From infancy to young adulthood : the Leiden Longitudinal Adoption Study

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From maternal sensitivity in infancy to adult attachment representations:

A longitudinal adoption study with secure base script

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Abstract

Background: We followed 190 adoptees from infancy to young adulthood to examine the associations between sensitivity and attachment. **Method:** Maternal sensitivity was observed in infancy, at 7 years and at 14 years. Attachment was measured in infancy, at 14 years and at 23 years. **Results:** Higher maternal sensitivity in infancy predicted more secure attachment in infancy and more secure attachment representations in young adulthood. Higher maternal sensitivity in middle childhood also predicted more attachment security in young adulthood. There was no continuity of attachment from infancy to young adulthood, but attachment in adolescence and young adulthood were significantly related. **Conclusions:** Children's attachment security may change over the early years but early sensitivity is of importance for attachment representations in adulthood.

Keywords: attachment, sensitivity, adult attachment, adoption, secure base scripts, Attachment Script Assessment

Introduction

Parental sensitivity to children's signals is widely considered to be of crucial importance for social-emotional and cognitive development throughout early childhood and adolescence (Bernier, Carlson, & Whipple, 2010; Feldman & Masalha, 2010; Mesman, Van IJzendoorn, & Bakermans-Kranenburg, 2012). Here we examine whether maternal sensitivity in the early years predicts attachment in adolescence and adulthood, using a sample of 190 adopted participants and their genetically unrelated parents followed from 5 months after birth until 23 years of age.

Parental sensitivity, defined as accurate recognition of and prompt and adequate responses to children's expressions of emotions, needs and (dis-)stresses (Ainsworth, Bell, & Stayton, 1974), is supposed to create a sense of agency in the child and to promote a secure attachment relationship. The concept of a working model of attachment is used to refer to the long-term influence of early parental sensitivity on later attachment representations. Early parent-child interactions are suggested to be represented in a mental model of attachment relationships that guide children's future expectations and interactions with significant others. Bowlby (1982, 1988) suggested that these mental models take shape in early childhood but remain by no means fixed, as later experiences might change the *working* models and adapt them to changing circumstances (see also Bretherton, 1985, 1996; Main, Kaplan, & Cassidy, 1985). In meta-analyses on the association between sensitivity and attachment significant but moderate effect sizes were found (Atkinson et al., 2005; Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003; De Wolff & Van IJzendoorn, 1997). Maternal sensitivity is considered to be a central construct in promoting children's well-being (Behrens, Hart, & Parker, 2012).

Continuity of attachment

Longitudinal studies on continuity of attachment spanning the first 20 years of life have shown equivocal results (Grossmann, Grossmann, & Waters, 2005). Strong continuity was found in some studies (Hamilton, 2000; Waters, Weinfield, & Hamilton, 2000), whereas in other studies continuity was more difficult to trace (Becker-Stoll, Fremmer-Bombik, Wartner, Zimmermann, & Grossman, 2008) or absent (Lewis, Feiring, & Rosenthal, 2000). The concept of lawful discontinuity was proposed to explain (dis-)continuities in the development of attachment contingent on the (in-)stability of the environment (Sroufe, Egeland, Carlson, & Collins, 2005). Divorce, unemployment, poverty and other strains in the lives of parents might disrupt their earlier sensitivity and negatively affect the attachment relationship with the children. The same would hold for changes for the better - e.g., interventions - that would elevate levels of parental sensitivity to the offspring and promote attachment security. Lawful discontinuity is

implied in the original idea of working models of attachment being open to environmental influences and changes (Bowlby 1982, 1988; Lamb, Thompson, Gardner, & Charnov, 1985).

In a recent meta-analysis by Pinquart, Feuβner, and Ahnert (2013) moderate stability of attachment was found, but stability was absent when the time interval was larger than 15 years. In an earlier meta-analysis (Fraley, 2002) on studies with shorter time intervals greater stability was found. It should be noted that in all studies conducted so far genetically related parent-child dyads were included, and as a consequence possible associations between early parental sensitivity and later adult attachments may be inflated or even spurious because of the dyads´ common genetic make-up (Harris, 1998; Haugaard & Hazan, 2003; Rowe, 1993). The current study on adoptees is the first to examine the associations between sensitivity and attachment from infancy to young adulthood in a sample of adoptees and their genetically unrelated parents.

Attachment Script Assessment

We examine longitudinal pathways from maternal sensitivity in infancy, middle childhood and adolescence to attachment representations in young adulthood assessed with secure base scripts in the Attachment Script Assessment (ASA; Waters & Waters, 2006). The concept of a secure base script is derived from the principles of attachment theory (Waters & Cummings, 2000) and makes use of insights from cognitive science, in particular research on mental models. Attachment experiences, including the child's early history and later changes in life, are internalized as various modes of mental representations, such as verbal (Kintsch, 1974) and non-verbal modes (Pavio, 2006), but also in event representations (Nelson, 1986; Schank, 1982, 1999). Similar to the idea of internal working models, a secure base script can be seen as a mental script that is formed based on an individual's history of secure base support (Waters & Rodrigues-Doolabh, 2001). Consistent and coherent support leads to a script that is easily accessible and includes the idea that the primary caregiver will be there for support, especially in times of need. Inconsistent or ineffective support leads to a script that might be incomplete and less accessible or might include more negative expectations about significant others (Waters & Waters, 2006).

The present study

In previous reports on the same sample we found evidence for the important role of early parent-child relationships in shaping social adjustment of the adoptees in middle childhood and adolescence (Jaffari-Bimmel, Juffer, Van IJzendoorn, Bakermans-Kranenburg, & Mooijaart, 2006; Stams, Juffer, & Van IJzendoorn, 2002), and that continuity of attachment across the first 14 years of life seemed to be dependent on the continuity of maternal sensitivity (Beijersbergen, Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2012). Besides, a potentially

temporary overrepresentation of insecure attachments was found in the adopted adolescents, and the need for more definite attachment assessments in adulthood was emphasized (Beijersbergen et al., 2012). Here we present attachment representations in the adopted young adults as measured with the ASA. Based on the concept of working models of attachment (Bowlby 1982, 1988), our hypothesis is that differences in secure base scripts can be predicted on the basis of variation of earlier and later attachment security and earlier and later maternal sensitivity.

Method

Participants

In the Leiden Longitudinal Adoption Study 190 internationally adopted children (100 girls) were followed from infancy to the age of 23 years. The children arrived in the Netherlands before the age of six months (M = 10.28 weeks, SD = 5.42) and were adopted from Sri Lanka (n = 116), South Korea (n = 49), and Colombia (n = 25). The adoptive families were randomly recruited through Dutch adoption agencies. Children's placement in adoptive families was based solely on the parents' position on the waiting list of the adoption agency, and not on the characteristics of the parents or children. All parents were Caucasian and came from predominantly middle-class socioeconomic backgrounds.

Procedure

During infancy we visited the families at home and 50 randomly selected families received a moderately effective short-term intervention to promote maternal sensitivity (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2005). The participants came to the laboratory for observations of mother-child interactions and the attachment relationship. At 7 and 14 years, we visited families at home to observe mother-child interactions. When the participants were 23 years of age, they came to the laboratory and attachment representations were assessed. During the first home visit (at the child's age of 5 months, or at 7 years, see below) the adoptive parents gave their informed consent for participation, and at 23 years the adopted young adult gave informed consent before the start of the lab visit.

Attrition

The original sample consisted of 160 families in infancy. At 7 years, 30 adoptive families from the same population were added to the sample. Compared to the original infancy sample no differences in background variables were found (Stams et al., 2002). In middle childhood, 146 of the 160 adoptive families participated (9% attrition), and in adolescence there was 11% attrition, with 143

of the 160 families participating (Jaffari-Bimmel et al., 2006; Stams et al., 2002). At 23 years, 62% of the eligible 190 adoptees participated in the study. At this assessment, long traveling distance, lack of interest, or time constraints were the major reasons for nonparticipation. Participants who dropped out did not differ on model variables at earlier assessments (*p* values ranging from .11 to .96).

Measures

Maternal sensitivity. At 12, 18, and 30 months, mother's sensitive behavior was assessed during structured tasks (building a tower or solving puzzles) in the laboratory. The Egeland/Erickson 7-point rating scales (Egeland, Erickson, Clemenhagen-Moon, Hiester, & Korfmacher, 1990; Erickson, Sroufe, & Egeland, 1985) were used to rate supportive presence, intrusiveness, clarity of instruction, and sensitivity and timing. The averaged Cohen's kappa's for agreement within one scale point were .91 (12 months), .90 (18 months), and .97 (30 months) (see Stams et al., 2002). For the current study on attachment representations we were interested in maternal supporting and structuring behavior represented by the scales supportive presence, clarity of instruction, and sensitivity and timing (see Van der Voort, Linting, Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2013). Principal component analyses were performed on the subscales of maternal sensitivity at 12, 18, and 30 months, and all analyses resulted in a one-dimensional solution, with explained variance ranging between 48% and 53%. Therefore, all scales were based on the average of the scores at 12, 18, and 30 months.

To make the sensitivity assessments at 7 and 14 years age-appropriate we used more difficult tasks (e.g., Tangram puzzles) and took into account the more verbal interaction between mother and child at these ages, compared to the more physical interaction in infancy (see Jaffari-Bimmel et al., 2006; Stams et al., 2002, for more information on the tasks at ages 7 and 14 years). Kappas ranged from .92 to .96 at age 7 (Stams et al., 2002), intraclass correlations ranged from .91 to .95 at age 14 (Jaffari-Bimmel et al., 2006).

Attachment: 12 and 18 months. Each infant's attachment to his or her mother was assessed with the Strange Situation Procedure at 12 and 18 months (SSP; Ainsworth, Blehar, Waters, & Wall, 1978). This procedure activates the attachment system as a consequence of the presence of an unfamiliar adult and two brief separations from the mother followed by reunions. For subtypes of attachment, insecure avoidant (A1 and A2), secure (B1, B2, B3, and B4), insecure resistant/ambivalent (C1 and C2), and disorganized (D), see Jaffari-Bimmel et al., p. 1145. Intercoder reliability for secure-insecure attachment at 12 and 18 months ranged from Cohen's kappa .80 to 1.0 (Juffer et al., 2005; Juffer, Rosenboom, Hoksbergen, Riksen-Walraven, & Kohnstamm, 1997). In infancy, the attachment distribution (secure/insecure and organized/disorganized) was not significantly

different from the normative distribution (see Juffer et al., 2005). In the present study, we used a continuous 6-point scale for security of attachment, based on the continuous scale for the three-way system designed by Main and colleagues (1985) and Van IJzendoorn, Sagi, and Lambermon (1992), extended with the D classifications (see also Jaffari-Bimmel et al., 2006). 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. Security scores were available for 12 and 18 months ($r = .72$, $p = .001$), and in accordance with our indicators for sensitivity in infancy we used the averaged score of the different points in time. The mean infancy attachment security score was 4.29 ($SD = 1.30$, $N = 160$).

Attachment: 14 years. The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996; Main, Goldwyn, & Hesse, 2003) is a semi-structured interview assessing an individual's state of mind with respect to attachment. Respondents are asked about their childhood experiences with their parents and how they think they are affected by them. Interview transcripts were classified as secure, insecure preoccupied or insecure dismissing, interrater agreement was 78% ($\kappa = .64$) for three-way classifications, see Beijersbergen and colleagues (2012) for more information on the coding procedure. In adolescence, there was an overrepresentation of insecure (dismissing) attachment relationships (Beijersbergen et al., 2012). In the present study, we used the continuous (reversed) 9-point scales of preoccupied anger, idealization, and unresolved loss or trauma (Hesse, 2008; Main & Goldwyn, 1998) to represent (lack of) insecure preoccupied, insecure dismissing, and insecure unresolved attachment, respectively. The intraclass correlation for these subscales was on average .72, and disagreements between coders were resolved by discussion (see Beijersbergen, 2007). Ratings for idealization and anger were available for both parental figures, the intraclass correlation was on average .78, and therefore scores within each subscale were averaged. Coherence of discourse could not be included in a fitting measurement model. The scales of idealization, anger, and unresolved loss (Hesse, 2008; Main & Goldwyn, 1998) tap into the different dimensions of insecure attachment, and resulted in a good fit of the measurement model (see Table 2 for correlations).

Attachment: 23 years. The Attachment Script Assessment (ASA; Waters & Waters, 2006) was conducted in young adulthood to assess attachment representations. Participants received four prompt word outlines that were developed to evoke the production of attachment-related stories, and both mother/child stories and

Table 1. *Descriptives of model variables.*

	Infancy			Middle Childhood			Adolescence			Young Adulthood		
	M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
Sensitivity												
Supportive presence	3.60	1.16	160	2.58	1.66	166	4.73	1.21	152			
Clarity of instruction	3.45	1.06	160	2.92	1.61	166	4.06	1.21	152			
Sensitivity and timing	3.71	1.09	160	2.76	1.75	166	4.29	1.21	152			
Attachment												
SSP	4.29	1.30	160									
AAI (reversed scores)												
Anger							8.42	1.14	149			
Idealization							5.92	2.07	148			
Unresolved loss							6.83	1.61	129			
ASA												
Story 1										3.65	1.16	117
Story 2										3.72	1.07	117
Story 3										3.87	1.10	117
Story 4										3.76	1.02	117

Note. SSP: Strange Situation Procedure, AAI: Adult Attachment Interview, ASA: Attachment Script Assessment; Descriptives are based on original (uncorrected) values.

adult/adult stories were included. Participants were instructed to use the columns of words to frame their best possible story, and they were stimulated to elaborate on the stories. Stories were audiotaped and literally transcribed. Transcripts of the stories were scored based on the presence or absence of a prototypic secure base script; this script suggests that there is a secure base in the story (mother or partner) who helps the main character deal with distress and helps things getting back to normal (Waters & Waters, 2006). Stories were coded on a 7-point scale (higher scores indicating more secure attachment) by three coders who were blind to all background information and to the other stories told by the same participant. Intercoder reliability at two stages of the scoring procedure (at the start and at the end) ranged between .78 and .88 (intraclass correlations, single measure, absolute agreement). Reliability and validity of the ASA have been tested in various cross-national studies (Bost et al., 2006; Coppola, Vaughn, Cassibba, & Costantini, 2006; Dykas, Woodhouse, Cassidy, & Waters, 2006; Vaughn et al., 2006a; Veríssimo & Salvaterra, 2006), see Bakermans-Kranenburg (2006) for a summary of the findings.

Attachment security in young adulthood, indicated by the mean score on the ASA in our sample of adoptees (M = 3.75, SD = 0.88) was similar to attachment security found in samples of undergraduate students studied by Groh and Roisman (2009), p = .78, and mothers at time 1 and time 2 studied by Vaughn and colleagues (2006b), p = .84, and p = .55, respectively.

Statistical analyses

The associations between maternal sensitivity in infancy, middle childhood and adolescence, and the adoptees' attachment representations in young adulthood were investigated using a longitudinal structural model, taking into account attachment in infancy and in adolescence. Relations between latent and observed variables were examined using EQS 6.1 for Windows (Bentler & Wu, 2006). Maternal sensitivity was represented as a latent variable with three indicators (supportive presence, clarity of instruction, and sensitivity and timing) at each wave. Attachment in infancy was included as a manifest variable (averaged security score of 12 and 18 months). Attachment in adolescence was represented as a latent variable with three indicators (preoccupied anger, idealization, and unresolved loss or trauma). Scores on the four stories of the ASA were the indicators of attachment representation in young adulthood.

To control for the intervention effect (Juffer et al., 2005) we regressed all model variables on a dummy variable indicating intervention versus control group. The residual scores centered at the original mean were used in further analyses (similar to Beijersbergen et al., 2012; Stams et al., 2002).

Multiple goodness-of-fit statistics were used to indicate model fit; the ratio between χ^2 and corresponding degrees of freedom, comparative fit index (CFI), and root mean square of approximation (RMSEA). Good fit is indicated by a

Table 2. *Correlation matrix of model variables.*

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Infancy	SP																	
2		CI	.77**																
3		ST	.75**	.86**															
4	Middle childhood	SP	.12	.09	.03														
5		CI	.11	.13	.05	.67**													
6		ST	.09	.15	.08	.73**	.85**												
7	Adolescence	SP	.31**	.30**	.21*	.14	.11	.08											
8		CI	.26**	.31**	.24**	.15	.19*	.13	.83**										
9		ST	.28**	.27**	.21*	.12	.13	.09	.86**	.89**									
10	Infancy	SSP	.18*	.16*	.12	-.05	.02	.00	.03	.07	.05								
11	Adolescence (AAI)	anger	.04	.01	.03	-.02	.09	.03	.03	.00	.01	.07							
12		ideal	.08	.07	.05	-.11	.00	-.01	.09	.11	.09	.07	-.35**						
13		loss	.03	.05	-.01	.08	.11	.11	-.06	-.10	-.10	.04	.21*	-.29**					
14	Young adulthood (ASA)	s1	.15	.16	.16	.12	.13	.10	.07	-.04	-.05	-.05	-.17	.15	.08				
15		s2	.20	.24*	.23*	.13	.14	.12	.06	.05	.01	.13	-.06	.13	.12	.54**			
16		s3	.14	.14	.15	.11	.12	.09	.12	-.01	.00	.04	-.08	.14	.12	.57**	.58**		
17		s4	.11	.10	.14	.22*	.12	.10	.10	.13	.06	.07	-.13	.05	.12	.56**	.52**	.53**	

Note. SP: Supportive Presence, CI: Clarity of Instruction, ST: Sensitivity and Timing, SSP: Strange Situation Procedure, AAI: Adult Attachment Interview, ideal: idealization, loss: unresolved loss, ASA: Attachment Script Assessment, s1 to s4: stories 1 to 4; *N* ranges between 82 and 160; Variables were corrected for the intervention; * $p < .05$; ** $p < .01$.

ratio between χ^2 and degrees of freedom smaller than 2.0, CFI exceeding .95, and RMSEA lower than .05 (Byrne, 2006; Tabachnick & Fidell, 2001).

Percentages of missing values ranged from 13 to 38%. These missing values were replaced with an expectation-maximization (EM) missing data procedure in EQS (Bentler, 2004).

Results

Preliminary analyses

Table 1 presents the descriptive statistics of all model variables. Preliminary analyses were performed to detect possible outliers and examine skewness and kurtosis of the variables. No adjustments were necessary. Table 2 presents a summary of the correlations among the indicators of sensitivity and attachment.

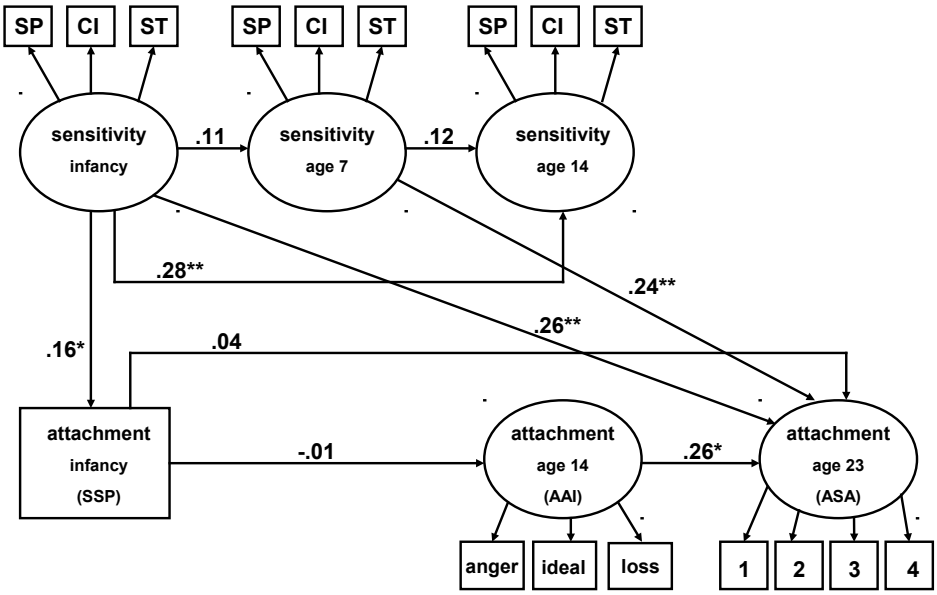

Figure 1. Full structural equation model (N = 190). χ^2/df = .91, CFI = .95, RMSEA = .06; SP: Supportive Presence, CI: Clarity of Instruction, ST: Sensitivity and Timing, SSP: Strange Situation Procedure, AAI: Adult Attachment Interview, ideal: idealization, loss: unresolved loss, ASA: Attachment Script Assessment; 1, 2, 3, and 4 represent the four stories in the ASA; The coefficients are standardized maximum likelihood parameter estimates; Non-significant pathways leading from sensitivity to attachment are not presented; Variables were corrected for the intervention; * $p < .05$. ** $p < .01$.

Model outcomes

The full model showed an acceptable fit, χ^2/df = .91, CFI = .95, RMSEA = .06. In Figure 1, for the sake of clarity the non-significant pathways leading from sensitivity to attachment in the model are not presented. Higher levels of maternal sensitivity in infancy predicted higher levels of maternal sensitivity in adolescence (p = .001). The relations between sensitivity in infancy and middle childhood and between sensitivity in middle childhood and adolescence were non-significant. More maternal sensitivity in infancy predicted more secure attachment in infancy (p = .048) as well as more secure attachment representations in young adulthood (p = .002). In addition, more maternal sensitivity in middle childhood predicted more attachment security in young adulthood (p = .003). Attachment in infancy did not predict attachment in adolescence and young adulthood, but attachment in adolescence and young adulthood were significantly related (p = .01). When gender was added to the model all structural pathways remained significant.

Discussion

In a prospective, longitudinal study on 190 international adoptees followed during their first 23 years of life, maternal sensitivity in early and middle childhood predicted attachment representations in young adulthood assessed with the Attachment Script Assessment. A more sensitive early child-rearing context was associated with both security of attachment in infancy and secure attachment representations in young adulthood. The strength of this prediction did not decrease over time, indicating that early sensitivity had enduring effects on attachment (see Roisman, Fraley, & Haltigan, 2013). Attachment in infancy was not related to attachment in adolescence or young adulthood, but attachment representations during adolescence showed continuity into young adulthood.

Sensitivity and attachment

We documented a remarkable continuity of maternal sensitivity to the children's signals from infancy to 14 years of age, and we found that early sensitivity shaped adult attachment even controlling for later sensitivity and previous attachment. Sensitive parenting matters in the domain of attachment. Sensitivity in the early and middle childhood years was related to later attachment representations and this relation was not dependent on common genetic background or continuity of parenting quality over time -- as Lamb et al. (1985) suggested. Neither do our longitudinal data fit Lewis's (1997) suggestion that attachment at later developmental stages would just mirror the momentaneous context. On the contrary, sensitive parenting in the (early) childhood years seems more influential than later parenting.

Maternal sensitivity in adolescence did not contribute to the prediction of attachment in young adulthood. An explanation may be that the influence of parenting might be larger in childhood than in adolescence (Scarr & Weinberg, 1983). Further, due to adolescents' and young adults' increasing selection of their own niches, other influences on their social-emotional development may become more profound (Miller, 2005), for example the growing influence of peers and the start of romantic relationships (Arnett, 2007). Comparison of the average ASA scores in adoptees and non-adoptees did not show evidence for a different distribution in adoptees, suggesting that the overrepresentation of insecure attachment in the adopted adolescents (Beijersbergen et al., 2012), comparable with meta-analytical findings on the normative attachment distribution in adolescence (Bakermans-Kranenburg & Van IJzendoorn, 2009), may have been of a temporary nature (Beijersbergen et al., 2012). The deviant attachment distribution in adolescence may be one of the factors explaining the lack of prediction from sensitivity at earlier and concurrent waves to adolescent attachment.

Discontinuity of attachment

The finding that early attachment is not predictive of adult attachment converges with recent meta-analytic findings showing no stability of attachment in studies with time intervals longer than 15 years (Pinquart et al., 2013). Attachment security in the first few years of life did not predict attachment representations at 14 years or attachment scripts at 23 years of age. In fact, the results of our study are consistent with the idea that attachment is not fixed in early childhood (Bowlby 1982, 1988) and that parent-child interactions seem to leave their imprint well into adulthood (Sroufe et al., 2005), without completely determining attachment-related scripts. The early years are formative but not predetermining later attachments. The shift from the behavioral level of attachment in infancy to the representational level in adolescence and young adulthood might explain why stability of attachment was only found from adolescence to young adulthood. Besides, research on attachment at the intrapsychic level has indicated that internal working models become increasingly stable with age (Pinquart et al., 2013).

Limitations

Some limitations of our study should be addressed. Data on attachment at age 7 was not collected, because at that time no valid measures of attachment in middle childhood were available. Consequently, continuity or change in attachment between infancy and adolescence remains unknown. Furthermore, it is unclear whether the findings in the current sample of adopted children can be generalized to parents with their genetically related children.

Conclusions

In sum, building on a longitudinal study covering the first 23 years of life, we found evidence for the importance of the quality of maternal sensitive support in the early years of life in genetically unrelated mother-child dyads. Early maternal sensitivity shaped adult attachment even controlling for later maternal sensitivity and previous attachment assessments. We replicated the well-established association between maternal sensitivity in early childhood and attachment security (Bakermans-Kranenburg et al., 2003) and extended our findings from early mother-child relationships to young adults' attachment representations. Our findings are consistent with attachment theory's central theme of working models of attachment, conceptualized as the long-term influence of early maternal sensitive support on individuals' later attachments. In our longitudinal study maternal sensitivity in early and middle childhood predicted attachment representations in young adulthood, confirming the importance of sensitive parenting for human development.

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