Chapter 4
Social Development from Infancy to Adolescence:
Longitudinal and Concurrent Factors in an Adoption Sample

Abstract

In the present longitudinal study, early adopted children (N = 120) were followed from infancy to adolescence to assess the continuity of the children’s social development. This study allowed for more conclusive evidence of the influence of early and concurrent factors on adolescent’s social development, independent of shared genetic factors between children and parents. Results showed that social development was stable, even after controlling for background variables and temperament. Concurrent temperament and maternal sensitivity influenced middle childhood and adolescent social development. Early parent-child relationships were indirectly associated with social development in adolescence, through the influence on social development in middle childhood. Bowlby’s (1973, 1980) thesis that adaptation is a product of both developmental history and current circumstances is supported.

Introduction

The goal of the present prospective, longitudinal study is to investigate the continuity of children’s social development and to examine the relative influence of early, middle childhood, and concurrent factors on social development in adolescence. The emphasis is on maternal sensitivity and infant attachment security, attachment disorganization, and temperament as predictors in early childhood, and maternal sensitivity, child temperament and social development as predictors in middle childhood. The adolescents involved in the study are biologically unrelated to their adoptive parents and the study thus allows for more conclusive evidence of child-rearing or social-interactive influences on adolescent’s development, independent of shared genetic factors between children and parents (Rowe, 1993a).

Since decades, people speculate on the role of early and current experiences in shaping human development. Some researchers view current experiences as more important than previous ones, others assign greater

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importance to early experiences. Jerome Kagan (1984), for example, used a tape-recording analogy. The tape remains the same if current experiences are the same as past experiences, but it changes if current behavior leads to different consequences. Lewis (1997) argued that life is not orderly or predictable and that the behavior of a child reflects the context in which it occurs. If the environment changes from good to bad, than the behavior of the child changes from good to bad. In these views, current experiences are more important in predicting development or behavior than early or past experiences. In contrast, Erikson (1963) stated that each stage of psychosocial development is influenced by the previous stage. For example, basic trust gained through close relationships with adults in infancy influences development in toddlerhood (DeHart, Sroufe, & Cooper, 2004). 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, with consequences for later social development (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).

Previous longitudinal studies on biologically related parent-child dyads found evidence for the predictive value of attachment, parenting, and temperament on later social development. Attachment research showed 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, Spinaker, 1984; Borkowski, Ramey, & Bristol-Power, 2002; Fagot, 1997; Sroufe, Egeland, & Carlson, 1999; Volling & Belsky, 1992; Youngblade & Belsky, 1992). Research on temperament showed links between temperament and social development (e.g., Rothbart, Ahadi, & Hershey, 1994).

However, relations between early childhood factors and later adjustment may be indicative of coherence in individual development and continuity in child rearing context (Lamb, 1984; Lewis, 1997; Sroufe, 1979; Sroufe, Carlson, Shulman, 1993). 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 of the mother, 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 or behavior than early or past experiences. Moreover, a major disadvantage of studies on biologically related parents and children is that associations between parent-child variables (for example, mother-child attachment) and parent variables (for example, maternal sensitive responsiveness) on the one hand and child
variables (for example, the child’s adjustment) on the other hand, may always be (partly) determined by genetic associations. For example, a major disadvantage of much previous work on the influence of parenting on children’s adjustment is the confounding of parenting effects and genetic similarities (Rowe, 1993a, 1993b). Longitudinal studies on adopted children make it possible to examine the interplay of individual child characteristics and parenting style across time independent of genetic similarities.

To date, only few studies followed adopted children over a prolonged period of time (Fergusson, Lynskey, Horwood, 1995; Hodges & Tizard, 1989a, Hodges & Tizard, 1989b; Hoopes, 1982; O’Connor, Jenkins, Hewitt, DeFries, & Plomin, 2001; Plomin, Fulker, Corley, & DeFries, 1997; Simon, 1996; Verhulst & Versluis-den Bieman, 1995). The findings of these longitudinal adoption studies are inconclusive as they suffer from various shortcomings. First, most longitudinal adoption studies did not start at an early age of the adopted children and included both early and later adopted children. Because of this, the confounding factors of prolonged or extreme deprivation before the adoption may also exert an influence on the development of the children. Also, prolonged physical and psychological suffering before the adoption may affect later adopted children more. Moreover, assessments of the early development of the adopted children are often not available. Second, previous longitudinal adoption studies often do not use a variety of intensive measurements, like observations. Parent- or self-report questionnaires are the most frequently used measurements. Third, the studies often include only two times of measurement and the time-intervals are short. Finally, most of the time, the sources of information are restricted to the adoptive mothers and the children themselves.

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 internationally at an early age (before the age of six 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 the adopted children’s 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, interviews, Q sorts, and socio-metric data), different times of measurement (infancy, middle childhood, and adolescence), and multiple sources of information (the children themselves, mothers, teachers, classmates).

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
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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 continuity of the adopted children’s social development is assessed, and the relative influence of early, middle childhood, and concurrent factors on adolescent social development is examined. We expect to find continuity in social development from middle childhood to adolescence. From the theoretical framework of attachment theory, we predict that secure child-mother attachment relationships in early childhood and higher maternal sensitive responsiveness in early and middle childhood are related to higher levels of social development of adopted children in adolescence. In this model stressful life events and changes in childrearing environment might affect the child’s social development (Main & Hesse, 2003; Waters, Hamilton, & Weinfield, 2000). Less secure and more disorganized child-mother attachment relationships in early childhood and lower maternal sensitive responsiveness in early and middle childhood may increase the risk for less optimal social adaptation. In the absence of genetic associations between parent and child, we expect children’s social development to be (partly) determined by concurrent as well as earlier parenting and child characteristics. The influence of early experiences on later development can only be determined when concurrent environmental influences and early and later child characteristics are taken into account. We examined, therefore, whether the quality of the parent-infant relationship predicted adolescents’ social development over and above the effects of constitutional factors such as gender and temperament, over and above the effects of concurrent parent-child relationships and child characteristics, and independent of genetic similarities between children and parents.

Method

Participants

In the present longitudinal study, 160 internationally adopted children were prospectively followed from infancy to age 14. For 120 families (51 boys and 69 girls) data were available from the study in infancy, middle childhood, and adolescence (attrition rate of 18%). In the first stage of the study an intervention was tested in 130 of the 160 families, starting when the child was 5 months of age. This short-term early intervention was implemented in three sessions at home between 6 and 9 months in a randomly assigned experimental group, and results were compared with a control group. The adoptive families were randomly recruited through Dutch adoption organizations and the adopted children were not selected on present or expected future problems. The parents were not aware of the intervention when they entered the study. The intervention was not repeated during the following years. The results of the intervention study were reported elsewhere (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2005; Juffer, Hoksbergen, Riksen-Walraven, & Kohnstamm,
In the present study, we controlled for possible effects of the intervention on adolescents’ social development. The children were adopted from Sri Lanka (n = 64), South Korea (n = 38), and Colombia (n = 18) and were placed in the adoptive families before the age of 6 months (M = 10.45 weeks; SD = 5.35). The adoptive parents were Caucasian white, 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 34.91 (SD = 3.37) and of the adoptive mothers 32.73 (SD = 3.29). The adoptive families were predominantly from middle-class or upper middle-class backgrounds (Stams et al., 2002). The adoptive 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.

Parents and adolescents gave various reasons for not participating at 14 years. The major reasons 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). Four families did not participate because the adolescent was living in a mental health setting. Six mothers had died of incurable illnesses. 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 at 5, 6, 9, and 12 months and came to the laboratory at 12, 18, and 30 months. At age 7, families were visited at home to observe mother-child interaction, to interview the mother, and to administer questionnaires. The school was visited in order to have a questionnaire and a Q-sort completed by the adopted child’s teacher and to interview classmates. At age 14, families were visited at home again 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’ teacher 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, 30 months and 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). Table 1 presents a summary of the assessments at the different ages.


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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. Principal components analysis showed a one-dimensional solution with an explained variance of 51%. The standardized item reliability was .51 (N = 120). The health scores ranged from 0.00 to 0.68 (M = 0.38, SD = 0.13, N = 120).

Table 1

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<th>Assessments at Different Ages of the Longitudinal Study</th>
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Infant-mother attachment security (12 months). At 12 months, attachment assessments were conducted using 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), and 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 out of three observers. Coders were trained by an experienced rater 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 where a different classification was given, consensus was reached after discussion. The attachment classifications were distributed as follows: 76% secure (n = 91), 22% avoidant (n = 26), and 3% resistant (n = 3). A continuous scale for attachment security was used in our analyses because there was insufficient representation of ambivalent children among attachment classifications to conduct robust analyses, and in order to gain statistical power in regression analyses. The continuous scores for attachment security were computed according to a rule that was derived from propositions by Main, Kaplan, and Cassidy (1985) and Van IJzendoorn, Sagi, and Lambermon (1992). A high score on the continuous scale indicated that the infant was able to use the mother as a secure base when exploring the environment and when distressed. Intercoder reliability for the continuous scale ranged from .81 to .95 (intraclass correlations), using four pairs of raters. The mean score was 3.35 (SD = 1.19, N = 120).

The Main and Solomon (1990) coding system was used to assess disorganization of attachment (D). Disorganized/disoriented infants show temporary loss of a consistent strategy for dealing with the stress involved in the Strange Situation and display (briefly) 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 coding of the continuous rating scale for intensity of disorganized behavior showed a satisfactory intercoder reliability on 20 cases (r = .86; Juffer et al., 2005). The mean score was 2.89 (SD = 1.98, N = 120). A continuous 6-point scale for security of attachment was constructed, 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 (Van Londen, Juffer, & Van IJzendoorn, in prep.). The most secure category (B3) received a score of 6, and the other B-classifications without D components a score of 5 (B1, B2, and B4). 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 4.23 (SD = 1.41, N = 120).

Maternal sensitive responsiveness (12, 18, and 30 months, 7 and 14 years). At 12, 18, 30 months, 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 free-play and task situations (e.g., making a simple puzzle, building a tower of blocks), both in the child’s home and at the laboratory. The Ainsworth scales were used to code sensitivity
and cooperation (Ainsworth, Bell, & Stayton, 1974), and the Egeland/Erickson scales (Egeland, Erickson, Clemenhagen-Moon, Hiester, & Korfmacher, 1990; Erickson, Sroufe, & Egeland, 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 kappa’s for agreement within one scale point were .91 (12 months), .90 (18 months), and .97 (30 months) (Stams et al., 2002). Principal-components analyses revealed a one-dimensional solution with an explained variance of 42% (12 months), 60% (18 months), and 50% (30 months). The internal consistencies, in terms of Cronbach’s standardized item alpha’s, were .71 (12 months; N = 117), .82 (18 months; N = 111), and .81 (30 months; N = 105). For each age (12, 18, and 30 months) an overall score for maternal sensitive responsiveness was computed, which was the standardized summation of all scale scores divided by their number. Principal-components analysis on these three scores revealed a one-dimensional solution with an explained variance of 60%. Cronbach’s standardized item alpha was .66 (N = 120). The three scores for maternal sensitive responsiveness were combined into one overall early childhood score, which ranged from -2.03 to 1.42 (M = -0.01, SD = 0.78, N = 120).

At 7 years, maternal sensitive responsiveness was assessed in two task situations (solving a difficult puzzle and making a drawing together on the same sheet of paper) in the child’s home. The Egeland/Erickson scales (Egeland et al., 1990; Erickson et al., 1985), and the Emotional Availability Scales, Middle Childhood Version (EAS; Biringen & Robinson, 1991; Biringen, Robinson, & Emde, 1993) were used to code supportive presence, intrusiveness, sensitivity and timing, hostility, clarity of instruction (Egeland/Erickson scales), sensitivity, structuring/intrusiveness, and hostility (Emotional Availability Scales). Intercoder reliability, in terms of Cohen’s kappa for agreement within one scale point, was established on 60 tapes. The averaged kappa’s ranged from .78 (sensitivity-Emotional Availability Scales) to .97 (hostility-Egeland/Erickson scales) (Stams et al., 2002). Principal-components analysis revealed a one-dimensional solution, with an explained variance of 44%. Cronbach’s standardized item alpha was .76 (N = 116). The overall score for maternal sensitive responsiveness was obtained by averaging the scores after standardization and ranged from -1.73 to 1.59 (M = -0.01, SD = 0.69, N = 116).

At 14 years, maternal sensitive responsiveness was assessed in a problem-solving task in the family’s home. The mother got solutions of several difficult puzzles and was asked to assist her child in solving the puzzles. An episode of 10 minutes was videotaped. Again, 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. The scale hostility was not included because of the small variance at 14 years. Intercoder reliability was established on 30 tapes. Intra-class correlations ranged from .91 (sensitivity and timing) to .95 (intrusiveness and clarity of instruction). Principal-components analysis revealed a one-dimensional solution, with an explained variance of 67%. Cronbach’s standardized item alpha was .87 (N = 120). The overall score for maternal sensitive responsiveness was obtained by
averaging the scores after standardization and ranged from -2.27 to 1.43 (M = -0.01, SD = 0.80, N = 120).

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 (the second author) 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, 14 years). At 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, Freeland, & Lounsbury, 1979; Bates, 1980, 1987). 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. Principal components analysis revealed a one-dimensional solution with an explained variance of 78% in infancy, 33% at 7 years, and 37% at 14 years. Cronbach’s alpha’s were .86 (N = 120), .72 (N = 119), and .74 (N = 118), respectively. On the basis of moderate to high correlations between different measurement points in infancy (.55 < r < .72), an overall score for the child’s perceived difficulty during early childhood was computed (Stams et al., 2002). The overall score ranged from -3.27 to 2.51 (M = 0.00, SD = 1.00, N = 120) in infancy, from -1.74 to 2.90 (M = 0.00, SD = 1.00, N = 119) at 7 years, and from -1.95 to 3.51 (M = 0.00, SD = 1.00, N = 118) at 14 years.

In infancy, two factors were extracted: mood and resistance (Juffer, 1993). In middle childhood and adolescence, temperament consisted of three scales: aggression, reactivity, and restlessness (Stams et al., 2002). Principal components analysis revealed one-dimensional solutions with explained variances which ranged from 42% (restlessness at 14 years) to 61% (aggression at 7 years). Cronbach’s alpha’s were, respectively, .86, .80, and .82 at 7 years and .90, .88, and .75 at 14 years.

Sociometric status (7 years). At age 7, sociometric status of the adopted child was assessed in individual interviews at school with all classmates. None of the children knew which child we were focusing on (the adopted target child). Each child named three classmates as most liked, and three classmates as most
disliked. The ‘like’ score was the total number of times a child was rated as liked and the ‘dislike’ scores was the total number of times a child was rated as disliked. The standardized difference of the standardized like score and the standardized dislike score, the standardized preference score, was considered as indicative of the child’s sociometric status or peer group popularity (Cillessen & Ten Brink, 1991).

School Behavior Assessment List (7 years). At 7 years, the socio-emotional behavior of the adopted child at school was assessed with the School Behavior Assessment List (SCHOAL; Bleichrodt, Resing, & Zaal, 1993) completed by the teacher. The SCHOAL consists of 52 items, measured on 6-point scales, with pairwise comparisons of opposite adjectives that describe personality characteristics. In the present study, one scale from the 7-years assessment was used: agreeable behavior. Cronbach’s alpha for this scale was .86 (N = 120).

California Child Q-set (7 and 14 years). The California Child Q-set (CCQ; Block & Block, 1980; Van Lier, Haselager, Hoeben, & Van Lieshout, 1992; Van Lieshout, Riksena-Walraven, Ten Brink, Siebenheller, Mey, Koot, Janssen, & Cillessen, 1986) was administered to the child’s mother and teacher at 7 years and to the mother at 14 years. It 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 calculated for prosocial competence, antisocial competence, and social esteem (Van Lier et al, 1992; Van Lieshout et al., 1986). 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). At 7 years, Cronbach’s alpha’s ranged from .52 (social esteem) to .87 (prosocial competence; N = 120). At 14 years, Cronbach’s alpha’s ranged from .66 (social esteem) to .84 (prosocial competence; N = 120).

Child Behavior Checklist/Teacher’s Report Form (7 and 14 years). At 7 and 14 years, the Child Behavior Checklist (CBCL; Achenbach, 1991a; Verhulst, Van der Ende, & Koot, 1996) and the Teacher Report Form (TRF; Achenbach, 1991b; Verhulst, Van der Ende, & Koot, 1997) were administered to respectively the adoptive mother and the teacher of the child. These measurements are standardized questionnaires to assess the adolescent’s behavior problems and competence. The questionnaires have satisfactory reliability and good validity (Achenbach, 1991a, 1991b; Verhulst, Van der Ende, & Koot, 1996, 1997; Verhulst, Koot, & Van der Ende, 1994). The CBCL and TRF contain 118 items describing behavioral/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 somewhat or sometimes true and a 2 if the item very true or often true. Syndrome scores were obtained for social problems. At 7 and 14 years, Cronbach’s alpha’s for the CBCL were .82 and .84 (N = 120), and for the TRF .74 and .76 (N = 99), respectively. Appropriate school behavior was assessed with the TRF. Teachers
indicated on a 7-point rating scale the degree to which the child behaved appropriately.

**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 two 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, neighbours or neighbourhood. Cronbach’s alpha was .68 \((N = 116)\) at 7 years and .68 \((N = 118)\) at 14 years. The overall score for stressful life events was the standardized summation of all items divided by their number and was transformed to normal by an inverse method (Tabachnick & Fidell, 2001). The scores ranged from 0.01 to 0.77 \((M = 0.21, SD = 0.20, N = 116)\) at 7 years and 0.00 to 2.40 \((M = 0.47, SD = 0.46, N = 118)\) at 14 years.

**Socioeconomic status (7 and 14 years).** At 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 to 9, lower class; 9 to 12, middle class; and 12 to 16, upper class (Bernstein & Brandis, 1970). Principal-components analysis revealed a one-dimensional solution with an explained variance of 69% at 7 years and 62% at 14 years. Cronbach’s alpha was .82 at 7 years and .79 at 14 years. The mean score was 10.03 \((SD = 2.75, N = 120, range 2.99 to 14.73)\) and 9.53 \((SD = 2.36, N = 119, range 3.05 to 14.02)\), respectively, which means that the sample can be considered as middle class.

**Composite score.** At 7 and 14 years, a composite score was calculated for social development. General scores were obtained rather than scores from single measurements or informants, in order to reduce the number of dependent variables, thereby preventing change capitalization, to ensure high quality data, and to minimize sources of error and subject loss. The scores were derived from different measures (questionnaires, Q sorts, and socio-metric data), and from multiple sources (mothers, teachers, classmates), and were averaged after standardization (see Kochanska & Murray, 2000 for a similar approach). At 7 and 14 years, social development consisted of respectively nine and seven variables. Rejection (reversed), acceptance, prosocial competence, antisocial competence (reversed), and social esteem were derived from the CCQ. At 7 years, the mother and teacher scores were averaged. Social problems (reversed) and appropriate school behavior were derived from the CBCL and the TRF. At 7 years, two additional variables were included: the child’s peer group popularity was derived from the sociometric measure, and agreeable behavior at school was derived from the SCHOAL. At both ages, principal-components analysis revealed a one-dimensional solution, with an explained variance of 59% at 7 years and 62% at 14 years. Cronbach’s standardized item alpha was .90 and .89 respectively. The composite score for social development was the standardized summation of all variables divided by their number and was transformed to
normal by means of a square rote transformation (Tabachnick & Fidell, 2001). The transformed social development score ranged from 0.00 to 1.33 ($M = .82$, $SD = 0.25$, $N = 120$) at 7 years and from 0.00 to 2.17 ($M = 1.90$, $SD = 0.27$, $N = 120$) at 14 years.

Statistical analyses

The results were based on all families for whom longitudinal data were available from the study in infancy, middle childhood, and adolescence ($N = 120$). First, bivariate associations between the variables were examined, in order to select the relevant predictors for the multivariate analyses to follow. Second, multivariate longitudinal effects were examined by a hierarchical multiple regression analysis. Finally, longitudinal structural models were tested to assess the continuity of social development and the relative influence of early and middle childhood, and of concurrent factors on the adopted adolescents’ social development.

Results

Preliminary analyses

Table 2 presents means and standard deviations of the predictor variables of early childhood, middle childhood and adolescence. Table 2 also presents the correlations between these predictor variables and social development at 14 years. The following predictors were significantly correlated with adolescent social development: child gender, early and middle childhood maternal sensitivity, early, middle childhood, and adolescent perceived difficult temperament, middle childhood social development, and stressful life events at age 7 to 14. The background variables age on arrival, country of origin, health condition on arrival, mixed versus all-adoptive families, experimental condition, stressful life events at age 5 to 7, and socioeconomic status in middle childhood and adolescence did not significantly correlate with adolescent social development. We excluded the non-significant background variables from further analyses, except for experimental condition which is included in the structural equation modeling because of its influence on attachment security and disorganization (Juffer et al., 2005; Juffer et al., 1997).

Table 3 presents the correlations between the predictor variables. The correlation between temperament at 7 years and social development at 7 years was relatively high ($r = -.66$, $p < .01$). Therefore middle childhood temperament was entered in the regression analyses before middle childhood social development to examine the influence of middle childhood social development, controlling for the effects of middle childhood temperament. The correlations between early, middle childhood, and adolescent temperament were also substantial (early to middle childhood: $r = .40$, $p < .01$; early childhood to adolescence: $r = .36$, $p < .01$; middle childhood to adolescence: $r = .64$, $p < .01$). Middle childhood and adolescent temperament were entered in the regression
analysis before early childhood temperament to examine the influence of early temperament, controlling for the effects of middle childhood and adolescent temperament. Adolescent temperament was entered in the regression analysis before middle childhood temperament to examine the influence of middle childhood temperament, controlling for the effects of concurrent adolescent temperament.

Table 2
Correlations Between Predictors and Adolescent Social Development

<table>
<thead>
<tr>
<th>Predictor</th>
<th>M</th>
<th>SD</th>
<th>Social development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex of the child</td>
<td>1.58</td>
<td>0.50</td>
<td>.29***</td>
</tr>
<tr>
<td>Country of origin</td>
<td>1.53</td>
<td>0.30</td>
<td>-.09</td>
</tr>
<tr>
<td>Age on arrival</td>
<td>10.45</td>
<td>5.35</td>
<td>.01</td>
</tr>
<tr>
<td>Health condition on arrival</td>
<td>0.38</td>
<td>0.13</td>
<td>.02</td>
</tr>
<tr>
<td>Mixed vs. all-adoptive families</td>
<td>1.38</td>
<td>0.49</td>
<td>-.10</td>
</tr>
<tr>
<td>Experimental vs. control</td>
<td>1.34</td>
<td>0.48</td>
<td>-.02</td>
</tr>
<tr>
<td>Attachment security</td>
<td>3.35</td>
<td>1.19</td>
<td>.11</td>
</tr>
<tr>
<td>Attachment disorganization</td>
<td>2.89</td>
<td>1.98</td>
<td>-.04</td>
</tr>
<tr>
<td>Maternal sensitivity</td>
<td>-0.01</td>
<td>0.78</td>
<td>.19*</td>
</tr>
<tr>
<td>Perceived difficult temperament</td>
<td>0.00</td>
<td>1.00</td>
<td>-.26**</td>
</tr>
<tr>
<td>Middle childhood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stressful life events at age 5-7</td>
<td>0.21</td>
<td>0.20</td>
<td>-.05</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>10.03</td>
<td>2.75</td>
<td>-.01</td>
</tr>
<tr>
<td>Maternal sensitivity</td>
<td>-0.01</td>
<td>0.69</td>
<td>.24**</td>
</tr>
<tr>
<td>Perceived difficult temperament</td>
<td>0.00</td>
<td>1.00</td>
<td>-.50**</td>
</tr>
<tr>
<td>Social development</td>
<td>0.82</td>
<td>0.25</td>
<td>.64**</td>
</tr>
<tr>
<td>Adolescence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stressful life events at age 7-14</td>
<td>0.47</td>
<td>0.46</td>
<td>-.21*</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>9.53</td>
<td>2.36</td>
<td>.06</td>
</tr>
<tr>
<td>Maternal sensitivity</td>
<td>-0.01</td>
<td>0.80</td>
<td>.00</td>
</tr>
<tr>
<td>Perceived difficult temperament</td>
<td>0.00</td>
<td>1.00</td>
<td>-.67**</td>
</tr>
</tbody>
</table>

Note. Sex of the child: 1 = male, 2 = female; Country of origin: 1 = Korea & Colombia, 2 = Sri Lanka; Mixed vs. all-adoptive families: 1 = all-adoptive family, 2 = mixed family.

1 a t Test and one-way ANOVA are the preferred ways for analyzing these data, however, the significance tests showed similar results.

* p < .05. ** p < .01 (two-tailed).
Chapter 4

Table 3
Correlations Between Predictor Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infancy 1. Sex of the child</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Attachment security</td>
<td>-0.01</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Attachment disorganization</td>
<td>0.02</td>
<td>-0.08</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Maternal sensitivity</td>
<td>0.02</td>
<td>0.13</td>
<td>-0.31**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Perceived temperament</td>
<td>-0.08</td>
<td>-0.01</td>
<td>0.18</td>
<td>-0.15</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Middle childhood 6. Maternal</td>
<td>-0.09</td>
<td>-0.09</td>
<td>-0.10</td>
<td>0.22*</td>
<td>0.08</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>sensitivity</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Perceived temperament</td>
<td>-0.20*</td>
<td>-0.08</td>
<td>0.16</td>
<td>-0.05</td>
<td>0.40**</td>
<td>-0.02</td>
<td>1.00</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8. Social development</td>
<td>0.18</td>
<td>0.18*</td>
<td>-0.18</td>
<td>0.24**</td>
<td>-0.31**</td>
<td>0.26**</td>
<td>-0.66**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adolescence 9. Stressful life</td>
<td>-0.16</td>
<td>0.06</td>
<td>0.03</td>
<td>-0.03</td>
<td>0.19*</td>
<td>-0.02</td>
<td>0.28**</td>
<td>-0.10</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>events age 7-14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Perceived temperament</td>
<td>-0.24**</td>
<td>0.10</td>
<td>0.17</td>
<td>-0.09</td>
<td>0.36**</td>
<td>-0.18</td>
<td>0.64**</td>
<td>-0.54**</td>
<td>0.41**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01.

Multivariate longitudinal effects: regression analyses

We performed a hierarchical multiple regression analysis on social development at 14 years to explore the continuity of development and the longitudinal effects of maternal sensitivity, attachment security and disorganization, and perceived difficult temperament, with forced entry of predictors. The following predictors were entered in subsequent steps in the analysis: (1) gender of the child, (2) stressful life events at age 7-14, (3) difficult temperament at 14 years, (4) difficult temperament at 7 years, (5) social development at 7 years, (6) maternal sensitivity at 7 years, (7) early difficult temperament, and (8) early parent child relationships (early maternal sensitivity, early attachment security and disorganization). The results are presented in Table 4. \( R^2 \) and adjusted \( R^2 \) indicate the total amount of variance accounted for by the variables in the regression equation, \( \Delta R^2 \) indicates the increase in the amount of variance accounted for after addition of a variable, and \( \beta \) indicates the association of each variable with the outcome variables, controlling for the previous predictors. The results showed a significant regression equation for social development at 14 years, \( F(10, 109) = 19.18, p < .01 \). The total amount of variance accounted for was 63%. The significant predictors were child gender, accounting for 12% of the variance, stressful life events at age 7 to 14, adding 7% to the variance accounted for, difficult temperament at 14 years, adding 33%, and social development at 7 years, adding 11%. Girls scored higher on social development than boys, more stressful life events were associated with lower
levels of social development, and lower levels of difficult temperament at age 14 and higher levels of social development at age 7 were associated with favorable social development at 14 years.

Table 4
Hierarchical Multiple Regression Analyses on Adolescent Social Development at Age 14

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$R^2$</th>
<th>$\text{Adj } R^2$</th>
<th>$\Delta R^2$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sex of the child</td>
<td>.12</td>
<td>.11</td>
<td>.12**</td>
<td>.17**</td>
</tr>
<tr>
<td>2. Stressful life events at age 7-14</td>
<td>.18</td>
<td>.17</td>
<td>.07**</td>
<td>-.03</td>
</tr>
<tr>
<td>3. Difficult temperament at 14 years</td>
<td>.52</td>
<td>.50</td>
<td>.33**</td>
<td>-.53**</td>
</tr>
<tr>
<td>4. Difficult temperament at 7 years</td>
<td>.53</td>
<td>.51</td>
<td>.01</td>
<td>.11</td>
</tr>
<tr>
<td>5. Social development at 7 years</td>
<td>.64</td>
<td>.62</td>
<td>.11**</td>
<td>.40**</td>
</tr>
<tr>
<td>6. Sensitivity at 7 years</td>
<td>.64</td>
<td>.62</td>
<td>.00</td>
<td>.03</td>
</tr>
<tr>
<td>7. Early difficult temperament</td>
<td>.65</td>
<td>.62</td>
<td>.01</td>
<td>-.07</td>
</tr>
<tr>
<td>8. Early parent-child relationships</td>
<td>.66</td>
<td>.63</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>Early sensitivity</td>
<td></td>
<td></td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>Early attachment security</td>
<td></td>
<td></td>
<td>-.05</td>
<td></td>
</tr>
<tr>
<td>Early attachment disorganization</td>
<td></td>
<td></td>
<td>.08</td>
<td></td>
</tr>
</tbody>
</table>

Note. $N = 120$. $\text{Adj } R^2$ = adjusted $R^2$. * $p < .05$. ** $p < .01$.

Multivariate longitudinal effects: structural equation modeling

Figure 1 presents a longitudinal structural model with social development as the dependent variable. The Egeland/Erickson scales were used at all measurement points (infancy, middle childhood, and adolescence) and these scales were therefore used as indexes of maternal sensitive responsiveness in the model. The scale hostility was not included in the model, because of the small variance in hostility at 14 years. Structural equation modelling techniques were employed to test the model and examine relations among the different latent and observed variables. Analyses were completed using EQS 6.1 for Windows (Bentler, 1995). Additionally, a series of model comparisons incorporating systematic deletion of (non-significant) paths (Models 1 to 2), variables (Models 3 and 4), and developmental data (Model 5 and 6) were conducted to further test the continuity of social development and the relative influence of early parent- and/or child-variables. A good-fitting model is indicated by a non-significant chi-square, but also by the ratio of the chi-square to the degrees of freedom (Tabachnick & Fidell, 2001), the non-normed fit index (NNFI; Bentler & Bonett, 1980), the incremental fit index (IFI; Bollen, 1989), the comparative fit index (CFI; Bentler, 1988), and the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993). A good-fitting model is indicated by, respectively, a ratio less than 2 ($\chi^2/df$), values greater than .90 (NNFI and IFI), values greater than .95 (CFI), and values of .06 or less (RMSEA) (Tabachnick & Fidell, 2001).
Figure 1. Structural Equation Modeling on Adolescent Social Development at Age 14. Model 1. Observed and latent variables are shown in rectangles and ellipses, respectively. ES = Emotional support; RA = Respect for the child’s autonomy; SL = Structure and limit setting; QI = Quality of instruction; SP = Supportive Presence; I = Intrusiveness; ST = Sensitivity and timing; CI = clarity of instruction; R = Resistance; M = Mood; Re = Reactivity; A = Aggression; Res = Restlessness.

*p < .05.
Figure 2. Structural Equation Modeling on Adolescent Social Development at Age 14. Model 2. Observed and latent variables are shown in rectangles and ellipses, respectively. ES = Emotional support; RA = Respect for the child’s autonomy; SL = Structure and limit setting; QI = Quality of instruction; SP = Supportive Presence; I = Intrusiveness; ST = Sensitivity and timing; CI = clarity of instruction; R = Resistance; M = Mood; Re = Reactivity; A = Aggression; Res = Restlessness.

* p < .05.
The independence model that tests the hypothesis that the variables are uncorrelated with one another was rejected, \( \chi^2 (300) = 2080.28, p < .001 \). Model 1 (see Figure 1) included all relations between the variables. The model provided an acceptable fit to the data, \( \chi^2 / df = 1.26, \) NNFI = .96, IFI = .97, CFI = .97, RMSEA = .05 (see Table 5). A chi-square difference test (Tabachnick & Fidell, 2001) indicated a significant improvement in fit between the independence model and Model 1, \( \Delta \chi^2 (58) = 1775.48, p < .001 \). Factor loadings of parent indicators (maternal sensitivity) and child indicators (temperament) ranged from .45 (Egeland/Erickson scale intrusiveness measured at 7 years) to .97 (Egeland/Erickson scale sensitivity and timing measured at 7 and 14 years). The paths between temperament in infancy and middle childhood and between temperament in middle childhood and adolescence were significant (\( t = 2.86, p < .01 \), and \( t = 6.71, p < .01 \), 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 (\( t = 3.13, p < .01 \), and \( t = 2.04 p < .05 \), 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 (\( t = 4.93, p < .01 \)). The path between maternal sensitivity and attachment security and disorganization in infancy was significant (\( t = 2.10, p < .01 \)). Temperament in infancy, middle childhood, and adolescence showed significant concurrent, but not predictive relations with social development in middle childhood and adolescence (\( t = -6.15, p < .01 \), and \( t = -5.99, p < .01 \), respectively). Maternal sensitivity in infancy, middle childhood, and adolescence did not show significant concurrent or predictive relations with social development in middle childhood and adolescence. The paths from the combined variable of attachment security and disorganization in infancy to social development in middle childhood and adolescence were not significant.

In Model 2 (see Figure 2), predictive paths (paths from previous experience/adaptation to later development) between maternal sensitivity and temperament on the one hand and social development in middle childhood and adolescence on the other hand, were omitted. The model represented the data well, \( \chi^2 / df = 1.26, \) NNFI = .96, IFI = .96, CFI = .97, RMSEA = .05 (see Table 5). According to the chi-square difference test (Tabachnick & Fidell, 2001), Model 2 did not show significant deterioration over Model 1 fit, \( \Delta \chi^2 (6) = 7.37, p > .05 \). The other fit indices remained similar as well. However, the concurrent paths from maternal sensitivity in middle childhood and adolescence to social development in middle childhood and adolescence were significant in Model 2 (\( t = 2.03, p < .05 \), and \( t = 2.36, p < .05 \), respectively). Moreover, the path from the combined variable of attachment security and disorganization in infancy to social development in middle childhood was significant (\( t = 1.99, p < .05 \)). Other parallel paths among constructs in Model 1 and Model 2 remained similar.
Table 5
Fit Statistics for Structural Models on Adolescent Social Development at Age 14

<table>
<thead>
<tr>
<th>Model</th>
<th>χ²</th>
<th>df</th>
<th>χ²/df</th>
<th>NNFI</th>
<th>IFI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null model</td>
<td>2080.28***</td>
<td>300</td>
<td>6.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Nested models</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 full model</td>
<td>304.80**</td>
<td>242</td>
<td>1.26</td>
<td>.96</td>
<td>.97</td>
<td>.97</td>
<td>.05</td>
</tr>
<tr>
<td>Model 2 omitting predictive paths between sensitivity/temperament and social development</td>
<td>312.18**</td>
<td>249</td>
<td>1.25</td>
<td>.96</td>
<td>.97</td>
<td>.97</td>
<td>.05</td>
</tr>
<tr>
<td>Non-nested models</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 3 omitting attachment security and disorganization from Model 2</td>
<td>268.18**</td>
<td>206</td>
<td>1.30</td>
<td>.96</td>
<td>.97</td>
<td>.97</td>
<td>.05</td>
</tr>
<tr>
<td>Model 4 omitting concurrent paths from sensitivity to social development from Model 4</td>
<td>371.04***</td>
<td>210</td>
<td>1.77</td>
<td>.89</td>
<td>.91</td>
<td>.91</td>
<td>.08</td>
</tr>
<tr>
<td>Model 5 omitting all infancy data</td>
<td>156.06***</td>
<td>104</td>
<td>1.50</td>
<td>.95</td>
<td>.96</td>
<td>.96</td>
<td>.07</td>
</tr>
<tr>
<td>Model 6 omitting all middle childhood data</td>
<td>138.08*</td>
<td>109</td>
<td>1.27</td>
<td>.97</td>
<td>.97</td>
<td>.98</td>
<td>.05</td>
</tr>
</tbody>
</table>

Note. NNFI = non-normed fit index; IFI = incremental fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation.
* p<.05. ** p<.01. *** p<.001.

Non-nested structural models. A series of model comparisons incorporating systematic deletion of developmental variables were conducted to further examine the continuity of development and the relative influence of early parent- and/or child-variables across differing developmental periods to predict social development in adolescence. In Model 3, the combined variable of attachment security and disorganization in infancy was omitted from Model 2. Model 3 provided an acceptable fit to the data, χ²/df = 1.30, NNFI = .96, IFI = .97, CFI = .97, RMSEA = .05 (see Table 5). The χ²/df ratio showed some deterioration of Model 3 over Model 2. The other fit indices remained similar. Parallel paths among constructs in Model 3 and Model 2 remained similar.

In Model 4, the concurrent paths (paths from experience/adaptation to concurrent development) from maternal sensitivity in middle childhood and adolescence to social development in middle childhood and adolescence were omitted from Model 3. Only marginal support was found for Model 4, χ²/df = 1.77, NNFI = .89, IFI = .91, CFI = .91, RMSEA = .08 (see Table 5). According to the chi-square difference test (Tabachnick & Fidell, 2001), Model 4 showed significant deterioration over Model 3 fit, Δχ²(4) = 102.86, p < .01. Moreover, all other fit indices showed deterioration of Model 4 over Model 2 and 3 (see Table 5). Parallel paths among constructs in Model 4 and Model 3 remained similar.

Model 5 examined relations from middle childhood to adolescence (omitting all infancy variables) and Model 6 examined relations from infancy to adolescence (omitting all middle childhood variables). Model 5 and 6 showed acceptable fit to the data, χ²/df = 1.50, NNFI = .95, IFI = .96, CFI = .96, RMSEA = .07, and χ²/df = 1.27, NNFI = .97, IFI = .97, CFI = .98, RMSEA = .05, respectively (see Table 5). However, all fit indices showed deterioration of Model 5 over Model 1 (see Table 5). The χ²/df ratio, the NNFI, and the CFI showed
deterioration of Model 6 over Model 1 (see Table 5). Compared with Model 1, the concurrent path from maternal sensitivity in adolescence to social development in adolescence was significant in Model 5 ($t = 2.00, p < .05$). The path from sex of the child to social development in adolescence was significant in Model 6 ($t = 2.00, p < .05$). Other parallel paths among constructs in Model 1 and Model 5 and 6 remained similar.

Best fitting and most parsimonious model(s). These results showed that omitting predictive paths (paths from previous experience/adaptation to later development) between maternal sensitivity and temperament in infancy and middle childhood on the one hand and social development in middle childhood and adolescence on the other hand from Model 1 (Model 2, see Figure 2) resulted in a non-significant change of the model fit. These paths could therefore be deleted to get a more parsimonious model without losing adequate model fit. Model 2 was a parsimonious model with adequate model fit. Omitting the combined variable of attachment security and disorganization from Model 2 (Model 3) resulted in deterioration of the $\chi^2/df$ ratio. Omitting the concurrent paths (paths from experience/adaptation to concurrent development) between maternal sensitivity and temperament in middle childhood and adolescence on the one hand and social development in middle childhood and adolescence on the other hand from Model 3 (Model 4) also resulted in significant deterioration of the model. The model that omitted all infancy data (Model 5) and the model that omitted all middle childhood data (Model 6) showed deterioration of the model fit.

The best fitting and most parsimonious model was the model that omitted predictive paths between sensitivity/temperament and social development from the first model (Model 2, see Figure 2). In this model, temperament in infancy was significantly and positively associated with temperament in middle childhood, whereas temperament in middle childhood was significantly and positively associated with temperament in adolescence. Maternal sensitivity in infancy was not significantly related to maternal sensitivity in middle childhood. However, maternal sensitivity in middle childhood was significantly and positively related to maternal sensitivity in adolescence. Social development in middle childhood was significantly and positively related to social development in adolescence. Maternal sensitivity and temperament in infancy, middle childhood, and adolescence showed significant concurrent, but not predictive relations with social development in middle childhood and adolescence. Higher sensitivity of the adoptive mother and less difficult temperament of the adopted child were related to favorable concurrent social development. Higher maternal sensitivity was related to more secure and less disorganized infant attachment, which in turn was related to more optimal social development in middle childhood and adolescence.
Discussion

In the present longitudinal study, 120 internationally adopted children placed before the age of 6 months were followed from infancy to age 14 to assess the continuity of their social development and to examine the relative influence of early, middle childhood, and concurrent factors on social development in adolescence. The study controlled for concurrent contextual (parenting) and constitutional (gender, temperament) factors in examining the influence of early experiences on later social development. For example, the predictive value of the quality of the early parent-child relationship on later social development was examined over and above the effects of child characteristics, over and above the effects of concurrent parent-child relationships, and because of the use of an adoption sample, over and above the effects of genetic similarities between children and parents.

Regression analysis showed that adopted children’s social development was rather stable from 7 to 14 years of age, even after controlling for significant background variables (gender of the child and stressful life events) and temperament at 7 and 14 years. Early attachment security and attachment disorganization were not associated with social development in adolescence. Early maternal sensitivity and early temperament were associated with social development at 14 years, but they did not predict social development at 14 years after controlling for the same variables measured at 7 years. Girls were found to be better adjusted than boys, and stressful life events between 7-14 years predicted lower levels of social development.

Structural equation modeling showed that predictive paths (paths from previous experiences/child characteristics to later development) between maternal sensitivity and temperament in infancy and middle childhood on the one hand, and social development in middle childhood and adolescence on the other hand, did not contribute significantly to the model. Attachment and maternal sensitivity in infancy were not directly associated with social development in adolescence but its indirect influence through earlier social development was confirmed. The concurrent paths from maternal sensitivity and temperament in middle childhood and adolescence to concurrent social development in middle childhood and adolescence were also essential for the resulting model. The best fitting and most parsimonious model represented continuity in temperament and social development measured in infancy, middle childhood, and adolescence, and concurrent relations between temperament and maternal sensitivity on the one hand and social development on the other hand. Most importantly, the model also included significant paths from early maternal sensitivity through early attachment to social development in middle childhood and adolescence. In sum, continuity of social development from middle childhood to adolescence was high. Early parent-child relationships were indirectly associated with social development in adolescence, through the influence on social development in middle childhood.
To date, only a few studies examined the association between infant attachment and maternal sensitive responsiveness on the one hand and social development in adolescence on the other hand (e.g., Carlson, Sroufe, and Egeland, 2004; Sroufe et al., 1993; Sroufe et al., 1999). Most studies report significant associations of infant attachment and maternal sensitive responsiveness with social development in early or middle childhood, even after controlling for concurrent experiences (for an example of a previous study of the present sample, see Stams et al., 2002; see also Sroufe et al., 1990). Some studies examined the association of early parent-child relationships and adjustment in adolescence, but most of them examined the relation between infant attachment and young adults' attachment representations (such as Hamilton, 2000, and Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). It may be difficult to find direct significant influences of infant attachment and early maternal sensitive responsiveness on other developmental domains over such a long period. In their structural equation model, Carlson et al. (2004) found a non-significant standardized coefficient of .02 for the direct path from early experience (a latent variable with the observed variables attachment quality and toddler experience) to adolescent social functioning. The present study found a comparable standardized coefficient for the direct path from the combined variable of attachment security and disorganization to adolescent social functioning. It is also possible that it is difficult to find significant direct results of early relational predictors, such as infant attachment and maternal sensitive responsiveness, in a period when children are trying to become autonomous and independent of parents, as in adolescence. These predictors may have a direct association with development in middle childhood or adulthood, and indirect associations with development in adolescence. Moreover, an explanation for the absence of a direct influence of early parent-child relationships on adolescent social development can be found in the strong influences of later and concurrent experiences and behavior. In the present study, these later and concurrent influences eclipsed the predictive value of the direct associations between early parent-child relationships and adolescent social development. Finally, significant direct associations between early parent-child relationships and later adjustment may be indicative of coherence in individual development (Sroufe, 1979; Sroufe, Carlson, Shulman, 1993) or of the confounding of parenting effects and genetic similarities between children and parents (Rowe, 1993a, 1993b).

In the present study, we found indirect influences of early parent-child relationships on adolescent social development. The different steps of the indirect path from early parent-child relationships to adolescent social development found in our study are supported by attachment theory and previous empirical studies. Early maternal sensitivity or early parental behavior has been found to be associated with infant attachment security and disorganization (e.g., Ainsworth, Blehar, Waters, & Wall, 1978; De Wolff & Van IJzendoorn, 1997; Main & Hesse, 1990; Pederson, 1990; Schuengel, Bakermans-Kranenburg, & Van IJzendoorn, 1999), early maternal sensitive responsiveness and infant attachment security and disorganization have been found to be
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associated with social development in middle childhood (e.g., Belsky, 1981, 1984; Belsky, Lerner, Spanier, 1984; Berlin, Cassidy, & Belsky, 1995; Borkowski, Ramey, & Bristol-Power, 2002; Elicker, Englund, & Sroufe, 1992; Fagot, 1997; Kerns, 1994; Shulman, Elicker, & Sroufe, 1994; Stams et al, 2002; Thompson, 1999; Volling & Belsky, 1992; Youngblade & Belsky, 1992; Zimmermann, Maier, Winter, & Grossmann, 2001), and social development in middle childhood has been found to be rather stable and associated with social development in adolescence (e.g. Elicker, Englund, & Sroufe, 1992; Schneider, Attili, Nadel, & Weissberg, 1989). Together, these paths may constitute indirect influences of early parent-child relationships on adolescent social development. 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.

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 found these results 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 relationship are indirectly related to adolescent social functioning, independent of the confounding of parenting effects and genetic similarities between children and parents (Rowe, 1993a, 1993b). 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 and developmental trajectories may be altered at many points, for example, by changes in social support, life stress, or level of depression of caregivers (Sroufe, Carlson, Levy, & Egeland, 1999). Early experiences do not determine in final form the development of the child, but they are incorporated into a 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 regular percentage in nonclinical samples; Van IJzendoorn & Kroonenberg, 1988), and the low percentage of resistant children (3%, which is lower than the regular percentage in nonclinical samples; Van IJzendoorn & Kroonenberg, 1988). The lack of resistant children precluded analyses by attachment classification. Second, we only assessed mother-child-interactions. Future studies should include father-child-interactions (Grossmann, 1997; Grossmann et al., 2002) and, because of the growing influence of peers in adolescence, peer-interactions as well. Sroufe, Egeland, & Carlson (1999) showed that peer relationships at any given age predicted later social competence and that such predictive peer competencies were themselves predicted by qualities of parent-child relationships that preceded them. In their study, peer and parent-
child relationships together predicted later social functioning better than either domain alone (Sroufe et al., 1999). Third, it is often claimed that adoptees and adoptive parents are broadly comparable with the general population, but this is not the case in some fundamental respects (Rutter, Silberg, O’Connor, & Simonoff, 1999). Adoptees differ with respect to adoption-specific aspects. However, in our study adoption-specific aspects (e.g., country of origin, age on arrival, health condition on arrival, mixed vs. all-adoptive families) were not associated with adjustment in adolescence. In addition, an increasingly number of adoptions involve older children, particularly those with special needs of one kind or another (Rutter et al., 1999). However, the adopted children in the present study were adopted at a very early age (before the age of six months) and were not selected on the basis of special needs. Moreover, 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; Rutter et al., 1999). To the extent that the adoptive families provide an under-representation of high-risk environments, 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). However, the present study found indirect influences of early parent-child relationships on social development in adolescence. Finally, it should be noted that we included only one dimension of parenting, namely maternal sensitive responsiveness. Social development may be influenced by other aspects of parenting, for example discipline or cognitive stimulation, or other environmental factors.

In conclusion, the results of the present study support coherence in individual development (Sroufe, 1979; Sroufe, Carlson, Shulman, 1993) from infancy through middle childhood to adolescence. Concurrent environmental experiences and child characteristics are essential influences on middle childhood and adolescent social development. Early parent-child relationships are associated with social development in adolescence through the influence on social development in middle childhood, even in the absence of genetic similarities between children and parents. Early parent-child relationships do not determine in final form social development in adolescence, but they provide the basis for healthy 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.

References


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