Social Development From Infancy to Adolescence: Longitudinal and Concurrent Factors in an Adoption Sample

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In the present longitudinal study, early adopted children ($N = 160$) were followed from infancy to adolescence to assess the influence of previous and concurrent factors on the children's social development. This study allowed for more conclusive evidence of the influence of early and concurrent rearing experiences and temperament on adolescents' social development, independent of shared genetic factors between children and parents. Results showed that social development and temperament were stable over time and that both previous and current parental sensitivity were important in predicting social development in adolescence. Quality of the early parent–child relationship was indirectly associated with social development in adolescence through the influence on social development in middle childhood. Maternal sensitivity in middle childhood and in adolescence partly buffered the negative effects of difficult temperament on social development in adolescence. Adaptation emerged as the product of both developmental history and current circumstances.

Keywords: social development, attachment, parental sensitivity, temperament, adoption

Speculations about the role of early and current experiences in shaping human development have proliferated for decades. Some researchers view current experiences as more important than experiences in the early years; others assign greater importance to early experiences. Lewis (1997), for example, argued that the behavior of a child primarily reflects the context in which it occurs. When the environment changes from good to bad, the behavior of the child changes correspondingly, without a trace being left of the earlier positive experiences. In this view, current experiences are much more important in predicting development than past experiences.

In contrast, Erikson (1963) stated that each stage of psychosocial development is influenced by the previous stage. For example, basic trust emerging from close relationships with adults in infancy influences development in toddlerhood (DeHart, Sroufe, & Cooper, 2004). In an extension of this perspective, Bowlby (1973, 1980) assigned an important role to both early and current experiences. In his view, adaptations are the product of previous patterns of adaptation and of new experiences. For example, in attachment theory, an important role is assigned to early patterns of attachment, affecting later social development but at the same time constituting working models under permanent reconstruction (Bowlby, 1973, 1980; Sroufe, 2000). Following this theory, a developmental approach should examine both prior and concurrent experiences and adjustment (Sroufe, 2000; Sroufe, Egeland, & Kreutzer, 1990).

Thus, several competing theories of the developing relation between the individual and the environment have been proposed: The first view holds that early experiences are most important in predicting the individual's adaptation; the second view emphasizes the influence of current experiences and de-emphasizes the impact of the early environment; the third view states that both early and concurrent experiences contribute uniquely to later developmental outcomes; the fourth view suggests that early experiences are influential because they shape the earliest developmental patterns, which themselves become important constraining influences on later development. The various views assume that development is not the predestined outcome of a genetic blueprint (which is a fifth perspective), but instead they imply that the organism functions in a bidirectional relation with its context and that changes in organism–context relations constitute development (Lerner, 1991, 2002).

With respect to the first view (that early experiences are the most predictive), previous longitudinal studies on biologically related parent–child dyads found evidence for the predictive value of early attachment and parenting on later social development. Attachment research has shown that infant–mother attachment security is an antecedent of children's social functioning over time (e.g., Berlin, Cassidy, & Belsky, 1995; Elicker, Englund, & Sroufe, 1992; Fagot, 1997; Kerns, 1994; Shulman, Elicker, & Sroufe, 1994; Thompson, 1999; Volling & Belsky, 1992; Youngblade & Belsky, 1992; Zimmermann, Maier, Winter, & Grossmann, 2001). Parental sensitive responsiveness has also been

shown to be a precursor of social development (e.g., Belsky, 1981, 1984; Belsky, Lerner, & Spanier, 1984; Borkowski, Ramey, & Bristol-Power, 2002; Fagot, 1997; Sroufe, Egeland, & Carlson, 1999; Volling & Belsky, 1992; Youngblade & Belsky, 1992). However, according to the second view (that current experiences are the most predictive), relations between early childhood factors and later adjustment may be indicative of continuity in child-rearing context (Lamb, 1984; Lewis, 1997). Lewis (1997) argued that the child's concurrent environment is rarely observed. For example, insecure attachment of a child may be explained by early inadequate parenting, but it may also be explained by continued and concurrent poor parenting. If this is true, current experiences may be more important in predicting development than early experiences.

Studies that include both early and current (parenting or child-rearing) experiences are necessary to test models following from the third and the fourth view (that both early and concurrent experiences are predictive in a unique or indirect way), but they are scarce as well (Lerner, 1991, 2002). As an excellent example of the power of such a study, Carlson, Sroufe, and Egeland (2004) found an indirect association between early experience and adolescent social functioning. In their study, early experience had an influence on relationship representation and social behavior in early childhood, which in turn influenced later representations of relationships and social behavior, which then influenced adolescent social functioning. In addition to the assessment of the development of the environment in relation to the individual's adaptation, studies are also needed that also attempt to measure characteristics of the organism, for example, temperament, across time, in order to test whether stability of these characteristics directly or indirectly influences the individual's adaptation. Temperamental characteristics are related to putative endophenotypic biological factors (e.g., Huffman et al., 1998) but also to family and environmental factors (e.g., Halverson & Deal, 2001). They can directly or indirectly (mediated by environmental factors) influence the child's adaptation.

The inclusion of child characteristics becomes more important in studies on biologically related parents and children, in which the associations between parent–child variables (for example, child–mother attachment) and parent variables (for example, maternal sensitive responsiveness) on the one hand and child adjustment on the other hand may always be (partly) determined by genetic associations. For example, in much previous work on the influence of parenting on children's adjustment, parenting effects and genetic similarities are confounded (Rowe, 1993a, 1993b). The same cluster of genes may produce two disparate behavioral effects. In the parent they may influence variation in child-rearing styles, whereas in the child they may influence variation in outcome traits. For example, more punitive discipline in parents of aggressive children may reflect a cluster of genes manifested as greater emotionality in the parent and aggression in the child (Rowe, 1993a).

Longitudinal studies on adopted children enable examination of the interplay of individual child characteristics and parenting style across time, independent of genetic similarities. Plomin, Loehlin, and DeFries (1985), for example, found that children who had fewer behavioral problems lived in families that were more supportive and expressive. However, in adoptive families, the correlation between these variables dropped to near zero. The largest part of the association between these family environments and child variables seemed due to genetic mediation.

The present study is the first to examine the role of infant attachment, maternal sensitive responsiveness, and child temperament on the social development of adolescents adopted at an early age (before the age of 6 months). All children were followed from infancy, so several indices of the child's early development and relationships were available to study the etiology and course of his or her social development. The adopted children's social development was examined from a broad longitudinal perspective with multiple indicators and with assessments in multiple contexts. Different measures were used (observations, questionnaires, and Q-sorts), as well as different times of measurement (infancy, middle childhood, and adolescence) and different sources of information (mothers, teachers).

Findings from a previous study of the present sample at age 7 showed that easy temperament in early childhood was associated with more positive social development at 7 years (Stams, Juffer, & Van IJzendoorn, 2002). Higher quality of both early and contemporaneous parent–child relationships, in terms of infant attachment security and early- and middle-childhood maternal sensitivity, was also predictive of favorable social development at age 7. Children who encountered more than two risk factors, such as difficult temperament and stressful life events, showed lower levels of adjustment at age 7. In contrast, the presence of two or more protective factors, such as secure attachment and higher levels of maternal sensitivity, predicted favorable adjustment at age 7 (Stams et al., 2002).

In the present follow-up at age 14, the various views with respect to the influence of early and concurrent experiences described above were tested with structural equation models. The following views were tested: (a) Early experiences are the most predictive; (b) concurrent experiences are the most predictive; (c) both early and concurrent experiences contribute uniquely to later outcomes; (d) early experiences are influential because they shape the earliest social–developmental patterns, which themselves affect later development; and (e) current adaptation is the consequence of stable child characteristics whereas both early and concurrent experiences are not predictive.

In sum, we tested whether our longitudinal data on the development of adopted children over the course of 14 years fit one specific model uniquely or whether the data are compatible with each of the views. Because we started this longitudinal study in the framework of attachment theory and in a previous stage of this study found support for the view that both early and concurrent child-rearing influences are important, we expected the model with direct and indirect influences of early and later experiences on a changing individual's adaptation to show the best fit with our data.

Method

Participants

In the present longitudinal study, 160 internationally adopted children were prospectively followed from infancy to age 14 (75 boys and 85 girls). The adoptive families were randomly recruited through Dutch adoption organizations, and the adopted children were not selected on present or expected future problems (Juffer, 1993). The children were adopted from Sri Lanka ($n = 86$), South Korea ($n = 49$), and Colombia ($n = 25$) and placed in the adoptive families before the age of 6 months ($M = 10.76$

weeks, $SD = 5.53$ weeks). The adoptive parents were Caucasian, and in all families the mother was the primary caregiver. At the time of the birth of the children the mean age of the adoptive fathers was 34.62 ($SD = 3.48$) and of the adoptive mothers, 32.52 ($SD = 3.35$). The adoptive families were predominantly from middle-class or upper-middle-class backgrounds (Stams et al., 2002). The adopted children were neither selected by nor matched to the characteristics of their future adoptive parents. Placement of a particular child in an adoptive family was contingent upon the adoptive parents' place on the waiting list of an adoption organization.

In the first stage of the study, a short-term, attachment-based intervention was tested, starting when the child was 5 months of age. The parents were not aware of the intervention when they entered the study. The intervention with a personal book and three sessions of video feedback (in 50 of the 160 families) was effective in promoting maternal sensitive responsiveness and enhancing infant attachment security (see for details Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2005). The intervention was not repeated during the following years. The associations of the intervention with the key variables of the present study are reported in the Results section.

In middle childhood, 146 of the 160 families participated (9% attrition). In adolescence, 143 of the families participated (11% attrition). Four families did not participate because the adolescent was living in a mental health setting. Six mothers had died of incurable illnesses. The major reasons for the nonparticipation of other families were disinterest and health problems of family members, and some mothers or adolescents had no time available because of their full-time employment outside the home (adoptive mothers) or because of school, homework, sports, and/or friends (adolescents). A series of separate Bonferroni-corrected statistical tests, with the initial level of significance set at $p < .10$, confirmed the absence of selective attrition with respect to the outcome and background variables.

Procedure

Families were visited at home when the children were age 5, 6, 9, and 12 months and came to the laboratory when the children were age 12, 18, and 30 months. When children were age 7, we visited families at home to observe mother–child interaction, to interview the mother, and to administer questionnaires. We visited each child's school to ask the adopted child's teacher to complete a questionnaire and a Q-sort and to interview classmates. We visited families at home again at age 14 to observe mother–child interaction, to interview the adolescent and the adoptive parents, and to administer questionnaires and a Q-sort. Parents and adolescents were asked for consent to send the adolescents' teachers a questionnaire. Teachers were sent questionnaires by mail.

Measures

Whenever possible, measures used at prior assessments were repeated in order to support the longitudinal approach. For example, maternal sensitive responsiveness at 14 years was coded with the same rating scales used at 12, 18, and 30 months and at 7 years (Egeland–Erickson scales; Erickson, Sroufe, & Egeland, 1985). If necessary, we used comparable instruments or adapted tasks in order to have age-adequate measures. Some instruments were adapted to make them age adequate (see below).

Health condition on arrival (5 months). At the child's age of 5 months, adoptive parents reported about their child's health condition on arrival. Health condition on arrival was an index of the infant's health condition from the time of birth until arrival in the adoptive family (Stams et al., 2002). The health score was computed by a standardized summation of three variables: birth weight, incidence of prematurity, and health problems on arrival (reversed). A high score represented a good health condition. The standardized item reliability was .48 ($N = 160$). The health scores ranged from 0.00 to 0.68 ($M = 0.37$, $SD = 0.13$, $N = 160$).

Infant–mother attachment security (12 months). At the child's age of 12 months, attachment assessments were conducted with Ainsworth's

standardized Strange Situation laboratory procedure (Ainsworth, Blehar, Waters, & Wall, 1978). This procedure activates the infant's attachment system as a response to the presence of an unfamiliar adult and two brief separations from the parent, followed by a reunion. On the basis of videotaped recordings of their Strange Situation behavior, infants were assigned into one of three patterns of attachment: *insecure avoidant* (A), *secure* (B), or *insecure resistant/ambivalent* (C). Secure infants are eager to explore the laboratory playroom in the presence of the attachment figure but show signs of missing the attachment figure when he or she leaves. On reunion, these infants actively seek interaction, are comforted immediately by contact, and soon return to exploration and play. Avoidant infants show little or no response to leave taking. Even in absence of the attachment figure, they continue to explore the environment, and on reunion they avoid the parent, look away, and turn toward the toys. Ambivalent infants remain relatively uninterested in exploration. They show great distress on separation and a mixture of contact-seeking and resistant behavior on reunion. They are difficult to comfort following stress.

Each videotape was scored independently by two observers. Coders were trained by experienced raters and were blind to other information concerning the dyad. Interrater reliability for the three main attachment classifications (A, B, and C) ranged from .80 to 1.0 (Cohen's kappas). In the case of differing classifications, consensus was reached after discussion. The attachment classifications were distributed as follows: 76% secure ($n = 121$), 22% avoidant ($n = 35$), and 3% resistant ($n = 4$). The Main and Solomon (1990) coding system was used to assess disorganization of attachment. *Disorganized/disoriented* (D) infants show temporary loss of a consistent strategy for dealing with the stress involved in the Strange Situation and (briefly) display disorganized or disoriented behavior in the parents' presence (e.g., stereotypical movements, anomalous movements, or the freezing of all movement with a disoriented expression). The classification of disorganized attachment (D vs. non-D) showed satisfactory intercoder reliability on 20 cases (85% agreement). Of all children, 16.3% were classified as disorganized ($n = 26$); 83.7% were classified as not disorganized ($n = 134$).

In the present study, we used a continuous 6-point scale for security of attachment (hereafter referred to as *attachment*), based on the continuous scale for the three-way system designed by Main, Kaplan and Cassidy (1985) and Van IJzendoorn, Sagi, and Lambermon (1992), extended with the D classifications. The most secure category (B3) received a score of 6, and the other B classifications without D components (B1, B2, and B4) received a score of 5. The classifications B/A, B/C and B/D received a score of 4. An A or C classification without disorganized attachment received a score of 3. The classifications D/B, A/D and C/D were coded 2, and the most insecure categories (D/A and D/C) were given a score of 1. The mean score was 4.26 ($SD = 1.44$, $N = 160$).

Maternal sensitive responsiveness (12, 18, and 30 months, 7 and 14 years). When children were at 12, 18, and 30 months, and at 7 and 14 years, the mother's behavior was assessed in terms of sensitive responsiveness. At the first assessments (12, 18, and 30 months), maternal sensitive responsiveness was assessed in task situations (e.g., making a simple puzzle, building a tower of blocks), both in the child's home and at the laboratory. The Egeland/Erickson scales (Egeland, Erickson, Clemenhagen-Moon, Hiester, & Korfmacher, 1990; Erickson et al., 1985) were used to code emotional support, respect for the child's autonomy, structure and limit setting, hostility, and quality of instruction. The averaged Cohen's kappas for agreement within 1 scale point were .91 (12 months), .90 (18 months), and .97 (30 months; Stams et al., 2002). For each scale, the scores at 12, 18, and 30 months were averaged after standardization. The scale hostility was not included because of small variance at 14 years. The internal consistency was .89 (Cronbach's standardized item alpha).

When children were age 7 and 14 years, maternal sensitive responsiveness was assessed in task situations (e.g., solving a difficult age-adequate puzzle) in the child's home. The Egeland/Erickson scales (Egeland et al.,

1990; Erickson et al., 1985) were used to code supportive presence, intrusiveness, sensitivity and timing, and clarity of instruction. At 7 years, intercoder reliability was established on 60 tapes. The averaged kappas ranged from .92 (scales for emotional support and sensitivity and timing) to .96 (clarity of instruction; Stams et al., 2002). At 14 years, intercoder reliability was established on 30 tapes, and intraclass correlations ranged from .91 (sensitivity and timing) to .95 (intrusiveness and clarity of instruction). Cronbach's standardized item alphas were .86 (7 years) and .92 (14 years).

Although the Egeland–Erickson scales (Egeland et al., 1990; Erickson et al., 1985) were developed for rating maternal sensitive responsiveness in early childhood, we used these scales in middle childhood and adolescence. We used age-adequate tasks at all assessments and took into account the more frequent verbal interaction between mother and child in middle childhood and adolescence compared with the more frequent physical contact between mother and child in early childhood. Also, the same person (Femmie Juffer) was responsible for the training of the coders at all assessments (infancy, middle childhood, and adolescence). For a detailed description of the use of the Egeland–Erickson scales in middle childhood, see the Method section of Stams et al. (2002, p. 810). Test–retest reliability and convergent validity in middle childhood were satisfactory (Stams et al., 2002).

Perceived temperament (12, 18, and 30 months, 7 years, and 14 years). When children were age 12, 18, and 30 months, and 7 and 14 years, temperament was assessed with the Dutch Temperament Questionnaire (Kohnstamm, 1984), which is an adaptation of the Infant Characteristics Questionnaire (Bates, 1980, 1987; Bates, Freeland, & Lounsbury, 1979). The child's behavior was rated by the adoptive mothers on nineteen 7-point scales. A high score on the scale indicated that the mother perceived her child as relatively difficult on aspects such as sociability, persistence, adaptability, and mood. Although the Dutch Temperament Questionnaire (Kohnstamm, 1984) was developed for rating temperament in early childhood, we used this questionnaire in middle childhood and adolescence as well. A few words were rephrased to make the questionnaire age adequate.

In infancy, two factors were extracted: Mood and Resistance (Juffer, 1993). On the basis of moderate-to-high correlations between different measurement points in infancy ($.55 < r < .72$), the scores at 12, 18, and 30 months were averaged after standardization for both scales. In middle childhood and adolescence, temperament consisted of three scales: aggression, reactivity, and restlessness (Stams et al., 2002). Cronbach's alphas were .61, .75, and .86, respectively.

Social development (7 and 14 years). When children were age 7 and 14 years, social development was tested with six indicators. The indicators were derived from different measures (questionnaire, Q-sort), and sources (mothers, teachers). The first five, rejection (reversed), acceptance, prosocial competence, friendliness (lack of social competence reversed), and social esteem, were derived from the California Child Q-set (CCQ; Block & Block, 1980; Van Lier, Haselager, Hoeben, & Van Lieshout, 1992; Van Lieshout et al., 1986), which was administered to the child's mother and teacher when the child was age 7 years and to the mother when the child was age 14 years. The CCQ consists of 100 cards, with descriptions of behavioral, affective, and cognitive characteristics of a child. Mothers and teachers had to sort the items into a nine-category forced distribution that ranged from (1) *extremely uncharacteristic* to (9) *extremely characteristic* of the child. Scale scores were obtained for prosocial competence, friendliness, and social esteem and were calculated on the basis of item content, factor analysis, internal consistencies, and Q-sorts by clinical experts (Van Lier et al., 1992). Profile scores were calculated for adult or peer acceptance and rejection, and were obtained by correlating the actual Q-sort with expert profiles for each construct (Van Lier et al, 1992; Van Lieshout et al., 1986). When the child was age 7 years, the mother and teacher scores were averaged. Cronbach's alphas ranged from .52 (social esteem) to .87 (prosocial competence; $N = 160$). At 14 years, Cronbach's alphas ranged from .66 (social esteem) to .84 (prosocial competence; $N = 160$).

The sixth indicator, social problems, was derived from the Child Behavior Checklist (Achenbach, 1991a; Verhulst, Van der Ende, & Koot, 1996) and the Teacher Report Form (Achenbach, 1991b; Verhulst, Van der Ende, & Koot, 1997) completed by respectively the adoptive mother and the teacher of the child. These measures are standardized questionnaires to assess child and adolescent behavior problems. The questionnaires have satisfactory reliability and good validity (Achenbach, 1991a, 1991b; Verhulst et al., 1996, 1997; Verhulst, Koot, & Van der Ende, 1994). The Child Behavior Checklist and Teacher Report Form contain 118 items describing behavioral and/or emotional problems. The problem items are scored on similar 3-point scales: a 0 is given if the problem is *not true* for the child, a 1 if the item is *somewhat or sometimes true* and a 2 if the item is *very true or often true*. At 7 and 14 years, Cronbach's alphas for the CBCL were .75 and .75, and for the TRF .80 and .75, respectively.

In a previous study of the same sample, social development at 7 years consisted of three additional indicators: the child's peer group social preference, agreeable behavior at school, and appropriate school behavior (Stams et al., 2002). The child's peer group social preference was assessed in individual interviews at school with all classmates (Stams et al., 2002). This measure is particularly suitable for research within groups in which the members know each other quite well (Terry & Coie, 1991, p. 879). The adolescents of the present sample were in their second or third year of secondary school with different classes for different subjects, and most of them did not know their classmates very well. Agreeable behavior at school at 7 years was assessed with the School Behavior Assessment List (SCHOAL; Bleichrodt, Resing, & Zaal, 1993) which assessed the socio-emotional behavior of children aged 4–11. Both measurements were thus not appropriate for use in adolescence. We excluded appropriate school behavior because this variable contained too many missing values in adolescence.

Stressful life events (7 and 14 years). A 4-point scale was developed to assess the degree to which the family had experienced stressful life-events during the last 2 years. The instrument was completed by the adoptive mother and consisted of nine items: physical health problems of relatives, mental health problems of relatives, bereavement, unemployment, divorce, financial problems, marital problems, problems at work, and conflict with relatives, neighbors, or neighborhood. Cronbach's alpha was .68 ($N = 146$) when children were age 7 years and .69 ($N = 143$) when they were age 14 years. The overall score for stressful life events was the standardized summation of all items divided by their number. It was transformed to normal by an inverse method and transformed to positive values by summation of the minimum (Stams et al., 2002; Tabachnick & Fidell, 2001). The scores ranged from 0.01 to 0.77 ($M = 0.21$, $SD = 0.20$, $N = 146$) at 7 years and 0.00 to 2.40 ($M = 0.48$, $SD = 0.47$, $N = 143$) at 14 years.

Socioeconomic status (7 and 14 years). When children were ages 7 and 14 years, socioeconomic status was assessed as a combination of the educational and vocational background of both parents. It was computed on the basis of sample-specific factor loadings and standard deviations. Mean scores correspond to socioeconomic strata in the following way: 3–9, lower class; 9–12, middle class; and 12–16, upper class (Bernstein & Brandis, 1970). Cronbach's alpha was .82 when children were age 7 years and .79 when they were age 14 years. The mean score was 9.90 ($SD = 2.84$, $N = 146$, range 2.86–14.73) and 9.49 ($SD = 2.39$, $N = 143$, range 3.05–14.02), respectively, which means that the sample can be considered as middle class.

Statistical Analyses

The results are based on all 160 internationally adopted children that were prospectively followed from infancy to age 14. We used a single EM imputation procedure to replace missing values in order to use all available information on all participants. EM imputation uses the expectation–maximization algorithm to predict the missing values (Scheffer, 2002).

Scheffer (2002) described EM imputation as a preferred option compared with replacing the missing values through case deletion or mean imputation. Two longitudinal structural models were tested to assess the stability of social development and the relative influence of early and middle childhood, and of concurrent factors on the adopted adolescents' social development. The key concepts (maternal sensitivity, child temperament, and social development) are represented as latent variables with multiple indicators, with the advantage of demonstrating the content validity of the indicators and correcting the latent variables for unreliability of the manifest indicators. Structural equation modeling techniques were used to test the models and examine relations among the different latent and observed variables. Analyses were completed with EQS 6.1 for Windows (Bentler, 1995). We did not constrain the factor loadings of the manifest variables of maternal sensitivity and temperament to be equal across measurement points because the indicators of the latent variables were not (exactly) the same in infancy, middle childhood, and adolescence. We did allow the residuals of these variables to correlate over time.

Results

Preliminary Analyses

Table 1 presents the factor loadings and the variances of the residuals of the indicators of the latent variables. Factor loadings of maternal sensitivity, child temperament, and social development ranged from .64 (social esteem as indicator of social development at 14 years) to .97 (sensitivity and timing as indicator of maternal sensitivity at 14 years). Table 2 presents the correlation matrix of all the latent variables.

The background variables age on arrival, country of origin, health condition on arrival, experimental condition, stressful life events at ages 5–7, stressful life events at ages 7–14, and socioeconomic status in middle childhood and adolescence did not significantly correlate with the latent variables; we excluded these variables from the model, except for experimental condition, which is included in the structural equation modeling because of its influence on maternal sensitivity and infant disorganization in this sample (see Juffer et al., 2005). The chi-square for the test of the homogeneity of the variance/covariance matrices of the two groups (experimental vs. control group) was significant, $\chi^2(561, N = 160) = 796.80, p < .01$. However, sample size was modest and the chi-square statistic amounted to less than 2 times the degrees of freedom, so groups were considered to be equivalent.

Multivariate Longitudinal Effects: Structural Equation Modeling

The independence model that tested the hypothesis that the variables were uncorrelated with one another was rejected, $\chi^2(595, N = 160) = 5,782.78, p < .001$. Model 1 included the full model with predictive relations between all pertinent constructs. In addition, early maternal sensitivity was included as a predictor of concurrent attachment (e.g., De Wolff & Van IJzendoorn, 1997; Van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Temperament and maternal sensitivity were presented as predictors of concurrent social development because temperament may be considered to be in part the biological substrate of social functioning (e.g., Huffman et al., 1998), and maternal sensitivity is an index of one of the most important social support systems in adolescence, namely the family (e.g., Newcomb, 1997; Sroufe et al., 1999). The model provided an acceptable fit to the data,

Table 1

Factor Loadings and Variances of Residuals of the Indicators of the Latent Variables

Variable	Factor loadings	Variances residuals[a]
Maternal sensitivity, infancy		
Emotional support	.89*	.40
Respect for autonomy	.72*	.76
Quality of instruction	.92*	.18
Structure and limit setting	.92*	.19
Maternal sensitivity, 7 years		
Supportive presence	.87*	1.02
Intrusiveness	−.67*	2.80
Clarity of instruction	.89*	.50
Sensitivity and timing	.93*	.18
Maternal sensitivity, 14 years		
Supportive presence	.92*	.27
Intrusiveness	−.80*	.91
Clarity of instruction	.92*	.23
Sensitivity and timing	.97*	.05
Perceived temperament, infancy		
Resistance	.89*	.00[b]
Mood	.89*	60.93
Perceived temperament, 7 years		
Reactivity	.82*	.39
Aggression	.88*	.13
Restlessness	.78*	.55
Perceived temperament, 14 years		
Reactivity	.93*	.24
Aggression	.92*	.15
Restlessness	.84*	.41
Social development, 7 years		
Rejection	−.96*	.00[a]
Acceptance	.95*	.01
Prosocial competence	.89*	34.07
Friendliness	.87*	21.97
Social esteem	.73*	4.62
Social problems	.82*	2.62
Social development, 14 years		
Rejection	.96*	.00[a]
Acceptance	.96*	.01
Prosocial competence	.90*	35.38
Friendliness	.87*	33.71
Social esteem	.64*	4.74
Social problems	.73*	2.21

[a] Unstandardized.   [b] Constrained at lower bound by EQS (Version 6.1 for Windows).
* $p < .05$.

$\chi^2/df = 2.32$, NNFI = .85, IFI = .87, CFI = .87, RMSEA = .09 (see Table 3). The paths between temperament in infancy and middle childhood and between temperament in middle childhood and adolescence were significant ($z = 3.24, p < .05$, and $z = 6.22, p < .05$, respectively). The path between temperament in infancy and adolescence was not significant. For maternal sensitivity, the paths between maternal sensitivity in infancy and adolescence and between maternal sensitivity in middle childhood and adolescence were significant ($z = 3.11, p < .05$, and $z = 2.19, p < .05$, respectively). The path between maternal sensitivity in infancy and middle childhood was not significant. Social development in middle childhood was significantly related to social development in adolescence ($z = 4.76, p < .05$). Temperament showed significant concurrent but not predictive relations with social development in

Table 2
Latent Correlation Matrix

Variable	1	2	3	4	5	6	7	8
Maternal sensitivity								
1. Infancy	—							
2. Middle childhood	.14	—						
3. Adolescence	.27*	.27*	—					
Perceived temperament								
4. Infancy	−.14	−.02	.03	—				
5. Middle childhood	−.04	.03	.25*	.32*	—			
6. Adolescence	−.09	−.15	.17*	.10	.82*	—		
Social development								
7. Middle childhood	.13	.12	.02	−.16	−.78*	−.58*	—	
8. Adolescence	.21*	.14	.03	−.09	−.74*	−.86*	.74*	—

* $p < .05$.

middle childhood and adolescence ($z = -7.19$, $p < .05$, and $z = -6.46$, $p < .05$, respectively). Maternal sensitivity also showed significant concurrent, but not predictive relations with social development in middle childhood and adolescence ($z = 2.56$, $p < .05$, and $z = 2.57$, $p < .05$, respectively). The path from attachment in infancy to social development in adolescence (standardized coefficient = −.04) was not significant, but the path from this variable to social development in middle childhood (standardized coefficient = .13) was significant ($z = 2.30$, $p < .05$). Three additional predictive paths were significant: the path from maternal sensitivity in middle childhood to difficult temperament in adolescence ($z = -2.68$, $p < .05$), the path from social development in middle childhood to maternal sensitivity in adolescence ($z = 2.88$, $p < .05$), and the path from difficult temperament in middle childhood to maternal sensitivity in adolescence ($z = 4.08$, $p < .05$).

In Model 2 (see Figure 1), all nonsignificant paths were removed. The model represented the data well, $\chi^2/df = 2.27$, NNFI = .85, IFI = .87, CFI = .87, RMSEA = .09 (see Table 3). According to the chi-square difference test (Tabachnick & Fidell, 2001), Model 2 did not show significant deterioration over Model 1 fit, $\Delta\chi^2(22) = 27.36$, $p > .05$. The other fit indices remained similar as well. So, removing all nonsignificant paths resulted in a nonsignificant change of the model fit. These paths could therefore be deleted to get a more parsimonious model without losing adequate model fit.

Indirect Effects

There were several indirect effects in the prediction of social development in adolescence in the final model (see Figure 1). For maternal sensitivity in infancy, we found an indirect effect through maternal sensitivity in adolescence to social development in adolescence (standardized coefficient = .04; $z = 2.57$, $p < .05$; due to small standard error). For maternal sensitivity in middle childhood there were four indirect effects (standardized coefficient = .20; $z = 3.58$; $p < .05$): The first was from maternal sensitivity in middle childhood through maternal sensitivity in adolescence to social development in adolescence; the second, from maternal sensitivity in middle childhood through social development in middle childhood to social development in adolescence; the third, from maternal sensitivity in middle childhood through difficult temperament in adolescence to social development in adolescence; and the fourth, from maternal sensitivity in middle childhood through social development in middle childhood and maternal sensitivity in adolescence to social development in adolescence. For attachment we found two indirect effects (standardized coefficient = .07; $z = 2.71$; $p < .05$): The first was from attachment in infancy through social development in middle childhood to social development in adolescence, and the second from attachment in infancy through social development in middle childhood and maternal sensitivity in adolescence to social development in adolescence. For difficult temperament in middle childhood there

Table 3
Fit Statistics for Two Structural Equation Models on Adolescent Social Development at Age 14

Model	χ^2	df	χ^2/df	NNFI	IFI	CFI	RMSEA	90% CI
Independence model	5,782.78	596	9.70					
Model 1: full model	1,174.00	507	2.32	.85	.87	.87	.09	.08–.10
Model 2: all nonsignificant paths eliminated	1,201.36	529	2.27	.85	.87	.87	.09	.08–.10

Note. NNFI = non-normed fit index; IFI = incremental fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence interval.
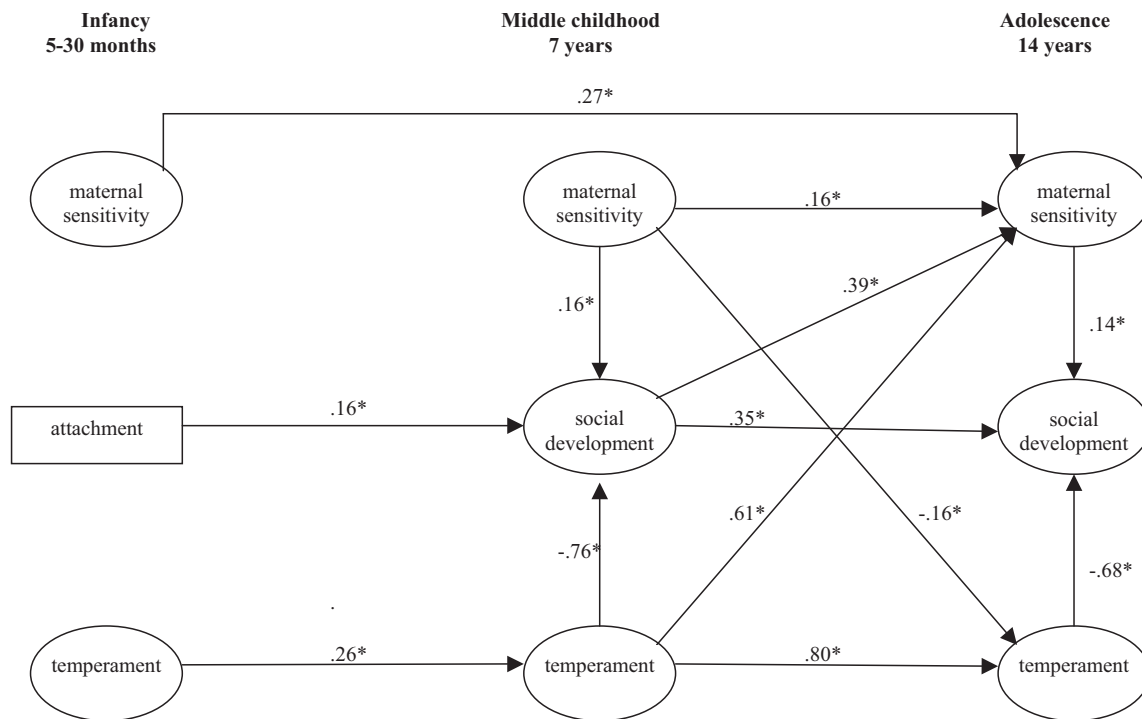
Figure 1. Structural equation modeling on adolescent social development at age 14: Model 2. All nonsignificant paths have been removed from the full model. Observed and latent variables are shown in rectangles and ellipses, respectively. * *p* < .05.

were four indirect effects (standardized coefficient = −.77; *z* = −6.58; *p* < .05): The first was from difficult temperament in middle childhood through difficult temperament in adolescence to social development in adolescence; the second, from difficult temperament in middle childhood through social development in middle childhood to social development in adolescence; the third, from difficult temperament in middle childhood through social development in middle childhood and maternal sensitivity in adolescence to social development in adolescence; and the fourth, from difficult temperament in middle childhood through maternal sensitivity in adolescence to social development in adolescence. For social development in middle childhood we found an indirect effect through maternal sensitivity in adolescence to social development in adolescence (standardized coefficient = .06; *z* = 2.20; *p* < .05).

Discussion

In the present longitudinal study, 160 adopted children placed before the age of 6 months were followed from infancy to age 14 to assess their social development across time and to test the relative influence of early, middle childhood, and concurrent factors on social development in adolescence. We examined five views on development. The first view implies that early experiences are the only important predictors. Results showed that the direct paths from early maternal sensitivity and attachment to social development at 14 years were not significant. The second view suggests that concurrent experiences are the most important predictors of current adaptation. Concurrent maternal sensitivity was significantly related to social development at 14 years; how-

ever, the association was not strong, and it was not the most important predictor in the model.

In the third and fourth views, both early and concurrent experiences are considered to be important. The third hypothesis is that both early and current experiences contribute uniquely to social development at 14 years. This view predicts direct and unique associations (of comparable size) between both early and concurrent maternal sensitivity and child–mother attachment relationships and social development at 14 years. Results showed that the direct associations between early maternal sensitivity and attachment on the one hand and social development at 14 years on the other hand were not significant and not comparable in size to the association between social development at 14 years and concurrent maternal sensitivity. The fourth hypothesis also stresses both early and concurrent experiences but includes the indirect influences of early experiences. This view predicts indirect associations between maternal sensitivity and child–mother attachment relationships in early childhood and social development in adolescence. We found indeed that early maternal sensitivity and infant attachment were indirectly associated with social development in adolescence, through social development in middle childhood and through maternal sensitivity in adolescence. In the fifth view child characteristics largely determine adaptation, and both early and concurrent experiences would not play any part. Although we found strong associations between temperament and social development, we also detected direct and indirect influences of early and concurrent experiences.

Thus, our study shows that social development in adolescence is a product of both developmental history and past experiences and

concurrent circumstances and child characteristics (Bowlby, 1973, 1980). Claims regarding the uniquely important role of early childhood experiences in shaping later adaptation are not compatible with our data, nor is the opposite claim stressing the unique influence of concurrent experiences. Development is the interplay between a changing environment and a changing individual, but early experiences and adaptations do not fade away. Instead, they indirectly shape future adaptation through their influences on intermediary developmental steps.

Findings from a previous study of the present sample in middle childhood showed that easy temperament in early childhood and higher quality of early parent–child attachment relationships were associated with more positive social development in middle childhood (Stams et al., 2002). In the present study, we found significant direct associations for early parent–child attachment relationships on social development in middle childhood but not for early temperament. This difference may be ascribed to the fact that the previous study did not include concurrent temperament in middle childhood. When concurrent temperament was included, it eclipsed the predictive value of the early measurement of temperament.

Child temperament was rather stable across time. Remarkably, although stable from early to middle childhood and from middle childhood to adolescence, temperament in early childhood was not significantly related to temperament in adolescence. However, there was a significant positive indirect effect between these variables, through temperament in middle childhood. In the final model, temperament, in particular concurrent temperament, also strongly influenced social development in adolescence. The influence of earlier temperament was found to be indirect, through middle childhood social development, adolescent temperament, and maternal sensitivity in adolescence. It is interesting to note that more difficult temperament in middle childhood predicted higher maternal sensitivity in adolescence, partly buffering the influence of difficult temperament on adolescent social development. The indirect pathway from middle childhood maternal sensitivity through adolescent temperament to adolescent social development indicated a similar buffer: More maternal sensitivity in middle childhood predicted less difficult temperament in adolescence, which in turn was related to more optimal social development in adolescence.

The indirect influences of early parent–child relationships on adolescent social development can be partitioned into successive steps. The different steps of the indirect path from early parent–child relationships to adolescent social development found in our study are predicted by attachment theory and converge with the findings from previous empirical studies (e.g., Sroufe, Egeland, Carlson, & Collins, 2005). Infant attachment security and disorganization have been found to be associated with social development in middle childhood (e.g., Berlin et al., 1995; Elicker et al., 1992; Fagot, 1997; Kerns, 1994; Shulman et al., 1994; Stams et al, 2002; Thompson, 1999; Volling & Belsky, 1992; Youngblade & Belsky, 1992; Zimmermann et al., 2001), and social development in middle childhood has been found to be rather stable and associated with social development in adolescence (e.g., Elicker et al., 1992; Schneider, Attili, Nadel, & Weissberg, 1989). Carlson et al. (2004) also found an indirect association between early experience and adolescent social functioning. In their study, early experience had an influence on relationship representation and social behavior

in early childhood, which in turn influenced later relationship representation and social behavior and which finally influenced adolescent social functioning. Our findings support the developmental contextual perspective of Lerner (1991, 2002), indicating that changes in the organism always occur in dynamic interaction with changes in the context (and vice versa).

The present study resembles Carlson et al.'s (2004) study in that both studies found indirect, but not direct, influences of early (attachment) experiences on adolescent social functioning. The present study confirmed these findings in a sample of adopted children who are biologically unrelated to their adoptive parents. Therefore, this study expands previous outcomes with the finding that early parent–child relationships are indirectly related to adolescent social functioning, independent of the confounding of parenting effects and genetic similarities between children and parents. Sroufe (2000) emphasized early experience as the foundation for later child development. Early relationship experiences are the first models for patterns of self-regulation to be incorporated and to generalize from. In his view, the childhood years are important for development, but developmental trajectories may be altered at many points, for example, by changes in social support, life stress, or caregivers' mental health (Sroufe, Carlson, Levy, & Egeland, 1999). Although early experiences remain influential also during developmental changes, they do not determine in final form the development of the child. They are incorporated into a coherent pattern of adaptation that provides the basis for healthy or deviant development.

Some limitations of the present study should be mentioned. A first limitation is the rather high percentage of securely attached children (76%, which is higher than the normative percentage in nonclinical samples; Van IJzendoorn & Kroonenberg, 1988) and the low percentage of resistant children (3%, which is lower than the normative percentage in nonclinical samples; Van IJzendoorn & Kroonenberg, 1988). The underrepresentation of resistant children precluded analyses by insecure attachment classification. Second, we observed only mother–child interactions. Future studies should include father–child interactions (Grossmann, 1997; Grossmann et al., 2002) and peer interactions. Our measure of social development at both 7 and 14 years of age included experiences and interactions of the children and adolescents with peers, but the behavior of peers with regard to the adopted children and adolescents was not observed. Sroufe, Egeland, et al. (1999) showed that peer relationships at any given age predicted later social competence and that such predictive peer competencies were themselves predicted by the parent–child relationship that preceded them. In their study, peer and parent–child relationships together predicted later social functioning better than either domain alone (Sroufe, Egeland, et al., 1999).

Third, although the intervention conducted in infancy was effective in enhancing maternal sensitivity and attachment security in early childhood (Juffer, 1993; Juffer et al., 2005) it was not significantly associated with the latent variables. Findings from a previous study of the present sample in middle childhood also showed that the intervention was not related to social development (Stams, Juffer, Van IJzendoorn, & Hoksbergen, 2001). The intervention was very brief—only three sessions—and long-term effects on social development without regular booster sessions should not be expected (Bakermans-Kranenburg, Van IJzendoorn,

& Juffer, 2003). Early maternal sensitivity was not associated with infant attachment. However, in the present study we used a composite variable for both attachment security and attachment disorganization to which maternal insensitivity is not related (Van IJzendoorn et al., 1999).

Fourth, it is often claimed that adoptees and adoptive parents are broadly comparable with the general population, but this is not the case in some respects (Rutter, Silberg, O'Connor, & Simonoff, 1999). Adoptees differ with respect to adoption-specific aspects such as country of origin, age on arrival, and health condition on arrival. In addition, an increasing number of adoptions involve older children, particularly those with special needs of one kind or another (Rutter et al., 1999). However, in our study, adoption-specific aspects were not associated with adjustment in adolescence, and the children were adopted at a very early age (before the age of 6 months) and were not selected on the basis of special needs. Furthermore, it has been argued that adoptive parents differ from other parents in being better educated and more socially advantaged (as was the case in our sample; Stams et al., 2002). To the extent that the adoptive families provide an underrepresentation of high-risk environments (Rutter et al., 1999), the effect will be to underestimate the strength of environmental effects. In fact, investigators studying more economically advanced families have not consistently documented significant associations between early parent–child relationships and later development (Bates, Bayles, Bennett, Ridge, & Brown, 1991; Fagot & Kavanagh, 1990; Goldberg, Perrotta, Minde, & Corter, 1986). The present study did find indirect influences of early parent–child relationships on social development in adolescence. Fifthly, it should be noted that we included only one dimension of parenting, namely maternal sensitive responsiveness. Social development may also be influenced by other aspects of parenting, for example, discipline or cognitive stimulation. Lastly, the low correlations between early and middle childhood effects suggest that the final model may not be completely mediational in nature.

In conclusion, the present study supports the importance of both early and concurrent experiences, even in the absence of genetic similarities between children and parents. Contrary to the view that the home environment has no predictable effects on children's social development (Harris, 1998), our results show that parenting does matter: Adoptive parents influence their adopted children's social development. Child temperament plays a significant part in shaping social development in adolescence, but maternal sensitivity also affects and partly buffers temperament. We documented the predictability of individual development (Bornstein & Suess, 2000; Sroufe, 1979; Sroufe, Carlson, & Shulman, 1993) from infancy through middle childhood to adolescence. Early parent–child relationships do not determine in a direct way social development in adolescence, but they provide the basis for later social development through the influence on earlier social development. Bowlby's thesis (1973, 1980) that adaptation is always a product of both developmental history and current circumstances is supported.

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