J Child Fam Stud (2015) 24:576–590
DOI 10.1007/s10826-013-9869-0

ORIGINAL PAPER

Concordance of Attachment Representations in Preschool Siblings Assessed by the Attachment Story Completion Task

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Published online: 24 November 2013

Abstract Several studies have indicated only a modest concordance of attachment security in siblings in infancy. Until now, very little was known about the concordance of siblings' attachment security beyond infancy, as assessed by the attachment story completion task. This cross-sectional study aims to examine the concordance of attachment representations of 38 first-born (4–7 years) and 38 second-born (3–5 years) siblings living in middle-class two-parent families. Personality factors and the level of parenting stress of the biological mothers (30–43 years) were analysed in relation to children's attachment security. The results indicate a 43 % secure-insecure concordance rate between siblings' attachment representations. Sibling's gender correspondence, age differences and differences in parenting stress were not related to attachment concordance whereas gender of the first-born child was related to attachment concordance. The results also indicate that older children more frequently had secure attachment representations compared to younger children and that attachment insecurity was associated with greater negative impacts of life events, lower maternal life satisfaction and higher parenting stress. Our study indicates that siblings' attachment representations may lack concordance even when siblings are assessed by the same method at the same time. If maternal and environmental factors are able to explain a substantial amount of variance in the attachment security of individual children, non-shared environmental factors might be underestimated when studying siblings' attachment representations. The significant effect of age on children's attachment representations found in this study suggests the need for future research on the stability of attachment representations during the preschool years.

Keywords Attachment representation · Sibling concordance · Story completion · Parenting stress · Preschool

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Introduction

Attachment plays a major role in children's development. Almost every infant develops an attachment relationship with a caregiver and endeavors to use his or her caregiver as a source of comfort and reassurance in the face of challenges or threats from the environment (Weinfield et al. 2008). However, the nature of the relationships and the effectiveness with which the caregiver can be used as a source of comfort and reassurance differ across infant-caregiver dyads. The organisation of attachment-related behavior in relationships is broadly categorised into secure and insecure attachments (Ainsworth et al. 1978; Sroufe and Waters 1977). Children who have experienced sensitive, supportive and responsive care are expected to develop a secure attachment organisation which reflects confidence in the caregiver's emotional availability and promotes a positive and trusting orientation towards the caregiver, oneself and more generally the world (Ainsworth et al. 1978; Belsky and Fearon 2002). In contrast, avoidant, ambivalent or incoherent and chaotic interactional patterns between the child and his or her primary attachment figure are associated with attachment insecurity.

Attachment theory assumes that maternal sensitivity, parents' mental representations of attachment security, the psychosocial environment and behavioral genetics contribute to children's attachment patterns. Maternal sensitivity has been defined as 'the extent to which a particular mother is able to gear her interaction with a particular baby in accordance with the behavioral signals he [or she] gives' (Ainsworth et al. 1978). This definition allows for the possibility that maternal sensitivity can vary between children in the same family. For the assessment of sensitivity, maternal behavior is most often rated in terms of accessibility, acceptance, cooperation and sensitivity of the mother toward a baby during his or her first year of life. The authors of the NICHD Early Child Care Research Network (2001) concluded that sensitivity was also the strongest predictor of preschool attachment classification. The stability of maternal sensitivity ratings over time was moderate in this analysis (.39–.48 between 6 and 36 months) but was found to be associated with changes in attachment security of the children and was thus considered further evidence for the influence of maternal sensitivity on child attachment. However, a meta-analysis including data from 1099 mother–child dyads yielded only a moderate overall effect size of .24 for maternal sensitivity on child attachment security (De Wolff and van IJzendoorn 1997; NICHD Early Child Care Research Network 2001), while the intergenerational transmission of attachment quality from mother to child was found to be much higher (van IJzendoorn 1995); the effect size was 1.06 indicating a 75 % concordance of maternal attachment representations and infant attachments.

As the attachment representations of mothers are more closely related to infant attachment quality than maternal responsive behavior, the process through which attachment quality is transmitted from caregivers to children remains only partially described by these two aspects. In this context, Atkinson et al. (2005) discussed methodological aspects that may have led to an underestimation of the impact of maternal sensitivity on infant attachment. The authors highlighted the influence of unresolved and disorganised classifications, as infant disorganisation does not seem to be linked to sensitivity ratings but rather to trauma-related features which might weaken the association between maternal sensitivity and infant attachment in samples including unresolved and disorganised classifications. The influence of life circumstances might equally reduce the correspondence between mother–child-attachment classifications when maternal attachment representations are assessed before the negative live events occurred, and child attachment afterwards. A recent study published by Huth-Bocks et al. (2011) reported data from a risk-sample of 147 women who were interviewed during pregnancy using the Working Model of the Child Interview (Benoit et al. 1997) and whose children were later observed in the strange situation at 13 months of age. In this study, a concordance rate of only 60 % for the secure-insecurity comparison between mothers and children was reported, and discordance of mother–child attachment was associated with contextual variables (e.g., household income). The effects were present both in a positive sense (insecure pregnant mothers whose children were later securely attached) and in a negative sense (secure pregnant mothers whose children were later insecure) and highlight the impact of psychosocial factors on the intergenerational transmission of attachment. The group of insecure mothers with a secure child was characterised by higher household income, higher percentage of fathers living with the family, more emotional support and fewer depressive symptoms of the mother. If domestic violence (defined as male-to-female violence during pregnancy and the infants' first year; Huth-Bocks et al. 2011) was experienced, this occurred after the child was born rather than during pregnancy, whereas domestic violence in the group of secure mothers with an insecure child rather occurred during pregnancy. The proneness of infants to changes in their attachment patterns has also been related to maternal personality factors. Vondra et al. (1999) found certain maternal personality risk factors (e.g., aggression, low social desirability), as well as anger control and depressive symptomatology, to be associated with changes in infant attachment patterns towards insecurity, whereas partner relationship satisfaction was associated with changes towards attachment security in infants. Their study also confirmed, in addition to demographic variables and disruptive events, the impact of maternal personality risk factors on the formation of specific attachment patterns in general. Thus, to understand stability and change in attachment patterns from one sibling to another including factors of maternal personality that proved to be influential is important in any data analysis.

Another important contribution to the solution of the "transmission gap" of attachment (van IJzendoorn 1995) came from recent behavioral genetics studies that indicated a specific genetic predisposition for attachment quality in children. In a study of 100 children between 15 and 52 months, Kochanska et al. (2011) demonstrated that the effects of maternal sensitivity on social competence and various developmental outcomes were only found among children with a short 5-HTTLPR allele (serotonin transporter linked promoter region). The short allele of the polymorphism has been linked to dysfunctions in the serotonergic system and to impairments in mood-regulation, executive skills and various forms of psychopathology (Kochanska et al. 2011, p. 605). Children with a short allele who had responsive mothers showed significantly better social and emotional competencies than children with the

same short allele whose mothers were less responsive to them. Additionally, an older finding from Lakatos et al. (2000) indicated an association between a variant of the dopamine receptor gene DRD4 and infant attachment disorganisation. Infants not carrying the seven-repeat variant were found to be four times more likely to be classified as disorganised than carriers of the seven-repeat variant. Subsequently, Gervai et al. (2007) and Lakatos et al. (2000) were able to demonstrate a relation between the quality of maternal communication and infant disorganisation only in the group of infants carrying the short form of the DRD4 allele but not for infants carrying the long form of DRD4.

To summarise, the influence and interrelatedness of all these factors on the formation of attachment representation in the child is evident, but the ways in which they interact have not yet been fully explored. In this context, the similarity of attachment security in siblings of the same family is of particular importance. The assessment of attachment patterns and attachment related factors in siblings reduces the sources of variance compared to the assessment of individual children from different families because the primary caregivers as well as the psychosocial environment normally stay the same or are very similar. Specifically, a high concordance of siblings' attachment relationships is expected in shared environments under stable family life-circumstances and absence of adverse life events. Thus, potential differences in sibling's attachment patterns could be more precisely attributed to factors that are either unique to each sibling (including sibling position), or to conditions that have changed over time and were not similar for both siblings at the time of the formation of attachment or to present circumstances (e.g., life events, parenting stress). Studies on the transmission of attachment from mother to child often do not report sibling position and leave open the question of whether the same statistical association of maternal attachment representation and sensitivity and child attachment pattern could be found for all siblings in the family. One of the reasons for this open question might be a lack of comparably valid instruments for the assessment of attachment patterns in each developmental period from infancy to adolescence.

Several empirical studies have indicated that attachment patterns in siblings and twins are only modestly concordant. Ward et al. (1988) examined the attachment concordances of 61 sibling pairs belonging to economically disadvantaged urban families. Attachment quality was assessed for each sibling at the age of 12 months in the strange situation. The mean spacing between the siblings was 31 months. 54 % of the sibling pairs were the same gender and 46 % of the sibling pairs were mixed. 60 % of the first-born children (and 61 % of the second-born children) had secure attachment qualities, while 40 % of the first-born children had insecure attachments (avoidant and ambivalent; and 39 % of the second-born children). 57 % of the second-born children received the same attachment classification that their elder sibling received at the same age. Based on a two-way-classification (secure-insecure), the data indicate a concordance rate of 61 %. Attachment concordance was associated with the stability of maternal interactional behavior. Mothers were assessed in a problem-solving situation that was conducted with each sibling 1 year after the strange situation procedure when a sibling had reached the age of 24 months. The authors concluded that siblings' attachment concordances were mediated by the stability of maternal behavior (Ward et al. 1988). Similarly, Teti and Ablard (1989) reported a concordance rate of 64 % (secure-insecure) in a sample of 47 sibling pairs from a middle-class sample. The younger siblings' attachments (mean = 1.6 years) were assessed in the strange situation and, for a parallel assessment of the elder siblings (mean = 4.2 years), a Q-sort-measure was used (Waters and Deane 1985). Given the absence of psychosocial risk status in this sample, the authors emphasised the unexpected low, but significant, concordance rate. They assumed that differences in the quality of maternal care between the siblings might account for differences in child attachment security. In these two studies, the moderate attachment concordance of siblings was explained by changes in maternal sensitivity either due to contextual factors or due to differential treatment of children. However, child-related features were not discussed. Van IJzendoorn et al. (2000) pooled data on sibling attachment from two US and one Dutch sample to examine attachment concordance in 138 sibling pairs. All children had been assessed with the strange situation between the ages of 12 and 14 months. The authors found a significant concordance rate of 62 % for siblings' attachment security. In contrast to former studies, sibling pairs of the same sex showed higher concordance rates (68 %) than sibling pairs of the opposite sex (56 %). Birth order was not related to attachment distributions but was significantly related to maternal sensitivity, as mothers displayed less sensitivity toward their younger child relative to their older child (van IJzendoorn et al. 2000). Spacing between the births was not related to concordance of attachment security of the siblings, but longer birth spacing was associated with higher sensitivity to the younger sibling, and shorter birth spacing was associated with higher sensitivity to the elder sibling. Several twin-studies have been conducted in recent years, mostly with young children tested in the strange situation, to investigate the impact of genetic similarity on attachment concordance (for an overview of these studies see Bokhorst et al. 2003). Three of the reported studies compared dizygotic and monozygotic twins and found higher concordance rates in monozygotic twins, but the difference between dizygotic and monozygotic twins was

non-significant. For example, O'Connor and Croft (2001) reported 70 % concordance of attachment security in monozygotic preschool twin pairs compared to 64 % concordance in dizygotic preschool twins (the mean age was 43 months). However, statistical analysis yielded no significant difference for attachment concordance between monozygotic and dizygotic twin-pairs, and the authors concluded that the data did not indicate a significant genetic influence but indicated a significant influence of shared environments on attachment security in preschool siblings (O'Connor and Croft 2001). Bokhorst et al. (2003) found concordance rates of 56 % for 57 monozygotic infant twin pairs and 60 % for 81 dizygotic infant twin pairs. These authors raised the issue that parental sensitivity does not always represent a shared environmental factor, even in the case of twins.

Our review of the literature revealed that there are few studies on attachment concordance in siblings, and the available studies were conducted with infants. These studies mostly assessed the quality of child-caregiver relationships using the strange situation procedure, whereas at a later developmental stage no study is currently available to describe siblings' attachment concordance assessed either on a behavioral or on a representational level. The concept of mental representations or "internal working models" of attachment was introduced by Bowlby to 'constitute the bridge between an infant's experience of sensitive or insensitive care and the development of beliefs and expectations that affect subsequent experience in close relationships' (Thompson 2008, p. 350). How attachment relationships with other caregivers and additional attachment-relevant experiences in a broader family context are integrated into attachment representations in middle-childhood is an unanswered question. Thus, examining the concordance of siblings' attachment representation beyond infancy is needed. Previous studies suggest that attachment representations would be transmitted from a mother to all her children under equally sensitive caregiving conditions and in the absence of important adverse experiences. In this case, concordance rates are expected to be similar to, or higher than, those found in infancy studies, as the children have spent longer periods of time in a shared family environment. On the other hand, maternal sensitivity can vary between siblings, and with growing age, the siblings' time spent in non-shared environmental contexts increases.

The research focus of the present study is to examine the concordance of attachment classifications in siblings between 3 and 6 years of age measured at the same time using the same representational measure of attachment. Thus, our study had the following aims: (1) to describe attachment representations of preschool-aged siblings measured by the attachment story completion task (ASCT) and (2) to assess the concordance rate of siblings' attachment representations in a cross-sectional study design. We expected that siblings living in the same family environment would have similar attachment representations. The study further aimed (3) to examine the effects of gender concordance, birth spacing, and differences in sibling-specific parenting stress on siblings' attachment concordance. These variables are considered relevant factors influencing concordance of sibling's attachment representations. We expected a significant association of gender concordance and of similarities in parenting stress with attachment concordance, but no effect of birth spacing within the narrow age-range studied. Finally, our study (4) explored associations between children's attachment representations and family and maternal characteristics. We hypothesised that the presence and impact of negative life events, a larger family size and lower socio-economic

Table 1 Demographic variables obtained by parents' report of 38 sibling-pairs

Age of children, years and months, mean (SD in months) [range]	
First-born	5 years 10 months (7 months) [4 years 5 months–6 years 9 months]
Second-born	3 years 9 months (7 months) [2 years 11 months–4 years 11 months]
Gender, n (%)	
First-born	
Male:Female	15 (40 %):23 (60 %)
Second-born	
Male:Female	20 (63 %):18 (37 %)
Gender of siblings, n (%)	
First- and second-born female	14 (36 %)
First- and second-born male	11 (29 %)
First-born female and second-born male	9 (24 %)
First-born male and second-born female	4 (11 %)
Age of the mothers, years, mean (SD) [range]	36.2 (3.1) [30–43]
Birth order of mothers, n (%)	
First-born:later-born	18 (47 %):20 (53 %)
Mothers' employment, n (%)	
Part-time >50 %:part-time ≤50 %:not employed	14 (16 %):19 (71 %):5 (13 %)
Socio-economic status, mean (SD) [range]	8.0 (1.8) [3–10]
Lower:middle:upper	1 (3 %):11 (29 %):26 (68 %)
Life events	
Numbers, mean (SD) [range]	11.7 (4.7) [4–21]
Total impact, mean (SD) [range]	−2.8 (5.3) [− 17 to 8]
Negative:neutral:positive	23 (60 %):7 (18 %):8 (22 %)

status would be related to attachment insecurity. Furthermore, we expected that specific maternal personality characteristics (e.g., low life satisfaction, or high aggressiveness) would be associated with child attachment insecurity.

Method

Subjects

In January 2003, families from day-care institutions in the two largest towns in the canton of Zurich (Switzerland) were invited by letter to participate in the study. Families were accepted in the study if they had first- and second-born children within the age range of 3–7 years and if both children had the same biological parents and lived with their parents in a two-parent family. Of the 49 families that finally agreed to participate, 38 healthy and normally developed sibling-pairs and their biological mothers were included in the data analysis. Overall, 11 families were excluded because, in 10 cases, the second-born child turned out to be younger than 3 years and in one case a father had recently died. At the time of assessment, 32 of 38 families (84 %) were two-child families, and 6 families (16 %) had a third younger child. Informants reported no severe behavioral or medical problems. Further sample characteristics are presented in Table 1.

Procedures

All families received a letter including a detailed description of the study protocol and written informed consent was obtained from all parents. The study included a home visit during which the ASCT was administered to each sibling separately. Two researchers who had attended university courses on attachment theory were carefully instructed in the administration of the ASCT by the project leader (last author), who is an experienced child psychologist trained with young children and specialising in attachment theory. Preliminary assessments were undertaken, and each home visit included a familiarisation time to accustom the children to the new situation. All ASCTs were administered by the same researcher (first author) and were performed in the Swiss-German dialect. The two siblings in each family were tested one after the other. No specific sequence was predefined, but the child who underwent ASCT last was not allowed to watch the administration of the first child. The ASCT was presented with a standard protocol (Bretherton et al. 2001) and videotaped. Concurrently, the mothers stayed in another room, filled out questionnaires and underwent an interview conducted by the other researcher (second author).

Measures

Attachment

Attachment representations were assessed by the ASCT (Bretherton et al. 1990). The ASCT has been used in previous studies and has been shown to be a reliable and valid indicator of attachment representations from 3 to 8 years of age (Bretherton 2005; Bretherton et al. 2001; Gloger-Tippelt and König 2002; Goodman et al. 1998; Murray and Woolgar 1999). The ASCT consists of a warm-up story about a birthday party, followed by 5 story stems. The child is asked to complete each story by narrating and acting out an invented end for each story using small family figures and props. Each story stem presents a mildly stressful conflict or problem that activates attachment-related thoughts and feelings. The first story is about a little mischief in the presence of the mother ("spilled juice"), the second is about pain ("hurt knee"), the third is about fear ("monster in the bedroom"), the fourth is about separation from parents ("departure"), and the fifth story is about the parents returning ("reunion"). After each of the story stems, the interviewer asked the child to 'show me and tell me what happens next'. Afterwards, only clarifying prompts were used if the child moved the figures without describing their action ('what is she/he doing?') or if the child did not indicate by speech or action that the story was finished ('anything else?'). If the child did not know how to continue after two prompts, the interviewer presented the next story.

The classifications of attachment representations were based on videos and detailed verbal/behavioral transcriptions. The ASCT scorings were performed by the first and second authors, and two siblings of the same family were never scored by the same researcher. Again, both researchers were trained on the attachment classification by the last author, who had been trained by L.A. Sroufe in the attachment classification of infants in the strange situation test and had obtained a certificate of reliability. Interrater reliability between the two researchers was assessed based on 10 of the 98 children and was performed for each story and for the child's dominant attachment strategy for all ASCT stories (for two-way classification: $r = 1.0$; for four-way classification: $r = .8$). Difficult cases were discussed and resolved with an external expert who had been trained in the analysis of the ASCT by G. Gloger-Tippelt.

For the classification of attachment representations, we used the criteria outlined by Bretherton and Ridgeway (1990), Gloger-Tippelt (1999) and Gloger-Tippelt and König (2002). For a classification of *security* (*B*), the following criteria were used for stories one through five, respectively: (1) juice was cleaned up, parental discipline or anger was not violent or extreme; (2) the adults

responded to the child's pain by hugging, administering a Band-Aid and verbal comfort; (3) the parents dealt with the child's fear, and the child was able to go to sleep without anxiety; (4) in the absence of the parents, the child did something constructive such as playing, eating, or sleeping but not in a "deactivating" manner, i.e., mechanically or obviously trying to avoid the separation theme; and (5) upon the return of the parents, the child and parents approached each other, greeted or hugged each other, and this was followed by a joint activity. To receive a secure classification, the child had to be cooperative, engaged and at ease when working on the story. Furthermore, the child needed to have resolved the presented conflict in a positive, constructive manner either by using parental support or by acting in a confident way where the emotional content of a story was addressed and the child figure was safe again in the end. For *attachment-insecurity* the following criteria were used: (1) *Avoidant* (*A*): children were classified as avoidant if they responded to several prompts with 'I don't know', 'I want another story', 'I want to stop now', or if the child focused on the testing material, and thus tried to avoid the attachment issue of a story. Avoidant classifications were also assigned if a child completed a story in a "deactivating" way by skipping over the presented conflict, ignoring the emotional content, presenting a harmless everyday action (i.e., 'they all went to bed') or by acting out something that had nothing to do with the presented story stem without showing signs of concern about what happened to the child in the story. (2) *Ambivalent* (*C*): if a child struggled to find an ending, was "stuck" in the problem, or repeated the misfortune or harm multiple times without finding a solution and violent, aggressive or catastrophic scenes were absent, the child was classified as ambivalent. Moreover, children who seemed "baby-like", immature and helpless in finding an end to the story, ridiculed the story or lost themselves in irrelevant, never-ending details were classified as ambivalent. (3) *Disorganised* (*D*): odd responses characterised by violence, death or other catastrophic scenes (e.g., the child was eaten by the monster, figures fell down and were severely injured and not helped afterward, family figures were highly aggressive without reason) resulted in disorganised classifications. Additionally, a story response was classified as disorganised when the child him/herself seemed blocked or anxious during the task, gave bizarre or threatening answers, or was aggressive toward the test material (e.g., beating the figures without speaking) or aggressive towards the administrator.

The most frequent four-way classification (B, A, C, D) over the 5 stories was determined by the child's dominant attachment strategy. For the two-way classification (secure-insecure), the A, C or D classifications were summarised as insecure. Based on the two-way classifications, a *security score* (0–7; 0 = only insecure classifications, 7 = only secure classifications) was defined by the weighted total number of secure classifications across all 5 stories. Because attachment-related thoughts and feelings are expected to be more strongly activated in the stories about a separation and reunion situation between the child and parents and based on recommendations by Bretherton and Ridgeway (1990) and Bretherton et al. (1990), we assigned the last two stories a weight of 2, while the first three stories received weights of 1. For example, a child who received secure classifications for the first three stories, but was avoidant in the last two stories received a security score of 3, whereas a child with avoidant classifications in the first three stories and secure classifications in the last two stories received a security score of 4. Similar weights were also used to identify children's dominant four-way attachment classifications when the stories had diverse classifications. A security score ≥ 4 was defined as a secure dominant attachment representation, and ≤ 3 was defined as an insecure dominant attachment representation. Concordance of siblings' attachment classifications were defined by the following: (1) differences in siblings' security scores (first-born minus second-born) and (2) the concordance of the two-way classifications (secure vs. insecure), which yielded a binomial variable (same, different). To study attachment security within each family, a sum score of the security score of first- and second-born children (range 0–14) was calculated (*total security score*).

Parenting Stress

The mother's parenting stress was assessed for each child individually using the short form of the widely used Parenting Stress Index PSI-SF (Abidin 1995), which includes 36 items that are answered on a five-point Likert scale ranging from definitely disagree (1) to definitely agree (5). The PSI-SF consists of 3 subscales that reflect parents' perceptions of their child-rearing competence in the following areas: (1) personal factors (subscale *Parental Distress PD,* range 12–60; item example: 'I feel trapped by my responsibilities as a parent'); (2) dissatisfaction with the interactions between parent and child (subscale *Parent–Child Dysfunctional Interaction P-CDI,* range 12–60; item example: 'I expected to have closer and warmer feelings for my child than I do, and this bothers me'); and (3) child's temperament, demanding-ness and non-compliance (subscale *Difficult Child DC,* range 12–60; item example: 'My child seems to cry or fuss more than most children'). The scale *Total Stress* (*TS*) is calculated as the sum of the three subscales and indexes the overall level of parenting stress (range 36–180). Higher scores reflect higher stress,

and parents who obtain a TS score above a raw score of 90 are expected to experience clinically significant levels of stress (Abidin 1995).

Maternal Personality

Mothers' personality traits were assessed by the Freiburg Personality Inventory-Revised FPI-R (Fahrenberg et al. 2001), which is one of the most widely used personality inventories for adults in German-speaking countries. The FPI-R includes 138 statements that are answered with 'I agree' or 'I disagree' and consists of 12 scales: Life Satisfaction, Social Orientation, Performance Orientation, Inhibition, Excitability, Aggressiveness, Strain, Somatic Distress, Health Worries, Openness, Extraversion and Neuroticism. For our analyses, the scales Life Satisfaction (item example: 'I'm always in a good mood'), Aggressiveness (item example: 'If someone shouts at me, I shout back'), Strain (item example: 'I'm frequently drawn, feel run down and exhausted') and Health Worries (an item example: 'To stay healthy, I'm looking for a quiet life') were used. Normative values are available with raw values converted into sex- and age-specific Stanine values (mean = 5, SD = 1.96; Fahrenberg et al. 2001). The FPI-R is a reliable indicator of individuals' personality traits (Brähler et al. 2002).

Life Events

The occurrence of life events since the birth of the first child was assessed with a list of 34 events (Steinhausen and Winkler-Metzke 2001) that asked about changes in work, financial and private situations (yes/no). A total number of life-events-score was computed by summing up the number of reported life events for each family (range 0–34). If a life-event occurred, mothers were further asked to indicate the subjective perceived impact rated on a five-point Likert scale ranging from 'not at all acceptable' (−2) to 'very acceptable' (+2). A total life-events-impact-score was calculated by summing up the indicated subjective perceived impacts for all reported life events. Negative total impact values were defined as a negative impact, values of zero were defined as neutral and positive values as a positive impact. An item example was: 'Did any family member have an accident since the birth of your first child? How did this affect you?'

Socio-economic Status (SES)

Paternal and maternal actual or last occupations were rated using information from the mothers by applying a five-point Likert scale ranging from non-skilled (1) to highly skilled (5). A SES score that summarised these scores and ranged from 2 (lowest SES) to 10 (highest SES) was obtained. Based on their SES scores, children's families were allocated to one of the following three classes: lower class (scores 2–4), middle class (scores 5–7), and upper class (scores 8–10).

Statistical Analyses

Descriptive results for nominal variables are presented as the number of cases and percentages. Means, standard deviations (SD) and ranges are given for continuous variables. As most variables showed significant skewness and/or kurtosis, we used nonparametric tests for testing the equality of means. To test associations between variables, Spearman correlations were used for ordinal variables. A Wilcoxon signed-rank test was performed to compare parenting stress scores and security scores between first- and second-born children. Effect sizes were computed using Cohen's d for first- and second-born parenting stress mean comparisons (.20, small effect; .50 medium effect; >.80 large effect (Cohen 1992). Cohen's Kappa was used to estimate the agreement between siblings' attachment security. Logistic and linear regression analyses were used to analyse independent effects (e.g., gender concordance, birth spacing, parenting stress differences) on the concordance of siblings' attachment representations (n = 38). Mixed effects models were calculated to analyse independent effects on attachment security (security scores) across the whole group (n = 76 children). A mixed model is a form of an analysis of variance (ANOVA) that was required by our sample unit (the mother, the first- and second-born child formed a triad in which the data tended to be related). In mixed effects models, independent variables (e.g., age, sex, birth order) were introduced as fixed effects, and family was introduced as a random effect. The introduction of family as a random effect means that each family had its own level of functioning that was reflected by the functioning of the children. In the first step of each mixed effects model, the interactions of independent variables were examined. If a significant interaction (e.g., age and birth order) was present and required in the model, the results are shown separately (e.g., for birth order). If this was not the case, we looked for additive effects. All analyses were performed with two-tailed tests and $p < 0.05$ was considered significant. Mixed effects models were analysed with S-Plus (Version 8) as implemented in the function *lme* (Pinheiro and Bates 2000). SPSS (release 19 for Windows; SPSS Inc., Chicago, IL, USA) was used for all other statistical analyses.

Results

Children's Attachment Representations

The children's attachment representations (four-way classifications) assessed by the ASCT are presented in Table 2. Of the 38 first-born children, 23 (60 %) were classified as secure, and 15 (40 %) as insecure; of the second-born children, 32 (86 %) showed insecure attachment representations and 5 (14 %) showed secure attachments (one second-born child could not be classified due to lack of compliance). The majority of children with an insecure attachment were classified as avoidant. The greatest difference between first- and second-born children was identified in the "departure" story; 68 % of first-born children responded in a secure manner, while 92 % of the second-born children answered in an insecure manner. A Wilcoxon test indicated significant differences between the security scores of first- and second-born children ($z = -3.68$, $p \leq 0.001$). First-born children had significantly higher scores (median = 5.0) than second-born children (median = 1.0).

Table 2 Dominant attachment classifications and four-way attachment classifications for each story of first- (n = 38) and second-born children (n = 37*) are presented

	B	A	C	D
Dominant				
First-born	23 (60 %)	13 (34 %)	2 (6 %)	0
Second-born	5 (14 %)	29 (78 %)	0	3 (8 %)
1. Story *juice*				
First-born	22 (58 %)	9 (25 %)	5 (14 %)	1 (3 %)
Second-born	11 (29 %)	21 (57 %)	3 (8 %)	2 (6 %)
2. Story *knee*				
First-born	18 (47 %)	14 (37 %)	6 (16 %)	0
Second-born	7 (18 %)	25 (68 %)	2 (6 %)	3 (8 %)
3. Story *monster*				
First-born	22 (58 %)	11 (29 %)	4 (10 %)	1 (3 %)
Second-born	7 (18 %)	26 (71 %)	3 (8 %)	1 (3 %)
4. Story *departure*				
First-born	26 (68 %)	10 (27 %)	2 (5 %)	0
Second-born	3 (8 %)	32 (86 %)	1 (3 %)	1 (3 %)
5. Story *reunion*				
First-born	22 (58 %)	12 (32 %)	2 (5 %)	2 (5 %)
Second-born	12 (32 %)	23 (63 %)	0	2 (5 %)

Numbers (%) are presented

Dominant attachment was defined by weighted security score across the 5 stories (last two stories with double weight). A security score ≥4 was defined as a secure representation, and ≤3 was defined as an insecure attachment

B, secure; A, insecure-avoidant; C, insecure-resistant; D, insecure-disorganized

* One second-born child was not classified due to lack of compliance

Children's attachment security scores and age for first- and second-born children are shown in Fig. 1. Birth order and age effects on children's attachment security were analysed with mixed effects models. First, we examined whether an interaction between birth order and age was present and required in the model (which would imply that the possible age effect would be different for first- and second-born children). This was not the case ($p > 0.05$), so we looked for additive effects of birth order and age on children's attachment security scores. While a significant age effect was found (B = 1.10, SE = .46, $p = 0.02$), the birth order effect was no longer present (B = .17, SE = .55, $p = 0.75$). No gender effects on children's attachment classifications were found.

Concordance of Siblings' Attachment Representations

The two-way cross tabulation of first- and second-born children's dominant attachment classifications is presented in

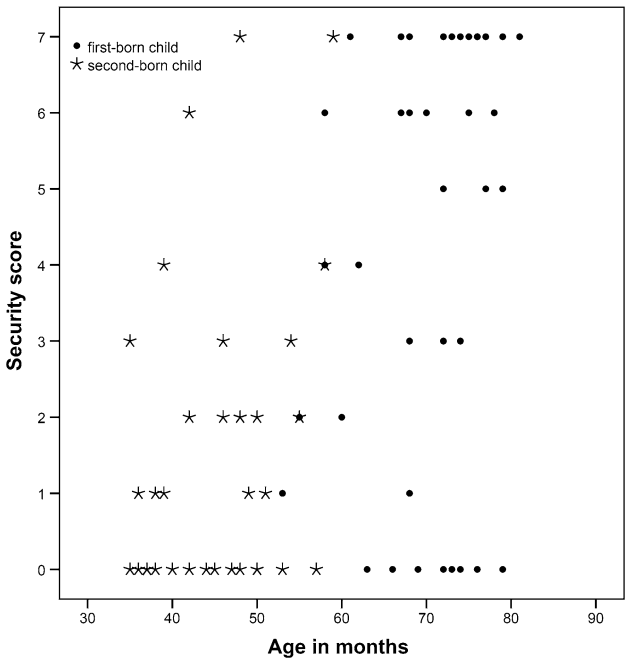

Fig. 1 Attachment security scores and age for first- and second-born children are presented

Table 3 Dominant attachment concordances of the 37 sibling-pairs

First-born children	Second-born children		Total
	Secure	Insecure	
Secure	3 (8 %)	19 (51 %)	22 (59 %)
Insecure	2 (6 %)	13 (35 %)	15 (41 %)
Total	5 (14 %)	32 (86 %)	37 (100 %)

Numbers (%) are presented

Secure, B attachment classifications; insecure, A, C or D attachment classifications

Table 3. The results indicate that 16 sibling pairs (43 %) had concordant classifications. In 3 families, both siblings had secure attachment classifications, and in 13 families, both had insecure attachments. Based on the numbers in Table 3, Cohen's Kappa was .003 which indicates that the observed concordance rate (43 %) was close to the concordance rate that would be expected by chance. The security scores of the children were not significantly related ($r = -.07$).

We examined possible factors that may have been associated with siblings' attachment concordances defined by the two-way attachment classifications (same vs. different) and by differences in siblings' security scores (first-born minus second-born). The following independent variables were examined: gender concordance (same vs. different), birth spacing (defined by first-born age minus second-born age), and parenting stress differences between the children (defined by first-born PSI-SF scores minus the second-born scores). Descriptive statistics for parenting stress scores are presented in Table 4. Only one mother (3 %) had a clinically relevant TS score for both children, while 6 mothers (16 %) had clinically relevant TS scores for either the first- or second-born child. No effects were found for gender concordance, birth spacing, or differences in parenting stress (TS and the sub-scores) in a logistic regression with attachment concordance (same vs. different) as the dependent variable. Furthermore, no significant effects of gender concordance, birth spacing and differences in parenting stress on the differences between siblings' security scores as the dependent variable were found in a linear regression. In contrast, when the gender of first-born children was included in the linear regression analyses (instead of gender concordance), results indicated that the gender of the first-born child was associated with the sibling's attachment concordance; attachment concordances were higher when the first-born was a boy ($B = -1.67, SE = .73, p = 0.021$). In our sample, 10 out of 16 concordant pairs had a male first-born child, and 16 of 21 discordant pairs had a female first-born. 8 of the 10 concordant pairs with a male first-born child had insecure attachment representations, while 2 pairs had secure attachment representations. For the 15 male first-born children, the siblings' attachment concordance was 67 %. For the 22 female first-born children, the concordance was 27 %.

Table 4 Maternal parenting stress assessed separately for 38 first- and 38 second-born children by the short-form of the Parenting Stress Index

Parenting Stress scales	First-born	Second-born	Statistics*
Parental Stress (PD)	25.7 (6.2)	24.6 (6.1)	$p = 0.13$, $d = .18$
Parent–Child Dysfunctional Interactions (P-CDI)	21.8 (4.4)	19.6 (4.0)	$p = 0.004$, $d = .52$
Difficult Child (DC)	28.7 (5.7)	27.4 (6.3)	$p = 0.31$, $d = .23$
Total Stress (TS)	76.5 (12.3)	71.6 (13.8)	$p = 0.02$, $d = .38$

Mean (standard deviation) are reported

d = effect sizes based on Cohen

* Wilcoxon-test was performed

Family Variables and Maternal Personality Factors in Relation to Children's Attachment Representations

The inter-correlations between children's attachment security, family variables and maternal personality factors are presented in Table 5. To examine the effects of family variables on child attachment (security score), we calculated a mixed effects model with age, birth order, gender and family variables as independent variables. The following family variables were examined: number of life events, total impact by life events, SES, and family size. First, we examined whether an interaction between birth order and the family variables was required in the model. This was the case for total impact by life events ($p = 0.02$) but not for SES and family size. Thus, the effect of total impact by life events on attachment was different for first- and second-born children. After controlling for the children's ages and genders, the analyses indicated a strong effect of total impact of life events on attachment security scores for first-born children ($B = .38$, $SE = .16$, $p = 0.02$). Total positive impact scores were related to attachment security. A similar, but smaller, effect was found for the number of life events; lower numbers of life events were related to child attachment security. No effects were found for second-born children. No significant effects for SES of the family or family size on children's attachment were found.

We assumed that specific maternal personality factors would be associated with child attachment (security score). Higher maternal Life Satisfaction was expected to be associated with child attachment security, whereas higher Aggressiveness, Strain and Health Worries were expected to be associated with attachment insecurity. The Stanine values (mean = 5, SD = 1.96) for maternal personality factors were as follows: Life Satisfaction mean = 6.2, SD = 1.7, Aggressiveness mean = 4.5, SD = 1.0, Strain mean = 4.7, SD = 1.7, and Health Worries mean = 3.9, SD = 1.9. Mixed effects model analyses with birth order, age and personality factors as covariates indicated a significant effect of Life Satisfaction on children's attachment security ($B = .37$, $SE = .16$, $p = 0.02$). Higher scores on the Life Satisfaction scale were associated with greater security scores of first-born children. No effects were found for Aggressiveness, Strain or Health Worries. In a more complex model that included Life Satisfaction and the number/impact of life events in addition to birth order and

Table 5 Inter-correlations between child, family and maternal variables (n = 37)

	Child variables				Family variables						Maternal variables											
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
A. First-born age	–																					
B. First-born attachment security score	.25	–																				
C. Second-born age	**.58**‡	.22	–																			
D. Second-born attachment security score	.03	−.07	.31	–																		
E. Total security score	.28	**.87**‡	**.39**†	**.37**†	–																	
F. Family size	.02	.08	.12	.01	.09	–																
G. Birth spacing	**.42**†	.14	**−.37**†	**−.33**†	−.02	−.10	–															
H. SES	.04	−.09	−.08	.04	−.03	.01	.09	–														
I. Number of life events	.01	−.31	.05	−.04	−.29	−.09	−.12	−.13	–													
J. Impact by life events	−.03	**.36**†	−.11	−.14	.21	−.01	.02	−.11	**−.60**‡	–												
K. Mothers age	**.49**†	.30	.16	.11	.31	.10	**.33**†	**.39**†	**−.38**†	**.35**†	–											
L. Life Satisfaction	−.18	**.32**†	−.25	−.03	**.38**†	.09	.05	.29	**−.42**†	.26	.32	–										
M. Aggressiveness	**.33**†	−.04	.11	.25	.10	−.24	.10	.10	.12	−.17	.19	−.08	–									
N. Strain	.17	−.28	.23	−.04	−.24	.10	−.04	.11	**.32**†	**−.46**†	−.10	**−.38**†	.19	–								
O. Health Worries	.00	.03	−.23	−.19	−.04	.01	.23	−.19	.00	.00	.11	.14	−.26	**−.40**†	–							
P. First-born PD	−.06	−.19	.20	−.16	−.17	−.14	−.16	−.02	**.33**†	**−.55**‡	**−.35**†	**−.39**†	.07	**.33**†	.07	–						
Q. First-born P-CDI	−.09	−.26	−.10	−.20	−.30	**−.37**†	−.09	−.01	.26	.04	−.15	−.15	−.11	.07	.25	**.33**†	–					
R. First-born DC	.04	.12	−.09	−.17	.13	−.16	.08	−.09	.19	.00	−.23	.14	.20	−.07	−.01	.16	**.33**†	–				
S. First-born TS	−.07	−.16	.05	−.22	−.14	−.26	−.11	−.10	**.42**†	−.27	**−.34**†	−.22	.09	.21	.15	**.72**‡	**.68**‡	**.66**‡	–			
T. Second-born PD	−.04	−.12	.27	−.02	−.07	−.04	−.25	−.16	.23	**−.42**†	**−.34**†	**−.42**†	.04	**.34**†	.13	**.76**‡	.31	.14	**.62**‡	–		
U. Second-born P-CDI	−.06	.12	.13	−.17	.07	.01	−.23	.06	.12	−.10	−.17	−.09	−.10	.28	.06	.29	**.50**‡	.14	**.41**†	**.47**†	–	
V. Second-born DC	−.11	.05	.12	−.00	.10	.07	−.26	.07	.12	−.17	−.19	−.08	−.04	.27	−.05	**.41**†	**.38**†	.21	**.47**†	**.61**‡	**.59**‡	–
W. Second-born TS	−.11	.01	.17	−.05	.05	.04	−.27	−.04	.13	−.26	−.29	−.22	−.05	**.34**†	.06	**.58**‡	**.44**†	.21	**.59**‡	**.84**‡	**.73**‡	**.91**‡

SES socioeconomic status, *PD* parental stress, *P-CDI* parent–child dysfunctional interaction, *DC* difficult child, *TS* total stress

Spearman correlation coefficient is presented. $^{\dagger}p < .05$; $^{\ddagger}p < .001$

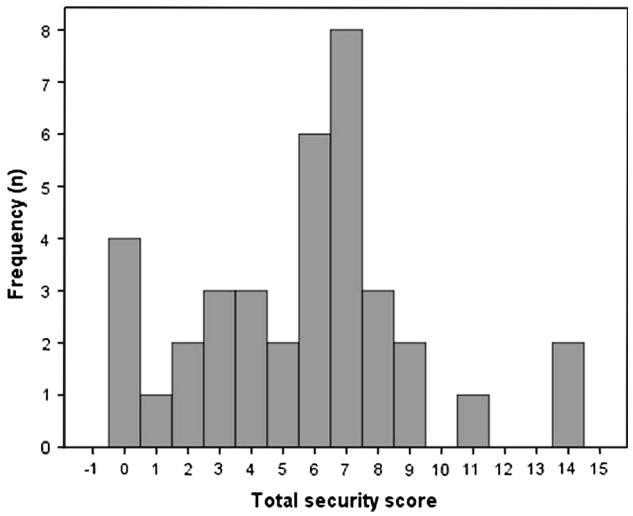

Fig. 2 Total attachment security score is presented (n = 37). A total security score of 0 indicates that both siblings have only insecure attachment classifications and a total security score of 14 indicates that both siblings have only secure attachment classifications in the ASCT

age, the effect of Life Satisfaction remained significant, while the effect of the number/impact of life events failed to reach significance with this set of predictor variables.

Attachment Security Within the Family

The total attachment security scores of the 37 families are presented in Fig. 2. We hypothesised that greater total attachment security within the family would be associated with better life circumstances of the families. While Spearman correlations indicated no significant associations for family size, children's birth spacing, SES, or impact by life events; the total attachment security score was significantly associated with the mothers' Life Satisfaction ($r = .38$, $p < .001$). Higher Life Satisfaction was associated with higher total attachment security within the family.

Discussion

This study is presumably the first to describe the concordance of attachment representations of preschool siblings assessed by the ASCT (Bretherton and Ridgeway 1990; Bretherton et al. 1990). Until now, very little was known about the concordance of siblings' attachment classifications beyond infancy. Our study with siblings of different ages living in intact middle class two-parent families indicated that only 43 % of the sibling-pairs had two-way concordant attachment classifications. This concordance rate was not significant and close to the concordance rate expected by chance. This is in contrast to the study by van IJzendoorn et al. (2000) based on the data of 2014 normal children of 15 US samples assessed using the strange situation procedure reporting a significant 62 % concordance rate between infant siblings which was also significantly higher than expected by chance (52 %). A 60 % concordance rate, but not significant in every case, was also found in other studies with younger sibling pairs and twins measured in the strange situation procedure (Bokhorst et al. 2003; Fearon et al. 2006; O'Connor and Croft 2001; Teti and Ablard 1989; Ward et al. 1988). However, methodological differences between the studies make it difficult to compare the concordance rates. Q-sort-measures are most often completed by the mothers and give descriptions of children's attachment-related behavior in everyday situations. Compared to the strange situation procedure used with infants (Ainsworth et al. 1978), the ASCT does not assess a child's attachment relationship based on specific behavioral signs as observed in a separation and reunion test situation with a primary caregiver (e.g., the child shows signs of stress on separation and signs of relief, anger or avoidance towards the returning mother upon reunion), but is meant to reflect its internal working model of attachment, which is supposed to integrate experiences with different attachment figures. Moreover, the influence of non-shared environments increases between siblings as they get older (e.g., different caretakers during the day) which may have also influenced the lower attachment concordance rates between siblings in our study compared to studies with younger children.

In our study, gender differences, birth spacing and differences in parenting stress between the siblings were not significantly related to attachment concordance. The lack of influence of gender differences and birth spacing are similar to results reported in studies on attachment concordance in younger children (Ward et al. 1988; van IJzendoorn et al. 2000). Still, the latter study indicated that mothers displayed less sensitivity towards the second-born child, a variable that we did not assess directly but that could potentially explain the non-significant concordance rate found in our study. Nevertheless, inclusion of the gender of the first-born child in the analysis revealed that the attachment concordance was higher when the first-born was a boy than when the first-born was a girl. Thus, primary caregivers of male first-born children may be challenged to develop an explicit parenting style and may interact in a similar manner with their second child which would lead to more similar attachment representations compared to other cases. However, the result for mothers' parenting stress contrasts with our hypothesis that higher parenting stress would be related to attachment insecurity. The results of other studies are not consistent in this aspect. Moran and Pederson (1998) found higher reported stress in

the Child-domain-Scale of the PSI-long-form for mothers of insecure-ambivalent infants, but no difference was found between secure and avoidant infants assessed by Q-sort. In contrast, Teti et al. (1991) did report significant correlations between PSI-scores and Q-sort-security scores in a sample of preschool children, but mainly for the child domain scales of the PSI-long-form. For the parent domain, the competence-scale showed a moderate correlation with Q-set security. Thus, specific coping responses that mediate the relationship between parenting stress and suboptimal parent–child-interaction patterns might have caused this finding, and future research is necessary.

Our study indicates that first-born children (4–7 years) had secure attachments more frequently than second-born children (3–5 years). However, birth order is confounded with age, and after including both variables in the analysis, older children generally had secure attachment classifications more frequently than did younger children (no significant birth order effect was found). This result is in line with Miljkovitch et al. (2003) who also assessed child attachment in preschool years (3–5 years) and used the same attachment measure but evaluated the ASCT by a self-developed Q-sort technique. Younger children presented less positive parent–child relationships than older children. In our entire sample of first- and second-born children, 37 % of the children had a secure attachment representation. However, only 14 % of the second-born children (3–5 years old) in contrast to 60 % of the first-born children (4 to 7 years) had secure attachment representations. Higher rates of children classified as insecure are expected in at-risk samples (König et al. 2007; van IJzendoorn et al. 1992). Yet, there are also further studies using the ASCT in non-risk samples reporting similar rates of insecure classifications (e.g., Gloger-Tippelt and Koenig 2007). Gloger-Tippelt and Koenig (2007) reported, for example, that 37 % of the 6-year old children in their study had secure attachment classifications, whereas 63 % had insecure attachment representations. The following five explanations are possible for the observed lower rates of secure attachment classifications in younger preschool children assessed with the ASCT. First, this finding might be an artefact due to developmental immaturity. As younger and older children differ in terms of their language development, the verbalisations of the younger children may have been misclassified. In our study, most insecure classified second-born children were classified as insecure-avoidant (78 %). Thus, these younger children may have completed the stories in a "deactivating" way by skipping over the presented conflict, by ignoring the emotional content, by presenting a harmless everyday action or by a general lack of responsiveness ('I don't know') because these children might lack the words for expressing their feelings rather than due to emotional avoidance. Yet, Wong et al. (2011) were recently able to predict attachment representations of 3- to 4-year old children who completed the ASCT when maternal attachment scripts were used as the predictor variable. The authors controlled for a possible bias due to the children's verbal abilities, but no significant effect for verbal abilities was found. Second, apart from the different levels of language development in younger versus older children, the younger children may have been more frightened by the same stories than older children. From a developmental psychology perspective, younger children are expected to be more irritated, or frightened, by separation from their parents and thus not be able to find a secure end. This would imply that the ASCT is not sufficiently reliable and valid for the assessment of attachment representations in 3- and 4-year old children. Yet, the procedure was originally developed for this age group. As theory of mind is observable around the age of four, younger children would be expected to exhibit how they feel about the story stem and usually act in such situations, whereas elder children might consider the expectations of the researcher and try to present a socially desirable answer. Third, the administration of the ASCT might have differed between younger and older children. Because younger children might need more time than older children to become accustomed to new situations (e.g., they might be shyer or more anxious), all ASCTs were performed in the children's homes, in a place that was familiar to the child, and each family was given familiarisation time prior to testing. Moreover, the ASCT starts with a warm-up story about a birthday party in which attachment-related thoughts and feelings are not activated. Thus, each child had been allowed to play as long as she/he wanted with the warm-up story to become familiar with the dolls and the new situation. Even if we cannot completely rule out this aspect, we believe that the administration of the ASCT was carefully introduced and prepared, and the story stems were coded according to the same diagnostic for all children (Bretherton and Ridgeway 1990; Gloger-Tippelt 1999; Gloger-Tippelt and König 2002). Therefore, future studies should be performed on the stability of ASCT classifications in the preschool years. Fourth, maternal sensitivity is known to be one of the strongest predictors of child attachment security. Van IJzendoorn et al. (2000) reported that birth order was significantly related to maternal sensitivity even though no significant effect of birth order on attachment security was found. The results of that study indicated that mothers displayed less sensitivity with their younger than with their older children (van IJzendoorn et al. 2000). This tendency to treat the elder child in a more sensitive way may be too subtle to affect the security of the child-mother relationship on a short-term basis but could contribute to an insecure attachment representation of the younger children at a later age. The results of a large study of a sample of 4- to 11-year old siblings from 3,860 families performed by Jenkins et al. (2003) also confirmed this. These authors examined

child-specific and family-context predictors of parental positivity with parent-report forms. Their results indicated that the oldest children received more positivity than the younger children and children's ages were the strongest child-specific predictor of positivity (Jenkins et al. 2003, p. 110). In our study, we did not assess maternal sensitivity directly—but rather maternal well-being—and thus were not able to confirm the assumption that the younger children of our sample had experienced less sensitive parenting as reported by van IJzendoorn et al. (2000). Five, there might be some other not yet identified factors (e.g., day-care situation, selection bias) which might have influenced our findings.

In our study with positively selected mothers in terms of maternal personality indicators (e.g., lower means in aggressiveness, strain and health worries and higher means in life satisfaction compared to the population norm), lower maternal life satisfaction was significantly associated with attachment insecurity of the children. Thus, our results underline the impact of maternal variables on child attachment and confirm findings of previous studies on this issue. However, our cross-sectional study design does not allow for any conclusion about causal relationships, and it remains unclear whether, for example, higher maternal life satisfaction leads to attachment security or whether children with secure attachment representations are easier to parent, which, in turn, may provide more satisfying interactions and contribute to greater life satisfaction. Mothers were asked to report life-events since the birth of their first child. Number and impact of life events were related only to the first-born's security scores. The number and the impact of life-events had probably more influence on the first-born as they were presumably exposed to them for a longer period of time than second-born children. This methodological aspect might account for the lack of relationship to second-born children's attachment security. The correlation was negative for the number of life-events, as expected, and we additionally found a positive correlation between impact of live events and first-born's attachment security. The more the mothers reported that life-changing events were experienced as pleasant, the higher the security scores were for the first-born.

Strengths of the current study are the assessment of siblings' attachment classifications using the same method at the same time point during the preschool years and the relative social homogeneity of our sample. Thus, potential changes in parental behavior due to different time points in the family history that are inevitable when siblings are assessed at the same ages should not have influenced the concordance rate. Nonetheless, certain limitations merit notation. First, our sample size was rather small. It was difficult to find parents willing to participate in the study. We believe that the relatively low participation rate might be explained by the time-consuming study procedure that collected other data not integrated in this work. Second, participants from middle and upper SES were clearly overrepresented in our sample. This overrepresentation may be caused by the fact that we only enrolled children of parents who could read German fluently and who were interested in participating in a study. Third, the number of life events and subjective perceived impact of life events were assessed for a rather long time period which may have been influenced by a recall bias.

The main conclusions of this study are that the attachment concordance of siblings in the preschool years was not significant as measured on a representational level, that attachment concordance in the preschool years may be lower than in infancy, that younger preschool children are more frequently classified with insecure attachments compared to older children when assessed with the ASCT (for reasons still needing further investigation), and that maternal life satisfaction was a significant predictor for child attachment security. Our results may help to inform future studies using the ASCT during the preschool years. Moreover, longitudinal studies on siblings' attachment courses and concordance in the context of shared and non-shared environmental factors are necessary.

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