| CHAPTER 5 |

Prenatal Period and Infancy: Psychological Insights Into the Beginning of Life

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ABSTRACT

This chapter's focus is on the emergence and development of human psychological life and a child's bonding with the caregiver (mother) in the prenatal, postnatal and infancy periods. Developmental changes are presented from the very onset of life to familiarise non-psychologists working with children with their nature and mechanisms.

Biological transformations and the first signs of foetus's motor and sensory activity occurring in the prenatal period create a setting for the development of early mental activity, memory and various forms of learning, as well as of the neurohormonal, behavioural and psychological communication required for a child to bond with its mother.

Newborns' innate sensitivity to various forms of stimulation from people preadapts them to social contacts. In the first 12 months of life, they develop locomotor skills and an integrated perception of their environment, transition from 'thinking in acting' fed by sensory data to increasingly purposeful and intentional activities and stabilise their image of the world. As a result of interactions with the caregiver(s), they acquire the ability of pre-verbal communication, experiencing and recognising emotions and building a common space of meanings and actions.

A child's basic trust is formed based on its early experiences with caregivers. The quality of its bond with the caregiver translates into the type of attachment behaviour it will show (secure, anxious-ambivalent, anxious-avoidant and disoriented-disorganised attachment). Trust and attachment are significant for a child's readiness for exploratory activity and the onset of self-regulation.

KEYWORDS

prenatal period, newborn, infancy, child development, preadaptation, trust, attachment styles

1. Introduction

Psychology's interest in the development of a human being starts with the beginning of a new life, focusing on the complexity of multidimensional relationships between the child and the environment in which it is raised. Prenatal programming involves not only the genetic determinants of development but also the foetus's ability to adapt,

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influenced by non-genetic and para-genetic factors[1]. According to research, there is close interaction between genetic programmes and epigenetic processes activated by current relational and social experiences[2].

Developmental changes taking place in the prenatal period constitute the basis from which a system enabling attachment, communication and bond with the mother develops in the foetal period; the competencies emerging afterwards are key to understanding subsequent developmental achievements.

2. The Biological Foundations of Psychological Life in the Prenatal Period

Prenatal development is a biologically determined process lasting from 38 to 42 weeks, which starts with conception and ends with birth. It is divided into three trimesters, during which the new organism grows and develops new functions. The first trimester is subdivided into the zygote stage and the embryonic stage characterised by the most rapid cell proliferation and differentiation processes, and the early foetal phase, when organs constituting the biological basis of psychological functions appearing in trimesters II and III start to bud off.

In the zygote stage, spanning the first two days after conception, the fertilised egg rapidly divides into layers of cells and travels into the uterus wall where it implants to form an embryo whose cells continue to differentiate.

The embryonic stage starts in week 3 and ends in week 8. It is the period when the main internal and external structures of the new organism begin to emerge. Cells differentiate into ectoderm, mesoderm and endoderm from which the buds of organs will develop through organogenesis. The ectoderm evolves into sensory organs such as the nervous system, the eye, ear and skin, which enable the reception of external stimuli. Their buds appear around week 3, and then the balance, touch and pain organs bud off. In weeks 5 and 6, the nervous cell precursors and neurotransmitters grow at a fast pace, and a network of synaptic connections appears, marking the beginning of sensory sensitivity (the stimulation of the foetus's mouth at around day 43 elicits whole-body movement and an EEG reading shows a reaction in the brainstem).

During the foetal stage, spanning weeks 9 to 40, precursor glial cells emerging around week 19 initiate myelination, which enables faster and more accurate transmission of nervous impulses. Following the rapid growth of neurons and the emergence of new neural connections, a motor and sensory map of the body appears in the cerebral cortex around month 5. By month 7, the early ability to recognise and learn related to the continuing expansion of the neural network and increasing density of inter-neural connections can be observed. As a result of the ongoing specialisation of all new structures, various signs of the foetus's activity appear as they begin to function.

1 Dąbrowska-Wnuk, 2019, pp. 222–227.
2 Lahousen et al., 2019.

The first signs of the foetus's activity from which psychological life will bud off become visible, and its spontaneous movements mark the onset of neuromuscular coordination. Increasingly complex motor activity (movements gradually form sequences as the foetus's control of movements and their precision improves) integrates with increasing sensitivity to intrauterine or external sensory stimuli (rhythms, sounds, tastes, or lights)[3], leading to the emergence of memory patterns related to particular modalities.

The states of consciousness resembling sleep and wakefulness appear around week 16 and gradually turn into sleep-wake cycles. The differentiating states of consciousness pave the way for the earliest mental experiences (processing, selecting and integrating of information) and the development of the budding forms of mental activity, memory, and learning (recognition, classical conditioning, habituation, associative learning and mimicking)[4]. The foetus receives and absorbs the unique traits of its caregivers' speech (such as melody, accent, rhythm, and sound intensity comprising the prosodic aspects of speech) non-auditorily. These developmental changes turn the foetus into an active entity that reacts, feels, and experiences emotions, has its individual temperamental traits and dispositions, and uses various means to communicate with the mother.

3. Prenatal Environmental Influences

Environmental factors in child development encompass both maternal internal and external influences, known as teratogens, as well as indirect factors such as social and psychological support[5].

The maternal internal environment is crucial for prenatal development. A mother's diet significantly affects the child's growth, particularly through essential nutrients like folic acid, which is vital for proper neural development. Additionally, maternal health conditions, such as diabetes, hypertension, and infections, can directly impact the baby's development. High levels of maternal stress and hormonal changes may also affect the formation of the fetal nervous system, potentially leading to developmental challenges.

External factors, or teratogens, can negatively influence fetal development. Substances like alcohol, drugs, and nicotine can lead to developmental disorders, such as Fetal Alcohol Syndrome. Moreover, exposure to chemicals, radiation and pollution can harm the fetus, while infections like rubella, toxoplasmosis, or Zika may result in congenital defects.

Social and psychological support also plays a vital role in prenatal development. Positive relationships with a partner, family, and support networks can enhance

3 Kornas-Biela, 2004.
4 Sovilj, 2012, pp. 259–266.
5 Boyd and Bee, 2019.

the mother's mental health, which, in turn, can indirectly benefit the child's development.

By considering these factors, we can gain a comprehensive understanding of how various influences affect prenatal development.

4. The Prenatal Origin of Child Bonding With the Mother

The bond between the child and the mother is formed through their neurohormonal, behavioural and psychological exchanges. Neurohormonal communication is a biochemical dialogue where neurohormones are biochemical carriers delivering information about the mother's emotions (stress, anxiety, depression, calmness, or joy)[6]. Memorised by the foetus, the information becomes a potential determinant of the innate emotional dispositions of the child it will become[7]. Behavioural communication is based on metabolic information about the mother's behaviours (risky activities, addictions, etc.), which causes changes in the functioning of the child's organs and behaviour (for instance, it may cause hypoxia or stimulate motor activity), and during the genetically determined development of the nervous system. Psychological communication takes place when the child "reads its mother's experiences, actions and emotions (touch, speech, singing, the music she is listening to, and locomotion) while the mother learns to appropriately identify and meet its needs. This exchange shapes their bond, the course of pregnancy and delivery, and the child's health"[8]. Emotionally challenging situations surrounding mothers put the foetus at risk of experiencing "an ecological disaster in the womb"[9]. The emotions they absorb are likely to stay with them for relatively long periods, shaping their 'emotional attitude' and determining whether they will respond to events with fear or trust, thus amplifying their positive or negative impact.

The emotional states of the mother and the metabolic and physiological changes they involve cause changes in the child's brain, which are antecedent to the development of psychological functions. For instance, a mother's positive emotions have been found to support neurogenesis[10] and traumatic experiences to inhibit it and cause neural atrophy of the hippocampus and prefrontal cortex, synapse dysfunction, neural plasticity disorders and other developmental problems. Strong anxiety increases cortisol concentration in amniotic fluid, exposing a child to developmental cognitive and language problems[11]. Child-mother bonding in the

6 Bowman, Arany and Wolfgang, 2021, pp. 1455–1486.
7 Thomason, 2020, pp. 40–50; Institute of Medicine and National Research Council, 2015; Springen, 2010, p. 15.
8 Evertz et al., 2021.
9 Kornas-Biela, 2004.
10 Emanuelle, 2011.
11 Glover et al., 2009, pp. 430–435; Laplante et al., 2008, pp. 1063–1072.

prenatal period has been studied in terms of integrating genes, brain, behaviour, and environment.[12]

5. The Newborn and Its Preadaptation to Social Contacts

The period of infancy extends between birth and the end of the first year of an infant's life. The neonatal period spanning the first 6 to 8 weeks is considered to have special importance for the child's development.

A newborn has an innately determined sensitivity to stimuli from people that preadapts it to social contacts[13]. It is most attracted to visually complex objects with distinct contours, such as the human face delineated by the hairline and the jawline, moving approximately 20 to 30 cm from its eyes, which is a typical distance between the faces of newborn and mother during feeding.

A newborn is also innately provided with behavioural patterns (crying, smiling, clinging, etc.) for interacting with the caregiver(s), distinguishes a human voice from other sounds and the voices of its caregivers from voices it did not hear prenatally, and reacts more strongly to the language(s) that it heard before its birth[14].

The newborn period is the time when an infant becomes capable of living outside of the mother's body as an individual entity. Its first activities, which are still innately determined, include states of arousal (ranging from deep sleep to active wakefulness[15]), rhythms (e.g. sleep-wake cycles, etc., representing the early temporal organisation of behaviours) and reflexes (some of which, such as seeking the mother's breast, have an adaptive purpose, while others, e.g. the swimming reflex disappearing by 6 months of age to be replaced by leg-arm coordination necessary for an infant to be able to sit up, precede the development of more advanced abilities). Of special importance are pre-organised innate behaviours, such as looking, sucking and crying that are activated at birth, as they enable a newborn to meet its various needs (for instance, sucking is a way to get food, explore the world, form bond with the mother, and self-soothe)[16].

A newborn can express basic emotions, including curiosity, disgust and anxiety, which at this stage of development are still generated by its inner states (physical discomfort, arousal, pain, or tension). The state of general arousal gradually evolves and reacts differently to positive and negative stimuli. The innate mechanisms enable first social interactions, such as interactive synchrony between infant and mother or the infant attuning its mood to the mood of other people.

12 Esposito et al., 2017, pp. 87–89.
13 Vasta et al., 2004.
14 Ibid.
15 Wolff, 1966.
16 Vasta et al., 2004.

6. The Direction of Changes in Motor, Perceptual And Cognitive Skills in the Period of Infancy

In the first year of life, developing motor and perceptual skills and early mental processes utilising sensorimotor data[17] create a basis that will make it possible for an infant to form a bond and communicate with the caregiver(s), develop social referencing skills, and create its own image of the social and physical contexts of the world.

6.1. Motor Skills

The development of the infant's motor skills is reflected in its increasing ability to change the body's position and ways of locomotion (gross motor skills) and related improvement of manipulative skills (fine motor skills).

6.1.1. From the Foetal Position to Independent Locomotion

Muscle tension control improved in the first weeks of life enables an infant to transition from the foetal position to early motor activities. A 2-3-month old infant can raise the head and hold it lifted for some time. The ability to lift the head and arms is a precondition for an infant being able to roll over from back to side at the age of 3-4 months. The improving control of the upper torso enables a 5-6-month old infant to roll over from the back to the stomach. At the age of 6-7 months, an infant makes its first attempts at locomotion (crawling) and changing the body position (sitting up). The ability to lift the body up leads to crawling, followed by sitting up unassisted at the age of 8-9 months. At around 9 months of age, an infant can stand when held by both hands, and a 10-month old stands up on its own when gripping the crib's railing. The first attempts at locomotion are made towards the end of the first year of life.

6.1.2. The Development of Manipulative Skills

Innate reflexes, such as the 'monkey grip' and reaching out to light go away by around 3 months of age. Between months 4 and 5, reaching for an object becomes a purposeful and eye-controlled action. The increasing precision of hand movements enables various forms of gripping. Between the ages of 5-6 months and 8-9 months, simple covering of an object with the hand develops into the ability to grip small objects between the thumb and index finger (the pincer grip).

The coordination of reaching and grasping skills gradually improves: a 5-6-month old child lets go of one object in order to reach for another, passes an object from one hand to the other to reach for yet another, and opens the hand to grasp an object before it can actually do it. Around the end of the first year of life, an infant manipulates objects with the hands, using them in the same way regardless of their structure or purpose (taps, rolls, throws).

17 Piaget, 1952.

6.2. Early Forms of Perception

New-borns are near-sighted and best see objects that are close to their eyes. At the age of 3 months, peripheral vision appears and evolves into stereoscopic in 3-4 month olds, enabling the development of depth perception.

An infant's perception of the world becomes increasingly complex and multisensory. At the age of 2 months, an infant stops seeing objects as points and contours, and starts to see them as groups of objects and discerns their organisation. For instance, a 7-week-old newborn looking at a human face is more interested in its elements, particularly the eyes, than the contours.

Along with developing motor skills (position, posture and grip changes), visual perception improves. A 4-5-month-old infant's images of people and objects stabilise, enabling it to recognise them regardless of changes in distance, lighting, shape, or colour. At the age of 7-8 months, an infant identifies objects that are moving, have been displaced, or are partly hidden, and an 8-10-month-old perceives and locates objects in space. The increasingly complex visual image of the world integrates with images generated by other senses, creating a basis for multimodal recognition of objects (intermodal transfer)[18].

6.3. Early Forms of Thinking[19]

An infant's thinking is a sensorimotor thinking, thinking in action, consisting in manipulating objects to attain some goal[20]. The first weeks of innately determined adaptation lead to an infant starting to perceive itself as physically separate from its environment at the age of 2 months and concentrating its activities on its own body at the age of 1-4 months, with the activities being more interesting than their object. This stage of development also marks the beginning of purposeful activity. Spontaneous activity is a goal in itself, and to achieve it, an infant performs sequences of movements or continues an accidental activity, such as repeating sounds (*cooing*).

At the age of 4-8 months, an infant's focus of activity moves to its surroundings. Having made a random discovery that shaking a rattle or pressing a key produces a sound or light, an infant intentionally continues to rattle and press to enjoy the effect of its activity. Only then does it realise the action-effect relationship (which introduces it to the concept of causality). Yet, an object is real for an infant as long as it plays with it, so when it disappears, an infant quickly stops looking for it.

The understanding of object permanence only appears at the age of 8 months, as an infant becomes capable of integrating its actions (reaching, grasping, manipulating) and sensory information based on visual memory and hand-eye coordination.

18 Vasta et al., 2004.

19 Infancy spans four of the six stages of the Piaget's sensorimotor period (years 0-2): reflexive (months 0-1), primary circular reactions (months 1-4), secondary circular reactions (months 4-8), and coordination of secondary schemes (months 8-12). See: Vasta et al., 2004, pp. 270–275.

20 Piaget and Inhelder, 1962.

From this time on, an infant knows that an object exists even if it is not present and attempts to find it when it is not visible[21].

The activities of an infant start to show intentionality when it is 8-12 months old. At this age, actions become goal-oriented, and an infant can distinguish between means and ends and can coordinate both aspects. For instance, it realises that in order to get the toy it is interested in (ends), it needs to remove the obstacle on the way to it (means), and consequently, it integrates both actions.

The evolution of motor, perceptual and cognitive skills is associated with an infant developing a close bond with the mother and communication and emotional referencing skills[22]. The skills underlie its ability to build safe relationships, social learning and active exploration of the world. As research has pointed out, there is an association between brain development and the social experiences of an individual[23].

7. First Social Interactions as a Source of Personal Development: Communication, Emotional Referencing, and Interpretations

7.1. The Prelinguistic Stage of Speech Development

The first sounds produced by an infant are a test of its vocal apparatus. Crying and whining, which appear when an infant is 0-3 weeks old, represent its first attempts to communicate with the parents and turn into vocalisation, pseudocry, and cooing by the age of 4-5 months. An infant's discovery that it can make sounds leads to babbling, i.e., the intentional imitation of human speech that starts with repeating single syllables at the age of 6-7 months and turns into sequences of syllables imitating the melody of the caregiver's speech, such as 'ma-ma-ma', by the age of 8 months. A 10-month-old infant repeats the sounds it hears, and distinguishes words uttered by its caregiver. At around 1 year of age, most infants pronounce their first words and understand what is being said to them. When it comes to verbal communication, the ability to read the non-verbal components of a caregiver's messages, such as facial expressions or touch, emerges. The caregiver's and infant's shared focus on objects (e.g. a toy) precedes the development of referential communication enhanced by gestures that are gradually replaced by words.

7.2. Emotions Expressed, Experienced and Recognised by an Infant

The earliest emotions of infants are innately determined[24]: a 3-week-old newborn smiles to the mother's voice, and a 2-month old infant smiles back on seeing her smile. At month 3, it smiles spontaneously and reacts with energetic body movements to the caregiver's voice. The range of its emotions gradually increases. A 3-4-month old

21 Ryu et al., 2017.
22 Anderson et al., 2013, pp. 1–17.
23 McCall and Singer, 2012, pp. 681–688.
24 Rosenblum, Dayton and Muzik, 2009, pp. 80–103.

infant communicates negative emotions, such as anger, sadness and anxiety, and recognises them in others without yet understanding their meaning. In the second half-year of life, the range of positive emotions expressed by an infant expands. It smiles when smiled at, provokes a smile in others, distinguishes facial expressions, and reacts differently to familiar and unfamiliar people. It can also anticipate the course of some routines (e.g. nursing), and reacts with anger, reserve and surprise to express disappointment when its anticipation proves to be wrong.

In the third quarter of the first year of life, an infant starts experiencing emotions related to its active role in social interactions. It distinguishes familiar faces from unfamiliar ones and shows interest in other people's emotions and reactions that provide guidance for it on how to behave (for instance, the mother's smile is an encouragement to proceed with an activity). Its behaviour has a regulatory effect too. Using facial expressions and verbalisation, it reveals its emotions and demands meeting its needs, e.g. such as passing a toy that is out of its reach. It also attempts to draw others' attention, to elicit reaction by repeating activities that make people smile, e.g. by mimicking their facial expressions. The way of expressing positive and negative emotions becomes increasingly different. The development of memory changes the nature of sadness or anxiety. An infant may already feel them by merely anticipating the occurrence of something unpleasant, like the caregiver leaving it alone, without such an event actually taking place.

At 8-9 months of age, an infant starts demonstrating strong interest in its permanent caregiver. New situations, especially the presence of unfamiliar people, cause it to show anxiety, reserve, and ambivalent emotions of varying intensity. At the same time, it demonstrates increasing interest in other people's emotions and interpreting them. Towards the end of the first year of life, an infant shows its first social behaviours: it tries to imitate others' emotions, comforts others, shows empathy, and understands the difference between its own and others' emotional states[25].

7.3. The Beginning of Shared Understanding of Situations and Acting Together

In order to better understand how the child and the mother build their common space of meanings and actions (intersubjectivity), the way they develop their relationship[26] needs to be considered in terms of how their activities involving people and objects integrate[27]. The transformation of their common space has been divided into four stages:

7.3.1. Encounter: From Contact to Interaction (0-1 month of age)

The pattern of child-mother interactions is established in the first month after birth based on the child's innate rhythms and the mother's reactions to their temporal organisation. It marks the beginning of a certain kind of a dialogue, where the child is

25 Boyd and Bee, 2019.
26 Schaffer, 1995, pp. 89–123; Schaffer, 2004.
27 Trevarthen and Hubbley, 1978, pp. 183–229.

given a leading role while the mother caters for its needs, observes the sucking cycle, and tries to interpret its cues (such as turning the head away).

7.3.2. The Establishment of a Joint Field of Attention and Action (2-5 months of age).
The earliest exchanges between the child and the mother, enabling them to initiate and maintain contact, take place when their faces are close together, for instance, when the mother is leaning over the child or holding it in her arms, etc. Having intercepted her child's spontaneous attention to an object, the mother initiates an interaction, allowing her to be led and regulated by the child. In this way, a joint field of attention is created[28], which the mother expands by commenting on the object.

7.3.3. Topic Sharing (5-8 months of age)
A mother who has previously attempted to catch the infant's spontaneous gaze now intentionally chooses an object and builds their interaction around it. To engage the child in interaction and attract its attention, she first uses non-verbal methods (showing, demonstrating and pointing) and gradually replaces them with verbal methods (describing, asking questions, giving tips, naming)[29]. This leads to the emergence at around month 5 of the 'me-you' and 'you-me' roles based on complementarity and reciprocity of exchanges. Encounters are initiated and ended by an infant (for instance, by gazing at an object and looking away from it, respectively), but it is the mother who turns them into quasi-dialogues, as she knows the object of the child's interest and can anticipate its actions. By harmonising their activities, the mother and the child create a basis for building a common space of meanings together. *An early form of dialogue appears when interactions with the mother cause the child to realise that his actions cause her to react in the expected way.* The ability of a 7-month-old infant to distinguish between adults who are 'useless' and 'useful' as play partners suggests that it is able to compare current and past situations and is aware that strangers are of not much use as they will not understand its cues[30]. At the age of around 8 months, an infant communicates using gestures and signs and understands them as they are conventionally understood. Marc T. Bornstein[31] has distinguished two types of infant-parent interactions based on their purpose and manner of initiation: a) interactions intended to attract an infant's attention and engage it into an exchange through rocking, kissing, cuddling, non-verbal vocalisation, etc.; b) interactions making use of various activities to expand an infant's scope of activity, which initially aim at shifting its attention from humans to objects so that it could observe, interpret and imitate.

28 Peacocke, 2005, 298–324.
29 Brzezińska, 2000.
30 Cole and Cole, 1989.
31 Bornstein, 2014, pp. 197–214.

7.3.4. Topic-Maintenance: Person-Object Integration (8-12 months of age)

In the last quarter of the first year of life, an infant actively coordinates its interaction with another person by referring to objects, follows the person's gaze, takes some responsibility for sharing a topic, and uses gestures to signal that it is ready to share a topic, which initiate or sustain interaction. As the asymmetry of contributions to an interaction decreases, pseudo-dialogue becomes a two-way communication relationship marking the beginning of the joint development of future interactions. Both labelling and words are used in this process. The appearance of intentionality and fluent succession of exchanges marks the onset of secondary intersubjectivity, which is understood as a shared understanding of an object of attention and common references that, as a basis of communication, link the understanding of a situation by its participants. A child learns that its reactions have a communicative value and adjusts its behaviours to others' reactions. The sequences of its actions become more and more intentional as it starts monitoring and modifying them according to anticipated goals and outcomes. By interpreting situations and their own and the child's actions, adults help a child make associations between the known and the new that create a framework for it to interpret new events and organise actions in new situations.

8. The Emergence of Attachment and Trust: The Stages of Attachment

Developing an attachment to the caregiver is an evolutionary and biologically determined need of every infant. Attachment is defined as a deep, long-lasting affective bond to an attachment figure, usually the mother, which increases the infant's odds of survival and gives it a sense of security and psychological comfort[32]. An attached child seeks closeness and contact with the caregiver when anxious, sick, or tired.

The behaviour of the attachment figure, its presence and the intimacy shown to the child have a significant effect on the child's psychological and physical development. According to Erik H. Erikson's psychosocial theory of development, the first 12 months of a child's life are the period when it can form basic trust in oneself, people, and the world or a relatively enduring sense of distrust in oneself and others[33]. Basic trust determines the ability to trust others and a feeling of being safe, translating into a sense of self-confidence, of being accepted, continuity, stability and predictability of the world seen as an interesting place to explore and offering opportunities to meet one's needs. These beliefs constitute a central element of human personality[34]. Infants start to develop trust in the first months of their life as a result of their first experiences and interactions with caregivers. Trust is the backbone of the attachment system[35], with its development being mainly shaped by the mother. The level of trust a

32 Bowlby, 1969; Thompson, 2002, pp. 164–172.
33 Erikson, 1963.
34 Gagliardi, 2021, pp. 1–22.
35 Mikulincer and Shaver, 2003, pp. 53–152.

child will be able to attain later in life is determined by the quality of its bond with the mother, which depends not only on her ability and commitment to meeting her child's needs (both physical and psychological), but also on how she perceives the child and herself and on her vision of maternity.

There is a close relationship between the development of attachment and the child's improving motor, cognitive, emotional and social skills (for their prenatal origins, see section 4). John Bowlby has divided the evolution of child-caregiver attachment into four stages, the first three of which take place or begin during the first year of the child's life[36]. The stages illustrate how a child moves from communicating its needs through preadaptive mechanisms to closeness-building exchanges with the caregiver, intentional regulation of behaviour, and early signs of self-regulation[37].

8.1. Pre-Attachment Phase (from birth to 6-8 weeks)

An infant is preadapted to react to signals sent by people, tunes in to them, shares others' emotions, and sends its own signals without yet choosing their recipients. Its relationship with the mother (the attachment figure) is based on an innate mechanism known as interactive synchrony. The responsibility for developing the relationship rests with the mother, who 'reads' her child's signals, stabilises it physiologically and emotionally, and works out care standards and routines.

8.2. Early Attachment (from weeks 6-8 to months 6-8)

Almost from the day they are born, many infants have one caregiver or receive occasional care from few people. Initially, an infant relates similarly to other people but, as months pass, it begins to distinguish its attachment figure(s) to whom it sends cues and attaches itself to from others, probably based on signals from developing smell and vision organs. When there are several attachment figures, an infant chooses one, usually the mother (who becomes the principal attachment figure), exhibiting anxiety in the presence of strangers.

An infant takes some control of interactions, by initiating contacts and showing purposeful behaviour. The caregiver's role is to stimulate and regulate the level of its arousal so that it could learn to self-regulate its emotions.

8.3. Clear-Cut Attachment (from 6–8 months to 18–24 months)

In this period of life, an infant develops new forms of attachment behaviour, enabling it to actively maintain closeness to the mother (see the developmental characteristics of a child, section 4) and resulting in the creation of its attachment pattern. It controls the level of closeness with the mother using verbal and non-verbal communication, tries to keep as close to her as possible, and shows separation anxiety when she goes away. A mother is 'a safe haven' for a child, from which it can explore the world when it feels safe, has an appropriate level of developmental skills (locomotion skills,

36 Bowlby, 1969; Marvin et al., 2016.
37 Czub, 2005; George, 2014, pp. 97–110.

integrated perception of the nearest environment, and the realisation of object permanence), and, importantly, believes in having an adult's support when needed[38] and self-confidence[39]. A mother has a special responsibility for regulating a child's arousal during activities and monitoring the emergence of self-regulatory processes, including adjusting to situations, controlling reactions, and expressing emotions.

Based on early experiences from interactions with the caregiver internalised by a child, internal working models are created, i.e. life-long affective and cognitive matrices guiding the formation of the child's future relationships with other people[40].

Attachment is considered as a subcategory of a wider process – the development of internal operational models[41] – within which humans interpret their experiences and construct beliefs about themselves and the world.

9. Attachment Styles

An infant's attachment is a special, deep and enduring bond connecting the infant with the mother. The first study on child-primary caregiver attachment and the role of first experiences is credited to Mary Ainsworth[42], who used the standardised *Strange Situation Procedure* to investigate the nature of the attachment of one-year old children to their mother. In their experiment, children and mothers were allowed to spend some time together in an unfamiliar environment, after which mothers were replaced by strangers to return after a time. As a result, children were exposed to the operation of three mild stressors: an unfamiliar environment, the presence of a stranger, and separation from the mother. The determination of attachment patterns was based on how children reacted to separation and reunion with their mother. The type of reaction was taken as a measure of their trust in the availability of the attachment figure, corresponding to their sense of security. The experiment led Ainsworth et al. to put forward three attachment styles: one secure (trustful) and two non-secure (anxious-ambivalent and anxious-avoidant). In 1990, Mary Main and Judith Solomon proposed a fourth attachment style that they called disorganised (fearful) attachment. The four styles provide an insight into the development of an infant-mother relationship and reliably predict the quality of relationships children will establish in the future.

9.1. Secure Attachment

Securely attached children willingly explore unfamiliar surroundings in the presence of their mother. When the mother goes away and a stranger appears, they show anxiety, cry, and stop to play. After she returns, they want to be close to her and quickly calm down, showing renewed interest in exploring their environment.

38 Grossmann et al., 2008, pp. 857–879.
39 Cassidy, 2008, pp. 3–22; Sroufe et al., 2005.
40 Bowlby, 1969.
41 Epstein, 1991, pp. 111–137.
42 Ainsworth et al., 1978.

A securely attached child clearly and readily communicates its needs, expresses emotions, and seeks comfort and assistance, preferring the assistance of their parents. The belief that the parent is available and ready to attend to their needs increases the child's trust that it will be so in the future. Compared to insecure children, the securely attached ones are more comfortable with themselves, more easily interact with others and solve problems, and are more self-confident and independent[43]. They also tend to develop more open and flexible emotional expression, show a high level of positive emotions[44], and give positive attributions to people and events, which encourages them to explore their surroundings single-handed[45].

For a child to form secure attachment, the parent's sensitive responsiveness, including their approach to parenthood – perceiving the child as worthy of care and the ability to aptly recognise and respond to the child's needs, emotional states and cues – are crucial. Equally important are the enhancement of the child's sense of importance and belief that its needs will be met.[46]

A securely attached child has a mutually satisfying relationship with the caregiver, integrating their activities and emotions[47]. The reciprocal regulation patterns they establish have a soothing effect on the child's excessive arousal, thus helping the child to develop the ability to self-regulate and control its anxiety and negative emotions.

9.2. Anxious-Ambivalent Attachment

Anxious-ambivalent children exhibit separation anxiety when separated from their mother, and both seek and avoid contact with them when they return (an approach and avoidance reaction). This attachment pattern characterises children who perceive their mother or other attachment figures as psychologically unavailable. The unavailability should be understood as not noticing or ignoring the child's needs, reluctance to initiate and maintain contact, inadequate reactions (e.g. responding with anger to a child showing fear), or inconsistent reactions to similar situations. Anxious-ambivalent children are uncertain about whether their caregiver will be available and what can be expected of them and show contradictory behaviours and emotions when separated from the caregiver: they simultaneously seek contact (longing), reject (anger), and cling (fear) to the caregiver in fear that they might be separated again.

The parents of anxious-ambivalent children are disoriented and frustrated caregivers, full of contradictions, with a strong sense of guilt[48]. In response to the parents' unpredictable behaviours and reactions inadequate to their states and needs, children develop a tendency to react situationally and manipulate others' emotions for their own benefit.

43 Ainsworth et al., 1978; Sroufe, Fox and Pancake, 1983, pp. 1615–1627.
44 Kochańska, 2001, pp. 474–490.
45 Cassidy, 2008, pp. 3–22; Sroufe et al., 2005.
46 George and Solomon 2008, pp. 833–856.
47 Bowlby, 1988; Grossmann et al., 2008, pp. 857–879.
48 George and Solomon 2008, pp. 833–856.

The parents of anxious-ambivalent children lack sensitivity to their emotional states and concentrate more on activities during interactions than on building intimacy. The anger and separation anxiety the children feel keep them close to the caregiver, which limits the range of their explorations and influences their *developmental characteristics*. The caregivers' tendency to dominate interactions suppresses the children's autonomy and ability to freely explore their surroundings. The inability to predict how the caregiver may react to their activities erodes anxious-ambivalent children's self-confidence[49], leads to the changeability of their moods, and makes them give contradictory attributions to events and intentions.

9.3. Anxious-Avoidant Attachment

Anxious-avoidant children seemingly do not care about the presence or absence of their mother. They do not protest when their mother goes away, continue to explore their surroundings, initiate contact with unfamiliar persons, and ask for help when they need it. They do not notice their mother's return and sometimes look away when they come up.

Anxious-avoidant attachment typifies children whose attachment figures are emotionally or physically distant (either outright reject children or punish them for trying to interact) or only pretend to be available (stay at a distance during interactions). Anxious-avoidant children, too, show some independence from their attachment figure: they avoid close contact, do not ask for help when they are in trouble, and when the caregiver becomes more distant, they focus on their activities to relieve anxiety and anger[50]. Anxious-avoidant attachment is ambiguous in that a child stays close enough to the caregiver for their needs to be met but not so close as to experience rejection. Lacking emotional contact with the caregiver, anxious-avoidant children focus on activities that they perform on their own or together with the caregiver. It is thought that they tend to see themselves as unworthy of attention, acceptance and love, and that they tend to doubt whether their caregivers will be there to support and help them in need.[51] Mothers may inadequately respond to their children's needs for various reasons. These may be their self-centeredness, unsatisfying contact with the child, indifference to its needs or to meeting them properly because of maternal immaturity, or objective causes, such as health problems or personal life difficulties. Mothers' distancing from children and avoiding closeness with them can also be a way to make children meet their high expectations. While caregivers of children with an ambivalent attachment style are inconsistent – sometimes available and sometimes too distant – caregivers of children with an avoidant attachment style often ignore the child's emotions and are distant and cold.

49 Ainsworth et al., 1978.
50 Main and Solomon, 1990, pp. 121–160; George and Solomon 2008, pp. 833–856.
51 Ainsworth et al., 1978.

9.4. Disoriented-Disorganised Attachment

Children with this type of attachment behaviour *ambivalently react* to their mother's departure and return, seeking closeness with them and avoiding it at the same time (they run up to mothers and instantaneously pull away, or even run away). In these children, the natural need to be close to the parent conflicts with their feeling of being neglected and denied care and comfort when they needed it[52]. These children's attitude towards their attachment figure is ambivalent: they are constantly vigilant, want to control everything, and tensely wait to see how things will play out, have fits of anger, and cry. They also tend to view the mother and the surroundings as threatening and unpredictable[53].

Disoriented-disorganised children are unable to develop a strategy for communicating their needs and establishing closeness to the mother and awkwardly seek protection and care to have at least some sense of security[54]. In extreme cases, such as when the mother is emotionally unavailable, harms the child, or struggles with problems disorganising childcare[55], the childcare process becomes unpredictable. This unpredictability prevents the child from developing a consistent pattern of attachment behaviour, disturbs their image of themselves and other people, and causes them to assign to relationships fearful attributions of varying intensity, which is accompanied by a narrowed understanding of their emotional states and volatile expression of emotions[56].

Sometimes a caregiver does not meet the typical or expected behavioural patterns in their relationship with a child. An atypical caregiver may respond inappropriately or unpredictably in situations requiring emotional support, may have mental health issues and difficulties in adequately addressing the child's needs, lack experience, and be uncertain in providing adequate care. They may also use parenting methods that differ from commonly accepted social norms. Atypical caregivers may influence the development of attachment in children, potentially leading to various attachment styles, including anxious or avoidant ones.

As well as constituting an enduring, relational framework for the affective, cognitive and social development of a child, attachment patterns also influence the nature and quality of relationships it will have with the world as an adult[57].

10. Summary

New-borns are preadapted to be sensitive to various forms of stimulation from people and actively seek to be stimulated. Biological changes in the prenatal period enable a

52 George and Solomon 2008, pp. 833–856.
53 Dozier and Bernard 2017; Main and Solomon, 1990, pp. 121–160.
54 Solomon and George 2011, pp. 3–24.
55 Ainsworth et al., 1978.
56 Czub, 2005.
57 Crittenden and Spieker, 2019, pp. 122–130.

foetus's motor and sensory activity, which marks the beginning of psychological life and bonding with the mother.

In the first year of their lives, infants gain:

- control over an increasingly wide range of motor and perceptual skills;
- the ability to think in action and stabilise their image of the world of people and objects;
- the ability to communicate pre-verbally, respond emotionally and read emotional references;
- the ability to build close relationships and interact with caregivers.

Infants' experiences from their interactions determine their level of trust and emotional attachment to the caregiver (secure attachment, anxious-ambivalent attachment, anxious-avoidant attachment, disoriented-disorganised attachment). The quality of an infant's attachment to the caregiver determines the nature of its exploratory activities and the beginning of self-regulation.

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