From security to attachment: Mary Ainsworth's contribution to attachment theory

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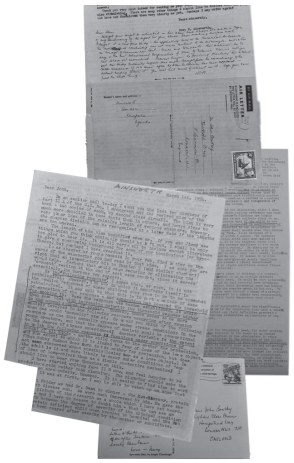

Chapter 2

ABC+D of Attachment Theory: The Strange Situation Procedure as the Gold Standard of Attachment Assessment

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'So saying, glorious Hector stretched out his arms to his boy, but back into the bosom of his fair-girdled nurse shrank the child crying, affrighted at the aspect of his dear father, and seized with dread of the bronze and the crest of horse-hair, as he marked it waving dreadfully from the topmost helm. Aloud then laughed his dear father and queenly mother; and forthwith glorious Hector took the helm from his head and laid it all-gleaming upon the ground. But he kissed his dear son, and fondled him in his arms...'

(Homer, The Iliad, book VI)

INTRODUCTION

The Strange Situation Procedure (SSP) and its standard coding protocol (Ainsworth, Blehar, Waters & Wall 1978) have been used in numerous studies on antecedents and sequelae of infant attachment. In this chapter we present the SSP and its attachment classifications and we discuss some of the work done on the antecedents of differences in attachment security.

ATTACHMENT

WHAT IS ATTACHMENT?

Attachment is the emotional bond between a child and his protective caregiver(s). That bond becomes most obvious in times of fear and tension, for instance during illness, separation or other threatening danger. For regulation of these negative emotions a child feels when scared or tense, the young child depends on a wiser or stronger person who makes sure that negative emotions like fear or sadness don't overwhelm the child and block any (exploratory) behavior. The caregiver acts as a haven of safety, which causes the child to feel supported and allows it to grow. Attachment is seen in some shape or other in all cultures, and appears to be important in parent-offspring relationships of many animal species as well.

The importance of attachment should not be underestimated. The helpless baby depends on protection in order to survive. This protection is normally provided by its biological parents, because they want their offspring to survive. From an evolutionary viewpoint, attachment is important for the parents so they can hand over their genes to the next generation(s). Attachment theory is essentially an evolutionary theory, and John Bowlby (1973, 1988), the British child psychiatrist and founder of the attachment theory, felt strongly indebted to Charles Darwin.

Even though protection would normally be provided by the parents, a child can also get attached to other caregivers who are in regular contact with the child and make

it feel secure in times of need. A good example of a network of attachment relationships in which a child can grow up is found in the citation above – the beautiful description of the departure of Hector, given by Homer almost three thousand years ago in The Iliad. It clearly shows that attachment is not a new phenomenon in human history, and that it is not just about the bond between mother and child.

The way Hector says goodbye to his loving wife Andromache shortly after in the same scene illustrates the importance of attachment for adults. Bowlby (1973, 1988) looked upon attachment as a lifelong attribute of people and their relationships. At no point in our lives can we escape the need for closeness to a protecting and loving partner in times of fear and tension. The fact that separation hurts in adulthood makes it clear that we depend on attachment figures to help us face the challenges of life. Hector has to face the battle with the enraged Ajax who can easily take him on. Hector suspects his end is near and wants to see his wife and son once more to pick up the courage to enter the life-or-death battle.

Attachment relationships are extremely important for development. Children who grow up in an orphanage from birth, having to go without the availability of a specific caregiver as an attachment figure, are especially at risk of suffering from delayed growth and delayed motor, cognitive and social-emotional development (Van IJzendoorn 2008). Children that grow up in children's homes often have disturbed neurophysiological emotion regulation, which becomes apparent from the dysregulation of the production of the stress hormone cortisol (Gunnar & Vasquez 2001). Normally a child becomes attached to one or more caregivers, even if these caregivers neglect or maltreat the child. Obviously, the quality of the attachment relationship suffers in such cases, but even under these circumstances feelings of attachment persist (Cyr, Euser, Bakermans-Kranenburg & Van IJzendoorn 2010). Attachment is seen as a milestone in the development of a child and a condition for a balanced development of a person (Bowlby 1953). Early experience with attachment relationships is assumed to be a decisive factor for the way children are later able to create bonds with other people, their future partners or their own children, and how they see themselves in relation to the outside world (Bowlby 1988).

THE DEVELOPMENT OF ATTACHMENT

The tendency to become attached is inborn in every human child. It is the result of a millennia-long evolution in which it was favorable for survival and reproduction of humans to get attached to a stronger, protective person during the first year of life. Children are in fact born 'prematurely' because they cannot move themselves from one place to another, they cannot feed themselves or keep themselves warm, and depend totally on their social environment for survival. The idea that babies become attached to their mother purely because she provides them with food and fulfills their basic needs

cannot stand if we look at ethology. Young geese that have just crawled out of their eggs follow the first moving figure they see, even if that is not their mother but, for instance, the ethologist studying them. Konrad Lorenz has given lively descriptions of this phenomenon (Lorenz, 1952). Human babies, however, do not have an instinct which causes them to become attached to the first living being they encounter. They get attached to the person who takes care of them the most during the first few months of life. In most cases that is the mother, but it could just as well be someone else. Through directing its attachment behavior (crying, laughing, following) at a specific person, the child makes this individual feel responsible for him or her at times of imminent danger – a very efficient system to ensure survival in environments of evolutionary adaptedness (Bowlby 1969) that, for millennia, were far from safe.

FOUR PHASES OF DEVELOPING ATTACHMENT

Bowlby (1982) has described four hypothetical phases through which attachment would develop during the first few years of life. The first phase, orientation towards people without differentiating between them, starts with the preference of the baby for the human smell, the sound of the human voice, and the rough outlines of the human face. This phase starts shortly after birth and lasts for the first few months of life. During the second phase, orientation towards specific people in the child's environment makes the baby focus on people it sees regularly and whom he or she becomes familiar with. This phase can be observed in the second half of the first year. The baby develops a preference for one or a few specific people to whom the child becomes attached during the third phase, the phase of specific attachment (from age 10 months to 3 years). It will want to be around these attachment figures when frightened or stressed. During the fourth phase, the phase of goal-oriented attachment which starts around the third birth day, the child can take the perspective of the attachment figure and take his or her expectations into account with the development of plans, for instance when playing with unfamiliar children in an unfamiliar environment, during the first day of school. Even though the child will want the attachment figure to be around, it will also be prepared to wait until the caregiver is available again. Attachment, in this phase, has developed from a relatively solid behavioral pattern aimed at physical proximity, to a mental representation of a protecting and comforting caregiver who is available to the child when the child needs him or her. The phases are still hypothetical in the sense that the age ranges are educated guesses without a firm empirical foundation of longitudinal research.

NO CRITICAL PERIOD FOR ATTACHMENT

It has been said that age 0-6 years is the critical period for becoming attached. There are two reasons why this assumption cannot be right. First of all, it is near impossible for a child not to become attached. Children practically always become

attached and have great ability to recover. Even autistic children are attached to their parents, in spite of their social handicaps (Van IJzendoorn et al. 2007). Also, children who are being maltreated or neglected are attached, even though this is usually an insecure or disorganized attachment (Cyr et al. 2010). The exception to the rule may be children who grow up in crowded orphanages without regular caregivers – a situation that is deviant from an evolutionary point of view.

Secondly, a cutoff point at age six is not based on empirical research. Bowlby suggested on theoretical grounds that until age five, attachment is open to influences from the environment – good or bad – but that even after that, it is possible for corrective attachment experiences to help the child back on track to a secure attachment. Empirical research into the development of adopted children has proven Bowlby right. Age at adoption is important for development - adoption before the child's first birthday usually results in better development, including attachment quality, than adoption when the child is older. Similarly, children who are placed with foster parents at a later age are more difficult to bring up than children who are placed with foster parents a few months after birth. But this does not mean there is a critical period for human children to get attached, a time frame in which certain skills have to be learned, lest they disappear altogether.

There are sensitive periods in which it is easier to learn these skills and after which it will be more difficult to learn or unlearn them, but children possess the ability to make an amazing recovery once they find themselves in a safe and stimulating environment. This becomes evident from research with children who are being adopted from orphanages. The developmental leaps these children take in a relatively short period of time are enormous: from dwarfism to average length, head circumference and weight, and from mental retardation to a level of cognitive functioning that is 15 to 20 IQ points higher than at the time of arrival at the adoptive family. Something similar is possible in the area of attachment. It is true that, sadly, some children are scarred for life, but for the majority of adopted children the cognitive and physical differences between them and biological children are small and the adopted children manage to catch up at surprising speed (Van IJzendoorn & Juffer 2006).

ATTACHMENT OVER THE LIFE COURSE

Even though we have established that there is no critical period in which the attachment representation is supposed to take shape, most children, in interaction with their caregivers, develop a mental representation of attachment during the first five years of life. Bowlby (1973) calls this an 'internal working model' of attachment. However, this mental representation of attachment is not solid and unchangeable at age five. It is not an absolute and definitive model but a working model that continually

keeps processing information from the environment and keeps adjusting itself to the changing circumstances.

The attachment representation that arises during the first few years of life does appear to leave its traces in adulthood. Three longitudinal studies show strong relationships between the quality of attachment in the first year of life and attachment representations during adolescence and early adulthood. Main and Hesse (Hesse 1999), Waters (Waters, Hamilton, & Weinfield 2000) and Hamilton (Beckwith, Cohen & Hamilton 1999) found continuity in quality of attachment in 70 to 77% of cases of children in diverse populations. A secure attachment relationship with a parent at age one predicted a secure attachment representation in adolescence, 16 to 18 years later. These are robust data. It is particularly interesting to look more closely at the cases that did change. Waters and Hamilton showed that radical change of situation (for instance divorce of the parents, or serious illness) could predict changes in attachment representation. Knowing that, it is plausible that intervention or therapy can also produce such effects.

There are studies, however, that show less or no continuity. The most important of these is the Minnesota longitudinal study conducted by Sroufe and Egeland (2005) which could not find any notable continuity of attachment across the first 18 years of life in a high-risk group of children (poor, and with abused or sometimes abusing parents). However, this is less surprising when one realizes that this group of deprived children and families had to try and survive in very unstable social circumstances. This could be a group with a majority of children experiencing (radical) change of situation, which in turn may change attachment representation.

MEASURING ATTACHMENT

Even though virtually all children become attached, the quality of their attachment relationship differs. This quality of attachment can be observed in stressful situations where the caregiver is not immediately available to comfort the child. The Strange Situation Procedure (SSP) was designed by Mary Ainsworth (et al. 1978) and is a standardized simulation of a stressful situation. It has been in use for decades and is the best-known instrument for measuring infant attachment.

THE ORIGINS OF THE STRANGE SITUATION PROCEDURE

The SSP was not invented overnight. The roots of its development date back to the first half of the 20th century. Mary Ainsworth wrote her dissertation in 1939 under the guidance of William Blatz, often referred to as the Doctor Spock of Canada (Wright 1996). It is very possible that this is where her interest in what we now call attachment stems from. Blatz lectured on his security theory for years and wrote briefly about it in

his books, but only clearly put his complete theory in writing in his last book, Human Security, which was published posthumously (Blatz 1966). According to Blatz, a child starts off having to depend on his parents. If the child feels certain the parent is going to be there for him, no matter what, the dependence is 'secure' and the child feels comfortable to go and explore. The parent acts as a 'secure base'. The exploration will result in development towards a state of 'independent security', although Blatz admits in his later writings that independent security can probably never be reached completely, and that a form of 'mature secure dependency' on friends and/or a partner is possibly the highest achievable goal. In the meantime, some people will remain 'immaturely dependent' or rely on defensive mechanisms in order to deal with feelings of insecurity.

Ainsworth's dissertation was based on Blatz's security theory. She designed an instrument to measure security in (young) adults: an extensive questionnaire which she kept expanding and improving upon until 1958 (Ainsworth and Ainsworth 1958).

When Ainsworth followed her husband to London in 1950 she started working with Bowlby at the Tavistock Clinic, researching the effects on young children of being separated from their mother. Ainsworth assisted James Robertson with analyzing the detailed notes he made while observing young children during situations of separation, for instance in hospitals or in institutions (Bretherton 1992). By doing this she gained a great deal of experience in the analysis of observational data.

In 1953 Ainsworth followed her husband again, this time to Uganda. There, Ainsworth studied normative development and mother-infant interaction. She did this by observing 26 mothers with their child(ren) at their homes for a few hours every two weeks. She also conducted interviews with the mothers (Ainsworth 1967). When studying these mother-child dyads, she saw increasing evidence for Bowlby's theory about attachment being something that is based on interaction rather than on the mother providing food and other basic needs. Ainsworth left 11 years between finalizing data collection in Uganda and publishing the book about the study. She commented that 'the full significance of what I observed and recorded in my field reports emerged only gradually, not merely in the process of analyzing my observations, but also in the course of reading, discussions with others interested in mother-infant interaction, and further research into the early development of attachment.' (Ainsworth 1967: ix).

Ainsworth first presented the findings of her Uganda study at the Tavistock Mother-Infant Interaction Study Group in London in 1961. Here we see emerging for the first time specific criteria to determine if the infant had 'formed an attachment to his mother as a special person' (Ainsworth 1963). Ainsworth found that only looking at crying, following and clinging as reactions to (threatening) separation was not enough to establish the strength of attachment. The general opinion up to that point had been

that the securely attached child is the one who protests loudly at the departure of his mother, and/or clings to her. Schaffer and Emerson (1964b) for instance, stated that intensity of protest of the baby when separated from the parent was indicative of the intensity of attachment.

Ainsworth however, believed that it was the anxious child who needed close physical contact with his mother, and for whom maintaining interaction from a (small) distance, even part of the time, wasn't enough (Ainsworth 1964). After examining her field notes exhaustively Ainsworth came up with the following types of attachment behavior: differential crying, smiling, and vocalization, visual-motor orientation towards mother, crying when mother leaves, following, 'scrambling' over mother, burying face in mother's lap, exploration from mother as a secure base, clinging, and greeting by lifting arms, clapping hands, or approaching through locomotion.

When the Uganda book finally appeared in 1967, Ainsworth had divided the children in three attachment groups, or classifications: non-attached, secure-attached and insecure-attached. Classifications were based purely on observations in the home. Regarding the judgment of quality of attachment through the behavior of the child Ainsworth was now confident that a close attachment could develop simultaneously with increasing competence and independence. Again she pointed out that it was the insecure child who would cling to his mother and refuse to leave her. (Ainsworth1967: 447).

In 1963 Ainsworth started the Baltimore Study, in which she and her colleagues observed mother-infant interaction in 26 families during three-weekly home visits of about four hours each. The study was initially intended as a replication of the Uganda study. Data collection went on until 1966. Each infant-mother pair in this study was observed in a final session when the child was 12 months old. This final session, the Strange Situation Procedure, was originally designed to assess the child's use of the mother as a secure base, inspired by Blatz, as we saw before, but also by Harlow (1960a), who had observed monkeys, and by Arsenian (1943) who had observed preschool children. Both Harlow and Arsenian reported that the baby, once it had developed an attachment to its mother, used her as a secure base or a 'haven of safety' from which it would go out and explore, ready to face external threats without panic (Ainsworth 1964). At the same time, the child's use of the mother as a secure base could be seen as an indicator for attachment since Ainsworth regarded being able to use the mother as a secure base for exploration necessary for a healthy attachment.

The first report on the use of the Strange Situation Procedure (Ainsworth and Wittig 1969), describes 14 infants from the Baltimore study who were divided into three groups, based on their behavior during the Strange Situation: Group A, containing children that we would now classify as insecure-avoidant; Group B,

containing the securely attached children, and Group C, containing the children that we would now classify as insecure-ambivalent. Between the first results of the Baltimore study and the last results, Ainsworth moved from determining the quality of attachment from the behavior of the child during the mother's absence to the behavior of the child at the moment of reunion. Attachment classification in the Baltimore study was, however, not just based on the Strange Situation Procedure. The results of the extensive home observations were decisive for the final classification system of the SSP (Ainsworth et al. 1978).

THE STRANGE SITUATION PROCEDURE TODAY

The Strange Situation Procedure (SSP) as it is used today is exactly the same procedure Ainsworth used in the Baltimore study. It is a situation that children also experience in day-to-day life, for instance when visiting the doctor or the well-baby clinic, or during the first few visits to a day care center. During the SSP the child is subsequently confronted with a strange room (a play room), an unknown experimenter, and two short periods of separation from the caregiver (see below). Usually the behavior of the child is recorded on video and carefully coded afterwards. Special attention is paid to the episodes in which the caregiver is being reunited with the child after the brief separations. During those reunion episodes the behavior of the child shows how much it trusts the caregiver and how long it takes before the balance between exploration of the environment and focus on the parent or caregiver has been restored. The SSP is used for parents or caregivers and their 12- 72 months old children. The original coding system is used for children from 12-20 months of age, whereas for older children adapted coding systems are used, in particular the Cassidy/ Marvin system (Cassidy & Marvin, 1992) to take into account the broader representational and behavioral repertoire of these children.

The Strange Situation Procedure consists of eight episodes of about three minutes each in which the child is being observed:

1. The caregiver and the infant enter the room.
2. The caregiver and the infant are in the room.
3. A stranger enters.
4. The caregiver leaves the room. The stranger and the infant are together in the room.
5. The caregiver returns (first reunion) and the stranger leaves. At the end of this episode the caregiver leaves for the second time.
6. The infant is alone in the room.
7. The stranger comes back.
8. The caregiver returns (second reunion) and the stranger leaves.

Being separated twice from the caregiver in an unknown environment is stressful for children and prompts attachment behavior. Especially the way in which the child approaches the caregiver at the reunion, and seeks contact, or tries to avoid contact, is angry, or acts in a disorganized way, is of interest. That is why the behavior of the child during the two reunions is the decisive factor for the attachment classification.

THE ABC + D OF ATTACHMENT IN CHILDREN

A B C

Securely attached children (classification B, see below) are upset when they are being left alone by their attachment figure in an unknown environment. Many (but by no means all) securely attached children are clearly upset, cry, and look for their caregiver. Their exploration and play come to a standstill. When the caregiver returns, these children will openly show their feelings of distress and will immediately start looking for reassurance and comfort from the attachment figure, but after a short while they will be able to go back to playing and exploring. Their curiosity about the nice toys in the playroom will prevail over their longing for immediate proximity to the caregiver. Securely attached children possess a basic trust – a general sense that the world is predictable and reliable – which is formed over time by a sensitive and comforting caregiver.

Children classified as insecure avoidant (attachment classification A) experience stress during the SSP, as becomes apparent from their accelerated heartbeat, but they will not show this stress to the caregiver. When the caregiver returns, they seem to be engrossed in play and they seem to want to avoid being close to the caregiver. In the meantime, however, the child is actually watching their caregiver in an unobtrusive way, and after a while she/he may look for some contact and closeness, still not showing any negative emotions. It is probable that this is a result of earlier, similar experiences in which the child's negative emotions were rejected by the caregiver. These caregivers are normally capable of dealing with positive emotions of the child, but feel at a loss or even threatened by their child showing feelings of stress or sadness. This, in turn, may be due to their own experiences as a child with a caregiver who ignored or rejected their feelings of stress or sadness.

Children classified as insecure-ambivalent (attachment classification C) do the opposite and emphasize their negative emotions, for instance by crying loudly, and they continue to do so when the caregiver returns. They desperately try to get close to the caregiver and want to be picked up and sit on their lap. But at the same time they seem to want to show the caregiver their disappointment in having been left alone in a strange situation full of unknown threats, even for a short time. They grab hold of the

caregiver but at the same time push him or her away, hence the term "ambivalent". While the insecure-avoidant children suppress their negative emotions, the insecure-ambivalent children let their tears run freely. Their experience has taught them that they can only get the caregiver's attention by screaming loudly or by making it obvious in other ways that they need to be comforted by a grown-up. The caregiver may have been inconsistently sensitive and available to the child, possibly because of previous experiences and problems during his or her own childhood.

The three main classifications of attachment have been divided into subcategories in order to do justice to the variety of behavioral patterns within each main classification. An 'angry' insecure-ambivalent child shows totally different behavior from a 'passive' insecure-ambivalent child, but both belong to the same main classification and both have the same background with regards to their upbringing by their caregivers.

A1 Avoids the caregiver in a conspicuous way during the episodes of reunion (for instance by ignoring him or her, by fixing its attention on toys, by turning away or crawling away). Does not attempt to approach the caregiver, or stops halfway. When being picked up by the caregiver makes no attempt to maintain contact. The stranger may be being approached in the same way as the caregiver.

A2 Greets or approaches the caregiver, but this greeting or approach is mixed with a tendency to turn around, or turn away, or to ignore the caregiver. There may be some tendency to maintain contact, but the context of avoidance remains predominant.

B1 Greeting at reunion takes place through positive interaction from a distance rather than approaching and seeking bodily contact. Little attempt to maintain contact when picked up. Little sadness during separation, and maybe some avoidance during reunion.

B2 Inclination to approach and greet caregiver, but hardly any attempts to make bodily contact. Some possible avoidance at first reunion, but no avoidance at the second reunion. No striving to maintain contact when picked up.

B3 Actively seeks bodily contact at reunion and actively tries to make it last. Seeks comfort, which is given by the caregiver until the child is at ease again, and goes back to exploring the environment in the presence of the caregiver. Very little avoidant or resistant behavior.

B4 Clearly seeks contact, especially during reunions, but contact seeking and maintaining are less explicit and less effective than the contact seeking of B3 children. Derives insufficient security and comfort from the presence of the caregiver to be able to explore independently after a period of separation. May show some resistance towards the caregiver, and can only really be comforted on the caregiver's lap.

C1 Specifically seeks closeness and contact during reunions, mixed with distinctly resistant, angry behavior. Experiences a lot of distress during periods of separation. Will often not get back to playing independently.

C2 Is extremely passive, with very little exploration in any episode, and little contact seeking or maintaining. Cries to show the need to be held. Resistance is not as strong as with the C1 children, but remains upset all through the reunion period, even if in bodily contact with the caregiver.

The various main classifications (ABC) have been studied rather thoroughly and sufficient psychometric validation has been conducted to be sure of their status as descriptors of child-parent attachment relationships. The sub-classifications, however, did receive very little empirical attention as yet, because it is difficult to get sufficient numbers of children classified in each of the categories for the purpose of validation. Also, it appears to be difficult to establish sufficient chance-corrected intercoder reliability on the sub-classifications in relatively normal, non-clinical populations. This problem is in no way unique for the SSP sub-classifications but is inherent to any coding system with too many categories. The SSP subcategories are helpful when coding complex behavior patterns but do not (yet) have the status of individual classifications of attachment with predictable and specific determinants and effects.

Children who are securely attached, but also children who have an insecure-avoidant attachment or insecure-ambivalent attachment, display an organized strategy to maintain interaction with the attachment figure. Insecurely attached children use resistant or avoidant behavior to realize as much closeness to the potentially protecting caregiver as possible, even though their attachment relationship does not fulfill all their needs.

A B C + D

However, as well as a secure, insecure-avoidant or insecure-ambivalent classification, children can get a disorganized (D) classification as discovered by Main and Solomon (1990). The essence of disorganized attachment is that the child is at times scared of the attachment figure, even though the attachment figure is at the same time their only source of protection and safety. This is an insoluble paradox that causes the child to behave in a disorganized way (for instance when the caregiver returns, the child may come to a complete standstill for 30 seconds or so, as if it is frozen, see below for more indicators). Disorganized attachment is not permanently visible and sometimes only becomes apparent from short episodes in the SSP.

Disorganized attachment always goes hand in hand with an 'organized' type of secure or insecure attachment, which is considered the basic attachment classification of the child. There are indications that especially insecure-avoidant or insecure-ambivalent attachment types combined with disorganized behavior causes psychological and behavioral problems (Schuengel, Bakermans-Kranenburg & Van IJzendoorn 1999).

Indicators of disorganized behavior in the Strange Situation Procedure in children of 12-18 months, when the caregiver is present are the following (Main & Solomon 1990):

- Simultaneous display of contradictory behavior (for instance, the child approaches the caregiver with its back towards him/her)
- Sequential display of contradictory behavior (for instance, the child approaches the caregiver but just before reaching him/her, it turns around)
- Undirected, misdirected, incomplete, or interrupted movements or facial expressions, stereotypies, asymmetrical movements, mistimed movements, anomalous postures
- Freezing, stilling, and slowed movements and expressions
- Direct signs of apprehension towards the caregiver
- Disoriented behavior, especially at the return of the caregiver

DETERMINANTS OF DIFFERENCES IN ATTACHMENT

The bulk of studies looking at attachment in non-risk populations shows that about two thirds of children are securely attached, one fifth have an insecure-avoidant attachment classification and about one tenth an insecure-ambivalent attachment classification. On top of that, about 15% of children are classified as disorganized. What causes these differences? Each child has an inborn inclination to become attached but not every child becomes securely attached. Is this due to genetic make-up, or is parenting the deciding factor? And is a child attached in the same way to all his caregivers: mother, father, and other caregiving adults like caregivers at the day care centre?

THE EFFECTS OF PARENTING

One of the more bold statements in attachment theory is that parenting is crucial, especially the way in which caregivers are sensitive in interacting with the child. Ainsworth (et al.1978) described sensitivity as the ability to notice attachment signals of the child in time, to interpret them correctly and to react to them promptly and adequately.

Research shows that sensitive caregivers do indeed more often have securely attached children. In a large meta-analysis, De Wolff and Van IJzendoorn (1997) found an effect size of about r=.24, or half a standard deviation. That is a robust effect and it justifies the conclusion that sensitivity of caregivers determines at least in part the quality of the attachment relationship with the child.

The fact that parenting is extremely important to the quality of attachment also becomes obvious when we look at the large number of properly designed intervention studies (with random allocation to the intervention group and control group). These interventions aim at changing the behavior of the caregivers, and if as a result of this

change, the attachment quality of the children changes as well, the causal relationship between sensitivity and attachment has experimentally been proven. In a large meta-analysis looking at all interventions aimed at improving sensitivity and attachment, Bakermans-Kranenburg, Van IJzendoorn & Juffer (2003) showed that in this respect attachment theory stands up to scientific scrutiny. When parents or other caregivers become more sensitive, chances for their children to be securely attached increase. Sensitivity of the caregiver is therefore a determinant of the quality of attachment relationship with the child. Nevertheless, a 'transmission gap' between parental attachment representation and child attachment has been documented to exist (Van IJzendoorn, 1995). Security of attachment in the parent leads to higher levels of sensitivity to the child's signals which in its turn leads to a more secure relationship between the child and the parent. Parental sensitivity thus mediates the association between parental and child attachment. But the mediation is incomplete, and only part of the intergenerational transmission of attachment seems to go through sensitive parenting. Other factors might play a role, such as other dimensions of parenting (for example support of exploratory behavior) or genetic similarities between parent and child (Van IJzendoorn, 1995).

THE EFFECTS OF GENES

Other studies have looked at genetic effects on attachment. Studying just one child in a family cannot answer the question which of the two is the determining factor: genes or environment (Harris 1998). To be able to unravel the influence of genetic determinants and determinants of parenting, you need two children per family, preferably twins, who are either genetically identical (monozygotic) or who share on average half of their genes (dizygotic). A twin study conducted in Leiden (Bokhorst, Bakermans-Kranenburg, Fearon, Van IJzendoorn, Fonagy & Schuengel 2003) showed no effect of genetic differences on the type of attachment these children had with their father or mother. Shared environment and unique environment however, were important, which is what attachment theory predicts.

The fact that attachment is not dependent on the child's genes also becomes clear from research into attachment networks. Most children do not grow up with just one caregiver. Sarah Hrdy (2009) shows that from an evolutionary viewpoint it would have been impossible for single mothers to bring up their children without the help from family or group members. Even just the amount of food necessary for a newborn baby to grow into a relatively independent teenager is so extremely large that one single adult could never get this together. Evolution has shaped the biological mother to share the upbringing with others, and the child has been shaped to accept other caregivers as attachment figures that can provide food and protection when the biological mother is absent. This is also the case if the mother has passed away. The risk of dying in the

'original environment of evolutionary adaptedness' (Bowlby 1969) was obviously much larger than in today's industrialized world.

THE ATTACHMENT NETWORK

Children can get attached to any caregiver in their environment who makes the effort to spend time with them on a regular basis. In our modern world too, a child builds up an attachment network with mother, father, caregiver at daycare, grandparents and other caregivers, and every one of those attachment relationships is a unique result of interactions with the child. Goossens and Van IJzendoorn (1990) found in a first study into the network of attachment relationships with father, mother and caregiver at daycare that a child can get attached in every possible way to each person from the network, depending on the quality of the interactions with that person. A secure attachment to mother is no guarantee of a secure attachment to father or caregiver at daycare. This shows that attachment does not depend on a biological tie with the attachment figure nor on provision of food or physical care. Sensitive interactions cause a child to become securely attached. As a child develops, the separate attachment relationships it has built up with the different caregivers melt into one integrated cognitive representation of attachment, which becomes apparent through the Adult Attachment Interview (Hesse 2008). When and how this merger takes place is as yet unclear, but it is an intriguing subject for longitudinal research.

ATTACHMENT AND CHILD MALTREATMENT

DISORGANIZED ATTACHMENT

At the moment, attachment is one of the key concepts in intervention programs for deprived, neglected and/or maltreated children (for reviews see Bakermans-Kranenburg, Van IJzendoorn & Juffer, 2003, 2005; Berlin, Ziv, Amaya-Jackson & Greenberg 2005; Oppenheim & Goldsmith 2007). Focus is in particular on disorganized attachment (D classification), the most anxious type of attachment. Disorganized attachment seems to be caused mainly by frightening or frightened and extreme insensitive behavior of parents (Hesse & Main 2006; Lyons-Ruth, Bronfman, & Parsons 1999; Main & Hesse 1990; Schuengel et al. 1999).

As mentioned earlier, disorganized children are caught in an irresolvable situation: their attachment figure and source of comfort and safety is at the same time threatening and a source of fright (Hesse & Main, 2006). Recent studies with children who were not neglected or maltreated, support this hypothesis. They show that abnormal behavior of the parent, for instance when the parent suffers from temporary

dissociation, assumes an attack position, speaks or shouts in a booming voice, handles the child roughly, or shows extremely introvert behavior as in a still-face procedure, evokes disorganized attachment behaviour (for a meta-analytic review see Madigan, Bakermans-Kranenburg, Van IJzendoorn, Moran, Pederson & Benoit 2006).

Neglect and maltreatment are extremely frightening for a child. In families with neglect and maltreatment, relationships between parent and child are dysfunctional. These parents set boundaries in a notably inadequate way: they more often use threats, punishments, force and power to get the child to cooperate (Chilamkurti & Milner, 1993; Loeber, Felton, & Reid 1994). Mothers who maltreat their children show more rejecting and controlling behavior towards their child, while neglecting mothers are mainly inconsistent in their reactions and cannot set boundaries that fit with the age of the child (Bousha & Twentyman 1984; Crittenden 1981). Both these hostile and helpless behavioral patterns have been observed by Lyons-Ruth and colleagues (1999) in mothers of disorganized children. These parents are not sensitive to feelings of fright in their child and are therefore not able to regulate these feelings or form a buffer for the child, while at the same time they evoke fear which activates the attachment system of their child. This in turn results in 'fright without solution', so often seen in maltreated or neglected children. This fright without solution is probably the most important process through which these children develop a disorganized attachment.

DIFFERENT WAYS TO DISORGANIZED ATTACHMENT

From the meta-analysis of Cyr and colleagues (2010) looking at the influence of maltreatment and other risk factors for attachment, it appears that children with at least five parental social-emotional risk factors (low income, single mother, adolescent mother, low education, ethnic minority, and/or substance abuse) have just as much chance of disorganized attachment as do children who have suffered neglect or maltreatment. Of course it is possible that in families with an accumulation of risks a lot of unproven or undiscovered cases of maltreatment exist. Another explanation could be that a different kind of parental behavior, as yet unidentified but of which the effects are as bad as those of maltreatment, causes the relationship between social economic risks and disorganized attachment in the child.

Research into frightened and frightening behavior of parents (Hesse & Main 2000; 2006) might shed light on the behavioral mechanisms that cause risk factors in the family to influence the development of disorganized attachment. Up to now we know that disorganized attachment comes into existence when the child is afraid of the parent. This fear hinders the development of an organized attachment strategy or causes the (temporary) disappearance of an existing strategy to use the parent as a safe haven at times of stress. Hesse and Main (2006) suggest that frightening behavior of parents can stem from unintegrated memories and emotions that are linked to traumatic

experiences, like loss or maltreatment. Parents who are surrounded by risks are more likely to have suffered loss or other traumatic experiences than parents in low-risk environments (Lynch & Cicchetti, 1998; Oravecz, Koblinsky & Randolph 2008). The child possibly reminds the parent of old traumas, which can cause dissociation - the parent tries to (unconsciously) detach him or herself from those same environments. This increases the risk of frightening or frightened behavior of the parent (for instance talking in a strangely high-pitched voice, freezing of all movement, acting as if the child is in control) which puts the child into the irresolvable situation of seeing its parent simultaneously as a safe haven and a threat, resulting in disorganized attachment.

Schuengel, Bakermans-Kranenburg, & Van IJzendoorn (1999) provided empirical support for this association. When direct maltreatment or neglect are absent, it seems possible that frightening behavior of the parent can be a key mechanism through which parents prompt disorganized attachment.

Apart from these speculative explanations there are two other conceivable pathways to disorganized attachment. In the first place, the attachment system of the child could be chronically hyper-activated if the parent withdraws from interaction with the child due to overwhelming personal or social-economical problems and daily pursuits. It is possible that children in high-risk families are dealing with a type of neglect that is inevitable in chaotic environments. Solomon and George (1999) expanded on the idea of 'fright without solution' and proposed that parents, who continuously fail to protect the child or fulfill its needs for attachment in stressful situations, will bring the child into an extreme and continuous state of fear. Eventually the child will come to the frightening conclusion that the caregiver does not offer a safe haven when the child needs protection, and that the caregiver will not fulfill its needs for proximity and protection (Madigan et al., 2006).

Along the same lines Lyons-Ruth and colleagues (1999) suggest that disorganized attachment does not only originate from frightening or frightened behavior of the parent, but also from extreme insensitive behavior of the caregiver. In their model, a lack of response (for instance withdrawal from interaction), or extreme insensitive reactions, like aggression towards the child, harsh discipline, lack of supervision in dangerous situations or ever recurring miscalculations in affective communication, can be just as frightening to the child as can behavior of the parent that directly prompts fear. In a sample of families at risk, including a number of maltreated children, it was found that both frightening behavior and extremely insensitive behavior were more characteristic for mothers of a child with a disorganized attachment than for mothers of a child with an insecure organized attachment. (Lyons-Ruth, Bronfman & Parsons, 1999; Lyons-Ruth & Jacobvitz, 2008).

A second alternative pathway to disorganized attachment could be the increased chance children of families with multiple risks have of experiencing domestic violence (Cicchetti & Lynch 1993). Children who witness domestic violence, including violence by one parent towards the other, have a higher risk of having a disorganized attachment. Zeanah, Danis, Hirshberg, Benoit, Miller & Heller (1999) expect that witnessing parental violence will frighten a young child and make him or her worry about the wellbeing of the mother and her ability to protect both herself and the child against the violence.

In short, it looks like there are a number of non-exclusive ways that can lead to disorganized attachment: maltreatment of the child by the caregiver, growing up in a family surrounded by a combination of risks, unresolved trauma in a caregiver, or extremely insensitive behavior of the caregiver.

CONCLUSION

Early experience with attachment relationships is assumed to be a decisive factor for the way children are later able to create bonds with other people, their future partners or their own children. The tendency to become attached is inborn, and even children who are being maltreated or neglected become attached, although this is usually an insecure or disorganized attachment. No effect of genetic differences has been found, but the effect of parenting appears to be strong, especially the way in which caregivers are sensitive in interaction with the child. The attachment representation that arises during the first few years of life does appear to leave its traces in adulthood, but studies show that the environment can change the attachment representation. Attachment is presently one of the key concepts in intervention programs for deprived, neglected and/or maltreated children. Quality of attachment can be measured with the Strange Situation Procedure, originally designed by Mary Ainsworth to measure the infant's use of its mother as a secure base, and subsequently further developed into an instrument used to determine the attachment classification of young children.

The Strange Situation - far from strange to attachment researchers - has for decades been regarded as the gold standard for measuring attachment, and will most probably continue to allow us to classify attachment quality of infants for decades to come.