



## **SUMMARY**

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#### **Research Brief**

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With the help of technology, we have gained extensive knowledge of the rich inner world of infants and their desire to explore. The first thousand days are of great importance for a child's health and continued development, and how the child is treated by the surrounding world is paramount. Sensitive caregiving, social interaction, active exploration and processing abstract information lay the groundwork for cognitive and emotional development. Children in different environments live different lives, and more knowledge is needed about how this affects development. The balance between a child's need for proximity, protection and exploration is well described in attachment theory. Since attachment cannot easily be measured, but is linked to the ability of the caregiver to provide sensitive care, the latter must be the focus of society's efforts. Internationally, programmes aimed at increasing parents' ability to provide sensitive care have had positive effects on attachment in risk groups. Such methods should be evaluated according to Swedish circumstances so as to form a basis for recommendations within child healthcare and social services.

### 1. Introduction

Research shows clearly that we have an inborn motivating force that makes us want to meet and explore the world. It also shows the importance of how we are treated by the surrounding environment. What infants need in order to use their own resources in a development-friendly way and adapt to their surroundings can be described as emotional nourishment, which provides them with important knowledge about being human. Nobody questions the fact that plants need water, sunlight, nutrients and an appropriate environment in order to grow. We can create the conditions for growth, but we do not unfold the leaves for the plant. The motivating force to develop our abilities is something we are born with, but it is the adult world that provides the stimuli for growth. Everything about us – from the expression of our genes to the structure of our brains – is influenced by our early experiences and environment (1). This is knowledge that obliges.

The purpose of this publication is to outline the existing knowledge of early infant development regarding thought processes (cognition) and the relationship with caregivers (attachment). We provide examples of what this knowledge can mean for parents, professionals and the social institutions that support families with infants. We also present knowledge gaps that are identified, along with suggestions for what society can do to fill them.

## 2. Concepts

When we use the term infants in this publication, we refer to children up to the age of 18 months.

Attachment is the emotional bond that a child develops for the parent figure that the child wants to be close to when experiencing fear or anxiety.

The attachment system coordinates the child's various behavioural responses that facilitate the establishment of proximity and contact with the parent figure.

*Bonding* refers to the emotional willingness, desire and commitment of the parent figure to pay attention to and satisfy the child's needs.

The caregiving system coordinates the parenting behaviour that is connected with paying attention to and satisfying the child's needs.

Caregiver refers to a person who usually cares for the child's needs. This can be a parent, family member or another person who fills such a role. Parent figure, caregiver and parent are used synonymously in this publication.

Sensitive caregiving means that the parent receives, interprets and responds to the child's signals according to the child's individual needs. The parent accepts the child's existence, is prepared to negotiate with the child when conflicts arise and is psychologically predictable and physically available in the child's everyday life.

Secure base refers to the balance between two important types of care – the parents' participation and involvement in the child's exploration and interaction with other people, and the provision of a safe haven the child can return to when it needs comfort and security.

### 3. The skilled infant

Small children have long been viewed as being passive and controlled by reflexes. Due to their limited ability to express themselves vocally, infants have been perceived as unable to learn, think or reflect on their surroundings. This view of the little child has changed over time. A movement began as early as the 70s and 80s when Ed Tronick (2) demonstrated that infants actively try to regain contact with parents who stop interacting with their children. If an adult does not respond to the child's signals, it leads to frustration and the expression of negative emotions on the part of the infant. The children in these studies showed clearly that they are active in the creation of their social relationships and seek the attention of their parents. About the same time, Claes von Hofsten (3) showed how a six-month-old child grasps for a toy travelling on a track in front of the child. If the movement of the object is interrupted and the toy stops just before the child begins to grab for it, the movement of the hand is directed forward towards the point where the toy would have been if the movement had not been interrupted. Thus began the narrative of the engaged infant who explores and actively examines its environment, whilst simultaneously needing security and to learn social interaction.

The invention of the microscope revolutionised our ability to understand the essence of nature. The telescope allowed us to peer out into space, and we have begun to understand our place in the universe. Thanks to the technological development that has taken place in the last 15 years, we have today a relatively extensive understanding of the rich inner world of the small child. This knowledge has been made possible by eye-tracking cameras, motion-detection systems and various methods for measuring brain activity – all in high definition.

We know today that active exploration begins even before birth: the foetus reaches out its hand and examines the umbilical cord and its own body. For example, the movement differs depending on whether the arm is moving towards the eyes or the mouth (4). A long list could be made of abilities that are available during the first six months after birth, and some illustrated examples follow. Children can understand, interpret and even predict the objective of other people's actions (5). In one study where a child could watch a person moving balls to a bucket, the infant soon moved its gaze from the person reaching for a ball to the bucket where the ball would later be placed (6). In another study, infants were surprised when someone who had previously repeatedly reached out for a certain toy then reached for another (7). These abilities develop at the

same rate as the child itself learns to perform the actions that are observed.

Although children learn through active exploration, social interaction with parents and other children is at least as important. Children are born with a range of abilities that help them to direct their attention and focus on other people, their faces and eyes (8). At six months of age, children are able to read facial expressions (perceive others as happy or angry) and follow other people's eyes. These abilities help children to learn words: if someone looks at a round object whilst saying "ball", it is clear what the adult is referring to (9).

Early in their lives, children are good at recognising and differentiating individuals with different appearances. During its first year of life, a child's ability to process facial information is trained, and an expert knowledge is formed about the kind of faces that the child most often sees in its environment. If the child grows up in a western environment, they become good at identifying and distinguishing faces that often appear in that environment at the cost of faces from other cultures (10). The same applies to female and male faces. Infants in families that share parental leave are able to more effectively process male and female faces (11). Individual differences in facial perception (12) and early forms of empathy during infancy (13, 14) are linked to the quality of care and attachment. In experiments where geometric shapes struggle up a hill and can either push each other up or stop each other, infants react with surprise when the shapes are "mean" instead of helping each other (13). It can be said that infants show empathy, but this ability is much more common amongst infants that are considered to have a secure attachment to the parents (14).

## 4. Infants' need for a secure base

Infants need adult support in order to utilise their own natural resources for development. Attachment involves the weaker person's need of support from someone bigger, stronger and wiser (15). The parent's emotional bonding to the child, which is expressed through the quality of care, is affected by the parent's own willingness and ability to be engaged in the child's needs (15). The two relationships act as a linked system; when the child experiences anxiety, it signals it's need for proximity and protection through attachment behaviour – for example, the infant that screams and has anxious movements. The parent receives, interprets and responds to these signals according to their perception of the child's needs and the parent's own ability to satisfy them. When the child does not feel anxiety - when the attachment system is on standby - the child can explore its environment and gradually learn to deal with various challenges. This, too, requires encouragement and involvement on the part of the parent.

The child's emotional experiences of having its needs for proximity and exploration satisfied by the caregiver(s) is the basis for the relationship-specific attachment pattern that the child develops during the latter part of its first year (6–12 months). Children who experience their parents providing sensitive care have access to a secure base as a starting point from which they can explore the world and as a safe haven they can return to as needed (16, 17). A continuous movement therefore occurs between the secure base, exploration of the environment and a return to the safe haven.

Satisfying the emotional needs of the child, however, is not tantamount to always doing what the child wants. In sensitive caregiving, the parent interprets the child's needs in order to judge what is best for the child at that moment. For example, it could involve comforting a child who has fallen, but also encouraging the child to dare to try again. But sometimes we don't get each other. Perhaps the parent fails to detect the child's signals, or does not understand the child's needs, or prioritises something else. The sensitive parent should in such cases be prepared to adapt, repair the misunderstanding and re-establish the connection (18). Research shows that secure attachment benefits from the fact that synchronisation in the interaction is not perfect but instead works as an evolving process in which both parties try to understand each other according to their own circumstances and strive to achieve mutuality (19). In this process - which involves an asymmetric relationship between child and adult - the adult always has a greater responsibility than the child (20).

When the attachment system is activated in children that have a secure attachment, their behaviour is characterised by both negative and positive expressions of emotion. Protests are apparent but can quickly subside and be replaced with renewed play and exploration. Children who are deemed to have an insecure attachment instead have experiences that are characterised by the parent offering proximity but based on their own needs rather than those of the child. Children with an insecure attachment can have either an avoidant or resistant attachment pattern. An avoidant strategy is distinguished by the fact that the child minimises its attachment signals and does not seek proximity unless it is extremely afraid. A resistant attachment pattern is typified by the child feeling uncertain as to what it can expect from the adult, so that it must maximise its signals in the hope of receiving a response.

The three attachment patterns are organised; that is, they are based on the fact that small children use their attachment strategy so as to try to reduce their own stress when they are anxious or afraid. All children develop attachment, with very few exceptions (such as those suffering from severe brain damage or neglect). But the way the child's attachment needs are expressed may vary. Impairments such as autism or intellectual disabilities can affect the way a child expresses attachment, as can cultural variations.

One topical issue that is important from a scientific and clinical perspective is when children's behaviour indicates

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that they have a disorganised attachment, which means that they display behaviour that is extremely insecure in situations they perceive as threatening or frightening (21). In psycho-socially stressed environments, the proportion of children with disorganised attachments is greater. The proportion is especially linked to experiences of inconsistent care, where a child finds itself in a behaviour paradox where the parent who should protect the child and offer proximity is the same person who frightens the child, and that the child should be wary of (22).

Hundreds of scientific studies have confirmed the connection between children's attachment patterns and their later social and behavioural development (23, 24). Children's attachment patterns are stored in mental structures (so-called inner working models) that contain the child's expectations for support from the secure base. The inner working models later provide guidance when meeting other people and in the formation of social relations.

An overview from 2017 presented the four most important issues regarding attachment research and how the current knowledge shed light on them (25):

- The significance of the environment. Twin studies show that
  the environment that is, variations in the parents' care
   has a great influence on the attachment behaviour of
  small children.
- Attachment across generations. Attachment patterns are passed from one generation to the next, although the exact mechanisms are only partially understood.
- Attachment over a lifetime. The attachment pattern follows the child from infancy until adulthood, whilst other life factors become more important later.
- Attachment and mental health. A connection is seen between attachment patterns and later socio-emotional adaptation, where various patterns of attachment are related to different types of behavioural problems.

#### 4.1 Temperament

Right from birth, children react to changes and new situations to different degrees (26). Temperament is used here to refer to the way that individuals perceive, interpret and react to various stimuli (27). Some infants quickly find a smooth rhythm in which parents do not experience any difficulty but convey that they understand their children. Other infants are more unpredictable; they require more from their parents, since they are more easily dissatisfied and more difficult to comfort. Some children show that they need time to deal with various changes, but they function well when they have settled in.

The relationship between temperament and attachment has often been discussed, but most researchers agree that these are two different ways to describe children. A child's temperament traits, together with the content of childcare, affect how the child develops, which means that both aspects are important to the child's development (28) and how variations in parental care should be interpreted.

# 5. The environment is crucial for a child's developing brain

Today, it is clear that a family's ability to help a child explore and to respond to its signals has great importance for the child's development (29). In recent years, therefore, there has been an interest in studying the brains of those raised under various difficult situations such as poverty, emotional starvation and abuse. It can be said that poverty settles in the brain. In one study (30), researchers established that the family's income is connected with the parts of the brain that have a direct link with our ability to process information and learn. Of course, it is not the income in itself but the living conditions connected with a lack of economic resources that are behind the results. There are also some animal experiments involving poor care that have been considered relevant to humans, since certain parts of the deep nuclei of the brain that are important for attachment are very similar amongst e.g. rats, monkeys and

Experiments on rats have shown that rat pups whose mothers are unable to care for them in a species-specific way (e.g. licking behaviour) develop changes in regions of the brain that regulate care behaviour (32), the consequence being an inability for them to take adequate care of their own pups, thanks to changes in the gene expression for hormones that control care behaviour. But perhaps the most exciting part of the experiment was that if, within 10 days of birth, caring rat dams were instead allowed to look after pups whose mothers were unable to properly care for them, no lasting effects on later care behaviour could be observed. The findings are interpreted to mean that early corrections in the environment can correct a negative development, but that the possibility is closed after a certain period of time, which varies according to species.

Research on the brains of monkey infants shows that young belonging to caring, warm monkey mothers explore the world without concern. Infants that have been rejected by their mothers, though, quickly learn to be afraid in order to survive. This can be seen in how nerve pathways form between deep parts of the brain, the "emotional brain" and the "thinking brain", which are responsible for considered decision making (31).

Clear parallels in structural brain development can be observed in humans; for example, children who are separated from their parents at an early stage and placed in institutions that do not meet their needs (33). Children who have been exposed to serious deficiencies in care also develop an impaired ability to process social information, and in some cases a heightened tendency to perceive faces as angry (when violence was experienced early in life) and sad (when neglect was experienced early in life) (34).

#### 5.1 Interaction between heredity and environment

The discovery of the environment's interaction with our biology at the molecular level is one of the most explosive research fields of the past decade. Science has taken the step from seeing genes as comprehensively engraved biological codes to understanding that the expressions of our genes are affected by our environment, or, in the words of social paediatrician Clyde Hertzman: "you are what your genes experience" (35).

Epigenetics means that our DNA is chemically modified in a way that affects its function. This process, called methylation, means that molecules become attached to the outside of DNA strands. This means that even identical twins can have genes that, whilst having the same building blocks, work differently due to methylation (36).

For example, adults who were abused as children have a clearly elevated level of methylation in their DNA compared with the rest of the population, a change linked to the constant added stress that violence and unpredictability, sudden breakups or inadequate care from parents causes in children (37). This is described in the literature as "toxic stress". Toxic stress is – just as it sounds – harmful, and generates extended high levels of cortisol that can, in turn, cause important hormone systems to be reprogrammed via epigenetic mechanisms (38). The hormones that are affected control the degree of activity/alertness and important neurotransmitters in the brain, such as dopamine, serotonin and even immune system cells. Sensitive care, on the other hand, promotes the development of the child's regulatory system (39).

The field of epigenetics has practically exploded over the last decade and has changed our understanding of the importance of a child's early environment. The methylation process begins as early as in the womb; we really do become what our "genes experience" from the moment we come into existence.

Behavioural genetics teaches us how our genes control to what degree we are sensitive to various environmental factors. One example is the receptor for the neurotransmitter dopamine, which has a number of variants that affect how responsive we are to sensitive caregiving (40). The variations in this sensitivity – so called differential susceptibility – may perhaps help to explain the "dandelion child" phenomena, where individuals who are not so sensitive to the treatment they receive from those around them can cope quite well in spite of poor emotional environments.

# 6. The role of society in promoting sensitive parenting

The prerequisites for childcare that promotes attachment – including financial security, freedom from violence, and mental health – are unevenly distributed. An important task for society, therefore, is to identify high-risk families

where effective efforts can be provided so as to strengthen parents' ability to provide care. Meanwhile, all parents should have access to up-to-date, relevant information about the developing brains of their infants, as well as being helped to understand how important they as parents are to their child's development.

#### 6.1 Assessing the quality of parental care

Special skills are needed in order to assess attachment. The research methods available in the field of attachment require special training before use, and in most cases special certification is needed. They are not designed for use in everyday clinical practice. A method such as the Strange Situation (16), a systematic observation of the child's behaviour in a test situation where it is separated from and then reunited with its caregiver, can therefore never be used to make a clinical diagnosis (21). Instead, a broad clinical evaluation of the child-parent relationship should be made, including an assessment of the parent's notions about their child and their parenthood, as well as an observation of the interaction between child and parent. (41).

Thus, simple, structured and proven methods for evaluating a child's attachment or a parent's sensitive care do not exist. At the same time, many experienced child healthcare centre nurses can usually sense that something is "not right" in the interaction or when the child's behaviour deviates from what is expected at their age. On the other hand, with the help of attachment theory, it is possible to describe what a child needs from its caregiver in situations of heightened stress, as well as the child's strategy for making sure it gets what it needs. Situations that increase stress and can easily arouse fear can include being in an unfamiliar environment (a child health centre consultation room) or meeting a stranger (such as a child health centre nurse, speech therapist or doctor). A child who is used to having emotionally available parents calms down more quickly and more readily begins to explore its surroundings, including responding to the unknown healthcare worker.

At preschool, children's individual reactions when introduced to alternative attachment figures provide important information about those children's ability to settle in to a new environment and benefit from the opportunities for their own development. Thus, in many cases, experienced professionals (child health centre nurses or preschool teachers) can use their observations of a child's behaviour in shaping support given to the parents or to determine whether others must be contacted for more targeted support. If, for example, social services need to be contacted, it is important that any investigation and planned interventions are based on previous experiences the child has had regarding its care and to what extent the primary caretakers have been able to support the child's development.

Since a child's attachment behaviour cannot be measured in the same way as its height and weight, various screening methods that may help identify children and parents in need of special support are currently being tested. The

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methods focus mainly on risks in the parent's behaviour (such as depression, anxiety, violence in close relationships and the use of alcohol and drugs), which can in turn affect their ability as a caregiver.

For example, 12-13 percent of all new mothers are afflicted with postnatal depression (42), which has welldocumented, long-term negative consequences on the relationship between mother and child (43). A mother who is depressed often has a reduced ability to provide her child with the sensitive care it needs. Fathers can also have postnatal depression, and although this is not as well researched, it naturally affects the father's mental health and his parental ability and relationship with the child (44). It is therefore important that all new mothers are questioned about depression at the child health centre, and that a validated form called the Edinburgh Postnatal Depression Scale (EPDS) is used as a support for the discussion (45). EPDS has also been tested in a Swedish study for screening fathers, but it is not yet routine to do so at child health centres. However, in situations where mental illness or other risk factors occur in the mother, it is particularly important to examine the parental ability and symptoms of depression of the other parent - with the help of EPDS, for example and to make use of resources in the social network.

For screening methods to be useful resources need to be allocated to comprehensive efforts aimed towards the parents who are identified. Workers at child health centres need to be able to allocate time for counselling and home visits, as well as having access to consultation and guidance for improving their knowledge in assessing which families should be referred for investigation and possible treatment. The doors to in-depth efforts need to be open and the thresholds kept low in order for families at risk to be identified and receive help.

## 6.2 Efforts to increase parents' sensitivity to a child's signals and needs

Programmes aimed at eliminating parents' own emotional obstacles to perceiving, interpreting and responding to their children's cues in a sensitive way have shown positive effects on the child's attachment in several international systematic reviews (46-48). The reviews show that the best effects were seen in groups of parents and children in previously-known risk groups; that is, as a result of targeted or indicated efforts carried out by professionals with expert knowledge. Examples of these programmes are Attachment and Biobehavioural Catch-up (ABC), Child-Parent Psychotherapy (CPP), Video-feedback Intervention to promote Positive Parenting (VIPP), Minding the baby, Social baby, Circle of Security (COS) together with home visits and video feedback, and the Sunderland Infant Program. VIPP is the programme that has perhaps been studied the most, and its effects have recently been outlined in a separate meta-analysis (49). In Handbook of Attachment, published in 2016 (50), the attachment-based programmes ABC, CPP, COS and VIPP are presented as being particularly successful. When

it comes to parents' sensitivity as an outcome, there are also other programmes that show positive effects (51-53), but the results are more mixed because of the large variation in design, content, target groups and practitioners, which makes it difficult to draw conclusions regarding the effects of individual interventions. Furthermore, the interventions have been tested only on mothers.

#### 6.2.1 Interventions used in Sweden

According to a recent survey, Marte Meo (54), ICDP (55), Circle of Security Parenting (COS-P) (56), Watch, Wait and Wonder (57) and Theraplay® (58) are used in Sweden.

In Sweden, about 600 people, mainly within child health centres and social services, have in recent years been trained as group leaders in the Circle of Security Parenting (COS-P) program, a psychoeducational parenting method (56). Two Swedish experimental studies of enhanced support in high-risk families, where sensitivity to the child's signals was used as outcome measure, were presented in 2017; one using Marte Meo (59) and one using Circle of Security Parenting (COS-P) as interventions (60). Both studies showed that the intervention resulted in increased sensitivity to the child's cues, and in the latter study, parent's representation of the child improved. The effect of the intervention was, however, limited because the intervention was in addition to – not instead of – conventional treatment.

It is also common that child health centre personnel are trained in ICDP, the International Child Development Program (55). The programme has several levels but is most often used only as a tool for health promotion, focusing on the approach . ICDP implemented in the form of structured parent groups is less common but has been researched in Norway in a relatively small study (61). Unfortunately, no Swedish studies have evaluated the effects of ICDP, although a recently published study examined conditions for implementing ICDP in child health services (62). According to ICDP's Swedish web site, an evaluation is currently under way in Sweden, using questionnaires (55).

## 6.2.2 Content of programmes that promote secure attachment and sensitive caregiving

Many effective programmes for teaching sensitive caregiving include video feedback. This means that parents are filmed or film themselves as they interact with their children in various situations (play, bathing, feeding) and then watch the films together with a trained professional. The task of the professional is to alert parents to examples of when the child's signals are treated sensitively and thus strengthen the positive interaction. Other programmes work with parents' representations of themselves as parents, of their children and of the parent-child relationship. By reflecting upon their own emotional obstacles in their relationship with their children, parents can become more sensitive to their children's needs.

The international literature shows that interventions are often delivered individually and in the form of home visits.

The combination of personal video-feedback and home visits is considered effective and it is these generic core components that are recommended in the English NICE guidelines for treating attachment difficulties in children in risk environments (63). There are indications that relatively short programmes are effective (64) for certain groups. VIPP, for example, contains four sessions and two follow-up meetings.

Finally, there is reason to note the literature that highlights that how to work with families in need of support is just as important as what can be offered to them (65-67). In other words, the relationship between care providers and the person receiving support is of great importance. The expression "authentic engagement" encapsulates an attitude characterised by sensitivity to the other person, respect for their cultural and personal values and confidence in their ability to positively influence their situation. This becomes crucial when professionals work with parents' attitudes towards and sensitivity to their children. We thus have important knowledge about both what can be done as well as how best to do it.

## 7. Knowledge gaps

Children in different environments live different lives, and these early experiences have an enduring effect on their cognitive development and understanding of their surroundings (68). In other words, there is no normative parenting, and child development is shaped in a dynamic interplay between the young child and its environment.

- More knowledge is needed about variations in environment and development in order to better understand our multicultural society
- What happens to a child's cognitive development in cases where the parents are unable to satisfy the child's need to explore, be secure and be seen? Are there any specific skills that are affected more than others?
- What do the attachment patterns look like in our multicultural society? There is a need for surveys that have sufficiently large and varied selections and that examine attachment patterns in different groups in Sweden.

It is problematic that there is too little overlap between the interventions that are used in Sweden and the programmes that are described in international systematic reviews as effective in promoting secure attachment or preventing disorganised attachment in risk groups.

- There is a need to compile methods that can be used to promote attachment and sensitive caregiving on the part of parents in a Swedish context.
- Thorough experimental studies are needed on methods that are used in Sweden as well as methods with demonstrated effectiveness that are adapted to Swedish circumstances.
- Research in the field needs to be practice-based, so that the results are relevant for decisions and recommendations.

## How can we promote the development of children and their relationships with caregivers?

#### What can parents do?

- Talk to and be with the child, do things that you both like.
- Practise turn-taking and be curious about how your child communicates. Discover the world together.
- Focus your full attention on the child when you respond to its contact attempts re-establishing contact is your responsibility.
- Remember not to ascribe different behaviours to "phases" – development is dynamic and occurs through interactions with you.
- Screens cannot replace human interaction. Try to keep a balance.
- Sharing parental leave is not just a matter of gender equality – a child's development is affected positively when more adults are committed and present.
- · Ask for help if you are facing challenges.

#### What can professionals do?

- Increase your knowledge about research findings regarding young children and communicate with parents about child development.
- Model sensitivity and take advantage of positive examples in the interaction.
- Build trusting relationships with families you are concerned about, especially through home visits.
- Provide support for depressed parents, and make sure the child is affected as little as possible by the parent's mental disorder by engaging the surrounding social network.

#### What can society do?

- Having a child's perspective means that the needs of even the youngest ones are taken into account when making political decisions.
- Child healthcare should be bolstered in order to be able to provide the best possible support to children in high-risk environments in collaboration with the relevant agencies.
- Encourage new platforms using the latest knowledge about infants; art exhibitions or activities at science centres, for example.
- We suggest the development of a "baby pack" that
  can be given to all new parents. This could be an
  aesthetically-pleasing sensory stimulus package for
  inner development containing tips and advice for
  parents regarding sensitive caregiving and age-appropriate stimulation.