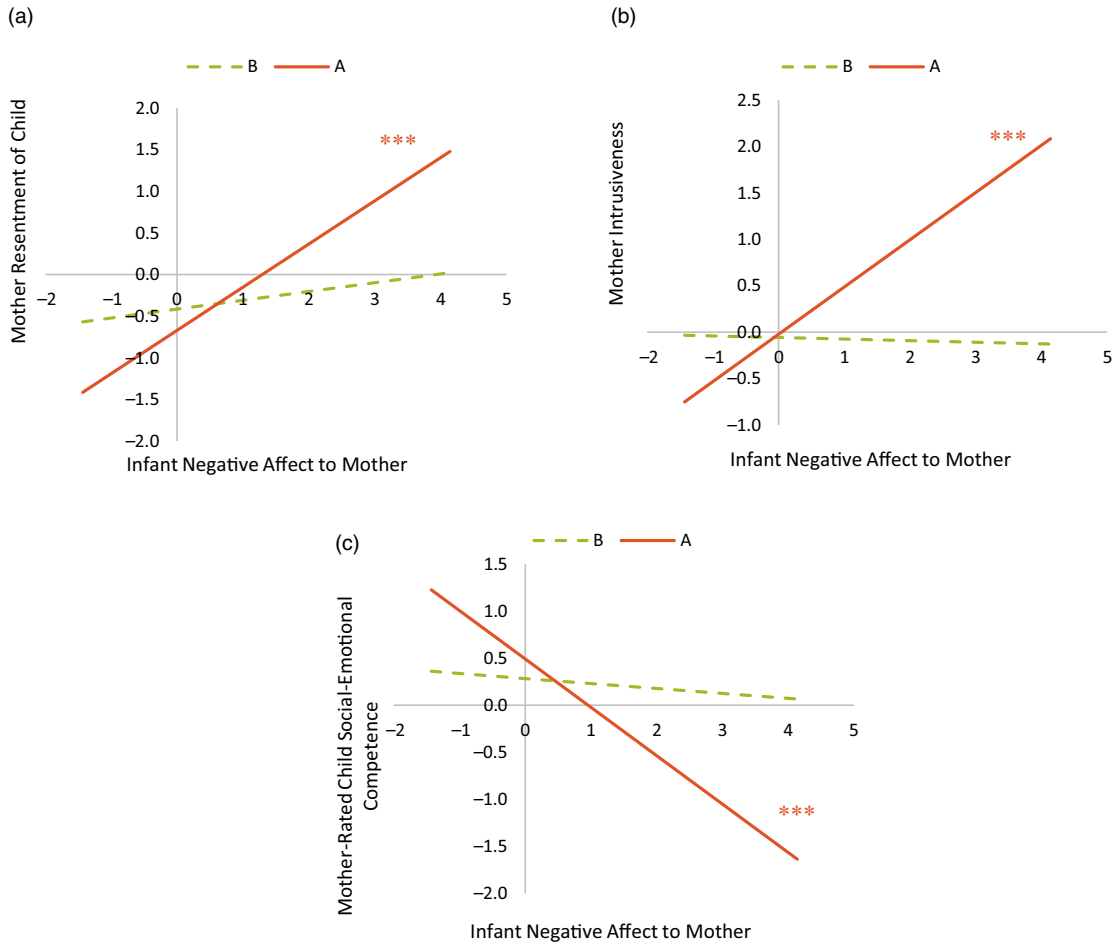

Figure 1. Associations between T1 infant negative affectivity and T2 maternal and child variables in different mother-child attachment groups. Simple slopes for significant moderation effects are plotted. B = Secure. A = Avoidant. *$p < .05$. **$p < .01$. ***$p < .001$.

In this study, we first compared secure and insecure groups, and then followed up with more fine-grained comparisons of the secure group with each of the insecure groups. The secure versus insecure comparison revealed few significant associations between attachment and developmental trajectories. The fine-grained comparisons produced more findings than the former, potentially supporting qualitative differences in both parent and child measures among the insecure attachment groups across the first 1–1.5 year of life. Those findings for specific insecure groups were not well replicated across mother-child and father-child dyads, with many explored effects of specific insecure groups being nonsignificant. The inconsistent findings may be caused by the modest sizes of the specific insecure groups, the differences between mothers' and fathers' roles as parents and attachment figures (e.g., Grossmann & Grossmann, 2020), as well as the age of the children – attachment is still under organization and co-evolving with parents' and children's behaviors at such an early age, and thus may have limited impact on the early trajectories of behaviors. However, after controlling for FDRs, several effects persisted, indicating the different forms of early organizations of attachment insecurity may have interesting and important implications not well recognized in the literature. We hope future replication studies and integrative approaches, such as meta-analysis or integrative data analysis (Curran & Hussong, 2009), will provide a more robust picture of the unfolding multifinal trajectories of attachment and behavior.

Overall, differences in attachment organization between children and their parents were associated with characteristics of their relationships, both for the parent and child measures. Several main effects, in alignment with the attachment field, illustrated benefits of early security. Adding to the large bodies of extant literature, we found that compared to secure dyads, insecure dyads evidenced less adaptive set of characteristics and dealt less adaptively with the challenge of a highly negative infant. Although overall, the latter findings were less consistent than findings in the extant literature that had been obtained at older ages and followed the consolidation of the child's attachment, they are nevertheless noteworthy, as they imply early origins of such process, already present as the attachment is still organizing. Of note, infants' negative affectivity in and off itself was unrelated to the attachment organization (examined in additional analyses that compared negative affectivity across all four groups in mother-child and father-child dyads; both Fs < 1).

Mother-child dyads

Surprisingly, secure dyads, compared to insecure ones, were not significantly different on any parent or child measure at Time 2. The associations between the infant's negative affectivity with the mother and Time 2 measures were likewise not significantly different.

But the inspection of the separate comparisons between secure dyads and avoidant, resistant, and disorganized ones revealed additional significant results. Mothers in the resistant group

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Table 4. Mother-child dyads: infant negative affectivity, 8 months and child measures, 16 months

	Child social-emotional competence, mother-reported			Child opposition to mother, observed			Child anger, observed		
	B	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
Model for secure (B) vs. all insecure (I) attachments									
Child sex	−0.13	0.15	.361	0.20	0.14	.143	0.26	0.14	.067
Session order	0.02	0.15	.920	**0.37**	**0.14**	**.007**[a]	0.22	0.14	.127
Infant negative affectivity	−0.05	0.08	.516	0.17	0.08	.034[b]	−0.02	0.08	.789
I vs. B	−0.04	0.16	.828	0.12	0.15	.418	−0.09	0.16	.574
Infant negative affectivity × I vs. B	−0.34	0.17	.047[b]	0.21	0.16	.199	0.31	0.17	.070
Model for B vs. A/C/D attachments									
Child sex	−0.18	0.15	.211	0.26	0.14	.064	0.23	0.14	.110
Session order	0.00	0.15	.998	**0.39**	**0.14**	**.004**[a]	0.21	0.14	.141
Infant negative affectivity	−0.05	0.09	.533	0.17	0.07	.025[b]	−0.02	0.08	.778
A vs. B	0.21	0.23	.377	−0.34	0.18	.064	−0.05	0.22	.824
C vs. B	0.09	0.21	.656	0.42	0.19	.027[b]	0.09	0.25	.728
D vs. B	−0.41	0.29	.156	0.37	0.24	.126	−0.32	0.24	.179
Infant negative affectivity × A vs. B	**−0.46**	**0.18**	**.008**[a]	0.09	0.16	.564	0.04	0.13	.782
Infant negative affectivity × C vs. B	−0.30	0.22	.173	0.35	0.30	.237	0.67	0.30	.028[b]
Infant negative affectivity × D/U vs. B	−0.15	0.35	.668	0.53	0.29	.067	0.61	0.34	.069

Note. B = secure. A = avoidant. C = resistant. D = disorganized/unclassifiable. I = insecure (A, C, and D/U). Z-tests were used for examining the statistical significance of the coefficients in the structural equation framework.

[a]Bold font represents statistically significant findings as indicated by the False Discovery Rate (FDR) controlling procedure (Benjamini & Hochberg, 1995). [b]$p < .05$, but not significant under the FDR-adjusted alpha levels.

The FDR controlling procedure ranks the *p*-values in multiple tests from the smallest to the largest (denoted as p_i, where $i = 1, 2, \ldots, m$, for m tests conducted; in our case, $m = 3$), and compares the ranked *p*-values against a series of adjusted alpha levels by looking for the largest i (denoted as k) that satisfies $p_i \leq \frac{i}{m}\alpha$. The corresponding tests 1, 2, . . . , k are then considered statistically significant. Because the alpha levels were adjusted for each test, some tests that met the traditional significance level of alpha <.05 were considered nonsignificant with the FDR controlling procedure.

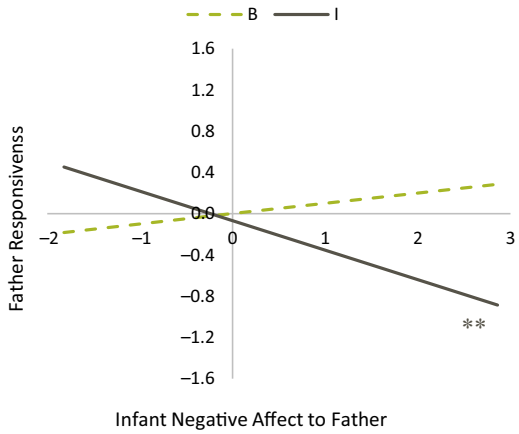

Figure 2. Associations between T1 infant negative affectivity and T2 paternal and child variables in secure and insecure father-child dyads. Simple slopes for significant moderation effects are plotted. B = Secure. I = Insecure. *$p < .05$. **$p < .01$. ***$p < .001$.

reported more resentment of their children than those in the secure group (regardless of their children's negative affectivity).

When the child's negative affectivity was taken into account, meaningful differences emerged in its relations with measures at 16 months. Consistent with our hypotheses, compared to secure dyads, in the avoidant dyads, at 16 months, mothers of highly negative infants reported high resentment and perceived their children as low in social-emotional competence; they also became highly intrusive.

Research has often documented highly intrusive, excessively stimulating behavior as characteristic for mothers of avoidant children (see review by Fearon & Belsky, 2016). The contribution of our study is to suggest that this common characterization of avoidant parenting may, in fact, need a caveat and a more nuanced understanding of the developmental process that takes into account the infant's emotional qualities as well. Those findings are consistent with those by Keller et al. (2005), who also identified a combination of the infant's high negativity (assessed by maternal report) and avoidant attachment as a particular risk for a future disruptive trajectory. We note that a recent meta-analysis found that child difficult temperament was related to resistant attachment, but not to avoidant attachment (Groh, Narayan, et al., 2017); however, as mentioned above, we found no differences in negative affectivity across the attachment groups. Our findings, however, indicate that the *combination* of high negativity and avoidant attachment seems to be a significant risk factor in mother-child dyads.

Interestingly, contradictory to the literature and our hypotheses, our findings did not support the associations between any of the insecure categories and maternal responsiveness. Although responsiveness has been generally associated with security (De Wolff & van IJzendoorn, 1997), it is a broad construct that encompasses a variety of sensitive behaviors (e.g., cooperation, positivity, availability; Bailey et al., 2017). Those facets of responsiveness may be differently associated with insecure categories (Bailey et al., 2017). Perhaps the general self-reported measure did not reflect the nuances in maternal responsiveness (or

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Table 5. Father-child dyads: infant negative affectivity, 8 months and parenting measures, 16 months

	Father responsiveness, self-reported			Father resentment of child, self-reported			Father power assertion, observed			Father intrusiveness, observed		
	B	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
Model for secure (B) vs. all insecure (I) attachments												
Child sex	0.11	0.14	.462	−0.12	0.14	.396	0.24	0.14	.104	−0.07	0.15	.641
Session order	−0.23	0.15	.115	0.08	0.15	.614	0.04	0.15	.777	−0.08	0.15	.591
Infant negative affectivity	0.10	0.08	.223	−0.07	0.09	.422	0.02	0.08	.843	0.01	0.08	.926
I vs. B	−0.07	0.15	.657	0.34	0.15	.024[b]	0.23	0.17	.186	−0.07	0.17	.696
Infant negative affectivity × I vs. B	**−0.39**	**0.13**	**.003**[a]	0.27	0.13	.041[b]	−0.12	0.16	.448	−0.09	0.15	.531
Model for B vs. A/C/D attachments												
Child sex	0.05	0.15	.740	−0.07	0.14	.624	0.26	0.14	.065	−0.06	0.15	.706
Session order	−0.19	0.15	.200	0.02	0.16	.911	0.03	0.14	.819	−0.08	0.15	.551
Infant negative affectivity	0.10	0.08	.210	−0.08	0.09	.404	0.02	0.08	.852	0.01	0.08	.935
A vs. B	−0.33	0.20	.108	**0.48**	**0.17**	**.006**[a]	**0.58**	**0.25**	**.020**[a]	0.05	0.29	.873
C vs. B	−0.14	0.22	.518	**0.57**	**0.21**	**.008**[a]	0.18	0.21	.404	−0.12	0.27	.650
D vs. B	0.32	0.25	.214	0.00	0.24	.997	−0.15	0.30	.625	−0.17	0.19	.363
Infant negative affectivity × A vs. B	−0.21	0.14	.127	0.15	0.17	.385	−0.06	0.19	.731	−0.19	0.23	.416
Infant negative affectivity × C vs. B	−0.35	0.24	.150	0.63	0.30	.036[b]	**−0.72**	**0.23**	**.002**[a]	−0.21	0.47	.661
Infant negative affectivity × D/U vs. B	**−0.63**	**0.19**	**.001**[a]	**0.39**	**0.16**	**.018**[a]	−0.01	0.26	.963	0.03	0.15	.842

Note. B = secure. A = avoidant. C = resistant. D = disorganized/unclassifiable. I = insecure (A, C, and D/U). Z-tests were used for examining the statistical significance of the coefficients in the structural equation framework.

[a]Bold font represents statistically significant findings as indicated by the False Discovery Rate (FDR) controlling procedure (Benjamini & Hochberg, 1995). [b]$p < .05$, but not significant under the FDR-adjusted alpha levels.

The FDR controlling procedure ranks the *p*-values in multiple tests from the smallest to the largest (denoted as p_i, where $i = 1, 2, \ldots, m$, for m tests conducted; in our case, $m = 4$), and compares the ranked *p*-values against a series of adjusted alpha levels by looking for the largest i (denoted as k) that satisfies $p_i \leq \frac{i}{m}\alpha$. The corresponding tests 1, 2, . . . , k are then considered statistically significant. Because the alpha levels were adjusted for each test, some tests that met the traditional significance level of alpha <.05 were considered nonsignificant with the FDR controlling procedure.

correspond to actual parenting). Note, however, that the interaction effects between avoidant and resistant attachment and negative affectivity on maternal responsiveness did have *p*-values < .05, but were considered not significant in our conservative approach that had adjusted for the multiple tests conducted. Future studies need to examine those associations with a larger sample and sufficient statistical power.

We also failed to find significant effects involving mother-child disorganized attachment. The literature generally suggests the link between frightening, abusive parenting and disorganized attachment (van IJzendoorn et al., 1999), but mothers in this low-risk sample rarely showed extreme power-assertive behaviors, which may have limited the strength of associations. In addition, the lack of findings may be related to the limitation of age, statistical power, and the range of variables – note that infant negative affectivity in disorganized mother-child dyads appeared to have less variability than in the other attachment categories, which might have limited the detection of interaction effects.

Father-child dyads

The overall comparisons of secure and insecure dyads produced one significant effect, consistent with attachment theory and our expectations: In insecure relationships, children showed more opposition to fathers' control. There was also evidence of multifinality with regard to infants' early negativity. In insecure dyads, fathers of infants who had been highly negative reported decreased responsiveness, warmth, and enjoyment of parenting, but there was no such effect in secure dyads.

As for mothers, the more fine-grained analyses revealed additional differences between the secure groups and each of the insecure groups, consistent with expectations from attachment theory. Compared to secure dyads, in avoidant and resistant ones, a pattern of adversarial dynamics began to be evident: Children in both avoidant and resistant dyads were more oppositional, complementing the aforementioned finding for the insecure group as a whole, and fathers reported more resentment of the child. In avoidant dyads, fathers also relied more on power assertion.

Father-related measures at 16 months evidenced multifinality with regard to early infant negativity, which was differentially associated with parent- (but not child-) related measures at 16 months in these more fine-grained comparisons. One clear pattern emerged for disorganized dyads. In those dyads, consistent with our hypotheses, fathers of more negative infants expressed lower responsiveness and more resentful feelings toward the child. Those associations were significantly different than in secure dyads (in which there were none). Because few studies examined disorganized attachment in father-child dyads, our understanding of paternal parenting in such dyads is highly incomplete. Perhaps having a history of parenting a highly negative infant is especially stressful for fathers in disorganized dyads. In future studies, collecting information about the fathers' atypical parenting or unresolved states of mind regarding relationships – both related to children's disorganization – would be helpful in clarifying origins of this effect and its specificity to fathers.

However, the findings did not support our hypotheses about the associations between avoidant attachment and intrusiveness or between disorganized attachment and power assertion. As the

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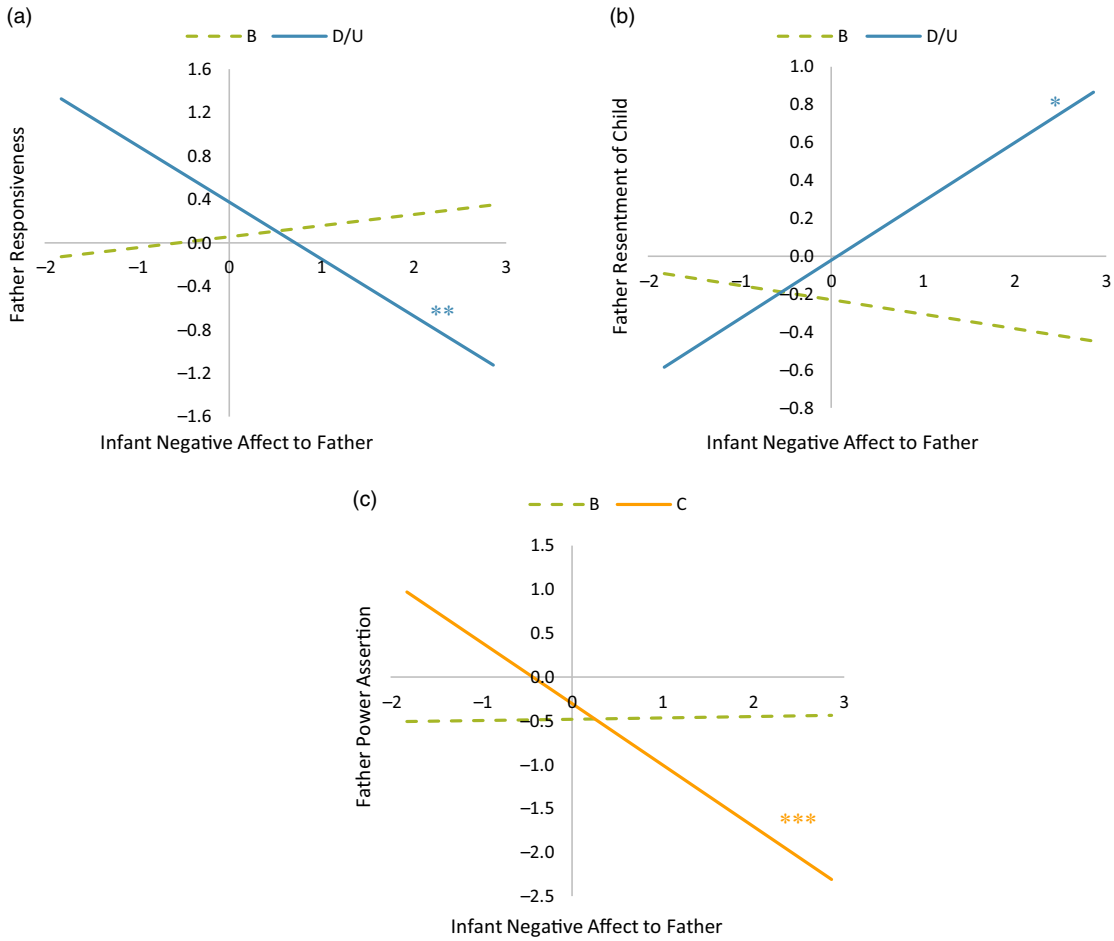

Figure 3. Associations between T1 infant negative affectivity and T2 paternal and child variables in different father-child attachment groups. Simple slopes for significant moderation effects are plotted. B = Secure. C = Resistant. D/U = Disorganized/Unclassified. *$p < .05$. **$p < .01$. ***$p < .001$.

attachment literature has been largely focusing on mother-child attachment (Cabrera & Volling, 2019; Cabrera et al., 2018), the relations among early difficulty, attachment categories, and behavioral patterns in father-child dyads are less clear and sometimes different than the findings in mother-child dyads (e.g., Volling et al., 2002; Olsavsky et al., 2020). Thus, more research for fathers is needed.

In resistant dyads, compared to secure, surprisingly, fathers of the infants who had been more negative used less power, compared to secure. This finding is puzzling, particularly given the previously described finding of resistant children being more oppositional toward their fathers than secure ones and being resented by their fathers. Perhaps fathers of highly negative resistant infants develop a strategy of withdrawing from confrontation with their children following the onset of control in the second year. Indeed, the frankly exploratory correlation between child opposition and paternal power assertion, both assessed in the same context and typically positively associated (for the total sample, .22, $p = .002$), was not significant for resistant father-child dyads in our data, suggesting the presence of an atypical process.

Strengths, limitations, and future directions

The strengths of this study include a multi-method, multi-trait, short-term longitudinal design. A relatively large sample allowed for comparisons of secure dyads with those that were avoidant, resistant, and disorganized, revealing distinct effects. We adopted a conservative analytical strategy of adjusting significance levels in view of multiple tests. Those effects spanned multiple aspects of the developing relationship, on both the parent and child sides. The measures targeted both adaptive and maladaptive processes across the first year. The findings complemented past evidence of multifinality in sequelae of infants' difficulty by examining origins of the moderating effects of attachment very early, as attachment itself is organizing rather than following its consolidation, as the earlier work had demonstrated. Last, but certainly not least, we obtained parallel measures for mother- and father-child dyads, addressing the persistent gap in the literature (Cabrera & Volling, 2019; Cabrera et al., 2018).

This study has weaknesses. Most importantly, attachment and the parent- and child-related measures were assessed concurrently. Therefore, this research is best seen as a preliminary investigation that produces a descriptive short-term longitudinal portrayal of multifinality of developmental processes unfolding for highly affectively negative infants across the first year, with child and parent effects intertwined, but not as a study that permits causal inferences. With attachment and parent and child adjustment measured concurrently, the data are insufficient for determining the causal direction. For example, it is possible that infants' difficult temperament may elicit mothers' intrusive and resentful responses, particularly in the context of avoidant attachment. However, it is also possible that mothers' intrusive and resentful responses to infants' difficult temperament may contribute to

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Table 6. Father-child dyads: infant negative affectivity, 8 months and child measures, 16 months

	Child social-emotional competence, father-reported			Child opposition to father, observed			Child anger, observed		
	B	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
Model for secure (B) vs. all insecure (I) attachments									
Child sex	−0.21	0.15	.156	0.21	0.14	.126	0.32	0.14	.024[b]
Session order	−0.08	0.16	.606	**0.34**	**0.14**	**.013**[a]	−0.24	0.15	.093
Infant negative affectivity	−0.04	0.09	.661	**−0.15**	**0.07**	**.032**[a]	**−0.18**	**0.08**	**.026**[a]
I vs. B	−0.13	0.16	.441	**0.67**	**0.16**	**<.001**[a]	−0.06	0.16	.701
Infant negative affectivity × I vs. B	−0.01	0.17	.955	0.07	0.18	.704	0.22	0.17	.212
Model for B vs. A/C/D attachments									
Child sex	−0.24	0.15	.107	0.23	0.13	.081	0.31	0.14	.030
Session order	−0.04	0.16	.795	**0.34**	**0.14**	**.014**[a]	−0.22	0.14	.129
Infant negative affectivity	−0.04	0.09	.679	**−0.15**	**0.07**	**.032**[a]	**−0.18**	**0.08**	**.027**[a]
A vs. B	−0.41	0.20	.047[b]	**0.62**	**0.22**	**.005**[a]	−0.25	0.20	.209
C vs. B	−0.17	0.27	.531	**0.93**	**0.18**	**<.001**[a]	0.03	0.30	.926
D vs. B	0.18	0.23	.438	0.48	0.29	.100	0.04	0.24	.867
Infant negative affectivity × A vs. B	−0.07	0.26	.792	0.10	0.20	.639	0.18	0.14	.193
Infant negative affectivity × C vs. B	−0.23	0.35	.509	−0.43	0.36	.229	−0.09	0.56	.873
Infant negative affectivity × D/U vs. B	0.04	0.20	.834	0.19	0.30	.521	0.30	0.29	.306

Note. B = secure. A = avoidant. C = resistant. D/U = disorganized/unclassifiable. I = insecure (A, C, and D/U). Z-tests were used for examining the statistical significance of the coefficients in the structural equation framework.

[a]Bold text represents statistically significant findings as indicated by the False Discovery Rate (FDR) controlling procedure (Benjamini & Hochberg, 1995). [b]$p < .05$, but not significant under the FDR-adjusted alpha levels.

The FDR controlling procedure ranks the *p*-values in multiple tests from the smallest to the largest (denoted as p_i, where $i = 1, 2, \ldots, m$, for m tests conducted; in our case, $m = 3$), and compares the ranked *p*-values against a series of adjusted alpha levels by looking for the largest i (denoted as k) that satisfies $p_i \leq \frac{i}{m}\alpha$. The corresponding tests 1, 2, . . . , k are then considered statistically significant. Because the alpha levels were adjusted for each test, some tests that met the traditional significance level of alpha <.05 were considered nonsignificant with the FDR controlling procedure.

avoidant relationships. Future studies should use longitudinal autoregressive models and experimental designs to examine the causal directions. It is our intention to do so as we are following this sample.

Our reliance on categorical measures from SSP may have been another limitation. Attachment researchers have increasingly emphasized advantages of dimensional approaches (Groh, Fearon et al., 2017; Roisman & Groh, 2021).

Still, the portrayal of different sequelae for highly negative infants that unfold in dyads categorized differently in terms of attachment is intriguing. The findings suggest that, for highly affectively negative infants, the dyadic patterns – for the parent and the child – may look quite differently in the emerging avoidant, resistant, and disorganized attachment relationships, as compared to secure relationships.

The participants in our community sample represented mostly low-risk families. Racial and ethnic diversity was relatively limited, although we were able to include 20% racial minority or multiracial families in our sample, a good step toward a goal of studying diverse socialization ecologies (Nishina & Witkow, 2020). At entry to the study, each family included two parents (not necessarily married), and the infants were typically developing. Mothers' and fathers' parenting was, by and large, generally responsive, reasonably gentle, adaptive, and skillful. Children were generally quite compliant, competent, and affectively positive. The distributions of the attachment categories were relatively consistent with data for low-risk US community samples. Most children were secure (71% with mothers, 67% with fathers). Consequently, the insecurely attached groups in this study were relatively modest in size. Therefore, in our more fine-grained analyses (groups B, A, C, D/U), we deliberately decided to adopt the analytic strategy of using the secure group as the reference group, and then to compare the associations between early negative affectivity and parent and child measures at 16 months in that groups vs. avoidant, resistant, and disorganized groups (rather than to each other). For descriptive purposes, we have depicted those associations separately for each attachment group, for mother- and father-child dyads (in supplementary materials). However, further to examine rigorously the differences among avoidant, resistant, and disorganized groups, future studies should rely on larger samples. As well, to increase generalizability, researchers should recruit more diverse samples, and samples that are enriched for family risks for insecure attachments, such as parental psychopathology, stress, chaos, or family violence.

Nevertheless, this study revealed the diverse patterns of associations between child difficulty and parents' and children's adjustment that are already unfolding in the first 1–1.5 years of life, along with the emerging attachment organizations. Such early developmental sequelae highlight the importance of understanding the exquisitely complex interplay between child early affectivity and the emerging foundation of the parent-child relationship.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S0954579422000669

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