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The relational basis of adolescent adjustment: trajectories of mother-child interactive behaviors from infancy to adolescence shape adolescents' adaptation

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The relational basis of adolescent adjustment: trajectories of mother–child interactive behaviors from infancy to adolescence shape adolescents' adaptation

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Theories of social-emotional growth propose that repeatedly-experienced parent–infant interactions shape the individual's adaptation across development, yet few studies examined interactive behaviors repeatedly from infancy to adolescence. This study assessed the trajectories of four mother–child relational behaviors at six time-points from 3 months to 13 years: maternal sensitivity, child social engagement, mother intrusiveness, and dyadic reciprocity. Trajectories were examined separately for infants who later exhibited higher and lower psychological adaptation in adolescence. Overall, relational behaviors changed substantially with age in non-linear ways and changes in the four patterns were inter-related. Differences between the high- and low-adaptation groups were observed for maternal sensitivity and intrusiveness already in infancy and differences on all factors emerged at the transition to adolescence. Maternal sensitivity, mother intrusiveness, and dyadic reciprocity were individually stable from infancy to adolescence. Maternal psychological distress, infant difficult temperament, and dyadic reciprocity predicted adolescent adaptation. Results point to the long-term effects of risk and resilience components in the mother–infant relationship and underscore continuity in social development from infancy.

Keywords: mother–infant interaction; adolescent adjustment; maternal sensitivity; dyadic reciprocity; longitudinal studies

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Theories of social-emotional growth suggest that the infant's early relationship with the caregiver shape the individual's adaptation throughout life (Bowlby, 1969; Grossmann, Grossmann, Winter, & Zimmermann, 2002; Meins, 1999; Sroufe, Egeland, Carlson, & Collins, 2005; Winnicott, 1956). As a key period in the transition from childhood to adult life, adaptation during adolescence, in particular, the adolescent's externalizing and internalizing symptoms and academic and social competence, are thought to develop on the basis of the parent–infant relationship on the one hand and to predict well-being and adjustment in adult life on the other (Masten et al., 2005; Roisman, Collins, Sroufe, & Egeland, 2005). Although several long-term studies have demonstrated the links between aspects of the mother–infant relatedness with competence and adaptation in middle childhood (Freitag, Belsky,

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Grossmann, Grossmann, & Scheuerer-Englisch, 1996), adolescence (Feldman, 2007a; NICHD Early Child Care Research Network, 2005), and adulthood (Sroufe et al., 2005), a repeated-measure study that focuses on observed interactive behaviors at multiple time points from early infancy to adolescence in relation to adolescent adjustment has rarely been conducted.

The focus on observed parent–infant interaction behavior as a prerequisite for theory building has been a cornerstone of Bowlby's (1969) ethological-based attachment theory. According to the early Ethologists (Lorenz, 1950; Timbergen, 1963), theoretical perspectives on the nature of social adaptation in mammals should begin with a meticulous documentation of behaviors that emerge or intensify during bond formation. Indeed, Bowlby's far-reaching formulations on the attachment system and its functioning across the lifespan were based on careful observations of infants' reaction to maternal presence and absence, daily routines, and changes in internal arousal. By focusing on the mother–child concrete interactive behaviors, Bowlby advocated a bottom-up theory of human development which deviated from the two major theories of the time: psychoanalysis, which proposed a theory-based rather than behavior-based model of human development; and behaviorism, which focused on the behaviors of individuals, not on the behaviors of relational units. According to attachment theory, repeatedly-experienced early interactions shape both brain structures and mental schemas that guide adaptation throughout life (Carter et al., 2005). This position has been incorporated into the dynamic systems' perspective on social-emotional growth (Fogel, 1993; Lewis & Granic, 2000), which proposes that initial modes of relatedness shape social outcomes through repeated iterations. This perspective further suggests that the repeated assessment of a social phenomenon (e.g., specific interactive behaviors) across a lengthy period of development can highlight periods of rapid growth and plateau and these can guide the timing and focus of effective intervention.

The present study followed a relatively small group of infants from infancy to adolescence and observed four mother–child interactive behaviors at six time-points from 3 months to 13 years: mother sensitivity, mother intrusiveness, child social engagement, and dyadic reciprocity. These repeatedly assessed behaviors were then examined in relation to the adolescent's adaptation, in terms of externalizing, internalizing, and depressive symptoms. By focusing on concrete interactive behaviors assessed repeatedly across a lengthy period of development, the study sought to illuminate the trajectory of each interactive construct across the developmental span, assess its individual stability, and examine the early predictors of adolescents' adaptation.

Longitudinal studies have demonstrated that maternal sensitivity, mother intrusiveness, child social engagement, and dyadic reciprocity are each related in meaningful ways to developmental outcomes. Among the four behavioral constructs, maternal sensitivity, i.e. the mother's warm and responsive style that provides the species-specific set of maternal behaviors, including the expression of positive affect, constant gaze, warm vocalizations, and affectionate contact, in a manner that is predictable and suited to the infant's moment-by-moment signals (Leckman, Feldman, Swain, Eichler, Thompson, & Mayes, 2004), has received the most longitudinal attention. For instance, mother sensitivity in infancy was found to predict social maturity in adolescence among children at risk for depression (Murray, Haligan, Adams, Patterson, & Goodyer, 2006); maternal sensitivity in the first months of life predicted separation anxiety at 6 years (Dallaire & Weinraub,

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2005); and higher maternal sensitivity in the first year predicted social adaptation in adopted adolescents (Jaffari-Bimmel, Juffer, van IJzendoorn, Bakerman-Kranenburg, & Mooijaart, 2006). Summarizing the findings from a cohort observed up to adulthood, Sroufe (2005) noted that attachment security, formed on the basis of repeatedly experienced sensitive mothering, shapes the individual's self-reliance, emotion regulation, and social competence throughout life.

Maternal intrusiveness, the mother's controlling style that over-stimulates the child and imposes the maternal agenda, has been associated with high risk in adolescence, including feeding disorders (Laporte, Marcoux, & Guttman, 2001), low academic achievement (Feldman, Guttfreund, & Yerushalmi, 1998), oppositional-defiant symptoms (Kashdan et al., 2004), and a greater risk for substance abuse (Johnson, Morrow, Accornero, Xue, Anthony, & Bandstra, 2002). Maternal intrusiveness disrupts the child's ability to engage in social interactions with strangers (Hobson, Patrick, Crandell, Garcia Perez, & Lee, 2004), plays a role in the development of maladaptive behavior (Wood, 2006), and predicts lower cognitive competence (Feldman & Eidelman, 2006). Intrusive mothering has similarly been associated with risk conditions, including premature birth (Minde, 2000) and substance abuse (Swanson, Beckwith, & Howard, 2000), pointing to the associations between maternal intrusive interactive behavior and compromised child adaptation.

Child social engagement, which indexes the child's involvement, initiation, alertness, and enthusiasm during social interactions, is an important determinant in the development of adaptive functioning (Marshal & Fox, 2006). Social engagement develops on the basis of both infant biological dispositions (Porges, 2003) and the parental facilitation of the infant's active involvement (Bakeman & Brown, 1980; Feldman, Greenbaum, Mayes, & Erlich, 1997), and has shown to predict cognitive and social-emotional outcomes in the toddler years (Feldman & Blatt, 1996; Mundy & Acra, 2006). Considering the path from middle childhood to adult life, the social status of boys in the peer group at 9 years was found to predict social adjustment in young adulthood (Nelson & Dishion, 2004), underscoring the child's social skills as a marker of long-term adaptation. Finally, with regards to the reciprocal component in the parent–child interactions, variously termed as ''reciprocity'', ''synchrony'', or ''mutual responsiveness'', research points to the contribution of reciprocity to the development of socialization, adjustment, emotion regulation, and cognitive skills (Feldman, 2007b). Parent–infant synchrony in infancy predicted attachment security at 1-year-old (Jaffee, Beebe, Feldstein, Crown, & Jasnow, 2002), lower behavior problems and better self regulation at 2 years (Feldman & Eidelman, 2004; Feldman, Greenbaum, & Yirmiya, 1999), symbolic play at 3 years (Feldman, 2007c), and the capacity for empathy in adolescence (Feldman, 2007a). Similarly, mother–child and father–child mutually responsive interactions across infancy predicted moral internalization and self-regulation in the preschool years (Kochanska, Aksan, Prisco, & Adams, 2008). Overall, these studies highlight the long-term associations between the four interactive behavioral patterns measured in infancy and aspects of the child's social competence, well-being, and risk for psychopathology in later childhood.

In light of the above, the present study had three primary goals. The first was to chart the trajectories of the four behavioral interaction patterns from the stage when infants enter the social world in the third month of life (Stern, 1985) and up to adolescence, when children shift their social investment from parents to peers (Allen & Manning, 2007). Mothers and children were observed at 3 and 9 months and at 2,

4, 6, and 13 years and mother sensitivity, mother intrusiveness, child social engagement, and dyadic reciprocity were coded at each age. As to mean-level change over time, it was expected that the highest levels of maternal sensitivity would be observed in the first year and then somewhat decline, based on theory and research indicating that maternal sensitivity across the first year is central for the development of secure attachment (Aisworth et al., 1978). Child's social engagement in the interaction increases with the development of language and mobility during the second year and further increases with the development of complex symbolic play and internal state talk from the third year and on (Bretherton & Beehgly, 1982; Marshal & Fox, 2006), and it was thus expected that child social engagement would increase with age. Mother intrusiveness was expected to be relatively low, based on studies demonstrating higher intrusiveness in cases of low SES, substance abuse, or prematurity than in low-risk samples. Finally, dyadic reciprocity, which addresses the influences of both parties in the interaction, was expected to increase beginning at 9 months, the age when inter-subjectivity emerges and infants begin to take an active role in social interactions. The second goal was to assess the trajectories of the four relational patterns in two types of infants; those who would later become well-adapted adolescents, as indexed by low externalizing, internalizing, and depressive symptoms, and those who would later show lower behavior adaptation. The focus was on the relational constructs that differentiate the two groups already in infancy and the time-points at which differences between groups are most notable.

The final goal was informed by ecological models (Belsky, 1984; Bronfenbrenner, 1977), which highlight the cumulative contributions of parent, child, and contextual factors to social development. Several parenting determinants were examined as predictors of adolescents' well being, including maternal psychological distress measured from infancy to adolescence, child temperament assessed across infancy, child IQ measured repeatedly during the preschool years, father involvement at 3 and 9 months, and relational patterns from infancy to adolescence. It was expected that factors related to the mother, the child, the context, and the mother–child relationship across the entire span would each contribute uniquely to adolescents' adaptation.

Method

Participants

The initial cohort included 36 mother–infant pairs who were recruited from a list of healthy newborns in Well-Baby Clinics in two large urban areas in Israel when the infants were 3 months old. Children were followed longitudinally at 3 and 9 months and again at 2, 4, 6, and 13 years. The initial sample included an equal numbers of boys, girls, first-born, and second-born infants. Infants were healthy and born at full term, weighed at least 2700 grams, and received an Apgar score of 8 or above.

At time of recruitment, mothers were between 23 and 36 years of age ($M = 28.7$, $SD = 2.5$ years) and had completed on average 14.2 years of education ($SD = 1.1$ years). All families were intact and were considered middle-class by Israeli standards (Harlap, Davis, Grower, & Prywes, 1977). According to the Well-Baby Clinic records, none of the mothers suffered serious illness, psychopathology, or serious pregnancy complications. Thirty-three of the 36 infants were observed at 2 years, 32 children were seen at 4 and 6 years, and 31 children were assessed at 13 years. Attrition was mainly related to the family's moving to a far away location or to inability to locate the family. No significant differences on demographic or study

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variables were found between families who returned for follow-ups and those who did not. The final sample at 13 years included 15 girls and 16 boys well as 16 first-born children.

Procedure

Observations at 3 and 9 months

Mothers were invited to a laboratory at a time of day the infant was expected to be fed and rested. Mothers and infants were situated in a face-to-face position; the infant sat on an infant-seat mounted on a table and the mother sat across from the child on an adjustable stool. Mothers were instructed to play freely with the infant as they normally do at home. Ten minutes of play were videotaped in a split-screen technique by two cameras fixed on adjacent walls that were controlled by a technician in an adjoining room.

Two years

The 2-year laboratory visit was scheduled within a month of the child's second birthday and lasted approximately 90 minutes. Visits began with cognitive assessment. Mothers and children were then observed interacting with a set of pre-selected toys for 10 minutes. Following, observations in several interactive settings were conducted and mothers completed self-report measures.

Home visits at 4 and 6 years old

Two home visits were conducted around the child's fourth birthday at two home visits were conducted in the summer prior to school entry at 6 years. Visits included cognitive testing, a 10-minute session of mother–child interaction with pre-selected toys, other mother–child and experimenter–child interactions, and self-report measures. Toys for the 2-, 4-, and 6-year play were selected on the basis of previous research (Feldman, 2007b; Tamis-LeMonda & Bornstein, 1994) and included toys that elicit free play and imagination (e.g., dolls, phones, tea sets, animals, puppets).

Thirteen years

Adolescents and their mothers visited the lab and visits lasted approximately 3 hours. Two interactive settings were videotaped between mother and child. In the first, dyads were asked to select a typical conflict and discuss it for 7 minutes; in the second, mother and child were asked to plan an enjoyable activity to do together. The coding of the positive interaction was used in the present study for comparability across age.

Measures

Intelligence

Children's full-scale IQ was assessed three times; at 2, 4, and 6 years. At 2 and 4 years children were tested with the Stanford-Binet Intelligence Scale 4th Edition (Thorndike, Hagen, & Sattler, 1986) and at 6 years children were tested with the Wechsler Intelligence Test for Children - Revised (WISC-R; Wechsler, 1974).

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Intelligence tests were administered by trained clinicians who did not participate in the coding of interactions.

Self-report measures

Several self-report measures were completed from infancy to adolescence. The following were used in the present study:

Maternal anxiety

Mothers completed the State-Trait Anxiety Inventory (STAI; Speilberger, Gorsuch, & Lushene, 1970), a well-validated instrument for anxiety symptoms when the infant was 3, 9, and 24 months. The trait anxiety score was used, which taps the stable anxiety-related component in the individual's personality.

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Maternal depression

Mothers reported on symptoms of depression on the Beck Depression Inventory (BDI; Beck, 1978), the most widely-used instrument for assessing depressive symptoms, when their children were 4, 6, and 13 years. Maternal anxiety and depression were correlated across observations ($r = .35$–$.53$, $p < .05, .01$) and their standardized scores the six time-points were averaged into a *Maternal Psychological Distress* composite.

Father involvement

Mothers rated the father's involvement in various activities related to two aspects: child care responsibilities (e.g., bathing, taking to pediatrician) and house care responsibilities (e.g., cleaning, shopping), when infants were 3 and 9 months, and scores were averaged into a father involvement composite at each age. Father involvement scores were inter-related ($r = .65$, $p < .01$) and were averaged into a *Father Involvement* Composite.

Infant difficult temperament

The Infant Characteristic Questionnaire (Bates, Freeland, & Lounsbury, 1979) was used to assess infant temperament at 3, 9, and 24 months. The Fussy-Difficult composite, the most stable composite of self-report measures with links to other self-report measures of temperament (Goldsmith & Alansky, 1987) was used. Fussy-Difficult scores were correlated at the three ages ($r = .41$–$.45$, $p < .01$), and scores were averaged into a *Child Difficult Temperament* composite.

Child behavior problems

The Child Behavior Checklist was used to examine children's internalizing and externalizing symptoms. The Child Behavior Checklist 2–3 years (CBCL 2–3; Achenbach, 1992) was used at 2 years and the Child Behavior Checklist (CBCL; Achenbach & Edelbrook, 1983) at 4, 6, and 13 years. The CBCL is a self-report measure of child behavior problems completed by the parent that includes 113 items

rated on a three-point scale. Items are clustered into three broad scores: a total behavior score, an internalizing syndrome score, and an externalizing syndrome score, and the total score was used in this study. The CBCL is the most widely-used instrument for assessing behavior problems in children with established reliability and validity. CBCL total scores at 2, 4, 6, and 13 years were inter-related ($r = .41$–$.51$, $p < .01$) and were averaged into a single composite.

Child depressive symptoms

Adolescents rated their depressive symptoms using the Child Depression Inventory (CDI; Kovacs, 1981). This well-validated instrument for the assessment of childhood depression includes 27 items related to four areas: emotional, cognitive, motivational, and physical which are summed to create the child depression score. The child depression scores and the averaged CBCL scores were inter-related ($r = .43$, $p < .01$) and their standardized scores were averaged into a *Child Psychological Adaptation* construct. Children were divided into adapted and non-adapted groups based on the median split.

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Coding

Interactions at each time-point were coded with the Coding Interactive behavior manual (CIB; Feldman, 1998). The CIB is a global coding system including that includes 44 rating scales coded from 1 (a little) to 5 (a lot); 21 are parent codes, 16 are child codes, 5 are dyadic codes, and 2 are overall codes, which aggregate into higher-order composites. The system has versions for newborns, infants and toddlers, preschoolers, and adolescents and has been used in numerous studies across various cultures. The system has good psychometric properties and has shown sensitivity to differences stemming from infant age, interactive partner, cultural background, biological and social-emotional risk conditions, and change following intervention (Feldman, 2000, 2009; Feldman & Eidleman, 2009; Feldman et al., 1997; Feldman, Keren, Gross-Rozval, & Tyano, 2004; Feldman, Weller, Sirota, & Eidelman, 2003). Four relational constructs were assessed repeatedly from 3 months to 13 years. Constructs, codes, and internal consistency were as follows:

Maternal sensitivity (alpha = .89–.95)

Mother acknowledgement of child communications, vocal clarity, positive affect, gaze, appropriate range of affect, affectionate touch (infancy), resourcefulness, consistency of style, adaptation to child signals, and supportive presence. The scales included in the sensitivity construct define the maternal sensitive-responsive style and include both the typical maternal behavior in human mothers (gaze, affect, vocalizations, touch), a predictable style (consistency), and the adaptation of maternal behavior to the infant's cues (adaptation, resourcefulness when infant is distressed, appropriate range of affect, implying that mothers increase or decrease stimulation in accordance with infant signals, and supportive presence, assessing the degree to which mother presence provides a "regulatory" context or a "holding environment" for the child).

Child social engagement (*alpha* = .84–.92): child alertness and enthusiasm, negative emotionality (negative), social initiation, vocalizations or verbal output,

gaze to mother or to object of joint attention, and expression of positive affect. Additional codes at 2, 4, and 6 years included: joint attention, competent use of environment, and symbolic-creative play. Additional code for adolescents included child proposing own solutions or ideas.

Mother intrusiveness (alpha = .80–.91)

Mother's physical manipulation of infant's body (until age 6), interruption of child's activities or conversations, breaking gaze while child is looking, disregarding child signals, and interactions are judged to be parent-led and following the maternal agenda.

Dyadic reciprocity (alpha = .85–.92)

Mother and child engage in a give-and-take play (or conversation), interaction is synchronous and not tense, atmosphere is rhythmic and fluent. Reliability was computed between a main coder and several additional coders who were trained to 90% reliability on 8 interactions at each age. Coding at each age was conducted by different coders. Inter-rater reliability averaged 94% (range 88–99%), intraclass $r = .93$ (range = .88–.99). The four relational constructs were theoretically based and a confirmatory factor analysis conducted on 483 interactions showed that they load on distinct factors (Feldman, 2009). Correlations between the four factors were modest to medium in size at each age (range: $r = .19$–.52).

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Results

Findings are organized in three sections. In the first, trajectories of each relational pattern are examined from infancy to adolescence for the high and low adaptation groups. This section examines mean level changes over time, group differences, and group by time interactions. The second section addresses the issue of individual stability from infancy to adolescence. The final section examines associations between maternal, child, and contextual determinants, relational patterns, and adolescent adaptation using correlations and regression.

Trajectories of relational patterns in adolescents of high and low adaptation

Trajectories of each relational construct: maternal sensitivity, child social engagement, mother intrusiveness, and dyadic reciprocity across the six time-points from infancy to adolescence were each measured with a MANOVA with repeated-measures with adaptation group (high, low) as the between-subject factor. The repeated polynomial was used to assess changes between each age and the next. Following, the significance of the linear, cubic, and quadratic trends in each trajectory were assessed.

Maternal sensitivity showed large mean-level changes with age, $F(df = 5) = 26.22$, $p < .000$, $\eta^2 = .81$. Sensitivity remained high during the first year and no changes were observed from 3 to 9 months. From 9 months to 2 years sensitivity decreased, $F(df = 1) = 22.19$, $p < .000$, $\eta^2 = .39$, and further decreased from 2 years to 4 years, $F(df = 1) = 9.92.19$, $p < .000$, $\eta^2 = .14$. A final decrease in maternal sensitivity was observed from 6 years to 13 years, $F(df = 1) = 7.73$,

$p < .01$, $\eta^2 = .09$. Changes in the trajectory of sensitivity followed a complex trend and the linear, quadratic, and cubic components were all significant. Means of maternal sensitivity at each time point are presented in Table 1.

An overall main effect for group was found, $F(df = 1, 29) = 14.38$, $p < .000$, $\eta^2 = .28$, indicating that adolescents who were less adapted received lower maternal sensitivity across development. The interaction between the development of sensitivity and adaptation group was not significant, indicating that the development of sensitivity followed the same trajectories in the two groups but the levels of sensitivity differed. Mean-level differences between the groups were observed at several key-points across development: at 3 months, $F(df = 1, 30) = 4.64$, $p < .05$; at 9 months, $F(df = 1, 30) = 7.27$, $p < .01$; at 2 years, $F(df = 1, 30) = 4.64$, $p < .05$; and at 13 years, $F(df = 1, 30) = 9.54$, $p < .01$, and in all time-points sensitivity was higher in the high adaptation group. The trajectories of maternal sensitivity for the high- and low-adaptation groups are presented in Figure 1A.

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Child social engagement

Marked changes across development were observed in the child's social engagement, $F(df = 5, 26) = 29.19$, $p < .000$, $\eta^2 = .83$. Social engagement changed meaningfully between each observation and the next. It increased steadily across the first 4 years, with marked strides across the first 2 years and slower increments thereafter: from 3 to 9 months, $F(df = 1) = 49.65$, $p < .000$, $\eta^2 = .60$, from 9 months to 2 years, $F(df = 1) = 19.18$, $p < .000$, $\eta^2 = .36$, and from 2 to 4 years, $F(df = 1) = 5.62$, $p < .05$, $\eta^2 = .13$. Social engagement then decreased from 4 to 6 years, $F(df = 1) = 10.38$, $p < .000$, $\eta^2 = .24$, and further decreased from 6 to 13 years, $F(df = 1) = 5.62$, $p < .05$, $\eta^2 = .13$. Similar to maternal sensitivity, the trajectory of child social engagement showed linear, quadratic, and cubic trends, although the timing of each effect were different from those observed for maternal sensitivity. Means for child social engagement across development appear in Table 1.

An overall main effect was found for group, $F(df = 1, 29) = 6.68$, $p < .05$, $\eta^2 = .16$, implying higher social engagement among well-adapted adolescents across the entire span. Similar to mother sensitivity, the interaction of the within-subject development of child social engagement and adaptation group was not significant, indicating that the trajectories of social engagement were similar in the two groups although means differed at several key points. However, unlike sensitivity, mean-level differences between children who later showed high or low adaptation were not observed during the first year but emerged at each time-point thereafter: marginally at 2 years, $F(df = 1, 30) = 3.54$, $p < .07$; at 4 years, $F(df = 1, 30) = 7.33$, $p < .01$; at 6 years, $F(df = 1, 30) = 9.04$, $p < .01$; and at 13 years, $F(df = 1, 30) = 7.42$, $p < .01$. The trajectories of child social engagement for the two groups are presented in Figure 1B and show a growing divergence from infancy to adolescence between groups.

Mother intrusiveness changed significantly with age, $F(df = 5) = 2.71$, $p < .05$, $\eta^2 = .31$, although changes in intrusiveness over time where significantly milder than those observed for maternal sensitivity or child social engagement. Examination of changes between one time-point and the next showed only one significant findings: intrusiveness decreased from 9 months to 2 years, $F(df = 1) = 4.03$, $p < .05$, $\eta^2 = .09$, and means for the development of mother intrusiveness appear in Table 1. Only the linear component was significant and pointed to a gradual decrease in

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Table 1. Trajectories of mother–child relational patterns from infancy to adolescence.

	3 months		9 months		2 years		4 years		6 years		13 years			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2
Maternal sensitivity	3.88	.68	3.96	.51	3.46	.55	3.28	.61	3.26	.44	3.10	.47	26.22***	.81
Child social engagement	2.12	.66	3.19	.64	3.76	.67	4.01	.59	3.75	.43	3.40	.78	29.19***	.83
Mother intrusiveness	2.61	.76	2.80	.78	2.51	.97	2.42	.76	2.31	.62	2.30	.68	2.71*	.31
Dyadic reciprocity	2.11	1.03	2.61	1.21	3.61	.99	3.38	.79	3.58	.58	3.32	.47	12.44***	.67

*$p < .05$; ***$p < .001$.

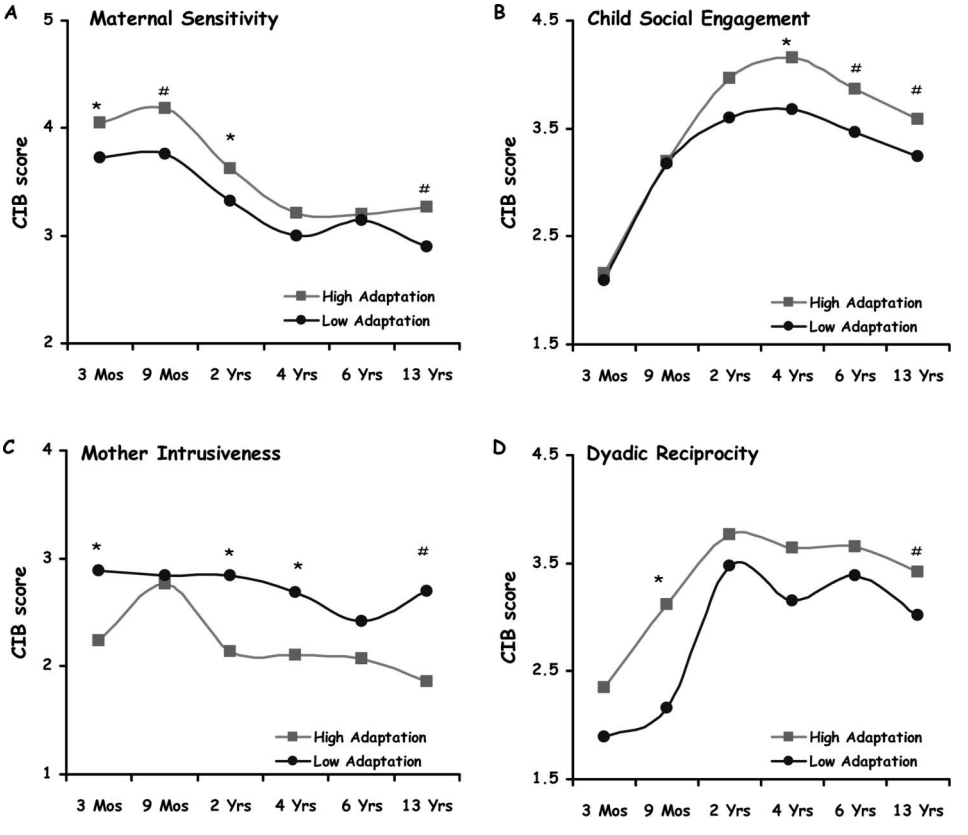

Figure 1A–D. Mother–child relational patterns from infancy to adolescence in adolescents exhibiting high and low adaptation.

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intrusiveness over time. Similar to sensitivity and engagement, an overall main effect emerged for adaptation group, $F(df = 1, 29) = 10.52$, $p < .01$, $\eta^2 = .22$, which highlight the continuous higher intrusiveness among mothers of less adapted adolescents. However, unlike maternal sensitivity and child social engagement, the interaction between the within-subject development of intrusiveness and adaptation group was significant, Wilks' $F(df = 5, 26) = 3.28$, $p < .05$, $\eta^2 = .35$, implying that the expression of intrusiveness over time differed for the two groups. These differences in the trajectory were significant regarding the change from 3 to 9 months, $F(df = 1) = 3.97$, $p < .05$, $\eta^2 = .07$; from 9 months to 2 years, $F(df = 1) = 4.06$, $p < .05$, $\eta^2 = .08$; and from 6 years to 13 years, $F(df = 1) = 8.98$, $p < .01$, $\eta^2 = .22$. The trajectories for the two groups are presented in Figure 1C. Mean level differences in intrusiveness were significant at the following points: at 3 months, $F(df = 1, 30) = 6.35$, $p < .05$; at 2 years, $F(df = 1, 30) = 4.54$, $p < .05$; at 4 years, $F(df = 1, 30) = 4.89$, $p < .05$; and at 13 years, $F(df = 1, 30) = 15.33$, $p < .001$.

Dyadic reciprocity

Mother–child reciprocity changed significantly with age, $F(df = 5) = 12.44$, $p < .000$, $\eta^2 = .67$, and the linear and quadratic components of the trajectory

were significant. Reciprocity increased from 3 to 9 months, $F(df = 1) = 4.43$, $p < .05$, $\eta^2 = .11$, and increased markedly from 9 months to 2 years, $F(df = 1) = 21.77$, $p < .000$, $\eta^2 = .39$, possibly in parallel to the marked decrease in sensitivity and increase in child social engagement. Finally, reciprocity decreased from 6 to 13 years, $F(df = 1) = 8.44$, $p < .01$, $\eta^2 = .17$. Means for the trajectory of dyadic reciprocity from infancy to adolescence are presented in Table 1.

An overall main effect was found for group, $F(df = 1, 29) = 8.40$, $p < .01$, $\eta^2 = .17$ highlighting the differences between the high and low adaptation group. In addition, the interaction of the within-subject development of reciprocity with adaptation group was significant, implying that the trajectories were unique to each group, Wilks' $F(df = 5, 26) = 2.98$, $p < .05$, $\eta^2 = .33$. Differences in the interaction term were found for changes from 3 to 9 months; $F(df = 1) = 3.99$, $p < .05$, $\eta^2 = .08$; from 4 to 6 years; $F(df = 1) = 5.83$, $p < .05$, $\eta^2 = .14$; and from 6 to 13 years; $F(df = 1) = 11.81$, $p < .01$, $\eta^2 = .18$. The separate trajectories of the two groups are presented in Figure 1D. Mean level differences between groups emerged at the following points: at 9 months, $F(df = 1, 30) = 5.81$, $p < .05$; at 4 years, $F(df = 1, 30) = 3.98$, $p < .05$; and at 13 years, $F(df = 1, 30) = 7.48$, $p < .01$.

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Stability of relational patterns from infancy to adolescence

To examine individual stability in relational patterns over the entire span, three scores were computed for each relational construct: infancy (average of 3 and 9 months), childhood (average of 2, 4, and 6 years), and adolescence. Overall, relational patterns were relatively stable over time. Mother sensitivity was stable from infancy to childhood, $r = .38$, $p < .05$, from childhood to adolescence, $r = .36$, $p < .05$, and from infancy to adolescence, $r = .32$, $p < .05$. Similarly, mother intrusiveness was stable from infancy to childhood, $r = .40$, $p < .05$, from childhood to adolescence, $r = .35$, $p < .05$, and from infancy to adolescence, $r = .31$, $p < .05$. These data support research in the attachment tradition which postulates that the mother's sensitive/insensitive style is stable across development. Child social engagement was stable from infancy to childhood, $r = .32$, $p < .05$, but not from childhood to adolescence, $r = .25$, $p > .10$, or from infancy to adolescence, $r = .22$, $p > .10$. Dyadic reciprocity was stable from infancy to childhood, $r = .37$, $p < .05$, from childhood to adolescence, $r = .33$, $p < .05$, and from infancy to adolescence, $r = .30$, $p < .05$, pointing to the stability in the synchronous component of the mother–child exchange across development.

Predicting adolescents' psychological adaptation from maternal, child, contextual, and relational determinants

Correlations between the parenting determinants and relational patterns were computed with Pearson correlations. Infant fussy-difficult temperament across the first 2 years correlated with maternal psychological distress, $r = .35$, $p < .05$, lower father involvement, $r = -.33$, $p < .05$, and lower child engagement, $r = .37$, $p < .05$. Maternal psychological distress was related to low father involvement, $r = -.34$, $p < .05$, low maternal sensitivity, $r = -.43$, $p < .01$, and low dyadic reciprocity, $r = -.32$, $p < .05$. IQ was related to child social engagement, $r = .33$, $p < .05$ and father involvement to maternal sensitivity. Children's CBCL scores across childhood correlated with higher maternal psychological distress, $r = .34$,

Table 2. Predicting adolescents' adaptation difficulties.

Predictors	Beta	*MR*	R^2change	*F* change
Mother psychological distress[a]	.28*	.35	.12	3.92*
Child IQ[b]	−.08	.35	.00	.13
Child difficult temperament[c]	.27*	.46	.10	3.88*
Father involvement[d]	−.06	.46	.00	.34
Mother sensitivity[e]	−.16	.68	.22	5.31*
Child social engagement	−.07			
Mother intrusiveness	.24			
Dyadic reciprocity	−.39*			
R^2 Total = .44: $F(df = 8, 21) = 3.74$, $p = .041$				

Note: Higher scores imply lower adaptation; $+p < .10$; $*p < .05$; $**p < .01$.
[a]Average of standardized maternal anxiety and depression scores across all time-points from infancy to adolescence.
[b]Average of children's full-scale IQ at 2, 4, and 6 years.
[c]Average of maternal rating of infant difficult temperament at 3, 9, and 24 months.
[d]Average of father involvement scores at 3 and 9 months.
[e]Average of interactive constructs across all time-points from infancy to adolescence.

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$p < .05$, lower reciprocity, $r = -.33$, $p < .05$, and fussy-difficult temperament, $r = .36$, $p < .05$.

A regression equation was computed predicting adolescents' adaptation from determinants across development. Factors were entered in a theoretically-based order. Consistent with Belsky's "determinants of parenting" model (1984) on the influences of maternal, child, and contextual factors; mother's psychological distress was entered in the first block as the maternal factor, child temperament and IQ were entered in the second and third blocks as the child factors, and father involvement was entered in the fourth block as the contextual factor. The four interactive behaviors were entered in the final block to examine the contribution of relational patterns across development to adolescents' psychological adaptation. Results of the model are presented in Table 2.

As seen, the model as a whole was significant and three factors were uniquely predictive of adolescents' adaptation: maternal psychological distress across the entire span of children's development, child difficult temperament during infancy, and interactive behaviors across development. Of the four interactive constructs, dyadic reciprocity was the meaningful independent predictor of adolescent adjustment. These findings point to the separate and cumulative effects of maternal, child, and dyadic factors, as they accumulate across the child's development, to shaping psychological adaptation in adolescence.

Discussion

This study examines four mother–child interactive behaviors observed repeatedly from infancy to adolescence in relation to adolescent adaptation: mother sensitivity, child social engagement, mother intrusiveness, and dyadic reciprocity. Consistent with the central hypothesis of attachment theory (that repeatedly experienced interactions with the caregiver shape the individual's adaptation throughout life) results showed that differences in the relational experiences between infants who later became well-adjusted adolescents and their less adapted peers were observed already

in the first months of life. The trajectories of the four relational patterns showed both substantial change over time and a dynamic inter-connection. Individual stability across the entire developmental span was found for mother sensitivity, mother intrusiveness, and dyadic reciprocity. Finally, determinants related to mother, father, and child predicted adolescent adaptation. Overall, the findings support theoretical perspectives on the critical role of the mother's early style, the stability of relational patterns from infancy, and the relational basis of adolescent adjustment (Bowlby, 1969; Sroufe, 1996; Stern, 1985; Winnicott, 1956). Still, the modest sample size and the low-risk background of the families should be taken into consideration in the interpretation of the findings.

Significant changes were observed in the four relational patterns over time, with maternal sensitivity, child social engagement, and dyadic reciprocity showing substantial and non-linear age-related changes and mother intrusiveness showing milder mean-level change. Changes in the four patterns were dynamically inter-related, with increase in some patterns co-occurring with decrease in others in a developmentally-appropriate manner. The mother's sensitive approach across the first year of life has been considered a critical component of the child's social-emotional growth (De Wolff & van IJzendoorn, 1997). In support, the data showed high levels of maternal sensitivity during the first year, which decreased markedly from 9 to 24 months, further decreased from 2 to 4 years, and stabilized thereafter. The final decrease from childhood to adolescence was caused by the reduction observed only in the low-adaptation group. In a mirror pattern, dyadic reciprocity started at a relatively low level at 3 months, an age when infants are less able to contribute meaningfully to the give-and-receive exchange, and increased substantially from 3 to 24 months, possibly in tandem with the growth in child social engagement and the shift in balance from a mother-dominated play to a more reciprocal exchange during the preschool years. Reciprocity then remained stably high across childhood and the decrease from childhood to adolescence was again mainly due to the decrease among the low-adaptation group. Child social engagement was the only pattern for which mean-level changes were found between each time-point to the next. Engagement increased linearly from 3 months to 4 years, with substantial strides across the first 2 years, along the maturation of social engagement (Porges, 2003), and smaller increments thereafter. From 4 years on, child engagement decreased slowly to mid-levels in early adolescence, hand-in-hand with the adolescent's shift of social interest from parents to peers (Allen, Insabella, Porter, Smith, Land, & Phillips, 2006). Intrusiveness was generally low in this sample and only one mean-level change was observed between 9 to 24 months, reflecting the mother's natural step back after the first year. It thus appears that the trajectories of early social development organize over time into a coherent dyadic style that reflects the infant's growing social skills. This multi-component relational style reflects the mother's ongoing adaptation to the infant's gradual autonomy while still keeping the familiar style that serves as a "secure base" across development (Allen & Manning, 2007; Bowlby, 1988).

Differences between infants who later showed higher and lower adaptation were detected already at the first months of life. At 3 months, mother sensitivity was lower and intrusiveness higher in the low-adaptation group and sensitivity remained lower for this group across infancy. Both sensitivity and intrusiveness at 3 months were found to predict later development in terms of attachment formation, cognitive growth, and the development of behavior adaptation (Feldman & Eidelman, 2006;

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Isabella, 1993; Jaffari-Bimmel et al., 2006). Differences between groups in dyadic reciprocity were first noted at 9 months, the period when inter-subjectivity, joint attention, intentionality, and goal-directed behavior first appear (Moll & Tomasello, 2007; Trevarthen & Aitken, 1999) and when individual differences in reciprocity predict cognitive and social-emotional outcomes (Feldman, Greenbaum, Yirmiya, & Mayes, 1996; Feldman et al., 1999). In contrast, group differences in child social engagement did not emerge until 4 years of age, the peak period for the child's involvement at play (Singer, 2002), and differences remained significant until adolescence. Thus, differences between children who later became more or less adapted adolescences were first noted for each social function during its critical period, the point at which the function is at its peak. As suggested by dynamic systems' models (Thelen & Smith, 1994), during periods of phase shift or increased activity in the development of a function, variability among individuals increases and even minor alterations can make a lasting impact. The results may thus highlight the periods most conductive for interventions and specify the therapeutic focus. For instance, in cases of relational disturbances during in the first months of life, interventions may focus on increasing maternal sensitivity and decreasing intrusiveness; during the toddler years, interventions may emphasize reciprocity; and interventions for relational problems during the preschool years may focus on increasing child involvement, reducing withdrawal, and promoting creativity, joy, and social engagement.

Individual stability was found in most interactive constructs across the entire developmental span of infancy to adolescence. Maternal sensitivity, mother intrusiveness, and dyadic reciprocity were all stable between infancy and childhood, between childhood and adolescence, and between infancy and adolescence, supporting positions that suggest that the maternal style is a relatively stable trait (Belsky, Rovine, & Taylor, 1984; Sroufe, 1996). Several high-risk conditions compromise early reciprocity, including postpartum depression (Field, Healy, Goldstein, & Guthertz, 1990), prematurity (Lester, Hoffman, & Brazelton, 1985), or high contextual risk (Tronick et al., 2005), and it is possible that the long-term impact of mother–infant synchrony on development (Feldman, 2007b) rides on the stability of reciprocity from infancy. In contrast, although child social engagement was stable across infancy, across childhood, and from infancy to childhood, it did not show stability from infancy to adolescence. Possibly, at the transition to adolescence children undergo developmental transition and their social behavior is less consistent with their previous style (Steinberg & Morris, 2001). It is also possible that the infant's social style does not fully consolidate until adolescence. Thus, although children's relational style is shaped by biological dispositions and temperamental tendencies, it does not reach the same level of stability as the maternal style and these findings may have implications for the potential effectiveness of socially-focused interventions during childhood.

Differences between adapted and non-adapted adolescents were observed for each of the four constructs at 13 years, although only in the case of child social engagement group differences were also observed at *t*-1, that is, at 6 years. Viewed from a dynamic systems' perspective, these findings suggest that the social system undergoes re-organization at the transition to adolescence. Indeed, parents often report that children become more protective of their privacy and that the previously established mutuality is altered at the transition to adolescence (Allen et al., 2006). At this point, interactions that were more stressed across childhood may be at a particularly high risk for disengagement during adolescence and the risks related to

low parent–adolescent rapport, surveillance, and closeness may be especially high for this group. Parent–child interactions in adolescence are naturally marked by a decrease in child participation and, consequently, with lower reciprocity. Yet, the data indicate that maternal sensitivity decreased and intrusiveness increased only for the low adaptation group. Possibly, facing the adolescent's appropriate distancing, mothers with a more anxious style or with a less positive rapport decrease their sensitive acknowledgement and increase their controlling actions. As interactions at this stage shift from actual play to verbal dialogue, mothers need to alter their social repertoire and this may be more challenging to those who are less flexible in adjusting to the child's changing needs. These findings mark the transition to adolescence as a period of increased risk, a period when even relationships that functioned relatively adequately across childhood may deteriorate and not provide the optimal context for the adolescent's growth.

Consistent with ecological models (Belsky, 1984), maternal, child, and dyadic factors across the developmental span predicted adolescents' adaptation. These included maternal psychological distress from infancy to adolescence, the child's difficult temperament, and the degree of dyadic reciprocity experienced across development. The effects of maternal anxiety and depression on infant development have been well-documented and relate to both genetic influences and disrupted rearing environment (Goodman & Gotlieb, 1999). Infants with reported difficult temperament, a factor related to both the infant's biological dispositions and the maternal perceptions, mental state, and attributions (Seifer, Sameroff, Barrett, & Krafchuk, 1994), similarly predicted adolescent adaptation. This association may stem from the child's early difficulties in adapting to the environment as well as from the infant growing up within the context of the mother's negative representations. Finally, the ''reciprocity'' component in early relationships, experienced repeatedly from infancy to adolescence, appears to play a central role in shaping the trajectories of adjustment. Together, maternal anxiety and depression, difficult temperament, and reciprocity across the developmental span shaped the curve of the child's psychological adaptation from infancy to adolescence.

Limitations of the study primarily relate to the small sample size which precluded the use of sophisticated analyses on the paths from infancy relatedness to adolescent adaptation. Future research is required to follow interactive behaviors from infancy to adult life, determine the brain circuits and physiological systems that support reciprocity and social engagement, and chart the specific ways such trajectories unfold under conditions of maternal, child, and contextual risk. Finally, research should examine the effects of interventions which highlight specific relational components at different developmental points and assess their effectiveness in restoring the dyad into a trajectory that supports growth, promotes adjustment, and enables adolescents to reach emotional maturity, psychological well-being, and interpersonal intimacy.

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References

Achenbach, T.M. (1992). *Manual for the Child Behavior Checklist 2/3 years*. Burlington, VT: University of Vermont, Department of Psychiatry.

Achenbach, T.M., & Edelbrook, C. (1983). *Manual for the Child Behavior Checklist*. Burlington, VT: University of Vermont, Department of Psychiatry.

Ainsworth, M.D.S., Blehar, M.C., Waters, E., & Wall, S. (1978). *Patterns of attachment*. Hillsdale, NJ: Erlbaum.

Allen, J.P., Insabella, G., Porter, M.R., Smith, F.D., Land, D., & Phillips, N. (2006). A social-interactional model of the development of depressive symptoms in adolescence. *Journal of Consulting and Clinical Psychology*, *74*, 55–65.

Allen, J.P., & Manning, N. (2007). From safety to affect regulation: attachment from the vantage point of adolescence. *New Directions in Child & Adolescent Development*, *117*, 23–39.

Bakeman, R., & Brown, J.V. (1980). Early interaction: consequences for social and mental development at three years. *Child Development*, *51*, 437–447.

Bates, J.E., Freeland, C.A., & Lounsbury, M.L. (1979). Measurement of infant difficultness. *Child Development*, *50*, 794–803.

Beck, A.T. (1978). *Beck Depression Inventory*. San Antonio, TX: Harcourt Brace Jovanovich.

Belsky, J. (1984). The determinants of parenting: A process model. *Child Development*, *55*, 83–96.

Belsky, J., Rovine, M., & Taylor, D.G. (1984). The Pennsylvania Infant and Family Development Project, III: The origins of individual differences in infant–mother attachment: maternal and infant contributions. *Child Development*, *55*, 718–728.

Bowlby, J. (1969). *Attachment and loss. Vol.1: Attachment*. New York: Basic.

Bowlby, J. (1988). *A secure base*. New York: Basic.

Bretherton, I., & Beeghley, M. (1982). Talking about internal states: The acquisition of an explicit theory of mind. *Developmental Psychology*, *18*, 906–921.

Bronfenbrenner, U. (1977). Toward and experimental ecology of human development. *American Psychologist*, *32*, 513–531.

Carter, C.S., Ahnert, L., Grossmann, K.E., Hrdy, S.B., Lamb, M.E., Porges, S.W., et al. (2005). *Attachment and bonding: A new synthesis*. Cambridge, MA: MIT Press.

Dallaire, D.H., & Weinraub, M. (2005). Predicting children's separation anxiety at age 6: the contributions of infant–mother attachment security, maternal sensitivity, and maternal separation anxiety. *Attachment & Human Development*, *7*, 393–408.

De Wolff, M.S., & van IJzendoorn, M.H. (1997). Sensitivity and attachment: a meta-analysis on parental antecedents of infant attachment. *Child Development*, *68*, 571–591.

Feldman, R. (1998). *Coding interactive behavior manual*. Unpublished manual, Bar-Ilan University, Israel.

Feldman, R. (2000). Parents' convergence on sharing and marital satisfaction, father involvement, and parent–child relationship at the transition to parenthood. *Infant Mental Health Journal*, *21*, 176–191.

Feldman, R. (2007a). Mother–infant synchrony and the development of moral orientation in childhood and adolescence: Direct and indirect mechanisms of developmental continuity. *American Journal of Orthopsychiatry*, *77*, 582–597.

Feldman, R. (2007b). Parent–infant synchrony and the construction of shared timing; Physiological precursors, developmental outcomes, and risk conditions. *Journal of Child Psychology and Psychiatry*, *48*, 329–354.

Feldman, R. (2007c). On the origins of background emotions; From affect synchrony to symbolic expression. *Emotion*, *7*, 601–611.

Feldman, R. (2009). Parenting behavior as the environment in which children grow. In L.C. Mayes & M. Lewis (Eds.), *A developmental environment measurement handbook*. New York: Cambridge University Press.

Feldman, R., & Blatt, S.J. (1996). Precursors of relatedness and self-definition in mother–infant interaction. In J. Masling & R.F. Bornstein (Eds.), *Psychoanalytic perspectives on developmental psychology* (pp. 1–42). Washington, DC: American Psychological Association.

Feldman, R., & Eidelman, A.I. (2004). Parent–infant synchrony and the social-emotional development of triplets. *Developmental Psychology*, *40*, 1133–1147.

Feldman, R., & Eidelman, A.I. (2006). Neonatal state organization, neuro-maturation, mother–infant relationship, and the cognitive development of small-for-gestational-age premature infants. *Pediatrics*, *118*, e869–e878.

Feldman, R., & Eidelman, A.I. (2009). Biological and environmental initial conditions shape the trajectories cognitive and social-emotional development across the first years of life. *Developmental Science*, *12*, 194–200.

Feldman, R., Greenbaum, C.W., Mayes, L.C., & Erlich, H.S. (1997). Change in mother–infant interactive behavior: Relations to change in the mother, the infant, and the social context. *Infant Behavior and Development*, *20*, 153–165.

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Feldman, R., Greenbaum, C.W., & Yirmiya, N. (1999). Mother–infant affect synchrony as an antecedent to the emergence of self-control. *Developmental Psychology*, *35*, 223–231.
Feldman, R., Greenbaum, C.W., Yirmiya, N., & Mayes, L.C. (1996). Relation between cyclicity and regulation in mother–infant interaction at 3 and 9 months and cognition at 2 years. *Journal of Applied Developmental Psychology*, *17*, 347–366.
Feldman, R., Guttfreund, D., & Yerushalmi, H. (1998). Parental care and intrusiveness as predictors of the abilities-achievement gap in adolescence. *Journal of Child Psychology and Psychiatry*, *39*, 721–730.
Feldman, R., Keren, M., Gross-Rozval, O., & Tyano, S. (2004). Mother and child's touch patterns in infant feeding disorders; Relation to maternal, child, and environmental factors. *Journal of the American Academy of Child and Adolescent Psychiatry*, *43*, 1089–1097.
Feldman, R., Weller, A., Sirota, L., & Eidelman, A.I. (2003). Testing a family intervention hypothesis: The contribution of mother–infant skin-to-skin contact (Kangaroo Care) to family interaction and touch. *Journal of Family Psychology*, *17*, 94–107.
Field, T.M., Healy, B., Goldstein, S., & Guthertz, M. (1990). Behavior state matching and synchrony in mother–infant interaction of nondepressed vs. depressed dyads. *Developmental Psychology*, *26*, 7–14.
Fogel, A. (1993). *Developing through relationships: Origins of communication, self, and culture*. Chicago: University of Chicago Press.
Freitag, M.K., Belsky, J., Grossmann, K., Grossmann, K.E., & Scheuerer-Englisch, H. (1996). Continuity in parent–child relationship from infancy to middle childhood and relations with friendship competence. *Child Development*, *67*, 1437–1454.
Goldsmith, H.H., & Alansky, J.A. (1987). Maternal and infant temperamental predictors of attachment: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *55*, 805–816.
Goodman, S.H., & Gotlieb, I.H. (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review*, *106*, 458–490.
Grossmann, K.E., Grossmann, K., Winter, M., & Zimmermann, P. (2002). Attachment relationships and appraisal of partnership: From early experience of sensitive support to later relationship representation. In L. Pulkkinen & A. Caspi (Eds.), *Paths to successful development* (pp. 73–105). Cambridge: Cambridge University Press.
Harlap, S., Davis, A.M., Grower, M.B., & Prywes, B. (1977). The Jerusalem perinatal study: The first decade (1964–1977). *Israel Medical Journal*, *13*, 1073–1091.
Hobson, R.P., Patrick, M.P., Crandell, L.E., Garcia Perez, R.M., & Lee, A. (2004). Maternal sensitivity and infant triadic communication. *Journal of Child Psychology and Psychiatry*, *45*, 470–480.
Isabella, R.A. (1993). Origins of attachment: Maternal interactive behavior across the first year. *Child Development*, *64*, 605–621.
Jaffari-Bimmel, N., Juffer, F., van IJzendoorn, M.H., Bakerman-Kranenburg, M.J., & Mooijaart, A. (2006). Social development from infancy to adolescence: longitudinal and concurrent factors in an adoption sample. *Developmental Psychology*, *42*, 1143–1153.
Jaffee, J., Beebe, B., Feldstein, S., Crown, C.L., & Jasnow, M.D. (2002). Rhythms of dialogue in infancy: Coordinated timing in development. *Monographs of the Society for Research in Child Development*, *66*, 1–132.
Johnson, A.L., Morrow, C.E., Accornero, V.H., Xue, L., Anthony, J.C., & Bandstra, E.S. (2002). Maternal cocaine use: estimated effects on mother–child play interactions in the preschool period. *Journal of Developmental & Behavioral Pediatrics*, *23*, 191–202.
Kashdan, T.B., Jacob, R.G., Pelham, W.E., Lang, A.R., Hoza, B., Blumenthal, J.D., et al. (2004). Depression and anxiety in parents of children with ADHD and varying levels of oppositional defiant behaviors: modeling relationships with family functioning. *Journal of Clinical Child and Adolescent Psychology*, *33*, 169–181.
Kochanska, G., Aksan, N., Prisco, T.R., & Adams, E.E. (2008). Mother–child and father–child mutually responsive orientation in the first 2 years and children's outcomes at preschool age: mechanisms of influence. *Child Development*, *79*, 30–44.
Kovacs, M. (1981). Rating scales to assess depression in school aged children. *Acta Paedopsychiatrica: International Journal of Child and Adolescent Psychiatry*, *46*, 305–315.

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Laporte, L., Marcoux, V., & Guttman, H.A. (2001). Characteristics of families of women with restricting anorexia nervosa compared with families of normal probands. *L'Encephale*, *27*, 109–119.

Lester, B., Hoffman, J., & Brazelton, T.B. (1985). The rhythmic structure of mother–infant interaction in term and preterm infants. *Child Development*, *56*, 15–27.

Lewis, M.D., & Granic, I. (Eds.). (2000). *Emotion, development, and self-organization: dynamic systems approaches to emotional development*. Cambridge: Cambridge University Press.

Leckman, J.F., Feldman, R., Swain, J.E., Eichler, V., Thompson, N., & Mayes, L.C. (2004). Primary parental preoccupation: Circuits, genes, and the crucial role of the environment. *Journal of Neural Transmission*, *11*, 753–771.

Lorenz, K.Z. (1950). The comparative method in studying innate behavior patterns. In *Society for experimental biology: Physiological mechanisms in animal behavior* (Society's Symposium IV; pp. 221–268). Oxford: Academic Press.

Marshal, P.J., & Fox, N.A. (Eds.). (2006). *The development of social engagement*. New York: Oxford University Press.

Masten, A.S., Roisman, G.I., Long, J.D., Burt, K.B., Obradovic, J., Riley, J.R., et al. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*, *41*, 733–746.

Meins, E. (1999). Sensitivity, security, and internal working models: Bridging the transmission gap. *Attachment & Human Development*, *1*, 325–342.

Minde, K. (2000). Prematurity and serious medical conditions in infancy: Implications for development, behavior, and intervention. In C.H. Zeanah (Ed.), *Handbook of infant mental health* (pp. 176–194). New York: Guilford.

Moll, H., & Tomasello, M. (2007). Cooperation and human cognition: the Vygotskian intelligence hypothesis. *Philosophical Transactions of the Royal Society of London*, *362*, 639–648.

Mundy, P.C., & Acra, C.F. (2006). Joint attention, social engagement, and the development of social competence. In P.J. Marshal & N.A. Fox (Eds.), *The development of social engagement* (pp. 81–117). New York: Oxford University Press.

Murray, L., Halligan, S.L., Adams, G., Patterson, P., & Goodyer, I.M. (2006). Socio-emotional development in adolescents at risk for depression: the role of maternal depression and attachment style. *Development & Psychopathology*, *18*, 489–516.

Nelson, S.E., & Dishion, T.J. (2004). From boys to men: predicting adult adaptation from middle childhood sociometric status. *Development & Psychopathology*, *16*, 441–459.

NICHD Early Child Care Research Network (2005). *Child care and child development. Results from the NICHD Study of Early Child Care and Youth Development*. New York: Guilford.

Porges, S.W. (2003). Social engagement and attachment; A polygenetic perspective. *Annals of the New York Academy of Sciences*, *1008*, 31–47.

Roisman, G.I., Collins, W.A., Sroufe, L.A., & Egeland, B. (2005). Predictors of young adults' representations and behavior in their current romantic relationship: Prospective tests of the prototype hypothesis. *Attachment & Human Development*, *7*, 105–121.

Seifer, R., Sameroff, A.J., Barrett, L.C., & Krafchuk, E. (1994). Infant temperament measured by multiple observations and mother report. *Child Development*, *65*, 1478–1490.

Singer, J.L. (2002). Cognitive and affective implications of imaginative play in childhood. In M. Lewis (Ed.), *Child and adolescent psychiatry: A comprehensive textbook* (pp. 252–263). Philadelphia: Lippincott Williams and Wilkins.

Speilberger, C., Gorsuch, R.L., & Lushene, R.E. (1970). *State Trait Anxiety Scale*. Palo Alto, CA: Consulting Psychologists Press.

Sroufe, L.A. (1996). *Emotional development: The organization of emotional life in the early years*. New York: Cambridge University Press.

Sroufe, L.A. (2005). Attachment and development: a prospective, longitudinal study from birth to adulthood. *Attachment & Human Development*, *7*, 349–367.

Sroufe, L.A., Egeland, B., Carlson, E.A., & Collins, W.A. (2005). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. New York: Guilford Press.

Steinberg, L., & Morris, A.S. (2001). Adolescent development. *Annual Review of Psychology*, *52*, 83–110.

Stern, D.N. (1985). *The interpersonal world of the infant*. New York: Basic.

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Swanson, K., Beckwith, L., & Howard, J. (2000). Intrusive caregiving and quality of attachment in prenatally drug-exposed toddlers and their primary caregivers. *Attachment & Human Development*, *2*, 130–148.

Tamis-LeMonda, C.S., & Bornstein, M.H. (1994). Specificity in mother–toddler language-play relations across the second year. *Developmental Psychology*, *30*, 283–292.

Thelen, E., & Smith, L. (1994). *A dynamic systems approach to the development of cognition and action*. Cambridge, MA: MIT Press.

Thorndike, R.L., Hagen, E.P., & Sattler, G.M. (1986). *The Stanford-Binet intelligence scale* (4th ed.). Chicago, IL: Riverside.

Timbergen, N. (1963). On aims and methods in Ethology. *Zeitschrift fur Tierpsychologie*, *20*, 410–433.

Trevarthen, C., & Aitken, K.J. (1999). Infant intersubjectivity; Research, theory, and clinical applications. *Journal of Child Psychology and Psychiatry*, *42*, 3–48.

Tronick, E.Z., Messinger, D.S., Weinberg, M.K., Lester, B.A., LaGasse, L., Seifer, R., et al. (2005). Cocaine exposure is associated with subtle compromises of infants' and mothers' social-emotional behavior and dyadic features of their interaction in the face-to-face still-face paradigm. *Developmental Psychology*, *41*, 711–722.

Wechsler, D. (1974). *Manual for Wechsler Intelligence Scale for Children-Revised*. San Antonio, Texas: Psychological Corporation.

Winnicott, D.W. (1956). *Collected papers: Through pediatrics to psychoanalysis*. New York: Basic Books.

Wood, J.J. (2006). Parental intrusiveness and children's separation anxiety in a clinical sample. *Child Psychiatry and Human Development*, *37*, 73–87.

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