

# Attachment Stability over a Period from Prenatal to 6 Months Post Partum

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**Abstract:** This study investigates the influence of prenatal mother-child attachment on intrauterine fetal movements and postnatal attachment (0;6 years). 2 questionnaires (The Parental-Fetal Attachment Scale (Cranley, 1981) (13<sup>th</sup>, 26<sup>th</sup> and 38<sup>th</sup> week of pregnancy) and Axis II (Zero to Three, 1994) (6 months post partum)), answered by 92 mothers (18–38 years) were used to identify the attachment category. Intrauterine fetal activity (head/arm/leg/fetal heart rate in the 13<sup>th</sup> week of pregnancy (+/- 1 week) was observed by ultrasound for 5 minutes. For statistical analyses, regression analysis (SPSS-PC+) was used. The results show, that there might be high stability of secure attachment, especially at the end of the second trimester. Insecure-ambivalent attachment at the end of the first trimester also remains stable until the age of 6 months. In our sample, there was no significant association between attachment and intrauterine fetal movements.

**Zusammenfassung:** *Mutter-Kind-Bindung von der Schwangerschaft bis zum Alter von 6 Monaten.* Die vorliegende Studie untersucht den Einfluß der pränatalen Mutter-Kind-Bindung auf die intrauterine Fetalaktivität und die postnatale Bindung im Alter von 6 Monaten. Wir erfaßten die pränatale Mutter-Kind-Bindung in der 13., 26. und 38. Schwangerschaftswoche mittels der deutschen Version der Parental-Fetal Attachment Scale (Cranley, 1981), die postnatale im Alter der Kinder von 6 Monaten mittels Achse II von Zero to Three (1994). Beide Erhebungsinstrumente wurden von 92 Müttern ausgefüllt. Die intrauterine Fetalaktivität, getrennt nach Kopf-, Arm-, und Beinbewegungen, hochgerechnet auf 5 Minuten Beobachtungszeit (die tatsächliche Beobachtungszeit lag zwischen 3 und 15 Minuten und wurde im Rahmen der Mutter-Kind-Paß-Routineultraschalluntersuchung durchgeführt), wurde gleichzeitig mit der ersten Bindungserhebung in der 13. Schwangerschaftswoche auf Video (VHS-System) aufgezeichnet und von 3 Ärzten unabhängig ausgewertet; in die Verrechnung ging der Mittelwert der 3 Zählungen ein. Außerdem wurde automatisch die Fetale Herzfrequenz im Rahmen der Ultraschalluntersuchung gemessen. Die erhaltenen Daten wurden regressionsanalytisch miteinander in Beziehung gesetzt. Unsere Ergebnisse weisen auf eine Zeitstabilität der erhobenen Bindungsmuster (sicher, ambivalent, vermeidend), besonders ab dem 2. Trimenon hin. Ambivalente Bindung bleibt vom ersten Trimenon an bis in die Postnatalphase

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hinein bestehen; sichere Bindung von der 26. Schwangerschaftswoche an. Sichere Bindung bleibt weiters schon in der frühen Schwangerschaftsphase stabil. In unserer Stichprobe ergaben sich keine signifikanten Zusammenhänge zwischen Bindungsmustern und der intrauterinen Fetalaktivität.

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## Introduction

It is a respectable merit of recent attachment research to operationalize the associations between security of early mother-child attachment and later self-esteem by means of observation methods. Furthermore, recent research showed that the quality of early attachment remains stable until later behavioral manners.

In this way, this research replicates observations of earlier psychodynamic research (Schindler, 1998; Janus, 1990; Janus, 2000; Huber, 1994) in psychotherapeutic settings.

These results are of special interest, because they deal with central paradigms of personality development: the ability of self-demarkation, remarkable fundamentals of being-alone, the development of self-esteem and interaction – paradigms, which may cause remarkable psychological and sociological problems, if they are not developed properly.

Psychoanalytic observations are operationalized by deductive attachment research, which helps to interpret these observations systematically. This may be the optimal base of collaboration of these disciplines.

John Bowlby (1995) developed Attachment Theory because he wanted to learn more about important developmental parameters.

Although child's behavior is mainly influenced by endogenous (actual psychological state) and exogenous (environmental) components, behavioral stability over a long-term period makes its prenatal establishment probably (Benoit et al. 1997; Benoit and Parker, 1994).

Attachment is a biological construct (Colin, 1996). The mother's behavior influences the child's emotional reactions (Colin, 1996). Grossmann (1993) reports the importance of the stability of parental empathy. So the parent's attachment also influences the children's attachment (Colin, 1996). The child internalizes the parent's behavior (internal working model) and finally generalizes its early experiences (Grossmann, 1993). This development is enabled by early experience of empathic relationships (Bowlby, 1995). Parent-child attachment, characterized by avoidance and ambivalence, may influence this development negatively (Ainsworth, 1978). Psychotherapy may support the development of secure attachment by giving a secure base, which fact enables reorganization of the internal working models (Bowlby, 1995).

Bowlby's basic observations were operationalized by M. Ainsworth (1978). She developed an artificial situation (Strange situation Test), enabling the observation of patterns of children's falling within the normal range responses after having been separated from their mothers. Even social behavior was observed to be influenced by the attachment: avoidant attached children were more aggressive and

had less self-esteem than secure attached ones. Ainsworth (1978) also reports a significant correlation between the Strange Situation Test and all day's life.

Originally, attachment underlying cognitive and emotional capacities develop postnatally. From our point of view, even Ainsworth's observations let arise the question of the attachment research obviously hesitates to explore the prenatal conditions of postnatal attachment, although to find answers for these questions is quite important for psychohygienic-prophylactic consequences. Certainly there are difficulties for cognition-orientated attachment research, because only small areas of the complex topic can be operationalized properly. Therefore, interdisciplinary collaboration is essential.

Quite often, this collaboration does not exist. Empirical attachment research seems to be isolated of psychoanalytic observation methods. For example, results are not exchanged and the benefits of an addition of both methods are not used.

This dilemma inhibits specific research. There is much need to start attachment research not only postnatally, but even in the prenatal period.

Referring to results of prenatal psychology and medicine, attachment research should no longer start postnatally. Modern observational methods (e.g. intrauterine phonography, intrauterine ultrasound observation ...) allow to make the development from the ovum until the newborn visible. This shows, that already in the early stages of pregnancy there exists active mother-child attachment. The fetus is no passive intrauterine individual. Even in embryonal stages, autonomous motility of the child can be observed (Tajani et al., 1990). There are also recent results reporting intrauterine fetal reactions in delighting and threatening situations (Chamberlain, 1997).

Research of interactive movements show the early stages of attachment. Piontelli (1992) reports these movements of "friendly twins" in the 20<sup>th</sup> week of pregnancy and its continuation up to the postnatal period.

These results replicate psychoanalytical and psychotherapeutic findings (Janus, 1990), which postulate integration and later objectivation of prenatal experiences (measured by introspective methods). Later attachment is described to be caused by "early agreement behavior".

Lake (cited by House, 1999) reports the interaction of mother and fetus. Following research projects report associations of prenatal neglect and postnatal attachment (Häsing et al., 1994; Chamberlain, 1989) and the fact, that the fetus seems to be able to recognize acceptance or avoidance in the prenatal period (Reiter, 1995; Huber, 1994).

Other methodological approaches deal with the association of prenatal attachment and creativity (Everts, 1998; Reiter, 1999) as well as cultural specificities (Chavers, 1984). Shamanistic cultures use as special technique the "genetic view", which enables to feel the actual and also the prenatal mother-child attachment (Schmücker, 1991; Schmücker, 1993). This "holographic" experiences are also used in immaginative psychotherapy and psychoanalytical orientated attachment research (Reiter, 1995).

Postnatal attachment, which can be seen as the base for cognitive and emotional representations, also exists prenatally. "Allowed to be or not to be" seems to be determined in the very early pregnancy and represents the base for postnatal attachment.

Research of the importance of the prenatal period suggest the identification of predictors within the prenatal period.

To use attachment theory also in the prenatal period, there is some need to modify the methods because of the existence of cognitive and affective predictors during pregnancy.

The persistence of attachment categories from the early childhood up to 17 years is also well documented (Dornes, 1997; Grossmann, 1993), as well as the persistence of prenatal attachment (Benoit et al., 1997; Benoit and Parker, 1994). Niederhofer (1994) reports the long-term influence of maternal stress situations during pregnancy on the babies' early childhood and no significant associations between insecure attachment and increased intrauterine fetal activity due to the fetus' irritation.

Recent literature does not report anything about the gestational time, when prenatal attachment is determined. According to genetic hypotheses, attachment would be expected to be determined even in early gestational time, according to psychoanalytic theories, later gestational time would be expected to be important, because mothers need time to accept their pregnancy and child. Our study compares attachment, assessed at the end of the first, second and third trimester.

It is necessary to point out the merits of attachment research, which documents the association between early safety and later self-esteem. Systematic observations of early development (Grossmann, 1993; Dornes, 1997) report the importance of the early determination of topics like self-esteem and love for the development of a stable attachment. Recent findings of prenatal psychology and medicine (Dornes, 1997; Niederhofer, 1994; Benoit et al., 1997; Benoit and Parker, 1994) refer to include the prenatal period into further attachment research. They report the influence of maternal attitudes towards pregnancy and delivery as well as the prenatal attachment on the later mother-child attachment.

These findings point out the psychohygienic importance of the prenatal period. The remarkable complexity of this research makes the importance of various approaches necessary. On the one hand, it is quite difficult to replicate data of introspective methods by empirical research, and on the other hand, empirical research is not able to describe prenatal attachment properly.

There is much need for the identification of valide and oeconomical predictors to identify risk groups with already prenatally pathological attachment.

In a second step specific psychotherapeutic interventions for risk groups could be developed.

Recent contributions (Niederhofer and Reiter, 1999; Niederhofer, 2000) and as well this study deal with this complex topic. We are searching for reliable and oeconomical predictors for attachment to be able to identify risk groups with the aim of developing early interventions to prohibit later pathological attachment.

## **Methods**

We assessed 92 mothers (18–38 years; Mean 26,3; 105 were invited, 13 refused) with no psychological trauma in their past and their children (APGAR min. 9/9/9). By means of a short interview (15 min) we explored the family's socioeconomi-

cal state. All social classes were represented equally in our sample, so that it can be seen representative for Austria.

We expected the early fetal attachment to be highly associated with the mother's attachment. In the 13<sup>th</sup>, 26<sup>th</sup> and 38<sup>th</sup> week of pregnancy the prenatal attachment was assessed by means of the Prenatal parent-child Attachment Scale (Cranley, 1981), including 24 items which had to be answered by the mother on a 5step rating scale (2 = very often – 0 = never). The highest subscore decided, which category each person was counted to. Varimax-rotated factor analysis was performed to extract three attachment categories (secure – item 7, 9, 17, 20, 22, 24, e.g. I refer to my baby by a nickname; insecure-ambivalent – item 1, 2, 5, 6, 10, 13, 14, 15, 16, 18, 19, 21, e.g. I'm afraid looking forward to see what the baby looks like; insecure-avoidant – item 3, 4, 8, 11, 12, 23, e.g. I don't think the baby can hear inside of me) (Means and standard deviations see Table 1; Percentage see Table 2).

**Table 1.** Means and standard deviations of subscales

	13 <sup>th</sup> week	26 <sup>th</sup> week	38 <sup>th</sup> week	postnatal
<b>SECURE</b>				
secure	10,8+/-1,22	10,6+/-0,67	11,1+/-1,24	59,8+/-1,24
ambivalent	3,6+/-2,14	3,9+/-0,65	4,5+/-0,36	62,3+/-0,99
avoidant	2,3+/-0,77	3,1+/-1,03	1,9+/-1,08	15,5+/-1,93
<b>AMBIVALENT</b>				
secure	2,8+/-1,22	2,3+/-0,67	2,1+/-1,24	26,7+/-1,93
ambivalent	18,6+/-2,14	16,9+/-0,65	14,5+/-0,36	124,6+/-2,74
avoidant	2,3+/-0,77	3,1+/-1,03	1,9+/-1,08	31,5+/-2,00
<b>AVOIDANT</b>				
secure	2,8+/-1,22	2,6+/-0,67	2,1+/-1,24	25,8+/-2,64
ambivalent	6,6+/-2,14	7,9+/-0,65	9,5+/-0,36	97,6+/-1,73
avoidant	10,3+/-0,77	9,1+/-1,03	10,9+/-1,08	27,9+/-1,53

**Table 2.** Prenatal attachment

<b>PERCENTAGE</b>						
attachment category	13 <sup>th</sup> week		26 <sup>th</sup> week		38 <sup>th</sup> week	
secure	72	78,3%	66	71,7%	64	69,6%
ambivalent	2	2,2%	4	4,3%	9	9,8%
avoidant	18	19,5%	22	24,0%	19	20,6%
<b>SPEARMAN CORRELATION COEFFICIENTS BETWEEN 13<sup>TH</sup> WEEK AND ...</b>						
attachment category	26 <sup>th</sup> week		38 <sup>th</sup> week			
secure	.88**		.70			
ambivalent	.71		.65			
avoidant	.75*		.69			

\*\* p > .001 \* p < .005

In the 26<sup>th</sup> week of pregnancy, we objectivated the intrauterine fetal activity by ultrasound observation, taking 5 minutes. The examination was videotaped and

**Table 3.** Intrauterine fetal activity

head movements	
16–20/min	8
21–25/min	5
26–30/min	2
31–35/min	0
36–39/min	0
arm movements	
16–20/min	7
21–25/min	5
26–30/min	2
31–35/min	1
36–39/min	0
leg movements	
16–20/min	5
21–25/min	7
26–30/min	3
31–35/min	0
36–39/min	0
FETAL HEART FREQUENCY	
Bpm	VPn
120–130	3
131–140	2
141–150	3
151–160	5
161–180	2

**Table 4.** Attachment (6 months)

secure	56	60,9%
ambivalent	14	15,2%
avoidant	22	23,9%

then scored by three blind observers independently. For further statistical analysis, the mean score of the three observers was used. We counted movements of the head, the arms and the legs separately for 5 minutes (because of the intended practicability as a screening program) (Table 3). The ultrasound investigation was performed between 8 a.m. and 10 a.m., i.e. after the mothers had breakfast. Women drinking alcohol or smoking during pregnancy were excluded from our study.

6 months (+/-0;5) after birth (adjusted for gestational age; premature children (< 28<sup>th</sup> week), as well as children with neonatal problems or congenital anomalies were excluded from our study) we assessed the mother-child attachment once again (Axis II (Zero to Three, 1994) because of its close relationship to the DSM-IV classification system) by an interview, taking approximately 1 hour. This assessment scale included 29 items, which had to be answered by the mother on a

10step rating scale (10 = very often – 1 = never). The highest subscore decided, which category each person was counted to. Varimax-rotated factor analysis was performed to extract three attachment categories (secure – item 1–7, e.g. the child's intentions are respected; insecure-ambivalent – item 8–16 and 22–29, e.g. the children's signals are ignored ; insecure-avoidant – item 17–21, e.g. almost no verbal-emotional interactions) (Means and standard deviations see Table 1; Percentage see Table 4).

We compared both questionnaires and the intrauterine activity regression analysis (Schubö et al., 1991).

## Results

Our data showed no significant prenatal time-stability of avoidant and ambivalent attachment, but of secure attachment ( $r = .88$ ;  $p < .001$ ) (Table 2).

Secure attachment in the 26<sup>th</sup> week of pregnancy was significantly (52%,  $p = .03$ ) associated with secure attachment at the age of 6 months (Figure 2).

Ambivalence in the 13<sup>th</sup> week of pregnancy was significantly associated (66%,  $p = .03$ ) with ambivalent attachment at the age of 6 months (Figure 1).

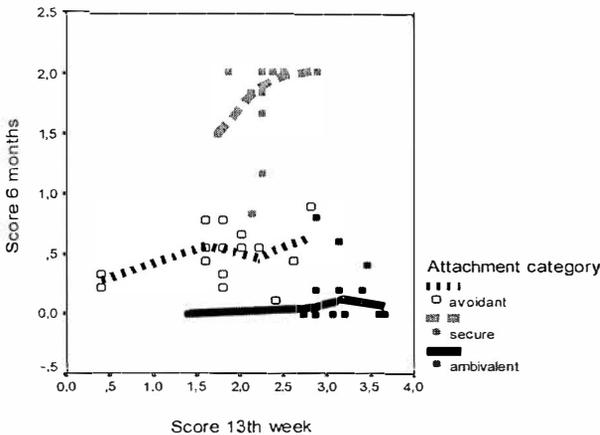


Fig. 1. Persistence of attachment (13<sup>th</sup> week – 6 months)

Secure attachment in the 13<sup>th</sup> week of pregnancy was significantly negatively associated (49%,  $p = .10$ ) with avoidant attachment at the age of 6 months (Figure 1).

Ambivalent attachment in the 13<sup>th</sup> week of pregnancy is also negatively associated with avoidance (38%,  $p = .05$ ) as well as with secure attachment (46%,  $p = .06$ ) at the age of 6 months.

Our data showed no significant association between prenatal avoidance and postnatal attachment.

There was no significant association between pre- and perinatal attachment and the intrauterine fetal activity, which might be due to the short ultrasound observation time (Prechtl, 1985).

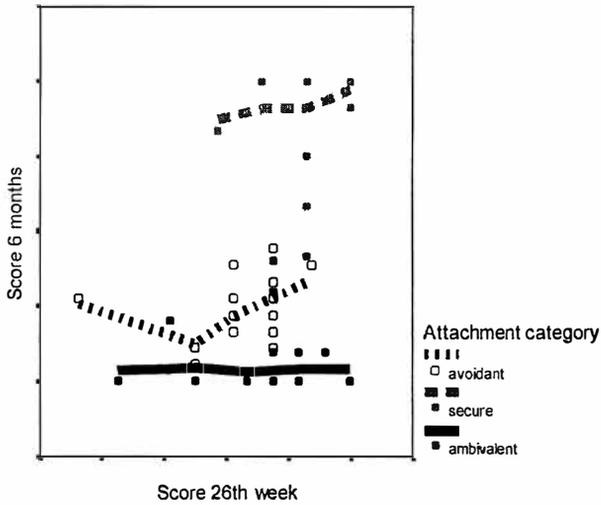


Fig. 2. Persistence of attachment (26<sup>th</sup> week – 6 months)

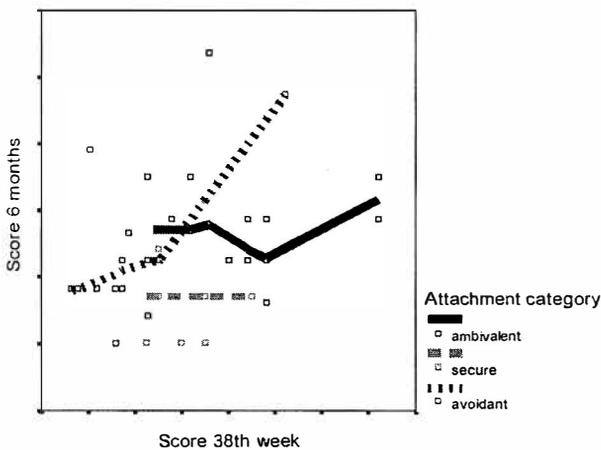


Fig. 3. Persistence of attachment (38<sup>th</sup> week – 6 months)

## Discussion

Literature (Bowlby, 1988; Grossmann, 1993) postulates the necessity of observation to enable attachment classification. So the – perhaps – wrong estimation by parents does not lead to wrong results, but there is the question, if the artificial “strange situation” really enables to classify into three attachment categories of every day’s life.

Recent literature (Crittenden, 1995) focuses on a every day’s life situation, but there is also the problem of the falsification by the observer’s interpretation.

The above mentioned assessment batteries cannot be used in the prenatal period. There is only the possibility of attachment categorization based on the mother’s estimations or on the (rudimentary) observation of biological parameters.

Recent literature discusses attachment persistence controversially: Hayes et al. (1991) deny any persistence, Egeland et al. (1979), Quinton et al. (1984), Ziegenhain et al. (1996) and Altemeier et al. (1979) confirm it.

Our results suggest the importance of the prenatal period for further attachment development (Benoit et al., 1997; Benoit and Parker, 1994).

Subjective experienced problems within the social environment (e.g. family problems, stressing job) of a pregnant woman may cause avoidant and/or ambivalent attachment, up to their children's age of 6 months, as our results show. Supporting programs may stabilize attachment.

Secure attachment in the early prenatal period remains stable up to 6 months and seems to avoid ambivalent attachment. Ambivalent attachment (assessed in the 13<sup>th</sup> week of pregnancy) also seems to remain stable. These facts can also be explained by the stability of the parent's attachment from the fetus' early prenatal period up to the child's age of 6 months. The high association between attachment in the early prenatal up to the postnatal period supports the genetic hypothesis of attachment determination.

Insecure prenatal attachment (13<sup>th</sup> week of pregnancy) does not seem to improve. We think, this fact is very important and should lead to the development of attachment stabilizing programs, which should focus on ambivalent attachment.

Our results should be confirmed by other studies. Then a kind of screening program could be developed, which would be the base for attachment stabilizing programs. We did not find any programs of this kind; only STEEP (Egeland et al., 1990) was developed to improve attachment for misused mothers.

Our results point out the early prenatal determination of attachment. As Vaughn et al. (1994) report, attachment is mainly modulated by the actual situation. Attachment can be seen as a maturational process (Mussen et al., 1981), as its common characteristics show: it undergoes specific steps of development. Each of these steps can be influenced by environmental factors (Nickel et al., 1980). Nevertheless, there seems to be a early determined attachment component.

Maternal sensitivity, as the meta-analysis of 66 studies (de Wolff et al., 1997) reports, and spontaneous, empathic behaviour of the mother (Kroonenberg et al., 1977) seem to guarantee secure attachment, as well as a stress-free environment (Main, 1996). Parental stress intolerance in combination with the (artificial) test situation may cause insecure attachment (see also the meta-analysis of van Ijzendoorn et al., 1995; Ziegenhain et al., 1996; Smith, 1988).

There seems to be a significantly higher incidence of insecure attached children by extremely young mothers (Broussard, 1995). Paternal dominance is negatively associated with insecure attachment, especially of girls (Fagot et al., 1993). Boys show insecure attachment in case of a dominant mother and a dominant father (Fagot et al., 1993). Parental object representations are important for secure attachment, especially in the early childhood (Levine et al., 1991).

Social and intrafamiliar supports show attachment stabilizing effects, mainly in the early childhood (Adler et al., 1991), because they enable parents to invest more physical contact in their children (Anisfeld et al., 1990).

Employment of mother and father as well as disabilities to invest physical contact and may cause insecure attachment (Barglow et al., 1987; Owen et al., 1984), especially in case of coincidence with financial problems (Vaughn et al., 1980).

Our results suggest not to use the intrauterine fetal activity as an indicator for attachment.

Further investigations will be necessary to separate the prenatal determination of attachment from postnatal modifying variables such as stressing job and family problems.

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