From expecting to experiencing
The role of parenting self-efficacy in the transition to parenthood

Marije Verhage

Intergenerational transmission of attachment in the transition to parenthood: The role of maternal psychosocial factors

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Under revision.
Abstract

In addition to maternal attachment state of mind, psychosocial factors may affect the development of infant-mother attachment relationships. To explore these factors, 140 first-time pregnant women were administered the Adult Attachment Interview during pregnancy and questionnaires on parenting stress, parenting self-efficacy and depressive symptoms at 3 and 12 months postpartum. At 12 months, infant-mother attachment and life events were assessed. Infant-mother attachment security was predicted by maternal autonomous classification. Unexpectedly, resistant attachment was predicted by dismissing classification and avoidant attachment by preoccupied classification. Lower parenting stress at 3 months predicted resistant attachment, whereas life events during the first year postpartum predicted avoidant attachment. To explain infant-mother attachment, stress and life events require consideration alongside maternal state of mind.
The transition to parenthood is a major life event (Nystrom & Ohrling, 2004), and the adaptation to this new role may be facilitated or impeded, depending on the psychosocial resources available to new parents, such as support and confidence in their own abilities, and on interfering events, such as hospitalization or the development of postpartum depression. Mothers’ adjustment to their new roles coincides with the development of the infant-mother attachment relationship over the first year after birth. Previous studies have shown that, on average, infant-mother attachment relationships develop a quality corresponding to the state of mind regarding attachment of new mothers (Van IJzendoorn, 1995). Attachment state of mind may not only shape infant-mother attachment relationships through their impact on perception and response to infants’ needs. Attachment state of mind may also be linked to the expectations with which parents approach parenthood, and may interact with the psychosocial resources that new mothers have at their disposal. In order to contribute to building more integrative models of the developing infant-mother relationship system, the current study investigated effects of mothers’ state of mind, parenting stress, expectations of parenting self-efficacy, mood changes, and life events that may occur across the first year of motherhood.

Infants adapt to their social environment by developing patterns of attachment behaviors towards their attachment figures. Ainsworth and colleagues (1978) were able to identify three patterns of behaviors shown by infants in relation to their mothers in times of distress and times of exploration. These behavioral patterns were thought to reflect the infant-mother attachment relationship and could be studied using the Strange Situation Procedure (SSP; Ainsworth et al., 1978). The most common pattern found was that of the secure attachment relationship, in which children openly seek reassurance from their mothers in times of distress, facilitating their exploration of the environment. Children in avoidant attachment relationships with their mothers minimize the expression of their attachment signals and shift their attention away from their attachment figures. Children in resistant attachment relationships are vigilant about their attachment figures’ whereabouts, and are easily distressed and angered, and difficult to soothe after disruptions in contact with attachment figures. Over the years, there were always a few children who could not be classified using this three-way classification system. A study on the behaviors of these children showed that they had in common temporary lapses and contradictions in their patterns of attachment behavior (Main & Solomon, 1990). The relationships of these children have been characterized as disorganized.

After Ainsworth and her colleagues (1978) had shown that these patterns of attachment were associated with maternal sensitive behavior in interaction with infants, Main, Kaplan and Cassidy (1985) discovered that infant attachment was also associated with parents’ narratives regarding their own attachment experiences as a child. Based on attachment theoretical notions of states of mind, they developed scales and categories to characterize the “conscious and/or unconscious rules for the organization of information relevant to attachment” (Main et al., 1985, pp. 66-67). The characteristic that provided the strongest distinction between parents in secure versus insecure attachment relationships with their children, was the coherence of the narrative...
surrounding attachment-related experiences. Coherent narratives are believable, complete yet succinct, relevant to the questions posed, and easy to follow for a listener. Interviews characterized by high coherence are presumed to indicate an autonomous state of mind regarding attachment. A meta-analysis by Van IJzendoorn (1995) confirmed the correspondence of infant-mother attachment relationships with maternal states of mind, including some studies with maternal attachment assessed prior to birth of the infant (Benoit & Parker, 1994; Fonagy, Steele, & Steele, 1991). On average, infants with a secure infant-mother attachment relationship significantly more often had a mother with an autonomous attachment state of mind. Regarding non-autonomous states of mind, a distinction is made between dismissing and preoccupied state of mind. In the meta-analysis, an avoidant infant-mother attachment relationship was associated with a dismissing state of mind, which is ascribed to adults who minimize the importance of attachment relationships in the formation of their adult personality. They often show signs of idealizing their childhood experiences or claim to have few memories of that period. Parents with preoccupied attachment classifications more often had a resistant infant-mother attachment relationship with their child compared to non-preoccupied parents. Interviews indicative of a preoccupied state of mind are characterized by current anger, confusion, and preoccupation with previous or ongoing attachment-related experiences. Disorganized infant-parent attachment relationships were found associated with unresolved/disorganized narratives regarding the loss of attachment figures or experiences of abuse (Main & Hesse, 1990).

The meta-analysis of Van IJzendoorn (1995) affirmed that parents’ attachment states of mind correspond to particular patterns of infant-parent attachment relationships (e.g., based on crosstabulation of preoccupied vs non-preoccupied against resistant vs non-resistant). Primary studies have tested correspondence for all categories at once, which in some studies has revealed other correspondences between parental state of mind and infant-parent attachment relationships. Two studies using the Dynamic-Maturational Model method for assessing attachment state of mind (DMM; Crittenden & Landini, in press) found that maternal state of mind still predicted secure infant-mother attachment, but non-autonomous states of mind were associated with opposite insecure classifications (dismissing mothers with resistant children and preoccupied mothers with avoidant children) (Hautamaki, Hautamaki, Neuvonen, & Maliniemi-Piispanen, 2010; Shah, Fonagy, & Strathearn, 2010). Shah et al. (2010, p. 333) called this pattern “inversion between generations” and suggested that this pattern could be explained by mothers trying to exhibit opposite behaviors to what their own parents did during their childhood, because they desire to develop a better relationship with their child. This overcompensating behavior might be similar to behaviors displayed by mothers with opposite states of mind regarding attachment and would therefore lead to opposite attachment relationships with their children. While these explanations are still speculative, the empirical findings suggest an ongoing need to study intergenerational transmission of attachment. This is especially the case because of the wide dissemination of insights from attachment research within the general population of countries in which attachment research takes place, and which may change the ways in which parents approach the attachment relationships with their children for bad or for good.
Furthermore, maternal states of mind regarding attachment are part of a complex of psychosocial factors, which independently or in interaction with each other determine how the mother interacts with her child (Belsky, 1984). Several of these factors have been examined previously as predictors of the infant-mother attachment relationship, such as parenting stress, parenting self-efficacy, depressive symptoms and the occurrence of life events. Studies on parenting stress have shown that parents who reported higher parenting stress more often had insecurely attached children (Atkinson et al., 2000; Candelaria, Teti, & Black, 2011; Jarvis & Creasey, 1991). A predictor that has not yet received much attention in attachment research is parenting self-efficacy (Coleman & Karraker, 1997; Jones & Prinz, 2005). Parenting self-efficacy is defined as “the expectations parents hold about their ability to parent successfully” (Jones & Prinz, 2005, p. 342). Parenting self-efficacy changes in accordance with the amount of success experiences parents have with their children (Porter & Hsu, 2003). Stifter and Bono (1998) have linked lower parenting self-efficacy to more insecure infant-mother attachment, but only in parents of colicky children and not in parents of non-colicky children. Another study found a positive association between a secure maternal attachment style and parenting self-efficacy during the first year after birth (Kohlhoff & Barnett, 2013). Some studies on other forms of self-efficacy have found positive associations between child-reported secure attachment to their parents and social self-efficacy (Coleman, 2003), negative associations between adult-reported insecure romantic attachment and social self-efficacy (Wei, Russell, & Zakalik, 2005), and positive associations between self-reported secure attachment to parents and career decision-making self-efficacy (Wright & Perrone, 2008).

Studies that looked into maternal depression as a predictor of the infant-mother attachment relationship revealed that infants of depressed mothers were significantly more likely to be classified as having an insecure attachment relationship (for a meta-analysis, see Martins & Gaffan, 2000). This association was found as well for symptoms of depression (Campbell et al., 2004; Hopkins, Gouze, & Lavigne, 2013). However, a recently published large population-based cohort study did not find a significant association between life-time depression, perinatal and postnatal depressive symptoms and infant-mother attachment security (Tharner et al., 2012). Stressful life events in the first year after birth may impede successful adaptation to parenthood, and thereby impact on the developing infant-mother attachment relationship. Studies have shown that the occurrence of life events may lead to less continuity in existing infant-mother attachment relationships over time (Bar-Haim, Sutton, Fox, & Marvin, 2000; Hamilton, 2000; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000), but a recent study showed no effects of life events in the transmission of organized attachment between mother and child (Beliveau & Moss, 2009). However, this latter study was done with children aged 3 to 4 years, whereas it might be expected that life events exert the largest effects on the infant-mother attachment relationship when they occur during the initial phase of relationship formation. Also, studies have not investigated whether the occurrence of serious life events in the first year after birth is associated with the development of insecure infant-mother attachment relationships.
The current study investigated whether infant-mother attachment relationship quality could be explained by mothers’ parenting stress, parenting self-efficacy, depressive symptoms, and life events during the first year after birth in addition to maternal state of mind. Also, parenting stress, parenting self-efficacy, and depressive symptoms were measured twice during the first year after birth to be able to assess the effects of changes in these variables on the infant-mother attachment relationship. The first hypothesis was that prenatal maternal state of mind would correspond to quality of infant-mother attachment relationships, examining all possible combinations. The second hypothesis was that parenting stress, parenting self-efficacy, depressive symptoms, and the occurrence of life events would explain additional variance in the development of the infant-mother attachment relationship when taking into account maternal state of mind. Furthermore, it was explored whether psychosocial factors in the transition to parenthood moderated the association between attachment state of mind and infant-mother attachment relationship.

Method

Participants

Participants were 140 women (age 18 - 40 years, \( M = 30.6, SD = 4.06 \)) who were pregnant with their first child at the beginning of the study. Education levels were predominantly high: 76% completed higher education (Bachelor or Masters degree), compared to 32% of the general Dutch female population (Bureau of Statistics Netherlands, 2011). Based on their parents’ country of birth, 85% of the participants were Dutch. Of the remaining 15%, 71% had a Western background and 29% had a non-Western background. Of all participants, 45% were married, 51% were cohabiting with their partner and the remaining 4% were single or not living with their partner at the beginning of the study. Slightly more girls (56%) than boys were born in our study sample.

Procedure

Recruitment of participants for a longitudinal study from early pregnancy until 12 months after birth took place via the study website and midwifery practices in the vicinity of Amsterdam, The Netherlands. Initially, women gave informed consent to filling out questionnaires three times during pregnancy (12, 22, and 32 weeks of gestation) and twice after birth (3 months and 12 months after birth). After filling out the first questionnaires, women were approached for three additional measurements if they lived within travel distance of the research facility, if they were fluent in Dutch and if they did not receive a prenatal diagnosis for a congenital abnormality of the fetus based on the ultrasounds given at 12 and 20 weeks of pregnancy. Approximately 50% of the women decided to participate in the additional measurements. After the third additional measurement, women were rewarded with a 60 Euros gift certificate. Permission for this study was granted by the Medical Ethical Committee of the VU University Medical Center.
The current study reports on data collected during two of the intensive measurements and with the postpartum questionnaires. The first intensive measurement was a home visit at approximately 22 weeks of pregnancy ($M = 22.6$, $SD = 0.88$) during which an interview was administered to assess state of mind regarding attachment. After birth, women received questionnaire packages at approximately 3 months ($M = 3.20$, $SD = 0.92$) and 12 months postpartum ($M = 12.10$, $SD = 0.46$). Questionnaire packages at both time points contained questionnaires on parenting stress, parenting self-efficacy, depressive symptoms and life events. Questionnaires were returned to the research facility. If questionnaires were not received, participants were sent a reminder e-mail and were contacted several times by telephone. For the final intensive measurement, participants visited the research facility shortly after the child turned 12 months old ($M = 12.80$, $SD = 0.67$), where they took part in a procedure to assess infant-mother attachment relationship quality.

**Measures**

**State of mind regarding attachment.** States of mind regarding attachment were measured with the Dutch version of the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984, 1985, 1996). The AAI is a semi-structured interview with 20 questions regarding general descriptions of the relationship with the parents during childhood, detailed descriptions of actual experiences with the parents, experiences of abuse and loss, the role of the experiences with the parents in the formation of their adult personality and the current relationship with the parents. Towards the end, several questions are asked about their wishes for their own children. All interviews were transcribed verbatim and coded using the Main and Goldwyn coding system (1994). Transcripts received one of the three primary classifications (autonomous, dismissing or preoccupied) for state of mind with respect to attachment, based on the coherence of the participants’ discourse displayed during the interview. A transcript classified as autonomous indicates that the interviewee was able to address the childhood experiences in a coherent and objective manner. The interviewee acknowledges that some experiences can be negative and recognizes the possible effects of these experiences on their further development. Markers for a classification as dismissing are portraying childhood experiences in a positive way, providing insufficient support by concrete memories, minimizing the importance of attachment relationships for the development of their personality and sometimes derogation of attachment persons or experiences. Support is either not sufficient or absent. Transcripts classified as preoccupied are vague or contain actively angry discourse. These transcripts indicate an ongoing involvement and preoccupation with childhood experiences. On top of the main classification, transcripts may be classified as unresolved when discourse concerning the loss of an important person or other traumatic experiences contains lapses in the monitoring of reasoning or discourse or reports of extreme behavioral reactions following such events.

The AAI transcripts were independently scored by the second and third author, who were certified reliable coders of the AAI. The second author was trained by David Pederson and...
Deanne Pederson from the University of Western Ontario and the third author was trained by Mary Main and Erik Hesse from the University of California at Berkeley.

**Infant-mother attachment relationship.** The quality of the infant-mother attachment relationship was assessed using the Strange Situation Procedure (SSP; Ainsworth et al., 1978), a widely used structured observational measure. During this procedure, mother and infant are confronted with a series of mildly stressful situations, such as confrontation with a stranger and two short separations followed by reunions, designed to elicit attachment behaviors in the infant. All assessments were videotaped and scored using the original scoring guidelines by Ainsworth and colleagues (1978) for the three main classifications (secure, avoidant, and resistant) and additionally the Main and Solomon scoring system for disorganized attachment (1990). Infants with a secure infant-mother attachment relationship tend to seek reassurance from the mother during periods of distress, but feel safe to explore when no stressors are present. Infants classified as having an insecure-avoidant attachment relationship with their mothers tend to turn away from their caregivers during periods of distress and not show their distress. Infants with an insecure-resistant attachment relationship with their mothers tend to seek comforting from the mother upon reunion, but show resistant behaviors at the same time. They are usually difficult to soothe and their behaviors often have an angry quality. On top of the main classification, attachment relationships may be classified as disorganized when the infant seems to experience a breakdown in their organized attachment strategy during the reunion with the parent. This breakdown is characterized by the display of disoriented behaviors, simultaneous contradictory behaviors, or bizarre behaviors.

In addition to classifications, continuous scores for the security of the attachment relationship were computed based on the interactive behavior between infant and mother during the Strange Situation Procedure, following the procedure of Richters, Waters and Vaughn (1988), which was adapted by Van Ijzendoorn and Kroonenberg (1990). This method provides a continuous score for the security of the infant-mother attachment relationship (Van Ijzendoorn and Kroonenberg, 1990), which has been used frequently in other studies (e.g., Kok et al., 2013; Roisman, Booth-Laforce, Belsky, Burt, & Groh, 2013). Strange Situations were scored in an independent lab by three experienced coders (M. H. van Ijzendoorn, M. J. Bakermans-Kranenburg, and L. R. A. Alink; Leiden University, the Netherlands) who were blind to mothers’ AAI classifications.

**Parenting stress.** Parenting stress was measured using the parent domain of the Dutch version of the Parenting Stress Index (PSI; Abidin, 1983; de Brock, Vermulst, Gerris, & Abidin, 1992). The parent domain consists of 7 subscales: lack of parenting competence (13 items), role restriction (7 items), difficulties with parent-child attachment relationship (7 items), depression (12 items), social isolation (6 items), health problems (6 items), and partner conflict (7 items). In total, the parent domain includes 58 items, scored on a Likert scale from 1 (strongly disagree) to 6 (strongly
agree). Sample items are “I expected to have closer and warmer feelings for my child than I do and this bothers me” and “Since having a child, my partner has not given me as much help and support as I expected”. Items are summed to obtain scores on subscales. Subscales can be used separately or be summed into an average parent domain stress score. This parent domain stress score is used in the current study.

The PSI is a widely used measure for parenting stress and the Dutch version has been validated for the use in clinical and normative samples (de Brock et al., 1992). Internal consistency (Cronbach’s alpha) in the current study for the parent domain was .94 at 3 months after birth and .94 at 12 months after birth.

Parenting self-efficacy. Parenting self-efficacy was measured with a Dutch translation of the Maternal Self-Efficacy in the Nurturing Role Questionnaire (SENR; Pedersen, Bryan, Huffman, & Del Carmen, 1989). The SENR contains 16 items measured on a 7-point Likert scale ranging from 1 (Not at all representative of me) to 7 (Strongly representative of me). Items were statements regarding feelings of competence in caring for an infant, e.g. “I feel I can catch on quickly to the basic skills of caring for my child” and “I wonder if I really can understand my baby’s needs”. Scores on all items were summed to obtain a total score. The SENR has been used in previous studies and test-retest reliability and internal consistency were moderate to high (Hsu & Sung, 2008; Pedersen et al., 1989; Porter & Hsu, 2003). Internal consistency (Cronbach’s alpha) in the current study was .85 at 3 months after birth and .88 at 12 months after birth.

Depressive symptoms. Depressive symptoms were measured using the Dutch version of the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Van der Does, 2002). The BDI is a 21-item questionnaire measured on a 4-point scale. Items represent various symptoms of depression and for each symptom, 1 of 4 graded statements can be chosen to reflect symptom presence and severity. Scores per item range from 0 (absence of symptom) to 3 (severe symptom presence). The BDI is widely used in clinical and normative samples and has proven to be a valid and reliable measure (Beck et al., 1961; Osman et al., 1997). Internal consistency (Cronbach’s alpha) in the current study was .86 at 3 months after birth and .84 at 12 months after birth.

Serious life events. The occurrence of serious life events during the first year after birth was assessed with the life events section of the PSI. This section contains 40 life events that could have occurred, such as moving house or birth of a child, and participants are asked to indicate which (if any) of these life events have occurred to them during the past twelve months. Because the list contains life events of different types (e.g., financial, work-related, health) and importance (e.g., moving house, death of child, starting education), not the entire life events scale was used in the current study. From the list, 8 serious life events were selected that could potentially affect the transition to parenthood and the development of the attachment relationship, as was done
by Beliveau and Moss (2009). These items were: Divorce or separation from partner, Reunion with partner after serious conflict, Death of partner, Death of a close family member, Death of a close friend, Miscarriage, Long-term illness, and Life-threatening illness. Hospitalization was not included, because this event may be confounded with delivery in the hospital. These life events were similar to life events reported in Waters et al. (2000) that were associated with stability of attachment, except for psychiatric disorders and abuse. If a participant indicated that one or more of these life events had occurred to her during the past year, she was given a score of “1”, whereas a score of “0” would indicate not having experienced any serious life events during the past year.

**Data analysis**

Preliminary analyses tested the associations between demographic variables (maternal age, education level, marital status, immigrant status, and infant gender), maternal attachment state of mind, and infant-mother attachment classifications. Intergenerational transmission of attachment classifications was tested with cross tabulations for two-way, three-way and four-way classifications. Multinomial logistic regression analysis tested the unique contribution of parenting stress, parenting self-efficacy, and depressive symptoms at 3 and 12 months after birth, and the occurrence of life events after birth on infant-mother attachment classifications on top of the effects of maternal attachment classifications. Finally, the effects of interaction terms between adult attachment classifications and parenting stress, parenting self-efficacy, depressive symptoms, and serious life events on infant-mother attachment were assessed using multinomial logistic regression.

**Missing data**

Seven participants had one or more missing questionnaires. They did not differ from participants with complete data on any of the demographic variables ($p > .73$) or on the questionnaire data ($p > .33$). Neither were there any differences between responders and non-responders on maternal state of mind and infant-mother attachment ($p > .26$).

Missing data analyses showed that missings were completely at random ($p = .63$). Missing data on the questionnaires were then imputed using the multiple imputation method in SPSS 20.0, creating five new sets of data, which were used for analyses. The multiple imputation method is a recommended approach for handling missing data (Schafer & Graham, 2002).

**Results**

**Preliminary analyses**

States of mind regarding attachment were distributed as follows: 56% ($N = 78$) secure autonomous, 29% ($N = 34$) dismissing, and 14% ($N = 20$) preoccupied. Two cases were rated cannot classify. In the four-way system, 15% ($N = 21$) of the cases were classified as unresolved; 9 had an underlying
autonomous classification, 5 a dismissing classification, and 5 a preoccupied classification. Of
the infant-mother attachment relationships, 67% \((N = 94)\) were classified as secure, 13% \((N = 18)\) as avoidant, and 19% \((N = 27)\) as resistant. One case was rated cannot classify. In the four-
way system, 16% \((N = 22)\) received a disorganized classification, with underlying classifications
being secure \((N = 15)\), avoidant \((N = 2)\), and resistant \((N = 5)\). Preliminary analyses showed that
none of the demographic variables were significantly associated with infant-mother attachment
classifications \((p > .11)\).

Table 1 shows the mean values, standard deviations, and correlations for values of parenting
stress, parenting self-efficacy, and depressive symptoms at 3 and 12 months after birth and of
coherence scores on the AAI, Richters security scores on the SSP, and maternal age. In addition,
36 (26%) participants reported one or more serious life events during the first 12 months
after giving birth. T-tests showed that mothers with life-events experienced more depressive
symptoms at 3 months after birth than mothers without life events \((t (10665) = -3.58, p < .001)\),
but mothers with serious life events did not differ from mothers without life events on parenting
stress and parenting self-efficacy \((p > .10)\).

### Table 1. Descriptive statistics and correlations among parenting stress, parenting self-efficacy, depressive
symptoms, attachment, and age

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PS 3 mos.</td>
<td>117.14</td>
<td>33.17</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. PS 12 mos.</td>
<td>116.19</td>
<td>30.23</td>
<td>.77**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. PSE 3 mos.</td>
<td>93.53</td>
<td>9.84</td>
<td>-.72**</td>
<td>-.59**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. PSE 12 mos.</td>
<td>69.49</td>
<td>9.67</td>
<td>-.53**</td>
<td>-.71**</td>
<td>.71**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. BDI 3 mos.</td>
<td>7.64</td>
<td>5.54</td>
<td>.61**</td>
<td>.48**</td>
<td>-.39**</td>
<td>-.30**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. BDI 12 mos.</td>
<td>6.56</td>
<td>4.95</td>
<td>.42**</td>
<td>.61**</td>
<td>-.32**</td>
<td>-.41**</td>
<td>.58**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Coherence</td>
<td>4.90</td>
<td>1.96</td>
<td>.04</td>
<td>-.12</td>
<td>.00</td>
<td>.15</td>
<td>.04</td>
<td>-.13</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Security score</td>
<td>1.05</td>
<td>2.37</td>
<td>.16</td>
<td>.06</td>
<td>-.10</td>
<td>.00</td>
<td>.16</td>
<td>.05</td>
<td>.18*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9. Age</td>
<td>30.57</td>
<td>4.09</td>
<td>.15</td>
<td>.25**</td>
<td>-.20</td>
<td>-.14</td>
<td>.08</td>
<td>.25**</td>
<td>.00</td>
<td>-.10</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. PS = parenting stress, PSE = parenting self-efficacy, BDI = Beck Depression Inventory, Coherence = coherence
of transcript on AAI, Security score = Richters security score on the SSP.
* = p < .05, ** = p < .01

### Intergenerational transmission of attachment

Table 1 indicates that coherence scores on the AAI were associated with Richters’ security scores
on the SSP \((r = .18, p = .034)\). The associations between maternal attachment classifications and
infant-mother attachment classifications are displayed in Table 2. The cross-tabulation for the
three-way classifications was significant \((\chi^2 (4) = 10.03, p = .04)\). Of the mothers with autonomous
AAIs, 77% developed a secure attachment relationship with their infants, which was significantly
more than expected (adjusted standardized residual = 2.7, \(p = .008\)). However, the non-
autonomous classifications yielded different associations than expected, with dismissing maternal
attachment classifications being predictive of resistant infant-mother attachment (adjusted standardized residual = 2.4, \( p = .016 \)) and preoccupied maternal attachment classifications marginally predicting avoidant infant-mother attachment (adjusted standardized residual = 1.7, \( p = .089 \)). No other combinations occurred above chance level. The cross-tabulation of the secure-insecure distinction based on three-way classifications yielded significant results (\( \chi^2 (1) = 7.15, p = .008 \)). Cross tabulations of four-way attachment classifications showed no significant association (\( \chi^2 (9) = 13.01, p = .16 \)). The cross tabulation of the secure-insecure distinction with unresolved and disorganized classifications included as insecure showed no significant association between maternal state of mind and infant-mother attachment (\( \chi^2 (1) = 1.68, p = .20 \)). Of the mothers with autonomous AAIs, 62% developed a secure attachment relationship with their infants (adjusted standardized residual = 1.3, \( p = .20 \)). The cross-tabulation of unresolved and disorganized classifications showed no correspondence between maternal unresolved state of mind and disorganized infant-mother attachment classifications (\( \chi^2 (1) = 1.72, p = .19 \)). Splitting up the group of mothers with an unresolved state of mind based on their secondary autonomous or non-autonomous classification, as was done in Schuengel, Bakermans-Kranenburg and Van IJzendoorn (1999) did yield significant results: unresolved state of mind in women with a non-autonomous secondary classification led to disorganized infant-mother attachment significantly more often than expected (adjusted standardized residual = 2.4, \( p = .015 \)), whereas this was not found for unresolved mothers with a secondary autonomous classification (\( p = .57 \)). Because the intergenerational transmission of attachment was most prominent with three-way attachment classifications, subsequent analyses were conducted with three-way attachment classifications. Cannot classify cases \((N = 3)\) were excluded from further analyses.

Table 2. Cross-tabulation of three-way infant and adult attachment classifications

<table>
<thead>
<tr>
<th>SSP classification</th>
<th>Secure</th>
<th>Avoidant</th>
<th>Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>59</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>% SSP predicted by AAI</td>
<td>77%</td>
<td>10%</td>
<td>13%</td>
</tr>
<tr>
<td>Adjusted residual</td>
<td>2.7</td>
<td>-1.1</td>
<td>-2.2</td>
</tr>
<tr>
<td>Dismissing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>22</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>% SSP predicted by AAI</td>
<td>55%</td>
<td>13%</td>
<td>32%</td>
</tr>
<tr>
<td>Adjusted residual</td>
<td>-1.9</td>
<td>-0.1</td>
<td>2.4</td>
</tr>
<tr>
<td>Preoccupied</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>11</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>% SSP predicted by AAI</td>
<td>55%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>Adjusted residual</td>
<td>-1.3</td>
<td>1.7</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Factors associated with infant-mother attachment

Multinomial logistic regression analysis was conducted with parenting stress at 3 and 12 months, parenting self-efficacy at 3 and 12 months, depressive symptoms at 3 and 12 months, and the occurrence of serious life events after birth of the infant in addition to maternal state of mind as predictors of infant-mother attachment. Descriptive statistics of these values for each infant-mother attachment classification are shown in Table 3. The omnibus test was marginally significant ($\chi^2 (18) = 28.77, p = .052$, Nagelkerke pseudo $R^2 = .23$). Higher parenting stress at 3 months after birth was associated with a smaller chance of developing a resistant infant-mother attachment relationship ($b = -0.045$, Wald $\chi^2(1.23) = 5.71$, $p = .017$, OR = 0.96) relative to the secure attachment reference group. A dismissing maternal state of mind was still associated with a larger chance of developing a resistant infant-mother attachment relationship ($b = 1.30$, Wald $\chi^2(1.22) = 5.91$, $p = .015$, OR = 3.66). Avoidant infant-mother attachment was predicted by the occurrence of serious life events ($b = 1.41$, Wald $\chi^2(1.23) = 5.30$, $p = .021$, OR = 4.08) and a preoccupied maternal state of mind ($b = 1.46$, Wald $\chi^2(1.83) = 3.88$, $p = .049$, OR = 4.32). Parenting stress at 12 months, parenting self-efficacy at both time points, and depressive symptoms at both time points were not associated with infant-mother attachment classification ($p > .17$).

### Table 3. Descriptive statistics of mean values and difference values of parenting stress, parenting self-efficacy, and depressive symptoms by infant-mother attachment classification

<table>
<thead>
<tr>
<th>Measure</th>
<th>Secure</th>
<th>Avoidant</th>
<th>Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>PS 3 mos.</td>
<td>120.41</td>
<td>34.52</td>
<td>115.02</td>
</tr>
<tr>
<td>PS 12 mos.</td>
<td>117.57</td>
<td>32.52</td>
<td>110.96</td>
</tr>
<tr>
<td>PSE 3 mos.</td>
<td>93.31</td>
<td>10.86</td>
<td>95.06</td>
</tr>
<tr>
<td>PSE 12 mos.</td>
<td>96.46</td>
<td>10.45</td>
<td>99.00</td>
</tr>
<tr>
<td>BDI 3 mos.</td>
<td>7.90</td>
<td>5.04</td>
<td>7.01</td>
</tr>
<tr>
<td>BDI 12 mos.</td>
<td>6.70</td>
<td>5.19</td>
<td>5.59</td>
</tr>
</tbody>
</table>

Note. PS = parenting stress, PSE = parenting self-efficacy, BDI = Beck Depression Inventory.

In addition to the direct effects of the psychosocial factors on infant-mother attachment, interaction effects between adult attachment classifications and each psychosocial factor were assessed. The omnibus test was significant ($\chi^2 (46) = 88.32, p < .01$, Nagelkerke pseudo $R^2 = .58$). Resistant infant-mother attachment was predicted by the interaction between dismissing maternal attachment and the occurrence of life events ($b = -5.67$, Wald $\chi^2(1) = 6.52$, $p = .011$, OR = 0.003) and the interaction between dismissing maternal attachment and parenting stress at 12 months ($b = -0.12$, Wald $\chi^2(1) = 4.63$, $p = .033$, OR = 0.88). Inspection of descriptive analyses showed that mothers with a dismissing state of mind were less likely to develop resistant attachment relationships with their infants when they had experienced one or more serious life events and when they reported higher parenting stress at 12 months after birth. Avoidant infant-mother attachment was predicted by the interaction between dismissing maternal attachment
and parenting stress at 3 months ($b = 0.20$, Wald $\chi^2(1) = 4.17$, $p = .041$, OR = 1.22), indicating that mothers with a dismissing state of mind were more likely to develop an avoidant attachment relationship with their infants when they reported higher parenting stress at 3 months after birth.

**Discussion**

Maternal state of mind regarding attachment in the current study was predictive of the infant-mother attachment relationship at 12 months after birth. Secure infant-mother attachment was predicted by autonomous attachment state of mind, and like Schuengel et al. (1999) showed, disorganized attachment was predicted by the combination of unresolved loss or trauma and non-autonomous state of mind. However, other corresponding patterns were rather unexpected. Avoidant infant-mother attachment was predicted (albeit with marginal significance) by preoccupied state of mind, and resistant attachment by dismissing state of mind. This inverted pattern has been shown before in studies using the DMM method for scoring the AAI (Crittenden & Landini, in press) with smaller sample sizes (Hautamaki et al., 2010; Shah et al., 2010), but has not been reported using the Main and Goldwyn coding system (Main & Goldwyn, 1994). Exploration of possible moderators of intergenerational transmission indicated that for dismissing state of mind, the inverted pattern was less likely when life events had occurred and parenting stress was high. Given that the current sample was characterized by high education, high parenting self-efficacy, and on average, low stress compared to clinical samples, a tentative explanation for the difference between the current findings and previous studies could be that the traditional correspondence between maternal attachment state of mind and infant-mother attachment is more suitable for more heterogeneous populations. Tests of this explanation await larger population samples, meta-analyses, and mega-analysis (combining primary level data from multiple studies).

Given that the current study as well as the two other studies finding inverted patterns of transmission (Hautamaki et al., 2010; Shah et al., 2010) have been conducted more than a decade after the Van IJzendoorn (1995) meta-analysis, time trends may play a role as well. People who currently become parents, especially when they are highly educated, have access to infant care and development information that has been updated, partly based on the previous decades of attachment research. Studies on the effectiveness of the use of text books or video materials as parenting education have shown that interventions using these materials without personal contact with an intervenor can be effective in promoting sensitive parenting behaviors (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; Browne & Talmi, 2005; Lambermon & van IJzendoorn, 1989). In fact, intervention studies without personal contact tended to have larger effect sizes than interventions with personal contact (Bakermans-Kranenburg et al., 2003). Little is known about differences in the ways that parents with dismissing or preoccupied states of mind use and apply information on infant development and caregiving, although an early study
found that mothers with dismissing and preoccupied states of mind did respond differentially to different parenting intervention modalities (Bakermans-Kranenburg, Juffer, & van IJzendoorn, 1998). Furthermore, an increase in attachment theory-informed information and interventions would have the effect of attenuating or at least changing the effects of parental attachment state of mind on the infant-parent attachment relationship.

In accordance with the second hypothesis, psychosocial factors included in the current study predicted variance in infant-mother attachment in addition to maternal state of mind. In particular, parenting stress and life events during the first year were associated with infant-mother attachment. The results regarding parenting stress might be explained by problems in the adaptation to motherhood. Mothers who reported lower stress at 3 months were more likely to develop resistant relationships with their infant. Stress levels at 12 months were not different for these groups, suggesting that this group exhibited a different pattern of stress during the first year after birth, with a later onset of parenting stress. This later onset of parenting stress may be maladaptive, because getting used to the challenges of parenthood does not take place during the first months after birth, but this adaptation process appears to start later and thus take longer for these mothers than for others. This may leave less time and energy for positive interactions with their infants during the first year after birth, which might explain the development of a resistant attachment relationship, because this is thought to be preceded by inconsistent sensitivity in mothers (Smith & Pederson, 1988). In previous studies, higher parenting stress was associated with more insecure attachment (Atkinson et al., 2000), but the current study showed that onset time of parenting stress in the transition to parenthood might thus be a proxy of adaptation to motherhood. More research is needed to establish whether timing of parenting stress is a risk factor for the development of attachment relationships. If this is confirmed, these mother-infant dyads can be targeted for intervention.

The occurrence of serious life events during the first year after birth predicted the development of an avoidant infant-mother attachment relationship. Also, the development of a resistant infant-mother attachment relationship was less likely when mothers with dismissing states of mind had experienced life events during the first year after birth. The importance of life events for the stability of the attachment relationship has been stressed before (Hamilton, 2000; Waters et al., 2000), but life events have not yet been found associated with the development of avoidant attachment in the first year after birth. It is possible that life events distract mothers from their infants and increase the latency to tending to the infants’ needs. Exploring these factors further is important, because of evidence that other sources of distraction or burden on regulatory resources, such as daily hassles (Phelps, Belsky, & Crnic, 1998), are also important for the development of infant-mother attachment. Attachment-based intervention was especially effective for mothers experiencing high levels of such daily hassles (Van Zeijl et al., 2006).

Depressive symptoms and parenting self-efficacy were not significantly associated with infant-mother attachment relationships, even though the association between depressive symptoms and attachment has been shown before (Martins & Gaffan, 2000). An explanation might be
that the levels of depressive symptoms in low risk populations are too low to cause any effects. Another recent study with a large normative sample did not find effects of depressive symptoms on infant-mother attachment either (Tharner et al., 2012). A similar explanation can be given for the lack of significant associations between parenting self-efficacy and infant-mother attachment, because participants in our sample scored rather high on parenting self-efficacy. It would be interesting to follow up on these results in a higher risk sample, to see whether effects of depressive symptoms and parenting self-efficacy are found in a more diverse sample.

The current study is not without limitations. The sample was highly educated and people with higher education levels have more access to information, such as the internet, on parenting advice. However, some previous studies on the intergenerational transmission of attachment were also conducted in samples with a high mean level of education and yielded the traditional results on intergenerational transmission (Benoit & Parker, 1994; Fonagy et al., 1991; Raval et al., 2001). Furthermore, education level was not associated with infant-mother attachment in the current study.

Another consideration is the difference between parenting stress as assessed in the current study and more general psychological stress. In the current study, parenting stress was not associated with the occurrence of life events, whereas it can be assumed that life events would lead to an increase in overall psychological stress, because life events are also associated with emotional and behavioral problems (for a review, see Thoits, 1983). Parenting stress and more general stress appear thus not interchangeable in the association with infant-mother attachment.

Recently, the inverted pattern of intergenerational transmission of attachment has emerged several times in the literature (Hautamaki et al., 2010; Shah et al., 2010), whereas reports on the traditional pattern of intergenerational transmission of attachment seem to be getting scarcer. This might be explained by the ‘decline effect’, which is the finding that effect sizes normally decline in replication studies after an initial study with remarkable results, which has recently received more attention in the literature (e.g., Ioannidis, 2005; Schooler, 2011). This effect was already apparent in the meta-analysis on intergenerational transmission of attachment (Van Ijzendoorn, 1995), with more recent studies showing smaller effect sizes than older studies.

In conclusion, the results of the current study provide insight in the association between psychosocial factors involved in the adaptation to motherhood and the development of the infant-mother attachment relationship. In addition to maternal state of mind regarding attachment, differences in the development of the infant-mother attachment relationship may be explained by differences in parenting stress and the occurrence of serious life events during the period of the first year after birth, and exploration of such psychosocial factors may increase in importance if there would be a trend towards weakening intergenerational transmission, although this is speculative at this point. These results form the basis for further research in other samples to assess the effects of psychosocial factors during the adaptation to motherhood on the development of attachment relationships and offer prospects for more targeted preventive and supportive practice.
References


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| From expecting to experiencing