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## Developmental trajectory from early responses to transgressions to future antisocial behavior: Evidence for the role of the parent-child relationship from two longitudinal studies

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### Abstract

Parent-child relationships are critical in development, but much remains to be learned about mechanisms of their impact. We examined early parent-child relationship as a moderator of the developmental trajectory from children’s affective and behavioral responses to transgressions to future antisocial, externalizing behavior problems in Family Study (102 community mothers, fathers, and infants, followed through age 8) and Play Study (186 low-income, diverse mothers and toddlers, followed for 10 months). The relationship quality was indexed by attachment security in Family Study and maternal responsiveness in Play Study. Responses to transgressions (tense discomfort and reparation) were observed in laboratory mishaps that led children to believe they had damaged a valued object. Antisocial outcomes were rated by parents. In both studies, early relationship moderated the future developmental trajectory: Children’s attenuated tense discomfort predicted more antisocial outcomes, but only in insecure or unresponsive relationships. That risk was defused in secure or responsive relationships. Moderated mediation analyses in Family Study indicated that the links between low tense discomfort and future antisocial behavior in insecure parent-child dyads were mediated by parental stronger discipline pressure. By influencing indirectly future developmental sequelae, early relationship may increase or decrease the probability that the parent-child dyad will embark on a path toward antisocial outcomes.

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Toddlers’ emerging feelings of discomfort, unease, anxious arousal, or distress in the aftermath of transgressions or mishaps have been long seen as reflecting the assent of important self-conscious emotions, a significant and adaptive landmark in normative socio-emotional development and conscience development (Abe & Izard, 1999; Barrett, 1998; Baumeister, Stillwell, & Heatherton, 1994; Dienstbier, 1984; Hoffman, 1983; Kagan, 2005; Kagan & Lamb, 1987; Kochanska, 1993; Kochanska, Gross, Lin, & Nichols, 2002; Kochanska & Thompson, 1997; Lagattuta & Thompson, 2007; Lewis, Sullivan, Stanger, & Weiss, 1989; Sears, Rau, & Alpert, 1965; Tangney & Fischer, 1995; Thompson, in press; Tracy, Robins, & Tangney, 2007; Zahn-Waxler & Kochanska, 1990). Conversely, callousness, the failure to experience such discomfort, concern, or remorse, or experiencing them in a relatively shallow way may be markers of an early risk for an antisocial developmental trajectory, given that a lack of guilt is a core symptom of future antisocial and externalizing disorders (Blair, 2005; Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Cleckley, 1982; Damasio, 1994, 1996; Damasio, Tranel, & Damasio, 1991; Fowles & Dindo, 2006; Frick & Morris, 2004; Frick & White, 2008; Frick et al., 2003; Lykken, 1995; Wakschlag, Tolan, & Leventhal, 2010).

Although most developmental psychologists agree that the awareness of standards, self-conscious emotions, and the emotional response in the aftermath of transgressions that includes distress, tension, embarrassment, and concern about reparation emerge in the second year, very few studies have examined toddlers' responses to transgressions or mishaps in the laboratory, using observations in standard paradigms. Guilt and associated self-conscious emotions are difficult to study observationally, because, in contrast to basic emotions, they lack a very clear expressive component, particularly in young children. Darwin (1872/1965), when writing about guilt in a toddler, referred to gaze aversion, unnatural brightness, and an odd, affected manner, impossible to describe. Much still remains to be learned about those responses, and several issues are not yet settled.

In pioneering studies, Barrett, Zahn, Waxler and Cole (1993) and Cole, Barrett, and Zahn-Waxler (1992), and then Barrett (2005), coded toddlers' microscopic emotional responses and attempts at reparation in carefully scripted mishap paradigms that led the child to believe he or she had broken or damaged an object. Those studies revealed that toddlers display negative emotion, frustration, distress, tension, worry, and concerned reparation following presumed transgressions. Barrett et al. (1993) and Barrett (2005) further suggested that even at an early age, emotions of guilt, indexed by reparation, may be distinguished from emotions of shame or embarrassment, indexed by distress and avoidance. Although extensive research has confirmed such distinction in adults and older children, it remains controversial whether, however compelling, it can indeed be reliably made in toddler age. Several researchers who have used mishaps modeled after that early work with larger samples of toddlers (Baker, Baibazarova, Ktistaki, Shelton & van Goozens, 2012; Kochanska et al., 2002; Kochanska, Barry, Jimenez, Hollatz, & Woodard, 2009; Kochanska, Casey, & Fukumoto, 1995; Kochanska, Forman, & Coy, 1999) have felt that such distinction may be premature. Those researchers have referred to post-transgression distress and arousal or a blend of various emotions, or simply indicated that they were labeling such distress as "guilt". Given the paucity of empirical data, in the current study, we focus on capturing empirically, using microscopic codes and overall ratings, children's emotional and behavioral responses to transgressions, including gaze avoidance, several indices of distress, tension, and concern, and attempts at reparation. We avoid inferring the underlying emotion, such as guilt, shame, embarrassment, remorse, regret, self-reproach, etc.

Over the course of early socialization, the emergence of post-transgression distress in the middle of the second year (Kagan, 1981; Kochanska et al., 2002; Lewis et al., 1989) dovetails synergistically with the onset of parental demands. Parents begin to ask toddlers to observe the family's rules and standards of behavior and to comply with daily requests and prohibitions. When children misbehave, parents often express displeasure, and children gradually begin to be aware of rules and behavioral standards and to feel uneasy and uncomfortable when they have violated them, intentionally or accidentally. In turn, parents may then recruit and capitalize on those feelings to facilitate the child's internalization of their rules and demands and to prevent future transgressions without the need to rely on coercive discipline (Dienstbier, Hillman, Lehnhoff, Hillman, & Valkenaar, 1975; Hoffman, 1983). The child's distress following transgressions is adaptive: Over time, transgressions become "somatically marked". The affective visceral memories of past wrongdoing activate unpleasant emotions and serve as effective internal regulators that inhibit future transgressions, and more broadly, prevent the child from embarking on a path to antisocial behavior problems (Damasio, 1996; Frick et al., 2000; Frick & Morris, 2004; Frick & White, 2008; Raine, 2008).

Children vary substantially in how easily, how often, and how strongly they experience and express distress following misbehavior, in part because self-conscious emotions are linked to temperament (Baker et al., 2012; Kagan, 2005; Kagan & Fox, 2006; Kochanska et al.,

2002; Rothbart, Ahadi, & Hershey, 1994; Rothbart & Bates, 2006). Children not prone to discomfort and anxious arousal may appear relatively unconcerned in the aftermath of transgressions. Consequently, for parents of such children, it is more difficult to resort to subtle discipline strategies that capitalize on the child's spontaneous feelings of unease in the context of socialization demands. We have shown in past work that to be effective, parents of such less reactive children should rely on alternative strategies that draw from mutual positive feelings and responsiveness between the parent and child (Kochanska, 1995, 1997). Some parents, however, may respond by deploying more power-assertive control, which in turn likely leads to the child's rejection of parental agenda, resentment, opposition, disregard for rules of conduct, and more broadly, antisocial behavior problems.

We have also shown that the quality of the early parent-child relationship is an important moderator of future socialization processes. In particular, the maladaptive developmental cascades from the child's difficulty to parental power assertion to children's antisocial outcomes are typically set in motion in parent-child dyads that had been insecurely attached in infancy. In secure dyads, such dynamics are defused (Kochanska, Barry, Stellern, O'Bleness, 2009; Kochanska & Kim, 2012).

The main goal of the current article is to examine the links between children's responses to transgressions at toddler age and future externalizing, antisocial, and disruptive behavior problems in the context of early parent-child relationships that vary in their quality. Based on the existing research, we expected that links between children's relatively low distress and future behavior problems would be present (or significantly stronger) in the context of sub-optimal relationships, but absent (or significantly weaker) in the context of optimal, positive relationships.

Data were drawn from two large longitudinal studies of normally developing young children. Family Study involved mothers, fathers, and children from two-parent community families, followed from infancy to age 8. Play Study involved ethnically diverse, low-income mothers and toddlers, followed from 30 to 40 months. In Family Study, the quality of the parent-child relationship was indexed by security of attachment in infancy with the mother and the father. In Play Study, it was indexed by maternal responsiveness to the child at age 2 ½. Although we did not have data on children's security in the latter study, responsiveness is broadly viewed as a key parenting dimension that is typically considered a significant factor in the formation of secure attachment (DeWolff & van IJzendoorn, 1997). Thus, both parent-child security and parental responsiveness are legitimate measures of the quality of the early parent-child relationship.

The secondary goal was to examine, in Family Study, the relations among children's responses to transgressions, parental control style, and children's antisocial behavior problems in the contexts of insecure and secure relationships. We expected that in insecure or more negative relationships, children who are relatively less affected by their transgressions may elicit stricter, more power-assertive parental control strategies aimed at preventing them from transgressing (Bates & Pettit, 2007; Bell, 1968; Lytton, 1990; Shaw, Owens, Vondra, Keenan, & Winslow, 1996). Such discipline, in turn, may increase the risk for future antisocial or disruptive behavior problems due to well-understood maladaptive processes that evolve in coercive relationships, including the child's anger and resentment toward the parent and his or her rejection of parental influence (Dodge, Coie, & Lynam, 2006; Gershoff, 2002; Grusec & Goodnow, 1994; McCord, 1997; Pardini, 2008; Patterson, Reid, & Dishion, 1992). We further expected such maladaptive developmental cascades to be weakened or defused in secure, positive relationships. Consequently, we tested a moderated mediation model that posited parental control style as a mediator of the links

between children's distress and tension following transgressions and their antisocial problems, and early security as a moderator of such path.

The behavioral transgression paradigms and observational coding, developed and refined in our laboratory, were fully comparable across the two studies to allow for a rigorous replication of the findings. The codes captured toddlers' emotional and behavioral responses elicited in situations when they believed they had transgressed by breaking a valued object. The quality of the parent-child relationships was observed as the organization of attachment in infancy in Strange Situation with each parent (secure vs. insecure), and as maternal responsiveness to the child in Play Study. Parents' control style (in Family Study only) was observed at preschool age in typical parent-child contexts that involved requests and prohibitions. Although generally parents used power-assertive techniques infrequently, they did vary in the amount of applied pressure. Children's antisocial behavior problems were rated by parents at 6 ½ and 8 years in Family Study and at 40 months in Play Study.

In both studies, the major emphasis was on behavioral measures, although established parental report instruments were also employed to assess externalizing or antisocial outcomes. Multiple teams of coders reached reliability typically on approximately 20% of cases, and followed with frequent realignments to prevent drift. Kappas were used for discrete variables. For continuous variables, either alphas or intra-class correlations (ICC's) were used. Note that the best practices in that regard have varied over the last 10 years, when the data reported here have been collected, but both approaches are essentially equivalent (Bravo & Potvin, 1991; Shrout & Fleiss, 1979). We programmatically deployed extensive data aggregation strategies whenever appropriate to create robust constructs (Rushton, Brainerd, & Pressley, 1983).

## FAMILY STUDY

### Method

**Participants**—Two-parent families ( $N = 102$ ) volunteered for a longitudinal study by responding to ads posted broadly in community venues in eastern Iowa. When the study began, the families represented a wide range of education (25 % of mothers and 30% of fathers having no more than a high school education, and 21% of mothers and 20% of father having post-graduate education) and annual income (25% made less than \$40,000, and 49% made over \$60,000). Ninety percent of mothers and 84% of fathers were White, 3% and 8% Hispanic, 2% and 3% were African American, 1% and 3% were Asian, 1% of mothers Pacific Islander, and 3% and 2% were "other" non-White. In 20% of families, one or both parents were non-White.

This article draws from the assessments at 15 months ( $N = 101$ , 51 girls), 38 months ( $N = 100$ , 50 girls), 52 months ( $N = 99$ , 49 girls), 80 months ( $N = 90$ , 43 girls), and 100 months ( $N = 87$ , 41 girls). At 15, 52, and 80 months, female visit coordinators (Es) conducted two 2–3-hr laboratory sessions, one with each parent (in randomized order). At 38 months, there was one home and one laboratory session, with each parent participating in half of each, and at 100 months, there was only one laboratory session (only questionnaire data collected at 100 months are reported here). The sessions were videotaped for future coding. The laboratory includes two rooms, a naturalistic living room that contains, among other furnishings, a low shelf with extremely attractive toys, designated as off limits to the child (the parent issued the prohibition upon entry to the room), and a sparsely furnished play room.

### **Assessment of Children's Early Parent-Child Relationships: Attachment Security to Mothers and Fathers at 15 Months**

**Paradigm and coding:** The Strange Situation (Ainsworth & Wittig, 1969) was conducted as the first procedure with each parent, and coded by professional coders at another university (one coder coded a given child with one parent only). Reliability, kappas, were .78 for the four main attachment categories (avoidant, A; secure, B; resistant, C; and disorganized or unclassifiable, D/U), and .85 for the coding of secure versus insecure attachment. All cases coded with low confidence by one coder and all D/U cases were double-coded and adjudicated. In this article, we focus on comparisons between secure children (B) and the combined group of insecure children (A, C, D/U).

**Attachment security with mothers and fathers:** Fifty-six children (55%) were rated as secure with *mothers*, and 45 (45%) were rated as insecure. Sixty-six children (66%) were rated as secure with *fathers* and 34 (34%) were rated as insecure (one child did not participate in the father-child paradigm). Forty children were secure with both parents, 18 were insecure with both parents, 26 were insecure with the mother and secure with the father, and 16 secure with the mother and insecure with the father.

There were no significant differences in the distribution of security vs. insecurity in girls and boys with mothers, Pearson Chi-square (1) = 2.22, ns, or fathers, Pearson Chi-square (1) < 1. The security status with the mother was unrelated to that with the father, Pearson Chi-square (1) = 1.67, ns. There were no effects of the order of the session (mother or father first) on security with the mother or the father; both Pearson Chi-square (1) values < 1.

### **Assessment of Children's Responses Following Transgressions (the Mishaps Context), 38 Months**

**Paradigms:** The paradigms were described earlier (Kochanska et al., 2002, 2009). Children were observed in two highly scripted, contrived "mishaps", one during each half of the laboratory session (with each parent). E handed a toy to the child and asked him or her "to be very careful" while handling it, because it was her "special" toy (a toy boat and a musical toy). Soon after the child touched the object, it fell apart in a salient manner. At that point, E expressed mild regret by saying "Oh, my (name of object)", sat quietly for 60 s, and then asked several standard questions, such as "what happened", "who did it" (approximately 60 s). E then left the room for 30 s to "fix" the object, returned with an undamaged exact replica, and reassured the child that the damage had not been the child's fault, until he or she was fully comfortable. The coding began at the point of the mishap and continued for up to 60 s after E returned with the "fixed" object. The parent was seated in the corner of the room and had been asked to remain neutral and engaged with questionnaires.

**Coding and data aggregation:** Several child emotion and behavior codes were applied to every 5-s segment. Those included: gaze downward or askance (included also covering face, eyes closed, reliability, alphas, .99–1.00); facial tension (e.g., biting lips, moving lips in an odd manner, grimacing, alphas, .97–.98); and bodily tension (e.g., squirming, twisting or shrinking body, hunching shoulders, rubbing hands, hanging down head), ranging from 0 (none), to 2 (multiple and/or strong signs of tension, kappas, .69–.87). Reparation attempts (e.g., trying to put back the broken object, alphas, .99–1.00) were also coded for each 5-s segment prior to E's departure "to fix" the object.

Several codes were applied to the entire longer "epochs" within the paradigm (60 s after the mishap, 60 s during E's queries, 30 s during E's absence to "fix" the toy, and 60 s after E's return with the "fixed" object). For each of the first three epochs, overall response was coded (1=unaffected, oblivious; 2=notices mishap, briefly affected; 3=affected, stilling,



appears uneasy and concerned; 4=strongly affected, uneasy; reliability, kappas, .68–.76). For each of the four epochs, if present, negative and positive affect were also coded, kappas, .64–.69 (neutral affect was also coded but not used here).

The instances of all 5-s codes were tallied and divided by the numbers of segments (gaze askance was weighted by 2 if it lasted throughout the segment). The overall response codes and affect codes were added across the coded epochs (strong affect was weighted by 2). Each of the above scores was then averaged across the two mishaps to represent the entire coded mishaps context. The descriptive statistics for those variables (prior to standardization) are in Table 1.

Finally, we created an overall score of *tense discomfort* that included gaze askance, facial tension, bodily tension, overall response, and negative and positive affect scores (following the reversal of positive affect scores and standardization of all scores). Cronbach alpha was .71. *Reparation*, the relative score of attempts to repair the object, was kept separate (see Table 1).

### Assessment of Parents' Control Style in Discipline Contexts, 52 months

**The observed contexts:** The child was observed with each parent during several naturalistic but scripted control contexts that occasioned parental interventions. One context (10 min with each parent) involved a cleanup task, when the parent asked the child to clean up many small toys and pieces of the craft project they had just completed. The prohibition contexts revolved around the very attractive, off-limits toys (cumulative time 65 min for each parent). Data were available for 98 mother-child and 98 father-child dyads.

**Coding and data aggregation:** The parent's style of control was coded for every 30-sec segment throughout the cleanup and for every 30-sec segments during the episodes when the child was involved with the prohibited toys (the onsets and offsets of those episodes had been first identified by separate teams of coders; coding reliability, alphas, ranged from .83 to .94). The codes used to create the measure of control style included the global ratings for each segment and the coding of physical techniques in each segment. The mutually exclusive global ratings included "no interaction", "social exchange" (but no attempt to control), "gentle guidance" (subtle, gentle control), "assertive control" (matter-of-fact, somewhat assertive, decisive control), and "forceful, negative control" (control delivered with an angry, threatening, combative, negative tone). Kappas ranged from .60 to .76. The physical codes (both codeable in one segment) included "assertive interventions" (holding the child's hand firmly, physically preventing the child from touching the toys), and "forceful interventions" (taking away a toy abruptly, handling the child roughly). Kappas ranged from .68 to .83.

For each parent, we tallied all instances of each global and physical code and divided by the number of segments. The descriptive data were as follows. In the *cleanup task*, for mothers, no interaction,  $M = .01$ ,  $SD = .03$ , social exchange,  $M = .08$ ,  $SD = .11$ , gentle guidance,  $M = .77$ ,  $SD = .23$ , assertive control,  $M = .14$ ,  $SD = .19$ , forceful, negative control,  $M = .01$ ,  $SD = .04$ ; physical assertive,  $M = .01$ ,  $SD = .04$ , physical forceful, not observed; for fathers, no interaction,  $M = .02$ ,  $SD = .06$ , social exchange,  $M = .07$ ,  $SD = .12$ , gentle guidance,  $M = .74$ ,  $SD = .25$ , assertive control,  $M = .16$ ,  $SD = .19$ , forceful, negative control,  $M = .01$ ,  $SD = .04$ , physical assertive,  $M = .01$ ,  $SD = .06$ , physical forceful,  $M = .00$ ,  $SD = .02$ .

In the *prohibition context*, for mothers, no interaction,  $M = .14$ ,  $SD = .13$ , social exchange,  $M = .65$ ,  $SD = .17$ , gentle guidance,  $M = .16$ ,  $SD = .10$ , assertive control,  $M = .05$ ,  $SD = .08$ , forceful, negative control,  $M = .00$ ,  $SD = .01$ ; physical assertive,  $M = .01$ ,  $SD = .04$ , physical forceful, not observed; for fathers, no interaction,  $M = .18$ ,  $SD = .14$ , social exchange,  $M = .$

63,  $SD = .18$ , gentle guidance,  $M = .13$ ,  $SD = .09$ , assertive control,  $M = .04$ ,  $SD = .08$ , forceful, negative control,  $M = .00$ ,  $SD = .01$ , physical assertive,  $M = .01$ ,  $SD = .03$ , physical forceful,  $M = .00$ ,  $SD = .00$ .

We then weighed those scores to reflect the amount of applied pressure (Kochanska, Aksan, Penney, & Boldt, 2007). Weights were as follows: for no interaction,  $-2$ , for social exchange,  $-1$ , for gentle guidance,  $1$ , for control,  $2$ , for forceful negative control,  $3$ , for physical assertive,  $4$ , and for physical forceful,  $5$ . We then summed the weighed scores; for the cleanup task, mothers,  $M = 1.01$ ,  $SD = .40$ , fathers,  $M = 1.05$ ,  $SD = .60$ , and for the prohibition context, mothers,  $M = -.61$ ,  $SD = .50$ , fathers,  $M = -.74$ ,  $SD = .49$ . Finally, we standardized the scores and averaged them across the cleanup task and the prohibition context for each parent. Although in general, parental pressure was low, this final score was normally distributed (see Table 1).

### **Assessment of Children's Antisocial Behavior, 80 and 100 Months**

**Inventory of Callous-Unemotional Traits: ICU** (Frick, 2004; Frick & White, 2008) captures a lack of concern for others and disregard for rules and standards of behavior (e.g., “does not seem to know right from wrong”, “seems very cold and uncaring”, “does not care if s/he is in trouble”, “feelings of others are unimportant”). Mothers and fathers completed the ICU at 80 and 100 months, and Cronbach's alphas were for mothers,  $.86$ , and  $.80$ , and for fathers,  $.82$ , and  $.84$ . We averaged across all 24 items (each ranging from 0=not at all, to 3=definitely true), to create one score for each parent at each time; at 80 months, mothers,  $M = .78$ ,  $SD = .34$ , fathers,  $M = .77$ ,  $SD = .28$ , and at 100 months, mothers,  $M = .71$ ,  $SD = .30$ , fathers,  $M = .75$ ,  $SD = .29$ .

**Child Symptom Inventory-4: CSI-4** (Gadow & Sprafkin, 2002; Gadow, Sprafkin, & Nolan, 2001; Sprafkin, Gadow, Salisbury, Schneider, & Loney, 2002) is an established clinical instrument that corresponds to DSM-IV (APA, 2000). For both parents, we used Symptom Severity scoring, where each item is rated from 0=never, to 3=very often. For each parent, we created the externalizing behavior score (the sum of 8 items for Oppositional Defiant Disorder, e.g., defies, refuses, deliberately annoys, and 15 items for Conduct Disorder, e.g., bullies others, lies), at 80 months, mothers,  $M = 8.00$ ,  $SD = 4.47$ , fathers,  $M = 7.23$ ,  $SD = 4.42$ , and at 100 months, mothers,  $M = 6.67$ ,  $SD = 4.25$ , fathers,  $M = 6.26$ ,  $SD = 3.68$ .

**Overall antisocial behavior scores, 80–100 months:** We created an overall composite score across both parents, both scores (ICU and CSI-4 externalizing score), and both times of assessment (all scores were first standardized).  $N$ 's for the instruments ranged from 82 (fathers at 100 months) to 88 (mothers at 80 months), to 90 for the overall final composite score. Cronbach alpha was  $.86$ , indicating that such score was highly internally consistent; the item-total correlations ranged from  $.52$  to  $.67$ , and there was no item whose removal would increase the alpha (see Lengua, Bush, Long, Kovacs, & Trancik, 2008 for a review of benefits of such approach). The data are in Table 1.

## **Results and Discussion**

**Preliminary analyses**—Correlations among the variables, presented in Table 2, indicated that tense discomfort and reparation were negatively related. Reparation was unrelated to any other variables. Children who showed less tense discomfort at 38 months received more power-assertive control from both parents at 52 months. Both parents' use of power assertion was related to more antisocial behavior in children from age 6 ½ to 8. Mothers' and fathers' power assertion scores were positively related.

ANOVAs were conducted for children's tense discomfort and reparation as the dependent variables. Children's security with each parent (0=insecure, 1=secure) and child gender (0=girl, 1=boy) were the between-subject factors. For tense discomfort, there were two main effects, of security,  $F(1,91)=7.09, p < .01$ , and child gender,  $F(1,91)=8.15, p < .01$ . Children who had been insecure with their mothers at 15 months showed more tense discomfort,  $M = .11, SD = .53$ , than those who had been secure,  $M = -.10, SD = .40$ , and girls expressed more tense discomfort than boys, girls,  $M = .12, SD = .49$ , boys,  $M = -.13, SD = .42$ . There were no significant effects for reparation.

ANOVAs were also conducted for the mothers' and fathers' power assertion, with the child's security with the respective parent and child gender as the between-subject factors. There was no effect of security on either parent's power assertion. There was a significant effect of gender,  $F(1,94)=4.10, p < .05$ , for maternal power-assertive style, with girls receiving less power than boys,  $M = -.18, SD = .56$ , and  $M = .17, SD = .98$ , respectively. There were no significant findings for the father's power assertion.

**Children's security at 15 months as a moderator of links between children's tense discomfort and reparation at 38 months and antisocial behavior at 80–100 months**—A hierarchical multiple regression was conducted to examine children's security with their mothers and their fathers as the moderators of the links between tense discomfort and reparation and antisocial behavior. Child gender (the covariate) was entered at Step 1, security with the mother and security with the father at Step 2, child tense discomfort and reparation at Step 3, and the four interaction terms (tense discomfort  $\times$  attachment security with each parent, and reparation  $\times$  attachment security with each parent) at Step 4. Table 3 presents the results of the hierarchical multiple regressions.

Security with either parent had no main effect on the child's antisocial behavior. Tense discomfort predicted (negatively) children's future antisocial behavior problems. That effect, however, was qualified by two significant interactions: tense discomfort  $\times$  security with the mother and tense discomfort  $\times$  security with the father. There were no significant findings for reparation. Figures 1 and 2 present the follow-up analyses of the interactions, using simple slopes (Aiken & West, 1991). In those figures, tense discomfort is considered the independent variable, and security with the mother (Figure 1) and with the father (Figure 2) are the moderators (with child gender as the covariate).

In Figure 1, the simple slope of children's tense discomfort on their antisocial behavior for children who had been insecure with their mothers was significant,  $b = -.50, SE = .23, p < .05$ , but for those who had been secure it was not significant,  $b = .15, SE = .25, ns$ . Thus, the variation in children's tense discomfort was associated with future antisocial behavior only for children who had failed to form a secure relationship with their mothers in infancy. In insecure relationships, children's lower tense discomfort was associated with higher antisocial scores. Such association was absent for children who had been secure.

The pattern was much the same in Figure 2. The simple slope of children's tense discomfort on their antisocial behavior was significant for children who had been insecure with their fathers,  $b = -.82, SE = .32, p < .025$ , but for those who had been secure it was not significant,  $b = .16, SE = .20, ns$ . Again the variation in children's tense discomfort was linked with future antisocial scores only in insecure relationships, where children who displayed less discomfort had higher antisocial scores. There was no such link in secure relationships.



For purely illustrative purposes, we graphed the antisocial behavior scores for insecure and secure children who were low and high on tense discomfort (based on the median score) for the *observed* rather than estimated values. Figure 3 presents the data.

Tukey test for multiple group comparisons revealed that in mother-child relationships, the insecure-low discomfort group had higher antisocial behavior scores than the insecure-high discomfort group ( $p < .05$ ). In father-child relationships, the insecure-low discomfort group had higher antisocial behavior scores than the insecure-high discomfort group ( $p < .01$ ), and higher antisocial scores than both secure groups ( $ps < .05$ ). The insecure-high discomfort group did not differ from the secure groups in either mother- or father-child relationships.

### **Parental power assertion as a mediator of links between children's tense discomfort and reparation and antisocial behavior: Moderated mediation analyses**

We adopted Preacher, Rucker, and Hayes's (2007) approach to the testing of moderated mediation models. In these models, children's tense discomfort at 38 months was again treated as the predictor, parent-child attachment security at 15 month as the moderator, and children's antisocial behavior at 80–100 months as the dependent variable. In addition, we considered parents' power assertion at 52 month as the putative mediator of the link between tense discomfort and antisocial behavior, and we estimated different indirect effects of tense discomfort on antisocial behavior, depending on the level of the moderator (security). In particular, the parent-child attachment security (moderator) was modeled to moderate both the effect of tense discomfort on power assertion and the effect of power assertion on antisocial behavior simultaneously. The results of the moderated mediation models are presented in Figure 4 for mother-child relationship and in Figure 5 for father-child relationship. Child gender was included as a covariate in both models, but not depicted for brevity.

In *mother-child relationships* (Figure 4), children's lower tense discomfort was associated with mothers' increased power assertion; mothers' higher power assertion, in turn, was associated with children's higher antisocial behavior scores. The interaction between children's tense discomfort and mother-child attachment security was significant such that the effect of tense discomfort on power assertion was significant in insecure mother-child relationships, but not in secure relationships.

Children's tense discomfort had no direct effect on their antisocial behavior. In insecure relationships only, however, discomfort had a significant indirect effect on antisocial behavior through the mother's power assertion,  $b = -.24$ ,  $SE = .12$ ,  $p < .05$ . The bootstrapping analysis confirmed the significant conditional indirect effect: Bias-corrected and accelerated bootstrap confidence interval,  $[-.92, -.02]$ , did not include zero at  $\alpha = .05$  level. In secure mother-child relationships, the conditional indirect effect was not significant,  $b = -.0003$ ,  $SE = .05$ , ns, 95% CI =  $[-.14, .09]$ .

The pattern of the moderated mediation was similar for *father-child relationships* (Figure 5). Children's lower tense discomfort was associated with fathers' increased use of power assertion, and it, in turn, was associated with children's higher antisocial behavior scores. The interaction between fathers' power assertion and father-child attachment security was significant: The effect of power assertion on antisocial behavior was significant in insecure father-child relationships, but it was not significant in secure relationships.

Children's tense discomfort had no direct effect on their antisocial behavior, but, as in mother-child relationships, it had a significant indirect effect on antisocial behavior through the father's power assertion. This, however, occurred only in insecure relationships,  $b = -.42$ ,  $SE = .21$ ,  $p < .05$ . Bias-corrected and accelerated bootstrap confidence interval for the

indirect effect,  $[-1.58, -.03]$ , did not include zero at  $\alpha = .05$  level. The conditional indirect effect was not significant in secure father-child relationships,  $b = .003$ ,  $SE = .05$ , ns, 95% CI =  $[-.14, .11]$ .

We conducted the parallel analyses replacing children's tense discomfort with reparation. There were no significant effects.

**Summary and discussion**—Children's tense discomfort in the aftermath of transgressions and their efforts to repair the broken objects were modestly negatively related. All significant effects were associated with tense discomfort, and there were no findings for reparation. There was one main effect of security on tense discomfort: Toddlers who as infants had been insecure with their mothers displayed more tense discomfort when they believed they had transgressed than those who had been secure. Because almost nothing is known about links between attachment security and self-conscious emotions, this finding is valuable in and of itself.

There was compelling evidence that the quality of the early parent-child relationship, reflected in secure attachment, moderated future links between children's tense discomfort at toddler age and their antisocial behavior problems at early school age. Notably, the pattern was replicated across mother-child and father-child relationships, despite the fact that the quality of attachment organization with the mother was unrelated to that with the father. The links between discomfort following transgressions at toddler age and future antisocial behavior problems during early school years were found only for children whose early attachment relationships were insecure. In those relationships, differences in children's response to transgressions significantly predicted future behavior problems. Among the insecure toddlers, those who appeared relatively less affected by and more indifferent to their apparent mishaps were seen as more oppositional, callous, aggressive, and more likely to disregard rules at early school age than the toddlers who appeared relatively remorseful and distressed following the mishaps. For toddlers who had been secure with their parent, such a link was absent. It was further developmentally meaningful that, in terms of observed rather than predicted scores, the groups of insecure children who did show relatively high tense distress were nevertheless not significantly better off in terms of their outcomes than any secure groups.

As proposed earlier, parents are often able to capitalize on the child's spontaneous concerned response following transgressions: When the child is already mildly negatively aroused, the parent may not need to resort to salient external disciplinary contingencies to promote rules and standards of behavior (Dienstbier, 1984). Conversely, children who are relatively unconcerned may elicit more parental pressure. The moderated mediation analyses suggest that the broadly accepted models depicting some children as "pulling" for relatively stronger parenting pressure and ultimately embarking on an antisocial trajectory (Bell, 1968; Lipscomb et al., 2011; Lorber & Egeland, 2011; Lytton, 1990; Patterson et al., 1992; Pardini, 2008) may apply particularly to parent-child dyads that have failed to form a secure attachment in infancy. Early insecurity with the mother or the father may be a context in which such dynamic is likely to emerge; but there was no evidence of a similar process in secure dyads.

As a note of caution, in those community families, power assertion was infrequent and children's externalizing scores were generally within the normative range. Nevertheless, the expected patterns of relations were detected. Research with at-risk samples, where parents resort to power-assertive techniques frequently and where children often have elevated behavior problem scores, may provide much more robust support for the proposed model.

## PLAY STUDY

### Method

**Participants**—Mothers of young children volunteered for another study broadly advertised in the same community as Family Study. In particular, locations frequented by low-income families (e.g., Women, Infants, and Children nutritional program offices, local Department of Health and Human Services offices, thrift stores, free medical clinics, pediatric offices, Head Start locations, mobile home parks, subsidized housing complexes, etc.) were targeted. To be eligible, the mother had to receive or qualify for some form of aid from a federal, state, or faith-based agency, or for Earned Income Tax Credit.

One hundred-eighty six mothers of toddler-age children (90 girls) were accepted. The average annual family income was \$20,385,  $SD = \$13,010$ ; 5% of mothers had not completed high school, 50% had a high school education or GED, and 45% had an associate, bachelors, or technical degree. Mothers' average age was 27.58 years,  $SD = 4.88$ . The sample was ethnically diverse (11% Hispanic, and 88% not Hispanic; 73% White, 15% African American, 2% Asian, 2% American Indian, and 8% more than one race or unreported).

The assessments took place when children were approximately 30, 33, and 40 months ( $M = 30.33$  months,  $SD = 5.40$ ;  $M = 33.34$  months,  $SD = 5.48$ ; and  $M = 39.98$  months,  $SD = 5.56$ , respectively). After the first assessment, at 30 months, the mothers were randomized into two groups that received different forms of parenting interventions for approximately 10 weeks (child-oriented play versus play-as-usual). There were no group differences in any variables reported in this article that were collected after the randomization attributable to the intervention. Thus, the groups were combined. At each assessment, mothers and children were observed in approximately 3-hour sessions in the laboratory, similar to that described in Family Study, conducted by female Es. The sessions were videotaped for future coding.

### **Assessment of Children's Early Mother--Child Relationship: Mothers' Responsiveness to Their Children at 30 Months**

**Paradigms:** Mothers' responsiveness to their children was observed in naturalistic yet scripted contexts during the laboratory sessions, typical for daily situations in toddlers' lives. There were seven contexts encompassing a total of 62 min (introduction to the laboratory, mother busy, snack, play, chores, free time, and opening a gift).

**Coding and data aggregation:** The approach was adapted from the classic responsiveness coding system by Ainsworth, Bell, and Stayton (1971). The coders rated maternal responsiveness for each context from 1 (highly unresponsive) to 7 (highly responsive). That overall judgment integrated Ainsworth's original scales of sensitivity-insensitivity, acceptance-rejection, and cooperation-interference. Reliability (intra-class correlations, ICCs) across teams of coders ranged from .81 to .93.

The scores across all seven contexts cohered; Cronbach's alpha was .89. Consequently, they were aggregated into one score.

### **Assessment of Children's Responses Following Transgressions (the Mishaps Context), 33 Months**

**Paradigms and coding:** The paradigms and coding were fully comparable to those in Family Study. The mishaps involved a toy boat and a musical toy. Reliability of coding for the 5-s codes ranged from .96 to .99 (ICCs) and from .60 to .82 (kappas). Reliability for the

child's overall response, kappas, ranged from .63 to .95, and for overall affect, from .71 to .86.

**Data aggregation:** The approach to data aggregation followed the exact same steps as in Family Study. Cronbach's alpha for the *tense discomfort* composite was .67.

### **Assessment of Children's Externalizing Behavior Problems, 40 Months—**

Mothers completed a well-established instrument, the Early Childhood Inventory (ECI-4, Gadow & Sprafkin, 2000), developed for younger children by the same research team as CSI-4, used in Family Study. ECI-4 is a clinical instrument for children aged 3–5 that produces scores for multiple disorders; we again used the Symptom Severity scoring approach, where the items are rated as 0 = never, 1 = sometimes, 2 = often, or 3 = very often. We then created an externalizing behavior score, analogous to that in Family Study (the sum of 8 items targeting Oppositional Defiant Disorder and 10 items for Conduct Disorder). All descriptive data are in Table 4.

## **Results and Discussion**

**Preliminary analyses—**There was only one significant correlation among the measures: Children's tense discomfort at 33 months was negatively related to externalizing problems at 40 months,  $r(162) = -.21, p < .01$ . There was one significant gender difference, with girls expressing more tense discomfort than boys, girls,  $M = .11, SD = .58$ , boys,  $M = -.11, SD = .42, t(166) = 2.91, p < .005$ .

**Mothers' responsiveness at 30 months as a moderator of links between children's tense discomfort and reparation at 33 months and externalizing behavior problems at 40 months—**A hierarchical multiple regression was conducted to examine mothers' responsiveness as the moderator of the link between tense discomfort and reparation and externalizing behavior. Child gender (the covariate) was entered at Step 1, mothers' responsiveness (standardized) at Step 2, child tense discomfort and reparation at Step 3, and the interaction terms (tense discomfort  $\times$  responsiveness and reparation  $\times$  responsiveness) at Step 4. Table 5 presents the results of the hierarchical multiple regressions.

Children's tense discomfort had a significant (negative) effect on externalizing problems, but that effect was qualified by the interaction with maternal responsiveness. Reparation produced no significant main or interaction effects. The follow-up analysis of the interaction, using simple slopes (Aiken & West, 1991), is depicted in Figure 6.

The simple slope of children's tense discomfort assessed at 33 months on their externalizing problems at 40 months was significant for children whose mothers had been less responsive at 30 months (1 *SD* below the mean),  $b = -5.36, SE = 1.85, p < .01$ , but not for children whose mothers had been more responsive (1 *SD* above the mean),  $b = -.50, SE = 1.04, ns$ . In dyads with unresponsive mothers, lower tense discomfort scores were associated with more future externalizing problems, but such a link was absent in dyads with responsive mothers.

**Summary and discussion—**The pattern of results in this short-term longitudinal study was entirely consistent with that in Family Study, despite the differences in the population, studied ages, and the measure of the quality of the mother-child relationship. Because attachment security in the Strange Situation was not assessed in Play Study, we adopted maternal responsiveness as another classic indicator of the quality of the mother-toddler relationship. Because there was no assessment between 33 months, when children's response to mishaps were assessed, and 40 months, when the measures of children's

externalizing behavior problems were collected, we could not conduct moderated mediation analyses analogous to Family Study that involved maternal style of discipline.

The findings were straightforward: The quality of the mother-child relationship moderated the relation between children's tense discomfort and their future externalizing problems. Children who appeared relatively less affected by the apparent mishap were at a higher risk for future externalizing problems than children who appeared relatively more concerned and uncomfortable. This relation, however, was present only for children whose mothers were relatively unresponsive; for children of responsive mothers, the variation in children's response to transgressions was unrelated to externalizing problems. As in Family Study, there were no significant findings for reparation (which was unrelated to tense discomfort).

## GENERAL DISCUSSION

This research makes several contributions to developmental psychology and psychopathology. Although in both of our studied samples most children were in the normative range of behavior problems, this work nevertheless may inform our understanding of early risks for a future maladaptive trajectory leading to an increased occurrence of antisocial behavior problems in young children. We bring together the study of early self-conscious emotions, attachment, parenting, and adjustment. The findings elucidate the adaptive role of children's early distress following transgressions in social-emotional development, and suggest that children who display relatively few signs of such distress may be at risk for future antisocial behavior problems. Furthermore, the data reveal how early parent-child relationships can serve either to amplify or offset those risks and how different developmental cascades may be set in motion in varying relationship contexts (Cox, Mills-Koonce, Propper, & Gariepy, 2010).

Despite a strong interest in moral emotions (e.g., Tangney, Stuewig, & Mashek, 2007; Tilghman-Osborne, Cole, & Felton, 2010), there have been very few behavioral investigations involving young children, because such emotions are very difficult to study using observational methods. It is very challenging to implement standardized yet naturalistic paradigms that effectively lead the young child to believe he or she has transgressed. It is also difficult to code subtle emotional and behavioral responses to such events, given that moral emotions such as guilt, shame, embarrassment, or remorse do not have distinct affective signatures, and they share many overlapping characteristics (Zahn-Waxler & Kochanska, 1990; Darwin, 1872/1965). Furthermore, at the toddler age, those emotions, linked to the developing self, are just in the process of emerging and forming, and may often present as blends or constellations of arousal, discomfort, tension, and reparation (Thompson, in press). Consequently, the empirical body of developmental literature on young children's reactions to transgressions is very thin.

We have examined children's responses to transgressions in our research program using mishap paradigms adapted from the original work by Barrett et al. (1993) and Cole et al. (1992). Our previous research has shown that arousal and distress in such contrived mishaps can be seen as aspects of early conscience. Children's responses to mishaps were meaningfully related to children's concurrent sensitivity to flawed objects presented in another paradigm (Kochanska et al., 1995). As well, individual differences in children's distress and tension in mishap paradigms predicted their future antisocial, disruptive, externalizing behavior problems. Across two longitudinal studies, children who appeared oblivious to and relatively unaffected by their apparent transgressions, and who showed low or no discomfort following such events, were at a greater risk for future antisocial outcomes than their peers who appeared concerned about the mishaps. The antisocial outcomes encompassed rule-breaking behavior, observed in the laboratory (Kochanska et al., 2002)



and disruptive, antisocial behavior problems, rated by parents and teachers (Kochanska et al., 2009). We did not, however, examine whether that risk is moderated by the context of the parent-child relationship.

The key findings reported in the present article are robustly replicated across two studies, a remarkable outcome given the differences between those investigations. The studies differed in the populations (two-parent community families versus low-income mothers), the children's ages when the assessments of the parent-child relationship, mishaps, and antisocial or externalizing outcome occurred (at 15, 38, and 80–100 months in Family Study and at 30, 33, and 40 months in Play Study, respectively), and the type of assessment of the quality of the parent-child relationship (attachment security in Family Study and maternal responsiveness in Play Study). The measures of children's responses to transgressions and of antisocial outcomes were kept comparable across the studies. Furthermore, in Family Study, the findings were replicated across the mother- and father-child relationships (even though there was no concordance in the attachment organization across the parents). We note that in this report, in both studies, we relied on parents' reports of antisocial outcomes. This is a limitation, and examining behavioral outcomes, such as observed disregard for rules, would also be important.

It is further notable that our findings involving children's responses to transgressions were replicated despite the fact that they were observed in very benign and subtle situations. Both for ethical reasons and for the sake of ecological validity, our paradigms simulated minor and brief mishaps that routinely happen in daily lives of toddlers, such as knocking down an object, breaking a toy, spilling food or drink, dropping food, etc. The expressions of discomfort were on average quite mild. Nevertheless, our coding system was sensitive enough to capture the various signs of children's overall tense discomfort that formed a coherent emotional-behavioral pattern and to reveal its meaningful links with the antisocial trajectory in the specific relationship contexts. Furthermore, we again detected gender differences, with girls displaying more discomfort, consistent with our and others' past work (e.g., Zahn-Waxler & Kochanska, 1990).

We have now demonstrated across several longitudinal studies, different populations, various children's ages, and a range of measures that the processes linking the qualities of the individual child, parental discipline, and antisocial outcomes consistently differ in sub-optimal and optimal parent-child relationship contexts. We have shown that certain qualities of the child -- for example, a difficult, angry temperament (as in Kochanska & Kim, 2012) or the relatively low distress following one's own transgressions as in the current article -- can be seen as forms of early risk for maladaptive cascades that lead to future antisocial behavior, often through increasing parental pressure. But such cascades between such early risks and antisocial behavior are moderated by the parent-child relationship context. In insecure or unresponsive parent-child relationships, such associations are amplified. In secure, responsive relationships, they appear attenuated or defused.

In this study, given the sample size, the different insecure groups (avoidant, resistant, disorganized) were combined; it would be valuable, however, to examine the links among children's responses to transgressions, parental control, and adjustment outcomes for children differing in the type of insecurity. It would further be valuable to examine whether children who present socialization challenges (difficult, callous) are less likely to form a secure bond with the parent in the first place.

It is worth noting that our findings are conceptually compatible with data from other laboratories. For example, Marsh et al. (2003) and Allen et al. (2002) found that adolescents' attachment style moderated the links between their mothers' behavior and the

adolescents' internalizing problems, risky behaviors, and social skills. Allen, Moore, Kuperminc, and Bell (1998) explicitly emphasized the need to modify theories of parenting in a way that incorporates the organization of parent – child attachment as a moderator. Alink, Cicchetti, Kim, and Rogosch (2009) found that child security moderated the causal chain from a history of maltreatment to poor emotion regulation to behavior problems.

Family Study has additionally offered a window into a plausible mechanism that might mediate the link between relatively low distress following transgressions and future antisocial behaviors in children in insecure relationships. The moderated mediation analyses demonstrated that in insecure relationships – both for mothers and children and fathers and children – there was a significant path from the child's apparent relatively low discomfort following transgressions to the parent's relatively more power-assertive control style to the child's future conduct problems. The comparable path was not significant in secure relationships. The findings were obtained despite the fact that parental power assertion in this study was quite low. We have reported parallel findings for links among children's individual characteristics (difficult temperament), parental power assertion, and somewhat comparable antisocial outcomes at 80 months in an earlier article (Kochanska & Kim, 2012). It appears that power assertion may be especially “toxic” in sub-optimal relationships, and in positive parent-child relationships, its effects appeared benign.

We have suggested (Kochanska & Kim, 2012) that in negative, insecure relationships, such developmental chain may be reinforced by parents' and children's negative internal working models of each other (Bugental & Johnston, 2000; George & Solomon, 1996, Kochanska et al., 2009). Parents increasingly perceive children as difficult, and children increasingly perceive parental power as hostile, unfair, and mean-spirited. By contrast, in secure, positive relationships, parents' and children's views of each other and of the relationship are accepting and trusting. Thus, children may be primed to perceive parental power as benevolent, well intentioned, and legitimate.

This work has several limitations that should be addressed in future research. The overall level of power assertion in this study was very low, and is better described as a degree of “control”. This is typical for families observed in a laboratory (see, for example, Joosena, Mesman, Bakermans-Kranenburg, & van IJzendoorn, 2012), particularly after children pass the toddler age. It would be very useful to observe abusive parents, who would likely produce much more robust observed measures of harsh parenting. Another limitation, in both studies, was the children's generally sub-clinical level of behavior problems that corresponded to normative samples used in the development of CSI-4 and ECI-4 (thus, the outcomes are better described as externalizing “tendencies” rather than problems). It would be also useful to include children screened for the presence of elevated problematic behaviors. We note, however, that significant anticipated effects were obtained despite the overall low level of parental applied pressure and within generally normative developmental outcomes, suggesting that the studied process may be quite robust. Finally, in future work, it may be informative to engage parents rather than strangers in interactions that involve contrived mishaps. In the current work, parents were neutral and uninvolved, preventing us from coding potential emotional exchanges within the parent-child dyad.

Cumulatively, this research demonstrates how sequences involving children's characteristics, parental discipline, and antisocial outcomes form different developmental cascades in varying relationship contexts, illustrating the multifinality principle in development (Cicchetti & Rogosch, 1996). Furthermore, it encourages researchers to search beyond main effects when studying complex developmental cascades (Masten & Cicchetti, 2010). Early relationships may not necessarily directly predict future outcomes, but they may set the stage for future complex dynamics between the parent and child and for

developmental trajectories (Sroufe, 2005; Sroufe, Carlson, Levy, & Egeland, 1999). Together, those findings open promising avenues of research and they contribute to developmental psychology and psychopathology. They may ultimately inform parenting intervention programs by elucidating specific long-term risks and indirect sequelae of early sub-optimal parent-child relationships. In particular, it appears that efforts to enhance the quality of early relationships may produce complex benefits -- not necessarily main effects, but rather, changes in the future developmental process and dynamic within the parent-child dyad.

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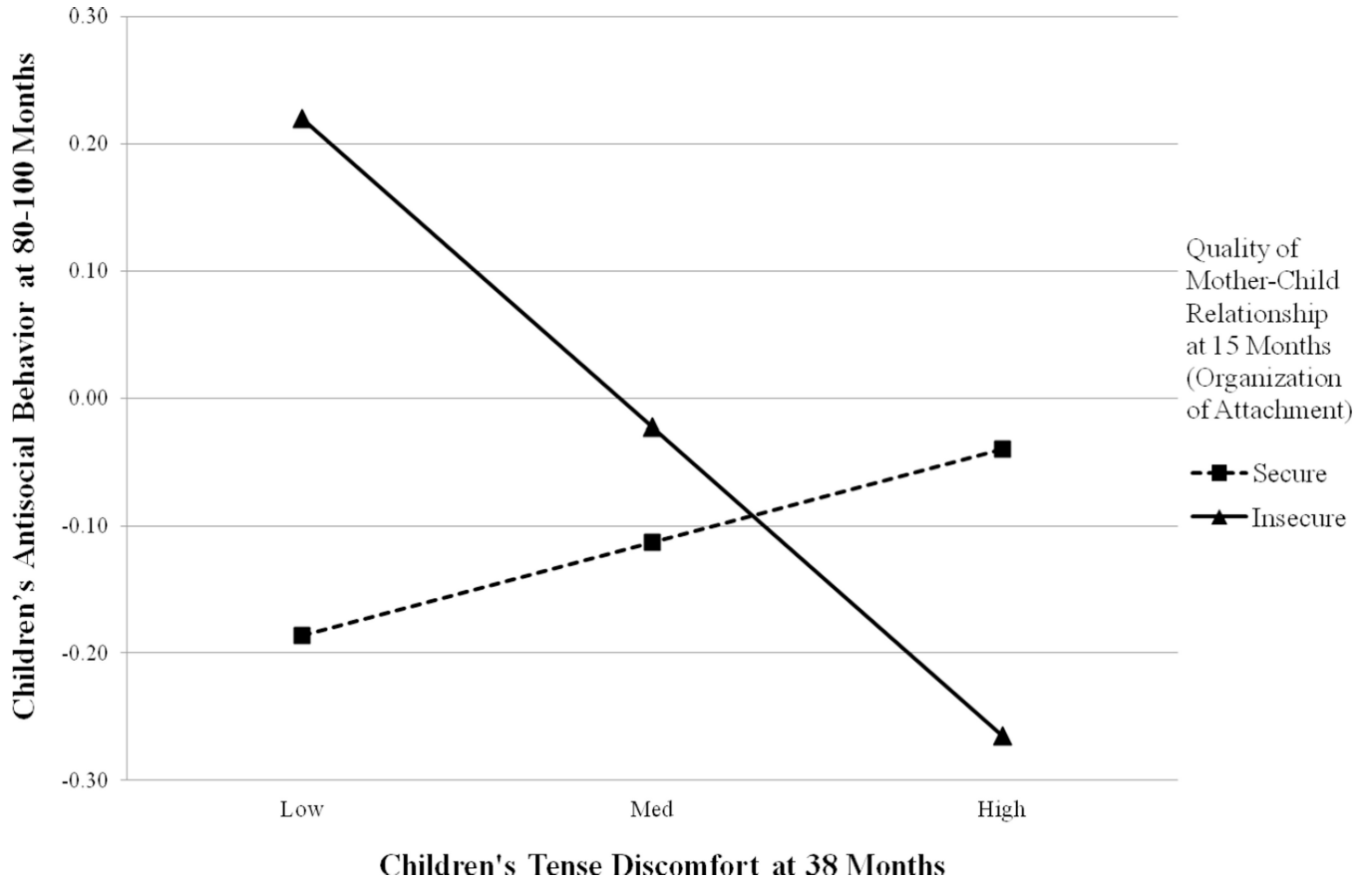
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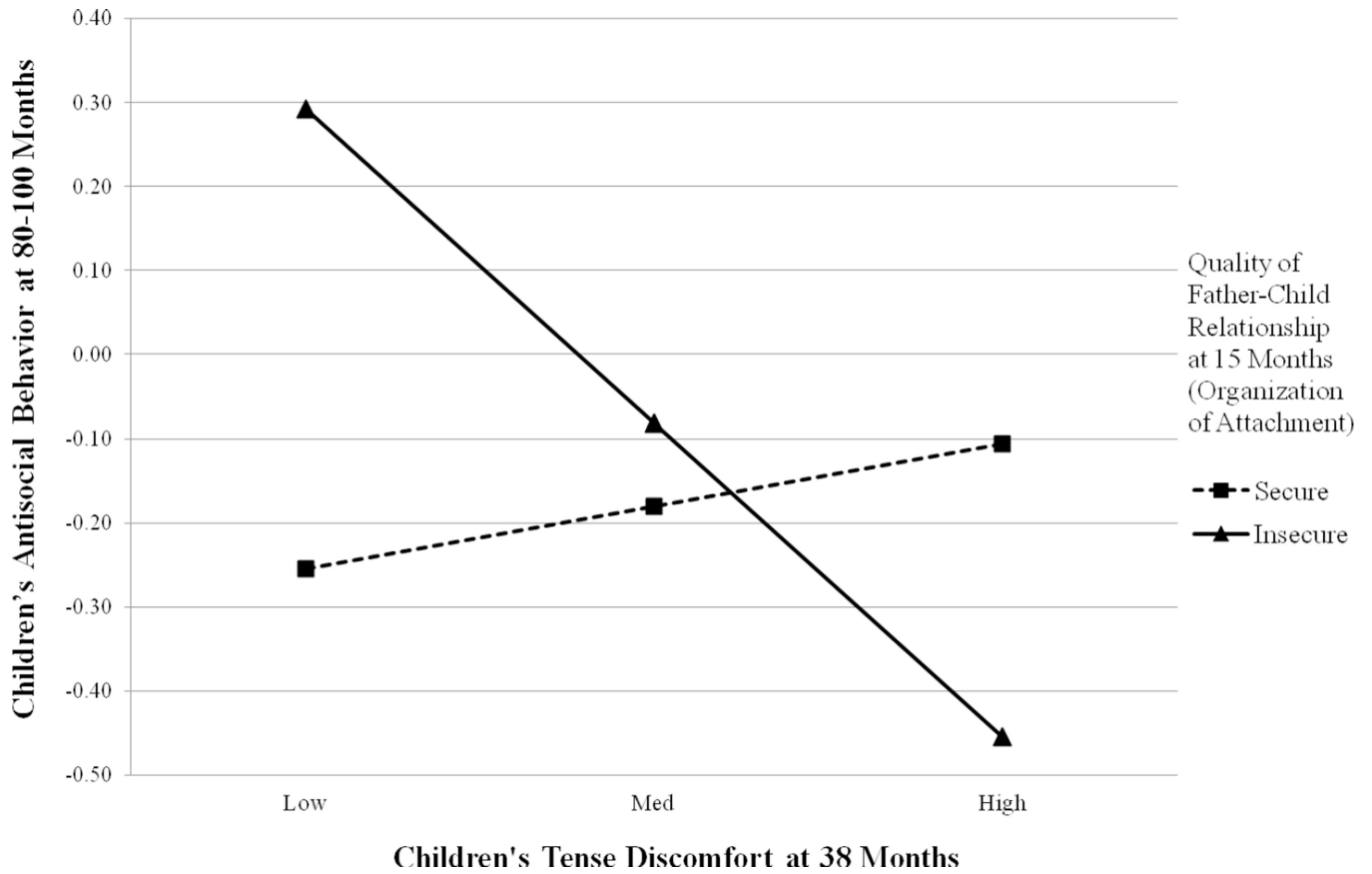
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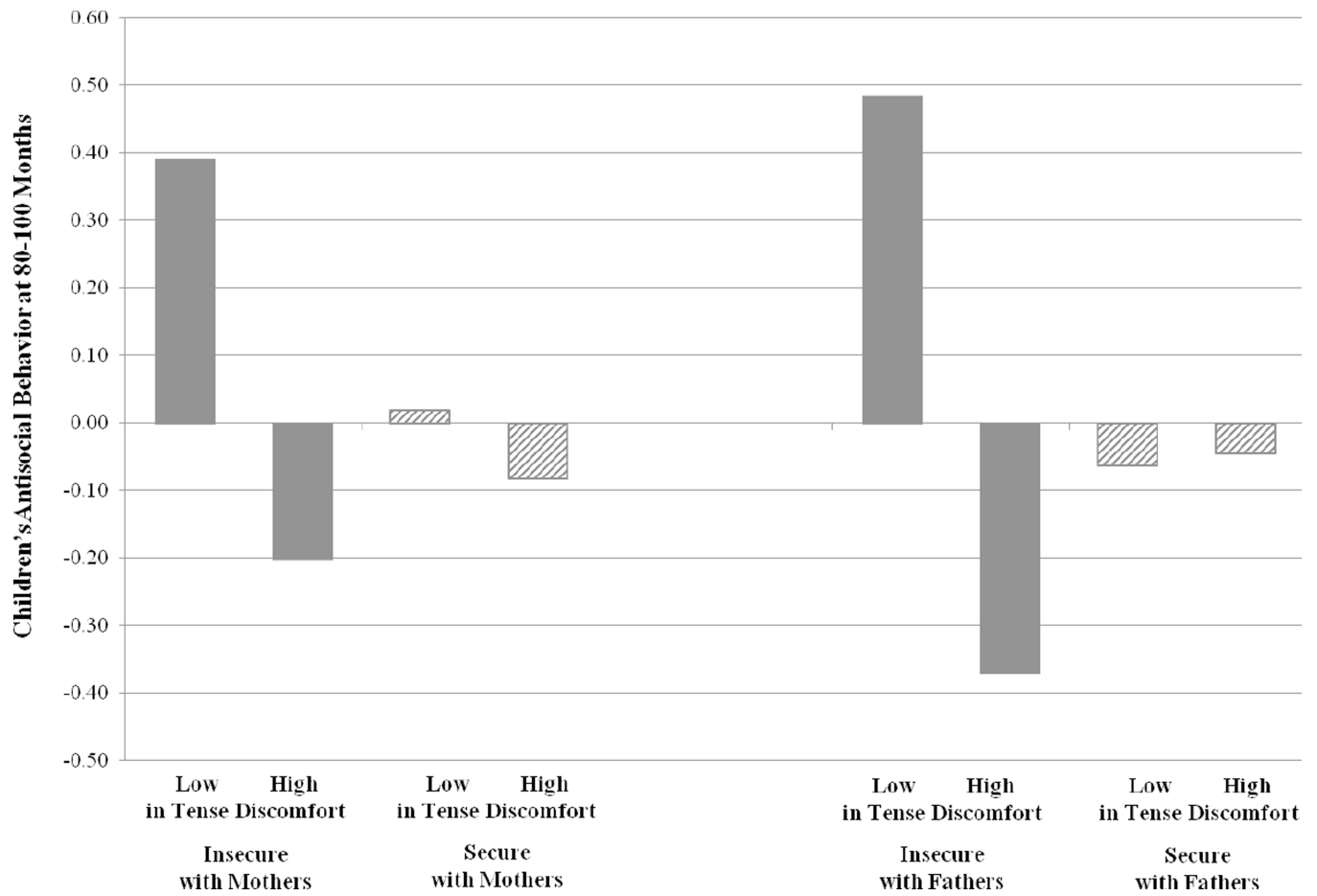


**Figure 1.**

Family Study: Quality of mother-child relationship at 15 months (security of attachment) moderates the link between children's tense discomfort at 38 months and antisocial behavior at 80–100 months. Although not depicted, children's gender was a covariate. Solid line represents significant simple slope; dashed line represents non-significant simple slope.

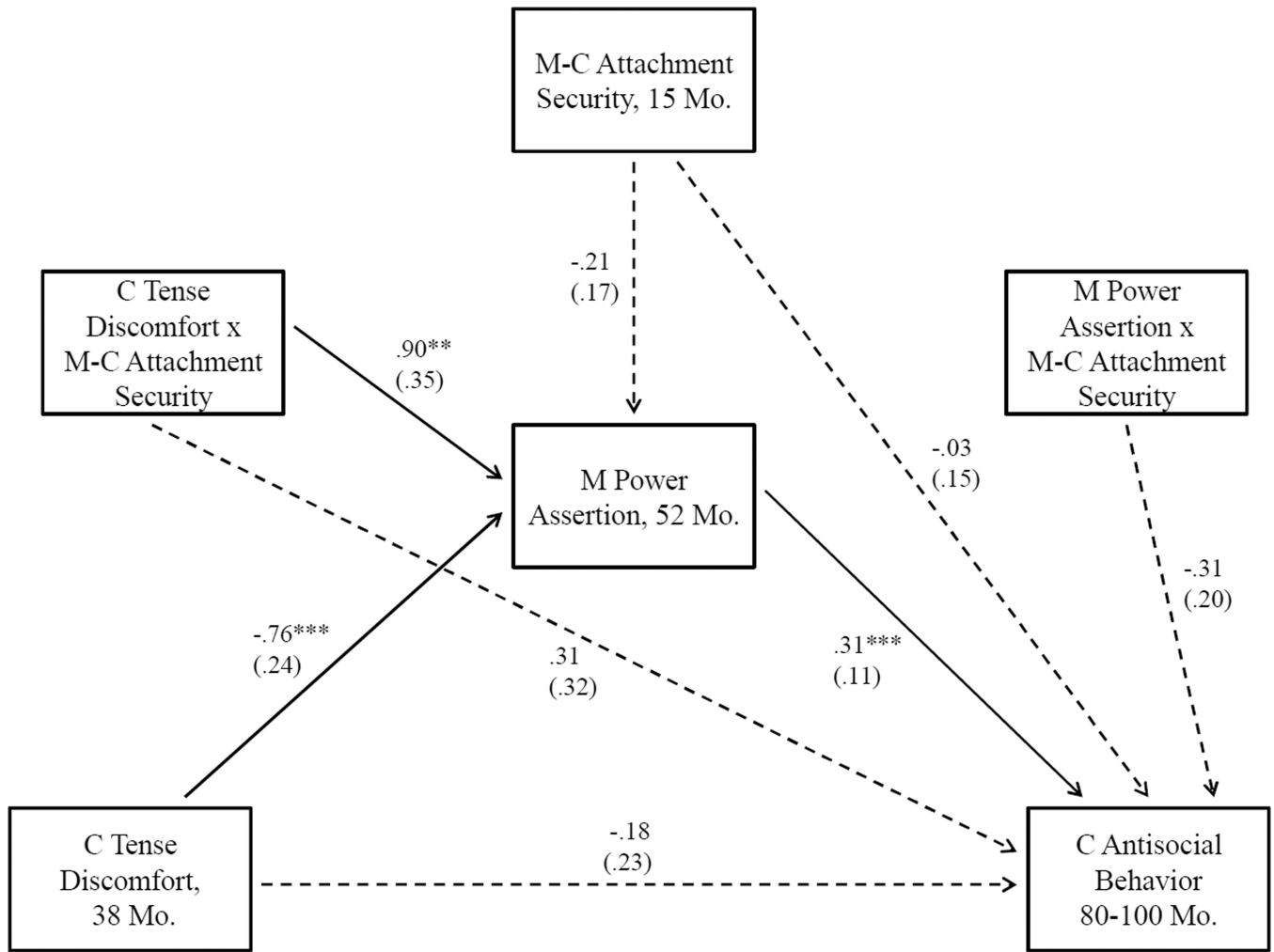


**Figure 2.** Family Study: Quality of father-child relationship at 15 months (security of attachment) moderates the link between children's tense discomfort at 38 months and antisocial behavior at 80–100 months. Although not depicted, the children's gender was a covariate. Solid line represents significant simple slope; dashed line represents non-significant simple slope.

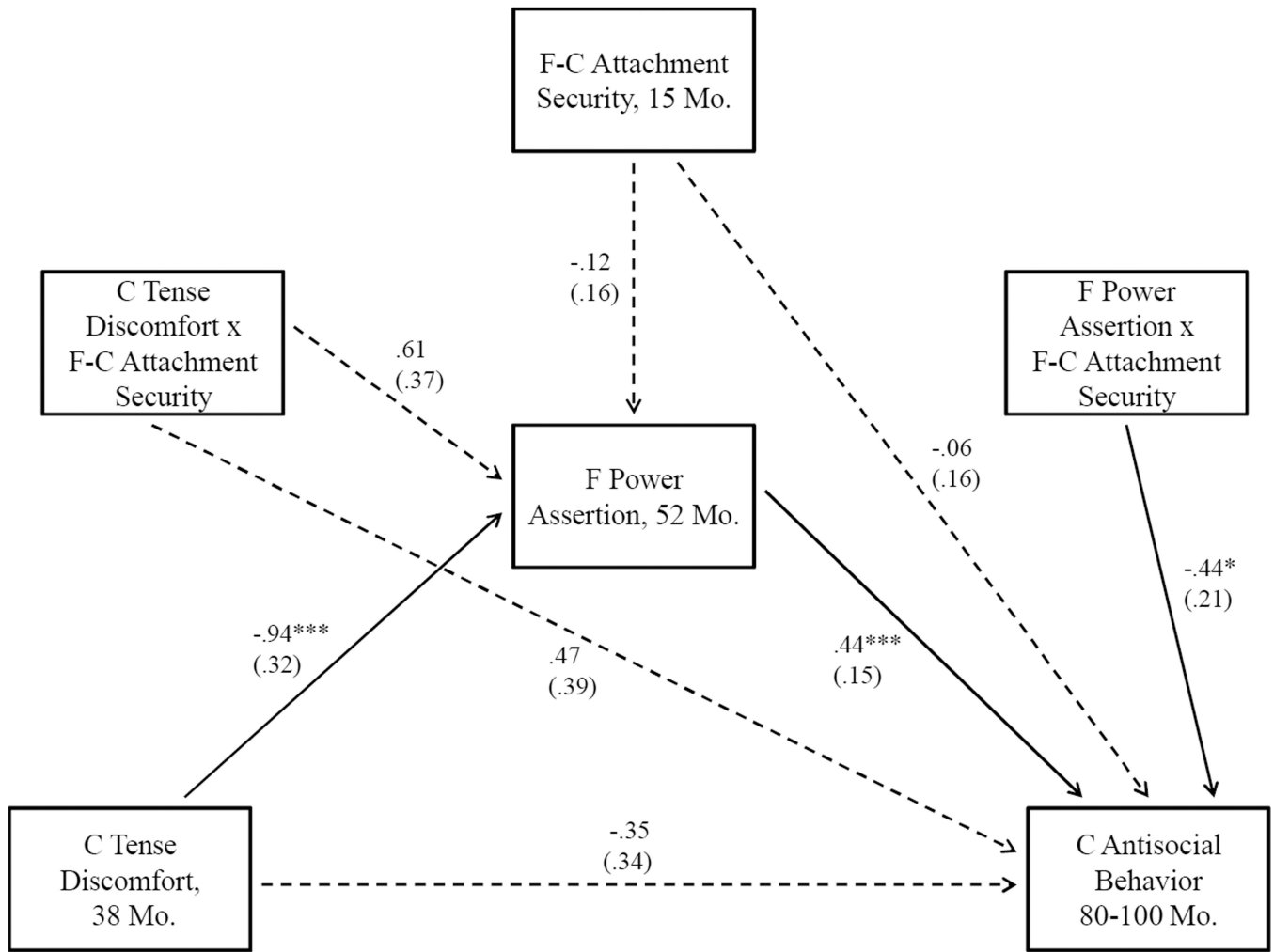


**Figure 3.** Family Study: Observed means of children’s antisocial behavior at 80–100 months in mother-child and father-child dyads (insecure and secure at 15 months) for children with low and high tense discomfort scores at 38 months.

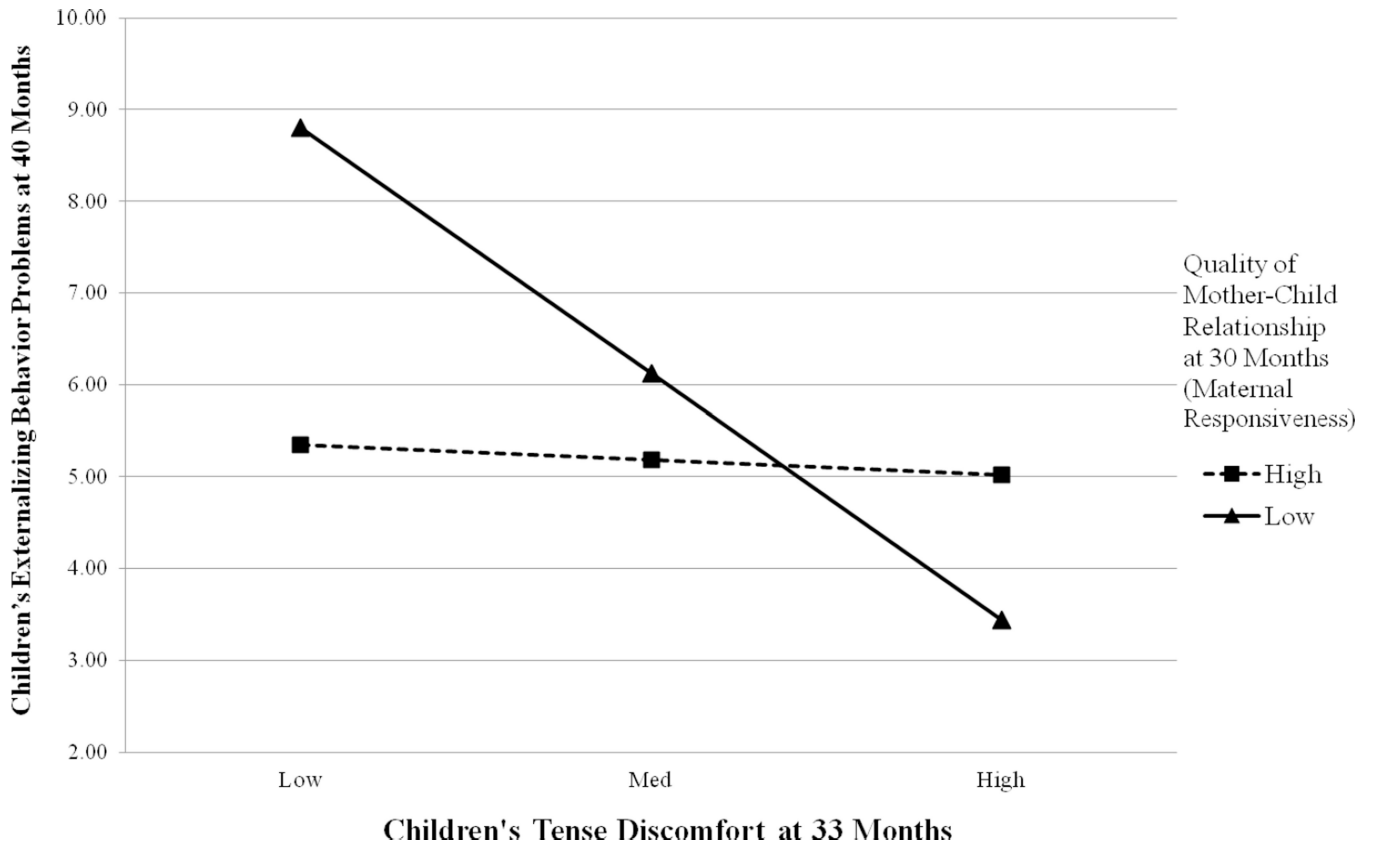




**Figure 4.** Family Study: The moderated mediation model predicting mothers’ power assertion at 52 months as the mediator and children’s antisocial behavior at 80–100 months as the dependent variable, with children’s tense discomfort at 38 months as the predictor and mother-child attachment security at 15 months as the moderator. Although not depicted, children’s gender was a covariate. Solid lines represent significant effects and dashed lines represent nonsignificant effects. M = Mother, C = Child, Mo. = Months. \*\*  $p < .025$ , \*\*\*  $p < .01$ , \*\*\*\*  $p < .001$ .



**Figure 5.** Family Study: The moderated mediation model predicting fathers’ power assertion at 52 months as the mediator and children’s antisocial behavior at 80–100 months as the dependent variable, with children’s tense discomfort at 38 months as the predictor and father-child attachment security at 15 months as the moderator. Although not depicted, children’s gender was a covariate. Solid lines represent significant effects and dashed lines represent nonsignificant effects. F = Father, C = Child, Mo. = Months.  $^+ p < .10$ ,  $** p < .025$ ,  $*** p < .01$ ,  $**** p < .001$ .



**Figure 6.**

Play Study: Quality of mother-child relationship at 30 months (maternal responsiveness) moderates the link between children's tense discomfort at 33 months and externalizing behavior problems at 40 months. Although not depicted, children's gender was a covariate. Solid line represents significant simple slope; dashed line represents non-significant simple slope.

**Table 1**

## Family Study: Descriptive Data

<b>Measure</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>Range</i></b>
Child Behavior in Mishaps Context, 38 months			
Gaze aversion	.36	.11	.15 – .78
Facial tension	.51	.15	.16 – .85
Bodily tension	.46	.20	.03 – 1.02
Overall response	7.64	1.11	3.50 – 10.50
Negative affect	.92	.76	.00 – 3.50
Positive affect	1.55	.97	.00 – 4.00
Tense discomfort <sup>a</sup>	-.01	.47	-.95 – 1.64
Reparation	.15	.10	.00 – .47
Parental Discipline Cleanup Task and Prohibition Context, 52 months			
Mother power-assertive control style <sup>a</sup>	.00	.82	-1.50 – 4.14
Father power-assertive control style <sup>a</sup>	.00	.83	-1.74 – 3.95
Parent-Rated Antisocial Score <sup>a</sup> , 80–100 Months	.01	.71	-1.20 – 2.60

<sup>a</sup> A composite of constituent standardized scores.

**Table 2**

Family Study: Correlations among Children's Tense Discomfort and Reparation at 38 Months, Maternal and Paternal Power Assertion at 52 months, and Children's Antisocial Behavior at 80–100 Months

	Child Tense Discomfort	Child Reparation	Mother Power Assertion	Father Power Assertion	Child Antisocial Behavior
Child tense discomfort	---	-.25**	-.26***	-.35****	-.17
Child reparation		---	.04	.03	.04
Mother power assertion			---	.52****	.34****
Father power assertion				---	.30***

\*  
 $p < .05$ .

\*\*  
 $p < .025$ .

\*\*\*  
 $p < .01$ .

\*\*\*\*  
 $p < .001$ .

**Table 3**  
 Family Study: Infants' Attachment to Mothers and to Fathers and Their Tense Discomfort and Reparation at Toddler Age as Predictors of Antisocial Behavior Problems at 6 1/2 – 8 Years

Predictors	F	Beta	F	Beta	F	Beta	F	Beta
Step 1								
C Gender	4.58*	.22	3.94*	.21	2.77	.19	1.04	.11
$R^2 = .05, F(1, 87) = 4.58^*$								
Step 2								
C Attachment security with M, 15 mo.	< 1	-.02	< 1	-.04	< 1	-.04	< 1	-.03
C Attachment security with F, 15 mo.	1.31	-.12	< 1	-.10	< 1	-.10	< 1	-.02
$R^2 = .07, F(3, 85) = 1.98$								
Step 3								
C Tense discomfort, 38 mo.	< 1	-.09	11.25****		< 1			-.80
C Reparation, 38 mo.	< 1	.01	< 1		< 1			-.21
$R^2 = .07, F(5, 83) = 1.29$								
Step 4								
C Tense discomfort × C attachment security with M					4.51*			.31
C Tense discomfort × C attachment security with F					7.82****			.55
C Reparation × C attachment security with M					< 1			.13
C Reparation × C attachment security with F					< 1			.14
$R^2 = .19, F(9, 79) = 2.12^*$								

M=Mother, F=Father, C=Child. Mo.=Months. Predictors entered as follows: at Step 1, child gender (0=girl, 1=boy), at Step 2, security with mother and security with father (0=insecure, 1=secure), at Step 3, child tense discomfort and reparation, and at Step 4, four interaction terms: child tense discomfort × attachment security with mother and child tense discomfort × attachment security with father and child reparation × attachment security with mother and child reparation × attachment security with father.

\*  $p < .05$ .

\*\*  $p < .025$ .

\*\*\*  $p < .01$ .

\*\*\*\*  $p < .001$ .



**Table 4**

## Play Study: Descriptive Data

<b>Measure</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>Range</i></b>
Mother Responsiveness, 30 Months	4.55	1.07	1.43 – 6.29
Child Behavior in Mishaps Context, 33 Months			
Gaze avertance	.04	.04	.00 – .41
Facial tension	.64	.19	.00 – 1.00
Bodily tension	1.36	.28	.46 – 2.00
Overall response	7.04	.86	5.50 – 12.00
Negative affect	.12	.40	.00 – 3.00
Positive affect	1.23	.91	.00 – 4.50
Tense discomfort <sup>a</sup>	-.00	.51	-1.17 – 3.03
Reparation	.15	.09	.00 – .45
Mother-Rated Antisocial Score, 40 Months	6.39	5.82	.00 – 34.00

<sup>a</sup> A composite of constituent standardized scores.

**Table 5**  
 Play Study: Mothers' Responsiveness at 30 Months and Children's Tense Discomfort and Reparation at 33 Months as Predictors of Externalizing Behavior Problems at 40 Months

Predictors	F	Beta	F	Beta	F	Beta	F	Beta
Step 1								
C Gender	4.74*	.17	4.32*	.16	2.42	.12	2.33	.12
$R^2 = .03$ , $F(1, 160) = 4.74^*$								
Step 2								
M Responsiveness, 30 mo.			2.36	-.12	2.06	-.11	1.03	-.08
$R^2 = .04$ , $F(2, 159) = 3.57^*$								
Step 3								
C Tense discomfort, 33 mo.					4.44*	-.17	8.04****	-.26
C Reparation, 33 mo.					< 1	-.02	< 1	-.00
$R^2 = .07$ , $F(4, 157) = 2.97^{**}$								
Step 4								
C Tense discomfort $\times$ M responsiveness							4.96*	.20
C Reparation $\times$ M responsiveness							< 1	.07
$R^2 = .11$ , $F(6, 155) = 3.28^{***}$								

M=Mother, C=Child. Mo.=Months. Predictors entered as follows: at Step 1, child gender (0=girl, 1=boy), at Step 2, mother responsiveness, at Step 3, child tense discomfort and reparation, and at Step 4, the interaction terms: child tense discomfort  $\times$  mother responsiveness and child reparation  $\times$  mother responsiveness

\*  $p < .05$ .

\*\*  $p < .025$ .

\*\*\*  $p < .01$ .

\*\*\*\*  $p < .001$ .