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From parent–child mutuality to security to socialization outcomes: developmental cascade toward positive adaptation in preadolescence

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A developmental cascade from positive early parent–child relationship to child security with the parent to adaptive socialization outcomes, proposed in attachment theory and often implicitly accepted but rarely formally tested, was examined in 100 mothers, fathers, and children followed from toddler age to preadolescence. Parent–child Mutually Responsive Orientation (MRO) was observed in lengthy interactions at 38, 52, 67, and 80 months; children reported their security with parents at age eight. Socialization outcomes (parent- and child-reported cooperation with parental monitoring and teacher-reported school competence) were assessed at age 10. Mediation was tested with PROCESS. The parent–child history of MRO significantly predicted both mother–child and father–child security. For mother–child dyads, security mediated links between history of MRO and cooperation with maternal monitoring and school competence, controlling for developmental continuity of the studied constructs. For father–child dyads, the mediation effect was not evident.

Keywords: parent–child relationship; security; socialization; attachment; preadolescence

Bowlby’s heuristically powerful theory of early human bonds (Bowlby, 1969/1982, 1973) has transformed, and continues to inspire, research in developmental psychology and psychopathology. The attachment construct has been increasingly influential in relational theories of development and socialization (Kuczynski & De Mol, 2015; Maccoby, 1999; Sroufe, 2005; Thompson, 2006, 2014).

The parent–child attachment system serves multiple developmental objectives. In a more narrow view, particularly applicable to young children, attachment is a biobehavioral safety-regulating system focused on protection (Goldberg, Grusec, & Jenkins, 1999; Sroufe & Waters, 1977). In an optimal (secure) attachment relationship, the child develops confidence in parental protection, effective comfort, and safe haven in case of stress or threat. In the absence of stress, the parent serves as a secure base for exploration. The child develops adaptive physiological and behavioral emotion regulation strategies (Hofer, 1994; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996) and enthusiasm for exploration. A sub-optimal (insecure) attachment compromises those aspects of adaptation.

In a broader view, the attachment system serves additional key goals, particularly applicable to older children (Kerns, 2008; Kochanska, 1995; Kochanska & Kim, 2012; Kochanska et al., 2010; Marvin & Britner, 2008; O’Connor, Scott, McCormick, & Weinberg, 2014; Psounia & Apetroaia, 2014; Thompson, 2008, 2014; Viddala et al., 2015; Waters, Hay, & Richters, 1986; Waters, Kondo-Ikemura, Posada, & Richters,

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1990). In that view, attachment is a key contributor to the socialization process, setting in motion developmental cascades in the domain of parent–child control, authority, and discipline (Bugental & Grusec, 2006; Kuczynski & De Mol, 2015). As Waters and colleagues (1990) proposed, having established a secure base, the child progresses toward a “positive orientation toward parental socialization goals and internalization of family values in early childhood” (p. 229). Security inaugurates a shared cooperative set, in which the child, as an active agent, willingly cooperates with the parent toward mutually embraced socialization goals. In an insecure attachment context, the child likely ignores, resists, resents, or rejects parental socialization agenda (Kochanska, Aksan, Knaack, & Rhines, 2004; Kochanska & Kim, 2012; Kochanska et al., 2010; Thompson, 2014). A mutually positive, responsive, warm parent–child relationship is thought to promote security, whereas a negative, unresponsive, rejecting, conflicted relationship predicts future insecurity (Belsky & Fearon, 2008; De Wolff & van IJzendoorn, 1997; Thompson, 2006).

Although the longitudinal developmental cascade from the early parent–child relationship to child security to future socialization outcomes appears implicitly accepted, gaps in our understanding remain. In this study, we aim to address three research lacunae. One, we explicitly examine and formally test a hypothesis that the *child’s attachment security is a mechanism that links early parent–child relationship with future developmental outcomes*. Two, given that long-term studies of parent–child relationships, attachment security, and outcomes are still quite rare, we examine a path *from toddler-age parent–child relationship to security in middle childhood to socialization outcomes in preadolescence*. And three, because we continue to know much less about father–child relationships than we do about mother–child relationships, we examine all studied processes in *children’s relationships with both parents*.

Attachment security as a mechanism linking early parent–child relationship with future developmental outcomes. Although the literature is replete with studies documenting *links* among the early parent–child relationships, security, and socialization outcomes, few investigations have formally tested *security as a mediator of effects of early relationships on outcomes*, particularly over several years. The assumption that security – and its specific features, such as a sense of trust, confidence in the parent, and expectation of comfort and support – is a *causal mechanism* linking early experiences with future outcomes is a key tenet in attachment theory. In that view, security is not the same as or reducible to positive parenting or positive parent–child relationship (although those are certainly related).

Alternative explanations, however, are also possible, and have a long history (e.g., Lamb, 1987; Lamb, Thompson, Gardner, & Charnov, 1985). Perhaps the child’s security, which tends to emerge in positive parent–child relationships, is associated with positive future outcomes simply because the early positive relationship continues, and it is that positive relationship that accounts for both adaptive outcomes and security. If so, then outcomes might simply be attributable to longitudinal continuity of the quality of parent–child relationships over time, for which security may be a proxy. In that view, parent–child relationship and security may not be distinguishable from each other. Thompson (2006) persuasively argued that both models need to be tested.

We embrace the former model that assumes that the construct of security has a “surplus of meaning” above and beyond being a proxy for, or a mere correlate of, a positive parent–child relationship. In our view, security entails internalized components that are not reducible to the dyadic parent–child relationship, although they may certainly be influenced by relational factors, particularly the child’s internal working models of the

parent, self, and the relationship. Whereas we expected the early parent–child relationship, child security, and outcomes to be positively correlated, we proposed *that security is indeed the mediating mechanism* that links the early positive dyadic relationship with future developmental outcomes.

To test such hypothesis adequately it is critical to adopt an analytical approach that formally examines the proposed mediation while controlling, whenever possible, for the continuity of the assessed constructs and, most importantly, for the quality of parent–child relationship concurrent to outcomes (Cole & Maxwell, 2003; Hoyle & Robinson, 2004). We have implemented a flexible approach to the statistical testing of mediation, PROCESS (Hayes, 2013).

A long-term longitudinal approach: from toddler-age parent–child relationship to security in middle childhood to socialization outcomes in preadolescence. With a few notable exceptions (e.g., NICHD Study of Early Child Care; Friedman & Boyle, 2008; Grossmann, Grossmann, & Waters, 2005; Sroufe, Egeland, Carlson, & Collins, 2005), most research has examined such processes over relatively short and early time periods, typically the first few years. In the present longitudinal study, we collected data on parent–child relationships in lengthy observations at 38, 52, 67, and 80 months, data on children’s attachment security – in middle childhood, at age eight, and data on socialization outcomes – in early preadolescence.

Over the course of the last several decades, along with the dramatic growth of interest in parent–child relationships, and social relationships in general, methodological challenges involved in their assessment have become apparent (Hinde, 1999; Reis, Collins, & Berscheid, 2000). Observational measures that adequately capture the parent–child relationship need to extend beyond measures of each individual, and must incorporate the dyadic quality of their interaction. Additionally, they must rely on lengthy observations of diverse interactions in naturalistic – yet comparable across dyads – contexts that resemble daily routines and typical parent–child situations. We have proposed such a measure: parent–child mutually responsive orientation (MRO; Aksan, Kochanska, & Ortmann, 2006; Kochanska, 2002; Kochanska, Kim, Boldt, & Yoon, 2013). MRO captures the degree to which a parent–child relationship is affectively positive, connected, cooperative, and mutually reciprocal and responsive. We also demonstrated statistically that MRO is a unidimensional latent construct that can be distinguished from and is not reducible to the two interacting individuals’ qualities (Aksan et al., 2006).

We sought to measure children’s attachment security to the mother and father at age eight, using a measure informed by attachment theory that focused specifically on the child’s internal perceptions and expectations of the given parent. To that effect, we employed the well-validated Kerns Security Scale that has been successfully used in several studies (Kerns, 2008; Kerns, Aspelmeier, Gentzler, & Grabill, 2001; Kerns, Brumariu, & Seibert, 2011; Kerns, Klepac, & Cole, 1996; Kerns & Seibert, *in press*). We administered that instrument in an individual interview-like format. Children reported their perceived security with mothers and fathers, including trust in the parent’s responsiveness and availability and their tendency to rely on the parent in times of stress.

We assessed socialization outcomes at age 10, when children spend an increasingly large amount of time outside of the home and face growing pressures from peers (Allen, Chango, Szwedo, Schad, & Marston, 2012; Larson, Richards, Moneta, Holmbeck, & Duckett, 1996; Steinberg & Morris, 2001). At the same time, direct parental control and supervision decline (Sroufe et al., 2005), and parental effective but often distal monitoring

becomes a key dimension of successful socialization. The child's active cooperation in monitoring, sharing, and adjudicating daily plans with the parent reflects a willing, accepting stance toward parental influence (Darling, Cumsille, & Martinez, 2008; Kerns et al., 2001; Stattin & Kerr, 2000) and has been linked to security (Kerns et al., 2001; Waters et al., 1990).

Successful functioning in the broader ecology of school is a salient task of children's adaptation in early preadolescence (Masten et al., 1995; Sroufe et al., 2005). Being comfortable and accepted in peer interactions and enthusiastically engaged in classroom activities are key dimensions of competence in preadolescence, meaningfully related to security with parents (Berlin, Cassidy, & Appleyard, 2008; Kerns, 2008; Kerns et al., 1996; Sroufe et al., 2005; Thompson, 2006, 2008). Consequently, using questionnaires, we examined the child's cooperation with the mother's and father's monitoring, reported by both parents and children, and successful functioning in school, reported by teachers, as two important socialization outcomes at age 10.

The examination of mother-child and father-child relationships. Researchers have been increasingly urged to examine the process linking the child's early experience, security, and socialization outcomes in the context of two fundamental relationships: mother-child and father-child. Attachment organization is considered to reflect the relationship's unique history, and socialization outcomes that entail the child's receptive, cooperative stance toward the given parent are unique to the parent-child dyad (Kochanska & Kim, 2012). Therefore, the prevailing focus on mothers and children, with an exclusion of fathers, yields an incomplete picture of developmental pathways. The need to include fathers and children in attachment research has increasingly gained urgency given the rapid societal and cultural transformations regarding fatherhood (Bretherton, 2010; Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000; Parke & Buriel, 2006; Pleck, 2010). Those societal processes are complex. Fathers have increasingly become involved as caregivers and attachment figures in young children's lives, but, at the same time, the number of female-headed and divorced families has also increased, leading to an interest in the role of non-resident fathers as continuing caregivers (Maccoby, Mnookin, Depner, & Peters, 1992; Williams & Kelly, 2005).

Consequently, studies of attachment, and parenting more generally, in mothers and fathers have been encouraged and are on the rise (Berlin et al., 2008; Brumariu & Kerns, 2010; Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; Hallers-Haalboom et al., 2014; Kerns, 2008; Steele, Steele, & Fonagy, 1996). The study of early attachment in multiple relationships has been identified as one of the key issues for attachment research in the twenty-first century (Thompson & Raikes, 2003). In particular, given differences that have been reported in mothers' and fathers' interactive styles with young children, we need to know more about the antecedents of security in both relationships (Thompson, 2006). For example, compared to infants' interactions with mothers, which comprised more caregiving, those with fathers have been described as comprising a higher proportion of play (Lamb, 1977). In a recent study, mothers were more sensitive during free play with their young (1-year-old and 3-year-old) children than fathers (Hallers-Haalboom et al., 2014). Despite the possible differences, however, a recent meta-analysis indicated that fathers' sensitivity predicts children's security, much as it does for mothers (Lucassen et al., 2011).

Some implications of early security with mothers and fathers may be similar, but some may be different, particularly when children are followed long-term into middle childhood and beyond. Grossmann and colleagues (Grossmann et al., 2002) found that

whereas attachment in the Strange Situation to both parents predicted children's attachment security at age six, for fathers it was sensitive play, but for mothers it was security in infancy, that predicted children's internal working models of attachment at age 10.

Father-child play has been more generally implicated as key in the development of children's social competence with peers (MacDonald & Parke, 1984; McDowell & Parke, 2009). We found, in the same sample, that children's attachment security to their fathers at age two, assessed by trained observers of the parent-child interactions who completed Attachment Q-Sort (Waters, 1987) for each dyad, predicted children's self- and parent-reported social competence at age eight (Boldt, Kochanska, Yoon, & Nordling, 2014). Generally, there is clearly a need for more studies of mother-child and father-child attachment in middle childhood (Kerns, 2008).

In summary, we examined the process leading from the parent-child relationship, assessed as a mutual, dyadic construct, to child attachment security to socialization outcomes, from toddler age to preadolescence. At 38, 52, 67, and 80 months, we observed, in lengthy observations in natural contexts, mother-child and father-child MRO. At age eight, in individual interviews, we assessed children's attachment security to mothers and fathers, expressed as perceptions of the parent as an attachment figure. At age 10, we examined socialization outcomes: children's cooperation with parental monitoring, assessed by children and parents, and competent functioning in broader ecologies, rated by teachers.

We anticipated that children with histories of higher MRO with their parents would score higher on the measure of security and would have more adaptive outcomes in preadolescence. But most importantly, we expected, and formally tested, the premise of attachment theory that *security mediates the links between early MRO and future outcomes*, using several statistical techniques specifically designed to investigate various types of mediation. Furthermore, we statistically removed from the outcome measures the potential effect of concurrent MRO. This allowed us to determine whether effects of earlier MRO on child outcomes are indeed attributable to the *mediating effects of security* rather than to simple continuity of MRO over time and its positive effects on the outcomes.

Method

Participants

Two-parent community families of typically developing infants ($N = 102$) from a college town, a small city, and rural areas in the Midwest, representing a broad range of education, volunteered for this longitudinal study. Among mothers, approximately 25% had a high school education (or less), 54% had an associate or college degree, and 21% had a postgraduate education (fathers, respectively, approximately 30%, 51%, and 20%). Annual family income ranged from less than US\$40,000 (25%) to US\$40,000–US\$60,000 (26%), to over US\$60,000 (49%). Ninety percent of mothers and 84% of fathers were White, 3% and 8% Hispanic, 2% and 3% African American, 1% and 3% Asian, and 4% and 2% Pacific Islander or other non-White, respectively. In 20% of families, one or both parents were non-White.

We created a relative measure of income by dividing the income score (1–8) by the family size, $M = 1.55$, $SD = .67$. We also averaged across the mother's and father's education level, each scored 1 to 5, $M = 3.46$, $SD = .96$. Those two measures correlated,

$r(101) = .37, p < .001$, and were standardized and then averaged into an overall family's socioeconomic status (SES) index, $M = -.01, SD = .85$. We included that index as an additional covariate in all analyses.

Overview

We present data collected at 38 months ($N = 100, 50$ girls), at 52 months ($N = 99, 49$ girls), at 67 months ($N = 92, 45$ girls), at 80 months ($N = 90, 43$ girls), at 100 months (age eight, $N = 87, 41$ girls), and at 123 months (age 10, $N = 82, 37$ girls). There were two 1.5–3-hour laboratory sessions at most times, one with each parent (at 38 months, there was one home and one laboratory session, with each parent participating in half of each, and at age eight, there was one laboratory session, focused mostly on child assessments). Sessions, conducted by female experimenters (Es), were video recorded. The laboratory has been designed to resemble a natural living room and a play room.

Behavioral data were coded by multiple teams. Reliability was typically established on approximately 15–20% of cases, followed by frequent realignments to prevent observer drift.

Measures of mother–child and father–child MRO, 38–80 months, and age 10 (control variable)

Observed interactions. Each parent–child dyad was observed in multiple natural but carefully scripted interactive situations that encompassed play, chores, preparation of snacks, snack time, parent busy with questionnaires, free time, a craft project, etc. Before beginning each activity, E gave the parent standardized instructions, for example: “This is a time for you and your child to have a short snack time”. Standard snacks and drinks were available in the room. The parent and child were free to choose how to follow and interpret E's instructions.

At each time of assessment between 38 and 80 months, there were multiple parent–child situations, consistent across all assessments, including the number (six) and their order in the session, with only minor differences in time allotted for each situation. The one exception was the assessment at 38 months, when there were nine situations split between the home and the laboratory sessions, and the situations were slightly adjusted, for example, the snack took place both at home and in the laboratory.

The total time of observations for each parent–child dyad was: 38 months, 77 min; 52 months, 65 min; 67 months, 60 min; and 80 months, 60 min (overall, each mother–child and father–child dyad was observed in 27 situations, 262 min). Additionally, at age 10 (when MRO was a control variable), each dyad was observed for 81 min in 15 situations adapted to children's greater maturity (e.g., discussions of various issues, solving hypothetical dilemmas, but also a snack and gift, as at earlier times).

Coding

Coders assigned one overall MRO rating for each observed situation (e.g., snack, play), from 1 (very untrue of the dyad) to 5 (very true of the dyad). That rating integrated four dyadic dimensions that are described below, along with their lowest and highest anchor points.

Coordinated routines

Low: The parent–child dyad has no routines or routines are choppy, rough, and conflict producing. High: The dyad settles into easy, comfortable, coordinated routines that reflect shared procedural expectations.

Harmonious communication

Low: The dyad communicates very little or not at all. High: The dyad communicates smoothly, in a connected, harmonious, back-and-forth way.

Mutual cooperation

Low: The dyad is unable to cooperate, and struggles and conflicts escalate. High: The parent and child adopt an open, willing, receptive stance toward each other, and even subtle cues suffice to elicit cooperation.

Emotional ambience

Low: Negative ambience permeates interaction in the dyad, and there are bouts of negative affect. High: The parent and child clearly enjoy each other's company, and the ambience is very positive and warm, with bouts of joy, good humor, and displays of affection.

The conventions specified how to integrate the four dimensions to arrive at the overall score for each situation. Coding at age 10 reflected children's greater maturity but was essentially similar. An example of the coding using the snack time follows.

A low code of MRO is given if the parent and child are unable to navigate the situation together. Imagine that the snack time begins, and the parent and child have difficulty agreeing on and choosing snacks, and a conflict ensues. After a failed attempt to get the child to eat, they both abandon the table, and the parent immerses herself or himself in a magazine, while the child roams around aimlessly. By contrast, a high code of MRO is given if, during the same situation, parent and child inspect the snacks together, agree on their selections, sit at the table, have an enjoyable conversation about the foods they have chosen, the laboratory, or their plans for the day. Then, they amicably clean up together, and perhaps enjoy playing a short game if they get done with their snacks early.

Reliability

Reliability, weighted kappas (and intraclass correlations, ICCs, in parentheses), for five pairs of coders, were as follows: .66 (ICC = .80), .74 (ICC = .83), .79 (ICC = .88), .81 (ICC = .88), and .83 (ICC = .92).

Data aggregation

At each assessment, the scores across all situations cohered substantially. Cronbach's alphas were as follows (mother-child first, father-child second): at 38 months, .72 and .79; at 52 months, .79 and .75; at 67 months, .81 and .78; at 80 months, .76 and .78; and at age 10, .91 and .88. They were averaged across all situations into one score for each parent at each time. Those scores correlated across all four assessments from 38 to 80 months (alphas .83 for both mother-child and father-child dyads), and were aggregated into *one overall MRO score from 38 to 80 months* for each dyad: mother-child dyads, $M = 3.07$, $SD = .38$, range 1.76–3.81, and father-child dyads, $M = 2.91$, $SD = .41$, range 1.43–3.71. The MRO score at age 10, the control variable, mother-child dyads, $M = 2.88$, $SD = .49$, range 1.07–4.27, and father-child dyads, $M = 2.86$, $SD = .38$, range 1.40–3.73, was kept separate. Those scores correlated robustly with the composite MRO scores from 38 to 80 months for both mother-child and father-child dyads.

Measure of children's security with mothers and fathers, age eight

Kerns Security Scale. In the laboratory, E read to the child 15 items from Kerns Security Scale that assesses perception of security in the relationship with each parent and has shown good psychometric properties (Kerns et al., 2001, 1996). The items tap attachment-specific beliefs and feelings (trust in the parent, expectations of availability, wish to rely on parent under stress, etc.). The child indicated, first, which description of each item was most like him or her, and second, whether this description was "very true" or "sort of true" (for example, "Some kids are really sure their mom would not leave them BUT other kids sometimes wonder if their mom might leave them").

Data aggregation

Following Kerns et al. (1996), all items were scored from 1 to 4, with higher scores indicating more perceived security; when averaged, they were fully comparable to Kerns et al. (2001), with nine-year-olds, mother-child, $M = 3.48$, $SD = .38$, range 2.00–4.00, father-child, $M = 3.40$, $SD = .41$, range 2.33–4.00. For the analyses, all items were standardized and averaged into one score (with the mother and the father; alphas were respectively .71 and .68).

Measures of cooperation with parental monitoring, age 10

Kerns child check-in questionnaire. The child and the parent completed the child's and parent's versions, respectively, of a 12-item questionnaire developed by Kerns (Kerns et al., 2001) to assess children's willing cooperation with and contributions to the process of parental monitoring. The items (scored 1 = yes, 0 = no) tap child "check-in" behaviors, such as volunteering information about plans and activities, contacting the parent about a change in plans, complying with agreed upon schedule, etc.

Data aggregation

The scores were the means of all items. The child's and the parent's perceptions converged, for mother-child dyads, $r(78) = .51$, $p < .001$, and for father-child dyads, $r(75) = .62$, $p < .001$, and thus the scores within each dyad were averaged into the scores of child cooperation with maternal and paternal monitoring, $M = .93$, $SD = .11$, range = .22–1.00, and $M = .91$, $SD = .13$, range = .13–1.00, respectively, comparable with Kerns et al. (2001).

Measure of school competence, age 10

Children's teachers completed Macarthur Health Behavior Questionnaire (HBQ; Essex et al., 2002). We selected three scales: Peer Acceptance-Rejection (8 items, alpha = .91, $M = 3.71$, $SD = .39$), Social Isolation (6 items, alpha = .81, $M = 1.18$, $SD = .33$, reversed), and School Engagement (8 items, alpha = .91, $M = 2.78$, $SD = .26$). Those scores were standardized (because some ranged 1–3 and some 1–4), and aggregated into one measure of school competence (alpha for the three scales was .60, $M = .00$, $SD = .75$, range –2.92–.70; however, when the scales were decomposed to specific items, alpha across all those items was .84).

Results

Overview

Following preliminary data analyses (correlations), we examined the proposed developmental cascade from early parent–child MRO to security to socialization outcomes using, first, multiple regressions and, second, the bootstrapping approach of PROCESS (Hayes, 2013), a versatile modeling program designed to investigate various types of mediation in a path analysis framework. We tested the presence of the indirect effect of early MRO on future outcomes (with security as the mediating mechanism). Such approach is also consistent with recommendations by Cole and Maxwell (2003) and Hoyle and Robinson (2004) for conservative testing mediation over time. They recommend controlling for the measure of the mediator concurrent to the dependent variable (here, MRO at age 10) and for earlier measures of the dependent variable, if available. As an earlier measure of teacher-rated competence was available, it was controlled as well.

Preliminary data analyses

Correlations. The correlations among the measures are given in Table 1. Generally, the parallel measures for the mother–child and father–child relationships, reported or observed, correlated significantly across the two parents. Parent–child MRO from 38 to 80 months was significantly associated with child security with the parent at age eight. Parent–child MRO and children’s security were associated with socialization outcomes at age 10. Note that this pattern was suggestive of the possibility of mediation from MRO to security to outcomes. The outcomes at age 10 were positively inter-related. The family’s SES was significantly associated only with mother–child and father–child MRO from 38 to 80 months. As expected, parent–child MRO at age 10 was significantly associated with MRO from 38 to 80 months, as well as with children’s security at age eight and the outcomes at age 10.

The testing of the mediational pathways from early parent–child MRO (38–80 months) to child security (age eight) to socialization outcomes (age 10): multiple regressions

We first examined the hypothesized mediation using multiple regressions. In all analyses, we controlled for SES, as well as for the MRO scores concurrent to the outcomes. Note that this strategy addresses the main question of this article: Are the positive effects of early MRO on future outcome mediated by later security, or are they due simply to the continuing high quality of the parent–child relationship?

Following Cole and Maxwell (2003) and Hoyle and Robinson (2004), in the analyses predicting school competence, we additionally controlled for the available analogous teacher rating obtained at 80 months, $M = .00$, $SD = .70$, range $-2.31-.64$, which indeed correlated with the rating at age 10, $r(66) = .39$, $p < .001$. Recall that no earlier measures of cooperation with parental monitoring were obtained, so we were unable to implement this strategy in the analyses predicting cooperation.

The analyses were conducted separately for mother–child and father–child dyads, with MRO and security as the predictors. In the first step, the covariates were entered: family’s SES and the child’s MRO with the given parent at age 10, concurrent with the outcomes. In the second step, the child’s MRO with the given parent from 38 to 80 months was added. In the third step, the child’s security with that parent at age eight was added.

Our approach to predicting children’s teacher-rated school competence was the same, with one exception: The earlier score on school competence, obtained at 80 months, was added in the first step (recall that an earlier score was not available for cooperation with

Table 1. Correlations among measures.

Family's	38-80 Months			Age 8			Age 10					
	MRO ^a			C Security ^b			C Cooperation with Monitoring ^c			C School Competence ^d		
	M-C	M-C	F-C	w/M	w/F	w/M	w/F	w/M	w/F	Competence	M-C	F-C
SES	—	—	—	—	—	—	—	—	—	—	—	—
M-C MRO, 38-80 Mo.	.38***	—	.35***	.10	-.01	.11	.07	.18	.17	.12	.17	.42***
F-C MRO, 38-80 Mo.	—	.56***	—	.35***	.27*	.39***	.35***	.41***	.42***	.53***	.42***	.74***
C Security w/M	—	—	—	.37***	.30**	.45***	.31**	.31**	.74***	.52***	.74***	.31**
C Security w/F	—	—	—	—	.68***	.39***	.27*	.46***	.31**	.28*	.31**	.31**
C Cooperation with M Monitoring	—	—	—	—	—	.38***	.24*	.27*	.27*	.21	.31**	.39***
C Cooperation with F Monitoring	—	—	—	—	—	—	.68***	.50***	.68***	.42***	.39***	.37***
C School Competence	—	—	—	—	—	—	—	.51***	.51***	.36***	.37***	.30*
M-C MRO, age 10	—	—	—	—	—	—	—	—	—	.28*	.30*	.65***

Notes: * $p < .05$; ** $p < .01$; *** $p < .001$.

M = Mother; F = Father; C = Child; SES = socioeconomic status; w/M = with M; w/F = with F;

^a MRO = Mutually Responsive Orientation; ^b Kerns Security Scale; ^c Kerns Check-in measure; ^d MacArthur Health Behavior Questionnaire, Teacher Version.

parental monitoring). Thus, the first step included three covariates: the family's SES, MRO concurrent to school competence, and the earlier score on school competence. The second and the third steps were analogous to the regressions predicting cooperation with parental monitoring.

We have additionally conducted another regression predicting children's school competence, in which data from both mother-child and father-child relationships were all entered as the predictors. The findings were fully comparable to the regressions described below.

Children's cooperation with maternal monitoring

Mother-child MRO at age 10 was significantly associated with child cooperation with maternal monitoring in the first step ($b = .09$, $SE = .02$, $p < .001$), and remained significant in the third step ($b = .06$, $SE = .03$, $p < .05$). The family's SES had no effect. Mother-child MRO from 38 to 80 months, when entered first, was a significant predictor of child cooperation with the mother ($b = .08$, $SE = .04$, $p \leq .05$), but when child security at age eight was added, the effect of 38-80-month MRO dropped to non-significant ($b = .06$, $SE = .04$, ns). Child security with the mother significantly predicted cooperation with maternal monitoring ($b = .06$, $SE = .03$, $p < .05$).

Children's cooperation with paternal monitoring

Father-child MRO at age 10, when entered first, was a significant predictor of child cooperation with the father ($b = .13$, $SE = .04$, $p < .01$), but did not remain significant once 38-80-month MRO was added. No other predictors were significant.

School competence

The earlier score on school competence (at 80 months) significantly predicted school competence at age 10 in both equations (with mother-child and father-child relationship predictors), but SES and concurrent MRO at age 10 were not significant. In the equation using the predictors from the father-child relationship, there were no other effects.

However, when predicting school competence from the mother-child relationship variables, mother-child MRO from 38 to 80 months was a significant predictor in the second step ($b = .69$, $SE = .27$, $p < .05$), but dropped to non-significant when child security at age eight was added in the third step ($b = .48$, $SE = .26$, ns). Child security with the mother significantly predicted school competence at age 10 ($b = .56$, $SE = .19$, $p < .01$).

Summary

Recall that the correlations indicated that in mother-child and father-child relationships, MRO from 38 to 80 months significantly predicted child-reported security with the given parent at age eight. Taken together with the regressions, the overall results suggest the presence of the hypothesized mediation from MRO at 38-80 months to security at age eight to children's cooperation with mothers' monitoring and school competence at age 10, but only for the mother-child relationships, and not father-child relationships. The subsequent analyses formally tested the presence of the posited indirect effects.

The testing of the mediational pathways from early parent-child MRO (38-80 months) to child security (age eight) to socialization outcomes (age 10): the PROCESS approach

We used PROCESS (Hayes, 2013) as a computational tool to formally estimate indirect effects. Note that in PROCESS, the judgment about the presence of an indirect effect is made on the basis of the bootstrap confidence interval (CI); the effect is judged to be present

if 95% CI does not include zero (in contrast to traditional approaches, where the judgment is based on the significance level). The bootstrapping approach is preferred for inference regarding indirect effects because the sampling distribution of indirect effects is not assumed to be normal (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004).

Before implementing PROCESS, we calculated residual scores of the outcomes, in which the outcomes were regressed on concurrently or earlier measured control variables. Children's cooperation with parental monitoring at age 10 was regressed on the concurrently measured parent-child MRO. Children's school competence at age 10 was also regressed on the concurrently measured parent-child MRO and, additionally, on the earlier school competence (at 80 months).

This statistical strategy allowed us to remove the effects of concurrent MRO from the prediction of all outcomes at age 10 (and of earlier school competence from the prediction of school competence at age 10). PROCESS does allow for adding control variables; however, it removes their effects not only from the dependent variable, but also from the mediator. This was not desirable or intended here; consequently, we used residualization as an alternative strategy to remove the effects of concurrent MRO and earlier school competence *only* from the outcomes. Note that family's SES was included as a covariate in PROCESS, because we did wish to remove its influence from both the mediator and the outcome.

Children's cooperation with parental monitoring

The results of the PROCESS models are presented in Figure 1 (A: for mother-child dyads; B: for father-child dyads). The mother-child history of MRO significantly predicted the mother-child security, and security also significantly predicted child cooperation with maternal monitoring. In father-child dyads, the history of MRO significantly predicted the father-child security, but security was not a significant predictor of child cooperation with paternal monitoring. Note that this effect was marginal, $p = .08$, and fell just short of significance at .05 alpha level due to the size of *SE*. In both mother-child and father-child dyads, the direct effect of the parent-child history of MRO on the outcome was not significant.

The indirect effect of the mother-child history of MRO on child cooperation with maternal monitoring, mediated by child security with the mother, was $b = .244$, $SE = .193$, and its bias-corrected bootstrap 95% CI [.006, .837] did not include zero. This indicates the presence of an indirect effect.

By contrast, the indirect effect of the father-child MRO history on the cooperation with paternal monitoring, mediated by child security with the father, was $b = .177$, $SE = .140$, and its bias-corrected bootstrap 95% CI [-.006, .587] did include zero. This indicates the absence of an indirect effect.

School competence

The results are presented in Figure 2 (A: for mother-child dyads; B: for father-child dyads). The findings for child school competence were similar to the prior findings: The parent-child history of MRO significantly predicted both mother-child and father-child security; only mother-child security significantly predicted child school competence; and no direct effect was found from the parent-child MRO to child school competence.

The indirect effect of the mother-child MRO on child school competence, mediated by the child's security with the mother, was $b = .333$, $SE = .209$, and its bias-corrected bootstrap 95% CI [.021, .824] did not include zero. This indicates the presence of an indirect effect. However, there was no evidence of an indirect effect of father-child MRO

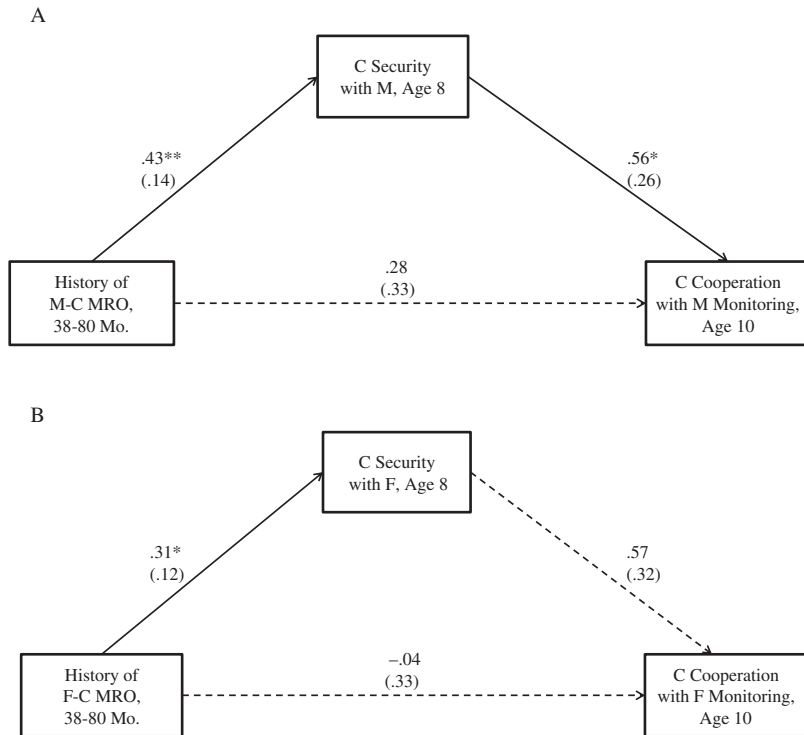


Figure 1. Mediation path from parent–child MRO at 38–80 months to the child’s security with the parent at age eight to the child’s cooperation with parental monitoring at age 10 (A: mother–child relationship; B: father–child relationship). Although not depicted, the family’s socioeconomic status is included as a covariate. Concurrent MRO is residualized from the child’s cooperation with parental monitoring at age 10. Solid lines represent significant effects; dashed line represents non-significant effect. Reported are unstandardized coefficients and standard errors (in parentheses). MRO = Mutually Responsive Orientation; M = Mother; F = Father; C = Child; Mo. = Months. * $p < .05$; ** $p < .01$.

on child school competence, mediated by child security with the father ($b = -.057$, $SE = .143$, 95% CI = $[-.347, .235]$).

Discussion

Developmental research has produced an impressive body of data supporting links between qualities of early parent–child relationships and children’s outcomes. Causal mechanisms that account for those associations, however, are not yet well understood. This multi-method, multi-informant, multi-assessment study addresses a key question of attachment theory: Does security mediate often-reported associations between early positive parent–child relationship and future adaptive outcomes (Haltigan, Roisman, & Fraley, 2013; Thompson, 2006)? Furthermore, the study addresses this question across a lengthy longitudinal time span, from toddlerhood to early adolescence, and for mother–child and father–child relationships. The findings reveal interesting similarities and differences between the two relationships.

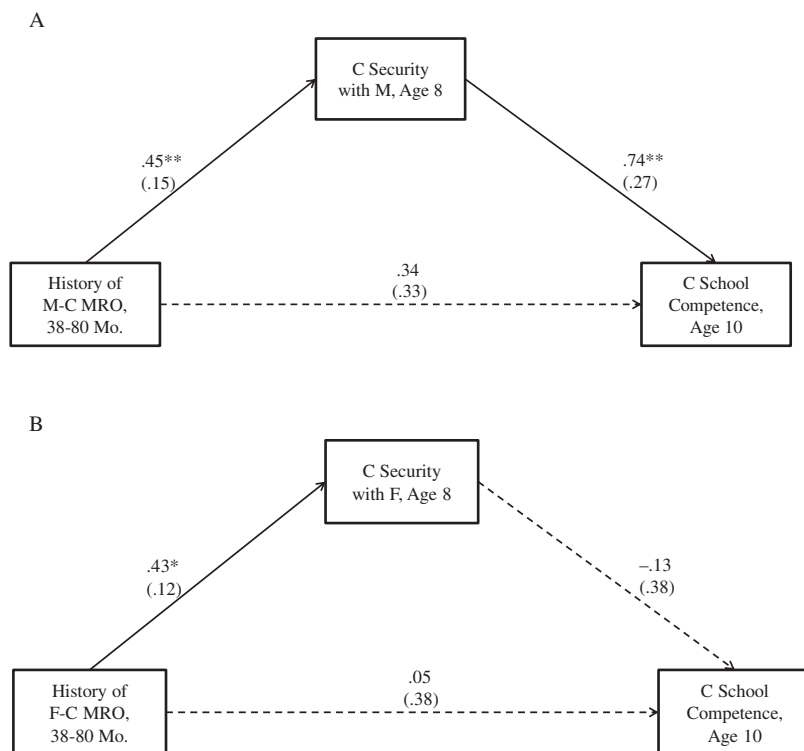


Figure 2. Mediation path from parent–child MRO at 38–80 months to the child’s security with the parent at age eight to the child’s teacher-rated school competence at age 10 (A: mother–child relationship; B: father–child relationship). Although not depicted, the family’s socioeconomic status is included as a covariate. Concurrent MRO and teacher-rated school competence at 80 months are residualized from teacher-rated school competence at age 10. Solid lines represent significant effects; dashed line represents non-significant effect. Reported are unstandardized coefficients and standard errors (in parentheses). MRO = Mutually Responsive Orientation; M = Mother; F = Father; C = Child; Mo. = Months. * $p < .05$; ** $p < .01$.

Children who had enjoyed mutually responsive, positive relationships with their parents from toddler to early school age perceived their parents as responsive and available attachment figures in middle childhood. Such relations are known (e.g., Belsky & Fearon, 2008; De Wolff & van IJzendoorn, 1997; Thompson, 2006); we note, however, that most of the extant evidence pertains to young children and to mother–child relationships. In this study, early positive, mutual relationship, observed in lengthy natural situations from toddler age to approximately 6½ years old, predicted children’s self-reported security with both mothers and fathers. Our findings therefore dovetail with the extant reviews that have indicated a similar process involved in the forming security for mothers and fathers (De Wolff & van IJzendoorn, 1997; Lucassen et al., 2011).

Differences between the two relationships emerged, however, when the entire developmental cascade was tested: from early parent–child MRO to child security to child outcomes. Our contribution is the formal testing of the model in which security mediates the associations between early positive parent–child relationship and future socialization outcomes, and the quality of the concurrent relationship is controlled. The results revealed that – for mother–child dyads only – there were indeed indirect effects of early

relationship on willing collaboration with maternal monitoring and on school competence in preadolescence, mediated by children's perception of security with the mother in middle childhood. Consequently, for mother-child relationships, the findings can be seen as supporting Waters and colleagues' (1990) and Kerns' (2008) depiction of a developmental cascade from early parent-child harmony to security to a "supervision partnership", with the child and parent willingly cooperating in the socialization enterprise. They are also consistent with the widely accepted view of early positive relationships promoting competence in broader ecologies through the child's sense of security with the parent (Kerns, 2008).

Although early father-child MRO was associated with child security with the father at age eight, and although MRO and security were positively correlated across the parent-child dyads, nevertheless, the entire sequence was different in the two relationships. There was no evidence of *the mediating role of security* with the father for either of the two outcomes at age 10. We thus understand less about mechanisms linking early positive father-child relationship with the child's future cooperation with paternal monitoring or social competence in school.

There may be several reasons for the differences in the paths from early parent-child relationship to security to the outcomes in mother-child and father-child dyads. It is possible that the difference in the pathways was due to the fact that at each age from 38 to 80 months (although no longer at age 10), MRO in mother-child dyads was significantly higher than MRO in father-child dyads (a finding consistent with Hallers-Haalboom et al., 2014). This was also true for children's security measure at age eight. Note also that, in contrast to mother-child dyads, in father-child dyads, MRO did not predict the studied outcomes even before security was added to the equations. Finally, perhaps the measures of MRO and of attachment security used in this study were not sensitive enough to reveal subtle differences in those constructs in the two relationships. For example, mother-child MRO may reflect mostly affection and low-level positive affect, whereas father-child MRO may reflect a more boisterous, high-intensity play and joy. It is clear that, in view of the dearth of research on differences between mother-child and father-child attachment, particularly in middle childhood, more data will be needed to understand this pattern of findings.

This study has several limitations. It is important to emphasize that caution is indicated with regard to the interpretation of possible differences in developmental cascades in mother-child and father-child relationships. Due to the limited sample size, each relationship was examined separately. Consequently, we can only state that, for mother-child dyads, we found evidence of the postulated significant mediation: the indirect effect of a mutual positive, responsive relationship from 38 to 80 months on children's outcomes at age 10, mediated through child-reported security at age eight, was present. For father-child dyads, such indirect effect was absent. In future research with larger samples, it will be important to examine both relationships in the same model, given that those are interdependent within the family system (Cox & Paley, 2003; Grossmann, Grossman, Kindler, & Zimmermann, 2008). The modest sample size was, of course, a limitation. We believe, however, that our analyses were not seriously compromised. The *N*-to-predictor ratios in the regressions were satisfactory; and in PROCESS, the use of the bootstrapping approach is particularly recommended for modestly sized samples (Preacher, Rucker, & Hayes, 2007).

Another limitation is the nature of the measure of security, which relied on children's explicit verbal appraisal and thus is subject to known reservations. Assessing security in middle childhood with multiple methodologies (Kerns & Seibert, *in press*) would be beneficial.

The partial overlap in the measures of child security and cooperation with monitoring (recall the latter included child reports) raises a shared method variance concern. However, the correlations between security and cooperation were fully comparable across child and parent reports, and regressions using only parental reports were essentially unchanged.

Parents and children in this study were generally well functioning. Children's security scores and their cooperation with parental monitoring were high (comparable with previous reports of community samples; Kerns et al., 1996, 2001), and teachers' ratings of school competence generally were also in a high range of scores for acceptance and school engagement, and low for social isolation. We note that even so, for mother-child dyads, the expected mediation did emerge. Future research with at-risk families, dysfunctional parent-child relationships, and children with elevated behavior problems scores will further elucidate the studied issues and provide information about generalizability of the findings.

While diverse demographically, the families were relatively homogenous ethnically (although note that 20% included a non-White parent). In this sample, there were no significant differences between families with two White parents and those that had one or two non-White parents with regard to MRO, security, or child outcomes. However, expanding this work to more diverse populations, with larger proportions of ethnic minorities, would be valuable.

Finally, it should be kept in mind that the design of this study is non-experimental and correlational in essence. Consequently, although our results imply a causal chain from early parent-child relationship to later-assessed child security to later-assessed outcomes, inferences about causality have to be tentative. Experimental studies that deploy interventions aimed at the early parent-child relationship in randomized design, and then assess children's security and future outcomes, are needed fully to address our proposed model.

Over the several decades of attachment research, Bowlby's ideas remain inspiring and heuristically productive. Contemporary techniques of the statistical testing of mechanisms by which security exerts its powerful developmental effects can now be useful in elucidating mechanisms of developmental cascades that have been implicitly accepted by developmental psychologists.

Disclosure statement

No potential conflict of interest was reported by the authors.

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